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EFFECT OF IRRIGATION FREQUENCY AND POTASSIUM SOURCE ON GROWTH, YIELD AND QUALITY OF GARLIC

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Keywords: *garlic, irrigation frequency, potassium source, growth, yield, quality and storability*

ABSTRACT

Two field experiments were conducted during the winter season of 2006/2007 and 2007/2008 at the experimental farm of the faculty of agriculture, Tanta university. The objective of this study was to investigate the effect of irrigation frequency i.e. irrigation once every 10, 15, 20 and 25 days intervals and potassium source i.e. K_2So_4 and Kcl. on water application, water distribution, water use efficiency, vegetative growth, yield and quality of garlic (clone sids-40).
Results indicated that irrigation once every 15 days then every 20 days were superior and significantly increased water application, water distribution, water use efficiency, plant height, leaves number, leaves fresh weight, yield and its components as well as bulb diameter, bulb weight, volatile oils in bulbs and carbohydrate content of bulbs. Application of K_2So_4 fertilizer was more beneficial than Kcl fertilizer it exerted increases in vegetative growth characters. Moreover, markedly increased total yield and yield components with K_2So_4 fertilizer. The study recommended that irrigation once every 15 days then every 20 days and using K_2So_4 fertilizer gives best results under such conditions.

INTRODUCTION

Garlic is the foremost alliaceous vegetable plant, and one of main vegetable crops in Egypt. It has been used for flavoring, soup, sausages and salads, in addition to its medical value. The increase in yield and improving bulb quality of garlic is usually dependent on many factors that influence the plant growth throughout the growth period, improving agricultural treatments especially application of optimal source of potassium fertilizer and the amount of available soil moisture especially the problem now is finding ways by which available water could be economically utilized.
Many investigators found a direct relationship between yield and its components of bulb crops and available moisture at the time of irrigation [1, 2, 3, 4] on garlic. Potassium element is very important in overall metabolism of plant enzymes activity, it was found to serve a vital role in photosynthesis by direct increasing in growth. Also, potassium has a beneficial effect on water consumption [5, 6]. Furthermore, many plant species including garlic were differing in growth and yields when supplied with either K_2So_4 or KCl as sole source of potassium [7, 8, 9, 10].
Thus, this study was planned to evaluate the effect of irrigation frequency and K-sources on the water relations, growth, yield and quality of garlic plants.

MATERIALS AND METHODS

Two field experiments were carried out during the winter seasons of 2006/2007 and 2007/2008 at the experimental farm of the faculty of agriculture, Tanta university. The experimental field soil was clay loam in texture with pH 7.7. Each experiment included 8 treatments which were the combinations of four irrigation intervals and two sources of potassium as follows:

A. Irrigation intervals:
1- Irrigation every 10 days by intervals (the plant received 15 irrigations during the growing season).
2- Irrigation every 15 days by intervals (the plant received 10 irrigations).
3- Irrigation every 20 days by intervals (the plant received 7 irrigations).
4- Irrigation every 25 days by intervals (the plant received 6 irrigations).

B. Potassium sources:
1- Potassium sulphate (K_2So_4).
2- Potassium chloride (KCl).

The irrigation treatments began after 30 days from planting. All treatments received equal amounts of water at the first irrigation. Representative soil samples were randomly taken on regular basis before each irrigation time from 5 plots for every irrigation treatment to determine the soil moisture at irrigation as percent of field capacity. A modified furrow irrigation system was used through siphon tubes to regulate the rate of water flow and to calculate the quantity of water applied for each plot. The quantity of water applied for each experimental plot was calculated using the following equation mentioned by [11].

$$Q = \frac{Ca \cdot A \cdot \sqrt{2gh}}{1}$$

Where: Q = the quantity of water applied in $m^3.s^{-1}$, *Ca* = coefficient of discharge (0.6), $A = (\pi d^2/4)$ where π = equal to 3.14, d^2 = radius square for the

siphon tube, g = the gravity equal to 9.81 $m.s^{-2}$ and h = the head of water in the main irrigation canal in m.

The soil moisture at irrigation time as percent of field capacity and total quantity of applied water calculated for each irrigation treatments are shown in Table 1.

Irrigation intervals/ (day)	Soil moisture at irrigation (percent of field capacity)			Quantity of water (m3.fed.-1)		
	2006/2007 Season	2007/2008 Season	Mean	2006/2007 Season	2007/2008 Season	Mean
10	76.12	75.90	76.01	2819	2637	2728
15	69.25	70.84	70.04	2590	2438	2514
20	62.20	63.70	62.95	2498	2348	2423
25	56.60	59.7	58.15	2703	2567	2635

Table 1. The soil moisture at irrigation time as percent of field capacity and total quantity of applied water

Cloves of garlic (clone sids-40) were sown on October 7th and 8th in 2006 and 2007 seasons, respectively. Sowing was on both sides of ridges and the experimental layout was split-plot with four replications. Irrigation treatments were randomly distributed in the main plots whereas; potassium sources treatments were in the sub-plots. Each sub-plot consisted of 6 ridges, 4 m long, 0.6 m width and inter-ridge spacing was 0.07 m, sub-plot area was 14.4 m^2 and the data were recorded as follows:

- Soil water distribution and efficiencies:

The water application efficiency (E_a), the water distribution efficiency (E_d) and the water use efficiency (WUE) were determined for each treatment according to [12] as follows:

- *Application efficiency:*

$$E_a = \frac{(w_s/w_f)(100)}{2}$$

Where: E_a = water application efficiency in %, w_s = stored water within irrigation in mm and w_f = depth of added water to the irrigated area in mm.

- *Water distribution efficiency:*

$$E_d = \frac{[1 - s/d]\ (100)}{3}$$

Where: E_d = water distribution efficiency in %, s = average numerical deviation from d, in mm and d = average of soil water depth stored along the furrow during the irrigation in mm.

- *Water use efficiency:*

$$WUE = \frac{(Y_i/w_a)}{4}$$

Where: Y_i = total seed yield in kg/fed., and w_a = total applied water in m^3/fed.

- Vegetative growth:

Randomly 10 plants were selected from each treatment. At 145 days after planting for measuring the vegetative growth measurements expressed as plant height, number of leaves, weight fresh of leaves and leaves dry weight.

- Yield and its components:

At harvest time (190 days after sowing), all plants of each treatment were harvested and the total yield per feddan was calculated after curing for 7 days. Also, a random sample (10 bulbs) was taken from each treatment to determine bulb weight, bulb diameter and number of cloves per bulb.

- Chemical constituents:

The chemical constituents of garlic plants as total nitrogen, phosphorus, potassium and total hydrolysable carbohydrates in dry matter of bulbs were determined following to Association of Official Analytical Chemists International [13] Also, volatile oils were determined in fresh samples.

RESULTS AND DISCUSSION

1- Water application and distribution efficiencies:

Both treatments, irrigation every 15 and every 20 days by intervals reflected the highest value of water application efficiency and water distribution efficiency during the growing seasons (Fig. 1). The highest values of water application efficiency were 75.48 and 74.20% at 15 and 20 days intervals, respectively. On the other hand, the highest values of water distribution efficiency were 78.86 and 75.25% at 15 and 20 days intervals, respectively.

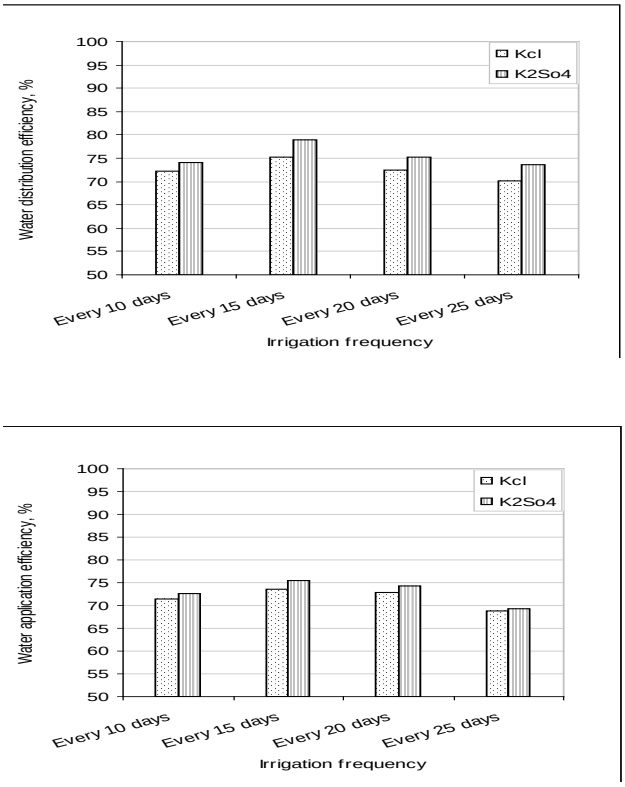

Fig. 1. The effect of irrigation intervals on the water application and water distribution efficiencies

2- Vegetative growth:

Data presented in Table 2 show the effect of different sources of potassium on vegetative growth of garlic. In this respect, plant height, number of leaves per plant, leaves fresh weight and leaves dry weight were increased with K_2So_4 than those with KCl. These results suggest that chloride ions toxicity might be inhibited photosynthesis process and hence limited plant growth with KCl as previously [8]. Who indicated that garlic plants were reacted adversely to excessive increase of KCl by exhibiting toxicity symptoms and by growing less than that with K_2So_4. Also, sulphur (So_4) is one of many elements required for plant growth, it is important in the formation of protein and chlorophylls. In addition, sulphur was found to improve soil structure and to increase water penetration and availability of nutrients under garlic plants [14, 15]. These results are agreement with those obtained by [16, 10]. Data in Table 2 show also that vegetative growth characters as plant height, number of leaves per plant, leaves fresh weight and leaves dry weight were significantly affected by irrigation frequency in both seasons. In this concern, irrigation every 15 days intervals then every 20 days reflected the highest values of all vegetative growth characters. Such increment effect of increasing the number of irrigation i.e. irrigation 10 times per season on vegetative growth characters may be due to both increasing the mobility of nutrients in the soil and consequently increased the minerals uptake by plant and increasing carbohydrates assimilation (Tables 4 and 5) which are necessary for different growth processes. The positive response to irrigation frequency were reported by [1, 3, 4, 17, 18, 19, 20] on garlic. The interaction effects between potassium source and irrigation frequency on plant height, number of leaves per plant, leaves fresh weight and leaves dry weight were significant in both seasons (Table 2). In general, plants fertilized with K_2So_4 and irrigation every 15 days intervals were very tall and had the highest number of leaves and highest values of leaves fresh weight and leaves dry weight in both seasons.

3- Yield and its components:

Yield and yield components like fresh weight and diameter of bulb, were affected by different sources of potassium. Results indicated that application of K_2So_4 was generally more effective than KCl in both seasons (Table 3 and Fig. 2). The highest values of all characters were obtained from application of K_2So_4 (yield was 8.225 and 7.964 ton/fed. in the first and second seasons, respectively). These results may be due to the favorable effect of So_4 ions on photosynthetic pigments formation and Carbohydrates assimilation diverted to the bulb filling and hence increasing yield. Conversely, Cl ions have a harmful effect on photosynthesis and translocation of carbohydrate from plant leaves to bulbs [8, 14]. These results are in harmony with those reported by [7, 10]. In Table (3), it is noticed that garlic total yield and its components except number of cloves per bulb were significantly affected by irrigation frequency in both seasons. In this respect, irrigation every 15 days and every 20 days by intervals recorded the highest values in the total yield (yield was 8.743 and 8.540 ton per fed. in the first and second seasons, respectively) and its components except number of cloves per bulb. From the previously mentioned results, it could be concluded that, the increase in total yield might be attributed to the increase in average bulb weight which in turn associated with the increase in the growth rate of garlic plants and nutrient, uptake. Similar positive responses of garlic plants were reported by [1, 3, 4, 19, 21, 22, 23, 24] on garlic. As for the interactional effect of potassium source and irrigation frequency, data in Table 3 show clearly that, there were significant interactions on total yield and its components except number of cloves per bulb. The highest values of yield and its components were obtained by using K_2So_4 and irrigation every 15 days intervals.

4- Chemical constituents:

Regarding the effect of potassium source on percentage of N, P and K in bulbs of garlic were ineffective but, application of

Second season 2007/2008				First season 2006/2007				Treatments
Leaves dry wt. (%)	Leaves fresh wt. (g)	No. of leaves/ plant	plant height (cm)	Leaves dry wt. (%)	Leaves fresh wt. (g)	No. of leaves/ plant	plant height (cm)	
								K Sources
13.03	28.07	8.31	66.63	14.03	29.27	8.57	67.91	Kcl
13.15	29.83	9.03	71.61	14.14	31.35	9.31	68.96	K2So4
								Irrigation treatments
13.01	28.63	8.76	69.43	13.99	29.60	9.10	71.92	Every 10 days
13.22	34.25	9.83	79.87	14.24	35.87	10.03	81.38	Every 15 days
13.10	28.67	8.83	71.37	14.07	30.28	9.16	72.53	Every 20 days
13.03	24.25	7.27	55.80	14.04	25.50	7.47	59.90	Every 25 days
0.184	0.804	0.2278	2.192	0.2754	0.9145	0.296		L.S.D. at 5%
								Interactions
13.00	27.83	8.20	67.10	13.97	29.13	8.74	69.93	Kcl + 10 days
13.01	29.43	9.32	71.77	14.02	30.07	9.47	73.90	K2So4 +10 days
13.05	32.97	9.39	76.67	14.11	34.33	9.58	78.03	Kcl + 15 days
13.39	35.53	10.28	83.07	14.37	37.40	10.48	84.73	K2So4+ 15 days
13.06	27.73	8.55	69.47	14.05	28.87	8.89	70.47	Kcl + 20 days
13.15	29.60	9.10	73.27	14.09	31.70	9.44	74.60	K2So4+ 20 days
13.01	23.73	7.12	53.27	14.01	24.77	7.09	57.40	Kcl + 25 days
13.06	24.77	7.42	58.33	14.07	26.23	7.85	62.40	K2So4+ 25 days
0.084	1.569	0.1883	2.611	0.157	1.356	0.404	2.259	L.S.D. at 5%

Table 2. Effect of irrigation frequency and potassium source on vegetative growth of garlic during 2006/2007 and 2007/2008 seasons

Second season 2007/2008						First season 2006/2007				Treatments
Water use efficiency (kg/m3)	Total yield (ton/fed.)	No. of cloves / bulb	Bulb diameter (cm)	Bulb fresh wt. (g)	Water use efficiency (kg/m3)	Total yield (ton/fed.)	No. of cloves / bulb	Bulb diameter (cm)	Bulb fresh wt. (g)	
										K Sources
3.123	7.817	22.67	5.76	71.92	3.031	8.053	21.40	5.94	74.92	Kcl
3.182	7.964	22.74	5.90	75.48	3.096	8.225	21.36	6.31	78.80	K2So4
										Irrigation treatments
3.021	7.970	22.68	5.58	71.12	2.865	8.078	21.53	6.31	74.40	Every 10 days
3.324	8.540	22.83	6.83	83.43	3.238	8.743	21.33	6.95	87.95	Every 15 days
3.274	8.025	22.73	5.82	73.85	3.174	8.293	21.49	6.02	77.13	Every 20 days
2.992	7.028	22.60	5.07	66.42	2.978	7.442	21.18	5.21	67.97	Every 25 days
	0.155	N.S	0.0446	2.272		0.134	N.S	0.889	2.83	L.S.D. at 5%
										Interactions
3.007	7.933	22.66	5.52	68.67	2.847	8.027	21.16	5.73	71.83	Kcl + 10 days
3.035	8.007	22.70	5.64	73.57	2.884	8.130	21.90	6.90	76.97	K2So4 + 10 days
3.289	8.450	22.78	6.76	81.53	3.201	8.643	21.50	6.92	85.43	Kcl + 15 days
3.359	8.630	22.89	6.91	85.33	3.275	8.843	21.16	6.99	90.47	K2So4+ 15 days
3.235	7.930	22.70	5.71	71.97	3.136	8.193	21.73	5.95	74.97	Kcl + 20 days
3.312	8.120	22.75	5.93	75.73	3.212	8.393	21.26	6.08	79.30	K2So4+ 20 days
2.962	6.957	22.55	5.05	65.53	2.941	7.350	21.23	5.17	67.47	Kcl + 25 days
3.023	7.100	22.64	5.10	67.30	3.015	7.533	21.13	5.25	68.47	K2So4+ 25 days
	0.103	N.S	0.1031	2.094		0.060	N.S	1.176	1.498	L.S.D. at 5%

Table 3. Effect of irrigation frequency and potassium source on yield, quality bulb and water use efficiency of garlic during 2006/2007 and 2007/2008 seasons

K_2So_4 fertilizer increased total carbohydrates and voliate oils in bulb compared with KCl fertilizer, in both seasons (Table 4). These results agree with those recorded by [9, 10].

Data in Table (4) indicated that total carbohydrates and voliate oils in bulb were significantly affected by irrigation frequency in both seasons. In this respect, irrigation every 15 days by intervals recorded the highest values. But, percentage of N, P and K in bulbs of garlic were insignificant in both seasons. The positive response irrigation frequency was reported by [1, 22]. The interactions between potassium source and irrigation frequency significantly affected total carbohydrates and voliate oils in bulb in both seasons. Plants fertilized with K_2So_4 and irrigation every 15 days intervals had highest values of total carbohydrates and voliate oils in bulb. The effect of all spraying treatments on percentage of N, P and K in bulbs of garlic were insignificant in both seasons (Table 4).

5- The water use efficiency:

Fig. (3) and Table (3) illustrated that the highest values of water use efficiency were at 15 and 20 days irrigation

Second season 2007/2008						First season 2006/2007				Treatments
Voliate oil (g/100g f.w.)	Total carbohyd-rates(mg /100g)	K (%)	P (%)	N (%)	Voliate oil (g/100g f.w.)	Total carbohyd-rates(mg /100g)	K (%)	P (%)	N (%)	
										K Sources
0.313	64.14	1.57	0.49	1.35	0.316	67.98	1.62	0.53	1.37	Kcl
0.394	66.64	1.59	0.50	1.36	0.395	69.53	1.64	0.55	1.39	K_2So_4
										Irrigation treatments
0.330	65.64	1.59	0.51	1.34	0.345	67.96	1.63	0.53	1.36	Every 10 days
0.413	74.08	1.66	0.56	1.40	0.423	76.38	1.71	0.60	1.44	Every 15 days
0.365	66.06	1.59	0.50	1.37	0.360	69.49	1.65	0.56	1.37	Every 20 days
0.307	55.76	1.47	0.43	1.30	0.293	61.22	1.54	0.47	1.35	Every 25 days
0.0446	1.877	N.S	N.S	N.S	0.019	1.591	N.S	N.S	N.S	L.S.D. at 5%
										Interactions
0.287	64.01	1.58	0.49	1.32	0.297	67.01	1.63	0.53	1.36	Kcl + 10 days
0.373	67.28	1.60	0.52	1.35	0.393	68.90	1.64	0.53	1.37	K_2So_4 + 10 days
0.370	73.25	1.65	0.55	1.40	0.370	75.90	1.69	0.59	1.43	Kcl + 15 days
0.457	74.92	1.67	0.56	1.41	0.477	76.85	1.72	0.61	1.45	K_2So_4+ 15 days
0.317	65.15	1.59	0.50	1.38	0.323	68.84	1.65	0.55	1.37	Kcl + 20 days
0.413	66.98	1.59	0.50	1.35	0.397	70.13	1.65	0.56	1.38	K_2So_4+ 20 days
0.280	54.14	1.46	0.42	1.29	0.273	60.18	1.53	0.46	1.34	Kcl + 25 days
0.333	57.39	1.48	0.43	1.31	0.313	62.25	1.55	0.49	1.36	K_2So_4+ 25 days
0.059	2.231	N.S	N.S	N.S	0.084	1.209	N.S	N.S	N.S	L.S.D. at 5%

Table 4. Effect of irrigation frequency and potassium source on chemical constituents of garlic bulbs during 2006/ 2007 and 2007/ 2008 seasons

intervals. These values were 3.48 and 3.33 kg.m^{-3} at 15 and 20 days irrigation intervals, respectively.

CONCLUSIONS

From the results of this study, it could be concluded that under such condition soil fertilization with K_2So_4 fertilizer and irrigation every 15 days then 20 days intervals being the superior treatment for producing the maximum garlic yield with the best storability and quality as well as the highest application, distribution and use efficiencies of irrigation water.

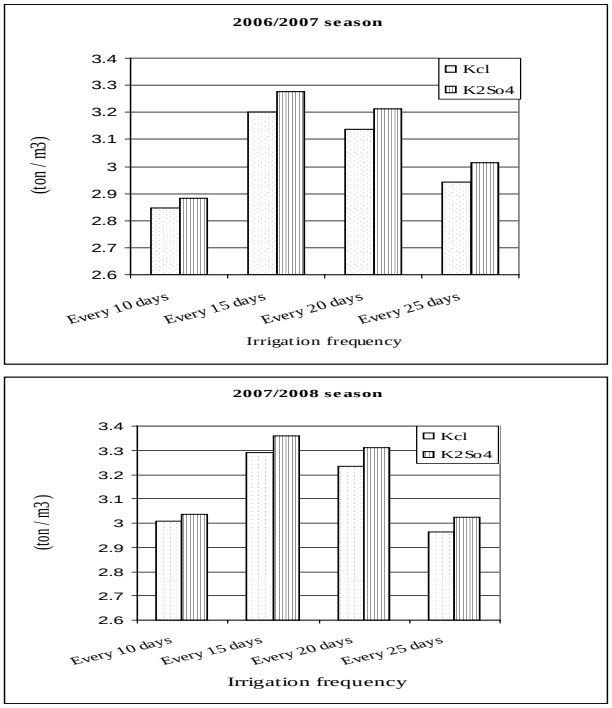

Fig. 2. Effect of irrigation frequency and potassium source on total yield of garlic bulbs

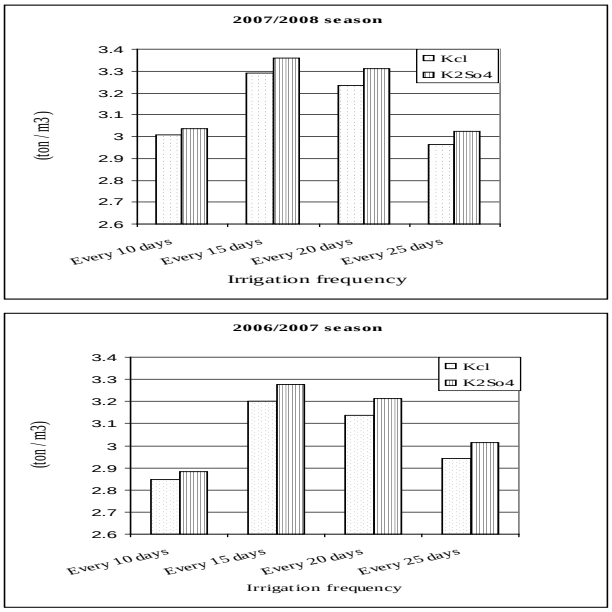

Fig. 3. Effect of irrigation frequency and potassium source on water use efficiency of garlic bulbs

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MILK QUALITY MANAGEMENT AT FLAV O'RICH DAIRY, U.S.A.

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Key words: *milk quality, management, FLAV O'RICH DAIRY*

Abstract

The paper aimed to present how milk quality standards are applied in practice in the USA using a study case at FLAV O'RICH DAIRY INC, London Kentucky, a very important milk processor in the area . The study how milk quality is checked from the bulk milk to final product according to the Milk Quality Program in force. The main aspects concerning raw milk selection criteria such as : antibiotic test, temperature, bacteria, organoleptic properties , acidity, somatic cell count , but also main milk components such as water, butterfat , total solids, protein, lactose , solids non fats , minerals, acids have been approached . Also a comparison for 7 butterfat producers for East Fluid Group has been done . Milk processing assures the destruction of human pathogens , the maintenance of product quality without significant loss of flavor, appearance, physical and nutritive properties and the selection of organisms which may produce unsatisfactory products . At FLAV O'RICH DAIRY , Total Quality Management is successfully applied as a combination of quality and management tools destined to increase the company business and reduce losses .

INTRODUCTION

Milk is a very important food both for human and animal beings due to its content in a large variety of components whose normal ranges are : water 84-90 %, fat 2-6 %, protein 3-4 %, lactose 4-5 %, minerals < 1 %. The concentration of these components varies between cows and breeds. The nutritional as well as economic value of milk is directly associated with its solids content. The higher the solids content the better its nutritional value and the greater the milk product yields. These nutritional attributes of milk have long made it a mainstay particularly in the children and old people diet [4, 8] . Therefore , milk is a very important raw material for food industry. There are estimated to be some 8 to 10,000 different types of milk products produced in the world . That is why the dairy industry is a large and dynamic segment of the agricultural economy of many nations and consumption of dairy products continues to increase throughout the world. Nearly 12% of the American household's total food expenditure is for dairy products. Milk and milk products alone provide 10% of the total available calories in the United States food supply [8]. In the USA , cash receipts from marketing's of milk exceeded $23 billion dollars in the year 2000. Recently , the publicized cow diseases such as spongiform encephalopathy "BSE" and foot and mouth disease "FMD" have increased consumer concern about the quality of foods of animal origin. A new definition of "high-quality" milk as been imposed and Quality Management System has appeared as a compulsory tool for assuring milk quality from cow udder to consumer's cup . [5,6]. In this context, the present paper approaches milk quality aspects in the USA according the standards in force giving an example how milk quality is checked at FLAV O'RICH DAIRY INC , London, Kentucky.

MATERIAL AND METHOD

The paper was carried out at FLAV O'RICH DAIRY INC, London Kentucky, a very important milk processor in the area . It aimed to show how milk quality is checked from the bulk milk to final product according to the Milk Quality Program in force in the USA. Important aspects concerning raw milk selection criteria such as : antibiotic test, temperature, bacteria, organoleptic properties , acidity , somatic cell count , but also main milk components such as water, butterfat , total solids, protein, lactose , solids non fats , minerals, acids have been approached . Also a comparison for 7 butterfat producers (F 1, F2, F3, F4, F5, F6, F7) belonging to East Fluid Group has been done.

RESULTS AND DISCUSSIONS

Production of quality milk is the concern of: dairymen, veterinarians, state regulatory departments, milk and milk product processors, retail distributors (super markets) and consumers of dairy products . In order to assure the delivery of safe quality products to the consumer , the regulatory control of milk and milk products is run under the milk sanitation program of the United States Public Health Service/ Food and Drug Administration, divisions of the Department of Health and Human Services which have developed a statement of policy and regulations with regard to milk quality. This model regulation is known as the "Pasteurized Milk Ordinance of 1978" (PMO), which also contains the milk quality standards recommended to states, counties and municipalities. The main milk quality problems the herds are facing are the increased number of clinical mastitis , high somatic cell counts , high bacteria counts and antibiotic residues in the bulk milk . If not solved , these problems can result in suspension from the Grade A milk market with significant economic implications to the dairy farmers . They have to find a rapid solution for reducing losses to minimum instead of loosing several thousands of dollars .

Current milk quality standards in Kentucky include the following requirements: 1) no visible adulteration or objectionable odor, 2) standard plate counts of <100,000 cfu and <300,000 cfu for Grade A and Grade B milk respectively, 3) no drug residues, 4) SCC <690,000, 5) temperature < 7.20 and 10 degrees C for Grade A and Grade B milk respectively, and 6) no pesticide residues. While US standards for SPC are comparable to peer countries, the current US SCC limit is conspicuously higher than Canadian and European standards (500,000 cells/ml for Canada and 400,000 cells/ml for most of the E.U.).

For FLAV O'RICH DAIRY INC, milk quality is a component of Total Quality Management System. Its slogan is " To deliver safe milk to consumers ". High quality milk should be white in appearance, have no objectionable odors and be free of abnormal substances such as pesticides, added water or

antibiotic and antiseptic residues. The milk processing Plant pays a special attention to the quality of raw milk because this is conditioning the quality of its dairy products and profit level.

Specification	Rejection milk criteria
Antibiotics Test	any positive or indeterminable results
Temperature	greater than 42 degrees F
Bacteria	anything greater than 90,000/slide sample
Added Water	1% or greater than (Cryoscope reading lower than 0.530)
Organoleptic properties	any odor or appearance deemed unacceptable by Flav-O'Rich personnel
Acidity	greater than 0.14
Direct Microscopic Somatic Cell Count	greater than 690,000

Table 1 . Raw Milk rejection Criteria at FLAV – O-RICH DAIRY Inc, London , Kentucky
Note : Not meeting any of the above criteria will not be considered a guarantee of acceptance.

For this reason, first of all milk reception starts with the checking of every tank truck of milk concerning the presence of antibiotics prior to the tank being unloaded. If the truck is confirmed positive for the presence of antibiotics, another test is run in order to identify which farm contaminated the milk.
The entire tanker load of contaminated milk must be dumped and the offending farmer is fined. A farm that repeatedly violates antibiotic residue standards will be prohibited from selling milk. Antibiotic residues are undesirable for public health reasons and because of their potential impact on the manufacturing process .
If raw milk passes the antibiotics test , milk samples are collected from the bulk milk in order to determine temperature, bacteria content , acidity and somatic cell count .A high quality milk has to have less than 42 degrees F , less bacteria than 90,000/slide sample, no or less than 1 % added water and less than 0.14 acidity. Also the organoleptic properties are checked such as appearance and odor . Somatic cell count (DMSCC) must be less than 690,000 cells/ml.
In most developed dairy countries milk quality is defined by the *somatic cell count (SCC)* in pre-pasteurized bulk tank milk. The largest factor that influences the SCC of milk is mastitis . FLAV O'RICH DAIRY INC, as many other milk processors prefers to purchase milk with low SCC . That's why it is used to offer financial incentives to farmers for high quality milk. High SCC milk is not desirable because it reduces the shelf life of dairy products and diminishes the quality and quantity of milk protein; thereby reducing cheese yields. For instance , for a milk counting 240,000 somatic cells/ml an amount of 9.748 lbs cheese should be produced from 100 lbs milk, while in a milk counting 640,000 cells/ml just 9.430 lbs cheese is achieved . The Canadian researchers , studying the impact of bulk milk SCC on the probability and cost penalties under the milk quality program have found that the milk price is reduced by Canadian USD 1 per hl each time bulk milk exceeds 500,000 cells/ml three times in a 4-mo period [1].
Milk is an excellent growth media for bacteria which can originate from either mastitis or from contamination of the milk with environmental pathogens during the milking or milk handling process. The failure to adequately clean milking equipment is often associated with high bacterial counts. High quality milk originates from healthy cows that are free of mastitis . Knowing this aspects , the FLAV O'RICH experts in milk quality control pay a special attention to the *standard plate count (SPC*), in pre-pasteurized bulk tank milk too . Less bacteria than 90,000/slide sample have to be found as milk bulk to be accepted for processing . Otherwise milk processing in cheese will be deeply affected with a disastrous economic impact.
Because the bacterial quality and somatic cell content of raw milk are important to product shelf-life, flavor and yields (particularly cheese), as many other milk processors, FLA O'RICH DAIRY INC strives to obtain the highest quality raw product possible from its suppliers . Grade A milk quality standards allow a maximum of 90,000 bacteria/ml. in raw bulk milk. The raw milk samples are then used for determining milk content . There are many factors that can affect milk composition like food, seasonal and geographical variations and cow breed . The milk which is checked at FLAV O'RICH DAIRY INC must be close to the admitted limits of variation for the following components : water, butterfat, total solids, protein, lactose, solids-non-fat, minerals, acids, enzymes , gases and vitamins as shown in Table 2.
Butterfat percentage is determined by means of butterfat test both at farm place , in the truck milk and finally the receiving butterfat is established. The amount of milk in

Farmer's name	% Water	% Butterfat	% Total Solids	% Protein	% Lactose	% Solids Non Fat	% Minerals	% Acids
John Smith	86.4	3.88	11.07	2.73	4.78	8.86	0.64	0.17
Admitted limits of variation	85.5 –88.7	2.2 - 5.5	10- 12.63	3.25	4.60	7.9 – 10.0	0.65	0.18

Table 2. Analysis of Raw Milk Composition at FLAV-O-RICH, INC. London , Kentucky, USA
Note: Date : 2/01/2009, FT-120 FOSS results

Variant	Producer's name	Farm weight Lbs milk	Receiving weight Lbs milk	Farm test butterfat %	Truck milk butterfat %	Receiving test butterfat %	Farm butterfat Lbs	Truck of milk butterfat Lbs	Receiving butterfat Lbs
F1	John Smith	20,002	20,000	3.86	3.83	3.88	772.07	766	776
F2	Greg Mc Queen	19,508	19,501	3.99	3.94	3.95	778.37	768.33	770.29
F3	MikeTompson	7,906	7,902	3.71	3.66	3.73	293.31	289.21	294.74
F4	Pete Mc George	43,059	43,051	3.79	3.80	3.76	1,631.94	1,635.93	1,691.71
F5	Tim Hoskin	54,000	54,008	3.86	3.82	3.82	2,084.40	2,063.10	2,063.10
F6	Ken House	51,490	51,496	3.72	3.73	3.69	1,915.42	1,920.80	1,900.20
F7	Pat Graham	59,999	59,992	3.99	4.00	3.93	2,393.96	2,399.68	2,357.68

Table 3.Butterfat producers comparison for Easter Fluid Group at January 2nd ,2009

pound is weighted both at farm level and also at the Dairy Plant reception department . Then the amount of butterfat is calculated taking into account the butterfat percentage and the amount of milk delivered at the farm place and in the truck.

According to the Milk Quality System (ISO), milk is checked every moment along the whole chain of its processing in the Dairy Plant into various products such as Skim milk, 1 % milk , 2 % milk and whole milk . This dairy products have to meet the requirements concerning the product specification as shown in Table 4.

FLAV O'RICH DAIRY INC pays a special attention to Total Quality, as a component of its culture, attitude and organization . It is a company which strives to provide customers with products and services that satisfy their needs. Its culture requires quality in all aspects of the company's operations, with processes being done right the first time and defects and waste eradicated from operations. The whole company and its employees are involved in the continuous improvement of the production of goods and services , otherwise Total Quality Management is successfully applied as a combination of quality and management tools destined to increase the company business and reduce losses . The TQM concept is not only a philosophy but a common practice to FLAV O'RICH DAIRY INC that seeks to integrate all its organizational functions such as marketing, finance, design, engineering and production, customer service, etc.) to focus on meeting customer needs and organizational objectives. The simple objective of TQM at FLAV O'RICH DAIRY INC is "Do the right things, right the first time, every time". A convincing example is the shelf life for Half and Whole Gallons of White Milk in the Summer months of the year 2008. In the month of May the shelf life was 93.4, in July 80.6 , in August 85.5 and in September 86.1 , which are considered acceptable values . Also in the same months of the year 2008 , from the total number of milk tanks received only a very few have been rejected as shown in Table 5.

Product	% Butterfat	% Total solids	Acidity
Skim milk	0.01-0.20	9.00-10.00	0.12-0.13
1% Milk	0.80-1.20	11.00-12.50	0.12-0.13
2% Milk	1.60-2.40	11.50-12.50	0.12-0.13
Whole Milk	3.25-3.35	12.00-13.00	0.12-0.13

Table 4 . Specifications concerning Butterfat , Total Solids and Acids for various dairy products

Specification	May	July	August	September
Milk Tankers , of which	511	569	629	608
Rejected tankers	3	3	2	1
Share of rejected tankers	0.19	0.52	0.31	0.16

Table 5 . Tankers of Milk received at FLAV O'RICH DAIRY in Summer 2008

The data show that the company had no incidents with bacteria (Coliforms), it registered zero incidents of positive tests from May to September. The Dairy Plant is facing very rarely with its customers complaints. For instance, in the analyzed months, the number of complaints was few as shown in Table 6.

An important part of Quality Management is HACCP (Hazard Analysis and Critical Control Points) along the milk chain processing . It is a systematic preventive approach to milk and milk products safety that addresses physical, chemical and biological hazards as a means of prevention rather than finished product inspection. HACCP is used by FLAV O'RICH DAIRY INC to identify potential milk safety hazards, so that key actions, known as Critical Control Points (CCP's) can be taken to reduce or eliminate the risk of the hazards being realized. The system is used at all stages of milk processing (raw milk quality, pasteurization , packaging, distribution etc)

CONCLUSIONS

[1]Milk processing is destined to provide the consumer with a wholesome, nutritious and safe product. The production of quality milk and milk products begins on the farm and continues through further handling, processing and distribution.

[2]Milk processing assures the destruction of human pathogens , the maintenance of product quality without significant loss of flavor, appearance, physical and nutritive properties and the selection of organisms which may produce unsatisfactory products .

[3] At FLAV O'RICH DAIRY , Total Quality Management is successfully applied as a combination of quality and management tools destined to increase the company business and reduce losses .

[4]The company has no problems with bacteria and incidents with positive tests. It is facing customers complaints very rarely , meaning that milk quality is assured along the milk chain from farm gate to final dairy products.

[5]Production of quality milk is the concern of dairy farmers , veterinarians, state regulatory departments, milk and milk product processors, retail distributors (super markets) and consumers of dairy products .

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Customer reason	May	July	August	September
Number of complaints	3	5	4	6
- Missing seal	1	0	0	0
-Bunt material	1	0	0	0
-Spoilage	1	3	3	5
-Mold	0	2	0	0
-Fly in milk	0	0	1	0
-Brown substance	0	0	0	1

Table 6. The number of complaints and customers' reasons

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FORESTRY RECLAMATION OF COAL SURFACE MINES IN THE APPALACHIAN MOUNTAINS OF THE EASTERN UNITED STATES

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Key words: *The Appalachian Regional Reforestation Initiative, ARRI, reforestation, tree planting, end- dumping, loose-grading*

Abstract

The Appalachian Regional Reforestation Initiative is a broad-based citizen/industry/government program in the United States working to encourage the planting of productive trees on abandoned and active coal surface mined lands. Using a combination of private and governmental resources, the reforestation initiative is facilitating and coordinating citizen groups, university researchers, the coal industry, corporations, the environmental community, and local, state, and federal government agencies that have an interest in creating productive forestland on reclaimed mined lands. Forestry research has confirmed that highly productive forestland can be created on reclaimed mine land by using a Forestry Reclamation Approach. The development and execution of this science-based, multi-agency initiative is serving as an organizational model for other groups around the world whose goal is to restore disturbed landscapes through reforestation.

INTRODUCTION

The majority of the Appalachian region in the eastern United States was originally covered with rich hardwood forest. Over the years, surface mining reclamation has resulted in forest fragmentation and a net loss of productive forestland. With the advent of the Surface Mining Control and Reclamation Act of 1977 (SMCRA), special efforts were made to address land stability and sedimentation caused by past mining practices. Reclamation practices under SMCRA have been characterized by high soil compaction rates and aggressive ground covers. Many mined lands were restored as grasslands but are not currently used for hay or pasture by their owners. Native forests will eventually be restored on such areas by natural succession, but this process is slow and centuries may be required.

Researchers began to notice that tree productivity on some pre-SMCRA sites actually had superior growth rates. Most of these sites were on areas with low soil compaction rates. Forestry researchers at Southern Illinois University conducted studies during the 1970's and 80's to examine 30-year-old tree plantations on low compaction spoil piles in the mid-west region (Ashby, 1980). They found very high survival rates and growth rates for many hardwood species. They also documented far greater natural succession of native forest tree species in the areas planted to trees, than on adjacent unplanted areas. Research at Virginia Polytechnic and State University, and the Powell River Project, confirmed that the site index, which is a measure of forest productivity, can be significantly increased by changing current reclamation practices and adopting a Forestry Reclamation Approach (FRA) (Burger et al., 1998). The FRA will increase forest productivity and timber value, increase diversity through natural succession, increase soil and water conservation, provide wildlife habitat, and carbon sequestration. It is for these reasons that the Appalachian Regional Reforestation Initiative (ARRI) was formed in 2005.

Appalachian Regional Reforestation Initiative (ARRI)

ARRI is a broad-based citizen/industry/government group working to encourage planting of productive hardwood trees on reclaimed coal mined lands and abandoned mine lands. ARRI's vision is not only to plant more trees, but also to build a productive forest ecosystem that encourages natural succession of native forest plants by promoting the use of the FRA technology. The goals of ARRI are to plant more high-value hardwood trees on reclaimed coal mined lands in Appalachia, increase the survival and growth rates of planted trees, and accelerate the natural process of succession and reestablish forest habitat.

By using a combination of private and governmental resources, the program facilitates and coordinates the coal industry, university researchers, the environmental community, and the state and federal government agencies that have an interest in creating productive forestland on reclaimed mined lands (Angel et al., 2005). ARRI has identified a Core Team that includes members from each Office of Surface Mining Reclamation and Enforcement (OSM) Field Office, and members from each State Regulatory Authority in the Appalachian Region. This Core Team has the responsibility to develop reforestation partnerships and promote ARRI. ARRI has also formed a Science Team which is drawn from Universities in nine states, and by other groups and agencies. It is the job of the Science Team to insure that state-of-the-science reforestation procedures are advocated by ARRI and that mined land reforestation research is advanced.

The FRA has taken lessons learned from past mining practices and modified current mining practices to create more productive forestland. The FRA discussed here is a general guideline. Each State is encouraged to develop a FRA that fits their unique environmental conditions.

THE FORESTRY RECLAMATION APPROACH

Create a suitable rooting medium for good tree growth that is no less than four feet deep and comprised of topsoil, weathered sandstone, and/or the best available material

The selection of the best growth medium will depend on the local environmental conditions and the best available soil material. In Ohio and parts of Pennsylvania, large deposits of topsoil are available. Topsoil is a valuable resource and it should be conserved and replaced when possible. However, in the mountainous areas of the other Appalachian states, topsoil is limited and alternate growth media have been shown to support productive forestland.

During mining operations, all highly alkaline materials with excessive soluble salts and all highly acidic or toxic material should be covered with four to six feet of a suitable rooting medium that will support trees. Growth media with low to moderate levels of soluble salts, equilibrium pH of 5.0 to 7.0, low pyretic sulfur content, and textures conducive to proper drainage are preferred (Burger et al., 2005). Native hardwood diversity and productivity will be best on soils with a sandy loam texture where the pH is between 5 and 7. These types of soils can be formed from overburden materials comprised of weathered brown or unweathered gray sandstone, especially if these materials are mixed with natural soils. Shale may be used in combination with sandstone; however, high concentrations of shale and other fine-grained spoil materials should be avoided. Many times these materials have higher pH values, which encourages heavy ground cover and inhibits tree growth. On remining sites, topsoil/sandstone may not be available in sufficient quantities. In these cases a combination of spoil materials will be required to create the best available growth medium.

Loosely grade the topsoil or topsoil substitutes established in step one to create a non-compacted soil growth medium
The use of pans and other rubber tire equipment must be eliminated during final grading. The practice of tracking-in with dozers to create a smooth and compacted final grade is not advisable, and is an unnecessary expense. The majority of the backfill should be placed and compacted using the currently accepted practices. The difference is only during the replacement of the growth medium in the last four to six feet. In area mining, haul trucks are used to dump the growth medium in a tight arrangement, and final grading is accomplished with one or two light passes with a dozer to strike off the tops of the dump piles. Likewise, in a dragline operation, the growth medium is placed in piles and a dozer lightly grades the area leaving a rough, non-compacted growth medium.
In steep slope mining areas, the majority of the backfill is placed and compacted as usual, but the final four to six feet of growth medium is dumped and lightly graded to achieve the required final grade. This low compaction technique will actually reduce erosion, provide enhanced water infiltration and restore the hydrologic balance, and allow trees to achieve good root penetration. Research conducted by the University of Kentucky, at the Starfire Reforestation Project, has shown that reduced compaction rates result in superior tree survival and growth rates (Graves et al., 2005). Ripping can alleviate compaction, and research has shown that this will increase tree growth. However, this is an unnecessary expense that can be avoided by limiting compaction during final grading.

Use native and non-competitive ground covers that are compatible with growing trees
Ground cover vegetation used in reforestation requires a balance between erosion control and competition for the light, water, and space required by trees. Fast growing and competitive grasses such as Kentucky-31 tall fescue and aggressive legumes such as sericea lespedeza, and sweet clovers should not be used where trees will be planted.
Seeding rates should be reduced in order to limit ground cover competition to planted tree seedlings. This is possible because loosely-placed mine soils recommended in Step 2 allow greater rates of water infiltration which reduces the potential for soil erosion. Competitive ground cover will inhibit both tree survival and productivity. Tree compatible grasses include foxtail millet, rye, red top, perennial ryegrass and orchard grass (steep slopes only), and compatible legumes include birdsfoot trefoil and white clover. By using these species in a mix with other appropriate species, seedling survival will be increased and erosion will be controlled. Fertilizer rates should be low in nitrogen to discourage heavy ground cover growth while applying sufficient rates of phosphorus and potassium for optimal tree growth (Burger et al., 2005).

Plant two types of trees – early succession species for wildlife and soil stability, and commercially valuable crop trees
Nitrogen-fixing trees and shrubs act as nurse plants for the higher quality hardwoods and some provide wildlife food and cover. Good nurse/wildlife plants include redbud, hawthorn, dogwood, and black locust. Crop trees should be selected according to the soil and environmental conditions. Research has shown that commercially valuable hardwoods can be successfully grown including the red and white oaks, white oak, white ash, black cherry, sugar maple and yellow poplar (Burger et al., 2005). Conifers such as white pine and pitch x loblolly pine hybrids have also been shown to thrive on FRA sites; conifers are best planted as pure stands. Using the FRA also encourages natural succession of early-successional native forest plants. By planting nurse and wildlife species, mid and late successional tree species and creating conditions for early successional species to volunteer, a shorter amount of time is required to reach a diverse, commercially-valuable mature forest.

Use proper tree planting techniques
The importance of proper tree planting cannot be over stated. The best planting stock available should be selected and maintained in cold storage until planted. Tree seedling roots exposed to air for as little as 15 minutes can significantly increase the mortality rate. Care should be taken to separate seedlings and prune roots only when necessary. The seedlings must be kept moist and immediately placed in the planting bag. The planting hole must be made as deep as possible, to accommodate the entire root system. The planting hole must be completely closed leaving no air pocket, and tamped in with the heal. In most cases, the extra cost of hiring professional tree planters will be well worth the investment.

ARRI OUTREACH

Since its creation in 2005, ARRI members and partners have been spreading the word about the FRA through numerous avenues. Each spring, every ARRI state has conducted one or more Arbor Day Event where coal companies, citizen volunteers, government workers, school children, and others get out on a mine site to plant trees, celebrate the value of forestland, and promote the reforestation of surface mines. In 2008, over 28,000 trees were planted at ARRI sponsored Arbor Day Events. The events usually attract considerable media attention and as a result, ARRI, the industry, and the participants have enjoyed positive and upbeat local and regional news coverage.
ARRI 'Signing Ceremonies' is another avenue by which word of the FRA is being spread. These high profile events are associated with ARRI's Statement of Mutual Intent (SMI) which is a way for agencies, organizations, and individuals to pledge support for the FRA and ARRI's goals. The 276 SMI signatories that have been collected to date represent 143 different organizations, which include 49 government agencies, 49 industry organizations, 22 environmental groups, 18 academic institutions, 5 citizen groups, and numerous individuals. The work of ARRI has attracted considerable international attention because the FRA is universal and applicable to all types of mining and in all places worldwide. Also, the development and execution of this science-based, multi-agency initiative is serving as an organizational model for other groups around the world whose goal is to restore disturbed landscapes through reforestation.
Each year ARRI has presented the Excellence in Reforestation

Awards to individuals, operators, and/or organizations for their exemplary efforts in forestry reclamation on Title IV and Title V mine sites that utilize the FRA in Appalachia. Two very successful annual Mined Land Reforestation Conferences have been held so far drawing upwards to 200 interested participants. The first conference was held in Abingdon, Virginia in 2007, and the second in Logan, West Virginia in 2008. The third conference will be held in Prestonsburg, Kentucky in 2009 and the fourth will be held jointly with the American Society for Mining and Reclamation in Pittsburgh, Pennsylvania in 2010. Several very fine instructional videos featuring the FRA have been produced by ARRI partners. One goal of the ARRI Science Team is to generate a series of guidance documents called Forest Reclamation Advisories which will describe state-of-the-science procedures for coal mine operator and other mine reforestation practitioners, agency personnel, and mine land owners. Five Advisories have been published, distributed, and made available on ARRI's website to date and several others are expected to be released very soon.

ARRI has been most successful in spreading the FRA by building partnerships with groups and individuals that share the common goal of science-base surface mine reforestation. One good example of a very successful ARRI partnership is centered on the American chestnut tree. ARRI and The American Chestnut Foundation (TACF) have formed a strong partnership to use FRA compliant surface mines as the 'springboards' for disease-resistant chestnuts back in the forests of Appalachia. Under the joint ARRI/TACF project called 'Operation Springboard', 11,809 American chestnuts were planted in 2008 on surface mines that will aid both the research and repopulation of these monarchs of the eastern forest. Another example of a successful ARRI partnership that is spreading the FRA involves the Cerulean warbler. This small, neo-tropical, migratory songbird breeds throughout the central and eastern US and relies on large tracts of mature deciduous hardwood forests during the breeding season. Cerulean populations have declined at about 3% each year since 1966, prompting a petition in 2000 to the U.S. Fish and Wildlife Service asking it to be listed as threatened under the Endangered Species Act. ARRI is actively facilitating partnerships between the coal industry and conservation groups like the Cerulean Warbler Technical Group, the American Bird Conservancy, the Appalachian Mountains Joint Venture, numerous South American groups, and government agencies and university researchers. The conservation groups win by addressing habitat needs, the industry wins by voluntarily addressing habitat needs outside of a regulatory mandate, and ARRI wins by getting more trees planted. ARRI is also helping to facilitate a three-way coal/coffee/Cerulean partnership between conservation groups, the coal industry in North America, and the coffee industry in South America.

CONCLUSIONS

Forestland enriches us all by providing numerous environmental and economic benefits. Forestland is also a renewable resource. By working together, State and Federal government agencies, the coal industry, landowners, university researchers, and local citizens, can indeed create highly productive forestland on reclaimed mine land by using the Forestry Reclamation Approach. We invite any and all interested parties to join the Appalachian Regional Reforestation Initiative and become Reforestation Champions. To learn more about ARRI and the FRA, visit our website at http://arri.osmre.gov.

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THE USE OF HIGH QUALITY AGRICULTURAL MACHINERY FOR IMPROVED COMPETITIVITY IN AGRICULTURE

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Key words*: agricultural machinery, performance, productivity, production, quality*

Abstract

First of all, a modern agriculture is based on machinery: tractors, agricultural machineries, seeders as well as combines. They all should be used to their maximum capacity in order to raise the competitivity. The optimal use of mechanization guarantees a growth in labour productivity, superior quality of agricultural works, a simplification of production which leads to important economic growth.
The growth in competivity could be based on an increased production per hectare, low expenses and loses. New performant seeders could realize the preparation of the soil the same time with the seeding.
By the help of SAPARD programme, many farmers bought performant tractors which can increase the productivity by using mixed equipments.
By optimal and effcient use of these equipments, it could be finaly made an evaluation of the production, usefull for the preparation of stocking areas.

INTRODUCTION

The endowment with poorly performing agricultural machinery, can not insure the mechanized works during the optimum period as they are scheduled, resulting in a loss of harvest. The offer of native agricultural machinery is reduced, and the financial difficulties of the farmers result in declining of the agricultural machinery use. The price of the imported machinery is high, but with the help of the European Union, many farmers are able to buy performant machinery. Although they are more expensive, in the end, they prove to have a high efficiency.
Using this machinery (tractors, tractor-drawn ploughs, scarifiers, seeders, combines etc.) is a solution to a growing competition within the farming community.

MATERIAL AND METHOD

The researches were conducted in farms which used agricultural machinery, analyzing the main agricultural works, fuel consumption and mechanized labor force. There were considered 2 ways of work (V1-native machinery and V2 – imported machinery).

RESULTS AND DISCUSSIONS

The diversity of sorts, crops and breeds and the different conditions due to varied relief, social, economical and pedoclimatic elements, enforce the use of a large range of tractors and agricultural machinery.
In 2007 there were 174003 tractors in agriculture, 170755 (98.13%) in private sector [2]. The mechanical seeders fleet grew up by 6.53% in 2007 compared to 2000; the number of bale press grew up in private sector by 17.92% compared to 2000 (table 1).
To national level, the average surface per tractor is only 54.2 hectares, and for combines is 102 hectares.
It can be observed from graphyc 1 that during analyzed period, in 2006 the tractors had an important growth. Plows also developed as number to 98.6% compared to 2000.
By comparative analyze, the price for mechanized works made by native and imported machinery , it can be observed that the use of imported machinery has important advantages (table and graphic 2).
In order to determine the need for tractors and agricultural machinery within the frame of a crop structure, it was considered the optimal agrotechnic ages, the working standards for each machinery, the work volume for each crop and for total, as well as the time schedule.
When working with high effective power machinery, the fuel consumption is reduced: for ploughing at 28-30cm +harrowing, the diesel consumption was reduced from 28 liters for V1 to 22 liters/hectare in V2[1].

YEAR	Tractors		Ploughs		Mechanical seeders		Combines		Bale presses	
	total	private	total	private	total	private	total	private	total	private
2000	160053	91,25	123192	92,85	57709	92,29	28084	92,64	6753	78,63
2001	164221	94,14	126905	95,27	59979	94,80	25784	95,26	5575	86,78
2002	169240	96,73	131252	97,39	62061	97,57	25315	97,79	4921	92,91
2003	169177	97,75	132142	98,31	63149	98,41	25048	98,73	4730	96,32
2004	171811	98,33	136100	98,83	65346	98,86	24653	99,01	5121	97,21
2005	173043	97,77	137018	98,30	66732	98,27	25055	97,94	5028	95,27
2006	174563	97,99	138594	98,46	67761	98,39	24975	98,29	5200	95,79
2007	174003	98,13	139782	98,61	67674	98,64	24656	98,42	5399	96,55

Table 1 Evolution of tractors and agricultural machinery fleet during 2000-2007 -pcs-
Source : NIS Romanian Statistical Yearbook 2000-2008

The labor force declined in V2 from 0.47 to 0.2 hours/hectare for the preparation of the germinal layer.
The new, performant seeders can realize the preparation of the germinal layer the same time with seeding. With such a seeder there can be saved 50 liters of diesel/ hectare of wheat and an uniform rising.

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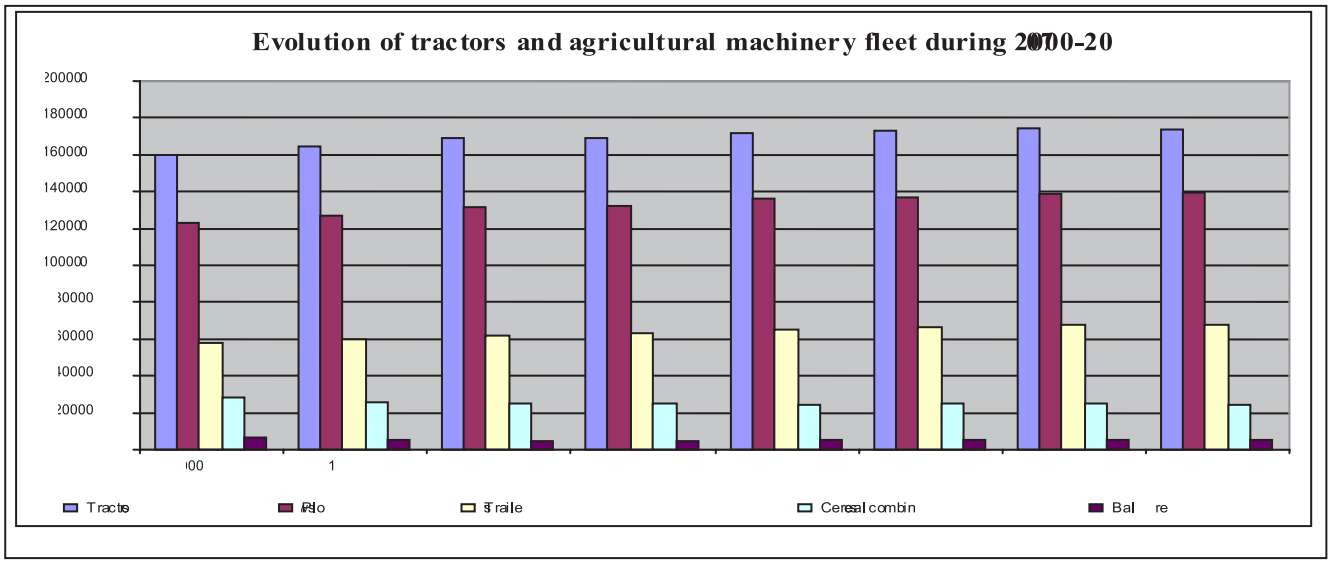
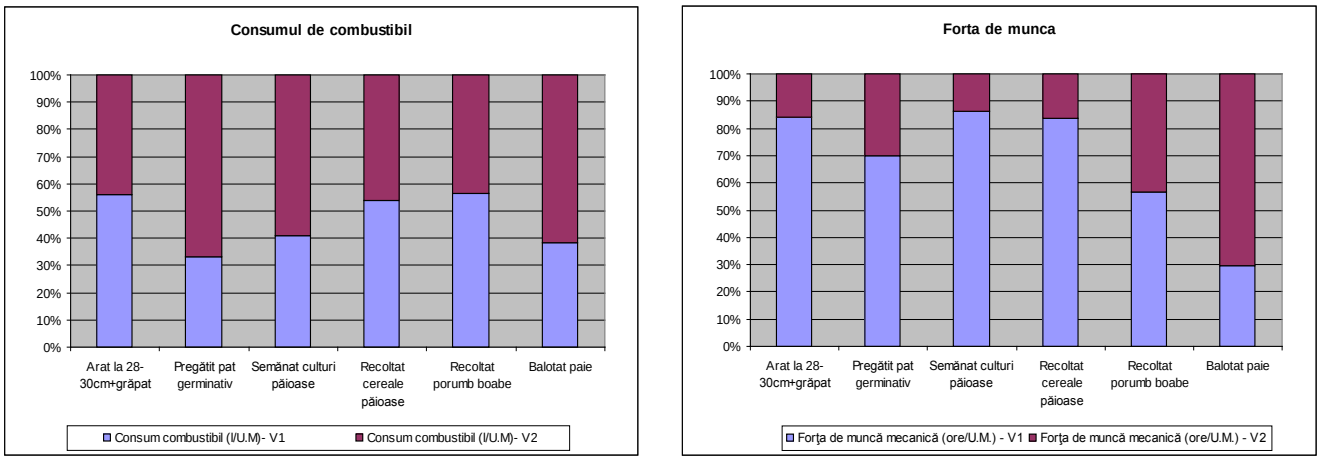


Graphyc 1 Evolution of tractors and agricultural machinery fleet during 2000-2007
Source: NIS Romanian Statistical Yearbook, 2000-2008

Mechanized works	U.M.	Fuel consumption (l/U.M)		V_2/V_1 (%)
		V_1^*	V_2^*	
Ploughed at 28-30cm+harrowing	Ha	U650+PP4(3)30+GS-1,2	Tractor New-Holland TG-210+Plug 5 trupiţe	59,3
		28,0	22,0	
		Mechanized labor force (hours/U.M.)		
		2,857	0,533	
The preparation of the germinal layer	Ha	U-650+CPGC-4	Tractor New-Holland TG-210+combin.Sapak	99,5
		4,0	8,0	
		0,47	0,20	
Seeding of straw crops	Ha	U-650+SUP-29	Tractor New-Holland TG-210+sem.Vaderstad	42,8
		4,5	6,5	
		1,0	0,16	
Harvesting of straw crops	T	Combine aut.C-12	Combine New-Holland+T.C.56HTS	74,3
		2,9	2,5	
		0,34	0,067	
Harvesting of maize	T	Combine aut.C-14+CS-6	Combine New-Holland+Heder Gerigoff	77,1
		4,45	3,43	
		0,35	0,268	
Straw baling	T	U-650+PPF	Tractor New-Holland TD-95+Presa Class	63,5
		2,13	3,425	
		0,179	0,428	

Table 2 Comparative price analisys for mechanized works made by native and imported machinery
Source: Adina Bădulescu, Optimum production structures in farms from Constanta County, Ed. Cartea Universitară, Bucureşti, 2008
V1- native machinery ; V2* - imported machinery*



Graphic 2 Comparative analisys for fuel consumption and mechanized labor force
Source: Adina Bădulescu, Optimum production structures in farms from Constanta County, Ed. Cartea Universitară, Bucureşti, 2008

CONCLUSIONS

The advantages of using high effective power machinery there are:
1. high quality works reflected in the production;
2. the possibility of making the works during optimal period of time (superior quality crops);
3. optimal seeds dosage and depth, machinery daily work standard;
4. reduced number of workers;
5. air conditioning systems allow better working conditions;
6. 10% higher productivity due to the capacity of the new tractors to turn around easier;
7. longer standing for machinery (imported tractor warranty is 10000 hours using time)
8. bigger tractors can improve the productivity using combined machinery;
9. performant tractors allows a better and larger harvesting;
10. the use of these machineries allow a production and stocking evaluation.
The endowment with non performant agricultural machinery can not face the actual demands of a modern agriculture from quantitative, quality and structural points of view.

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Key words : *Olingo- Bassaricyon gabii, comparison, other similar species, diversity in danger, Costa Rica*

Abstract

The paper aimed to present the situation of the carnivorous family Procyonidae in Costa Rica ,well known as a country with a large variety of fauna . It describes Olingo (Bassaricyon gabbii): taxonomy, physical characteristics , spread, diet, habits, behaviour and , reproduction in comparison with other very similar species such as: Bassaricus sumichrasti, Nasua larica, Potos flavus, Porcyon cancrivorus, Porcyon lotor. The deforestrations on large surfaces in Costa Rica and the environment pollution have deeply affected the protected areas. Due to this, many species like Olingo are in danger to lose their habitat and to disappear. As a result, the country's biological diversity has to be preserved by scientific conservation strategies and many efforts in order to maintain the natural balance of the ecosystems in our environment.

INTRODUCTION

The geographic position of Costa Rica has played an important part in the structure and diversification of our fauna, consisting of about 238 species , grouped in 142 genuses and 44 families and originating from the arctic and neo-tropical regions. The Chiroptera order is the most widespread, being followed by rodents, cetaceans and carnivores. Around 7 % of the species are endemic to Costa Rica (or Costa Rica – Nicaragua – Panama). Unfortunately, despite all the efforts made to protect the fauna and flora, the treat to the mammals in Costa Rica increases continuously, and certain species have become or are in danger of becoming extinct. As it is the case in other places, the loss of habitats, both in terrestrial and in coastline ecosystems, is the main threat to animal biodiversity in Costa Rica. Other factors, such as poaching, the use of inadequate fishing equipment, as well as other forms of usage threaten the mammal species in Costa Rica. The future protection efforts must be based on more detailed application and conservation strategies, especially as far as large mammals (such as monkeys and felines) are concerned. The species which this paper is about is part of the carnivorous family Procyonidae, which is found in the New World and which comprises 6 genuses and 18 species. This number also includes Bassaricyon lasius, which is known only through the specimen found in Estrella, 10 km South of Cartago and which has never been seen again. It is possible that this specimen was more widespread than Olingo (Bassaricyon gabbii). That is why this species if sometimes included on the list of mammal species in Costa Rica, while in other cases it is totally ignored. As a result, in Costa Rica there are six or seven species, but if we take into account a possible existence of B.lasius, which would be endemic to the central part of the country.

THE PROCYONIDAE FAMILY

The procyonidae have a small or medium size, long or moderately long tail (with which they grab things, see image 1, Potos flavus), with dark colour rings (except for Potos flavus), and clear facial traits. They have five fingers with short or long claws, clustered, curved and unretractable (semi-retractable in Bassariscus astutus). The procyonidae's dentition is adapted to the omnivorous diet through the transformation of sharp teeth, ready to rip the meat and others in the shape of fangs, ready to crush it. The dental formula normally is I 3/3 C 1/1 Pm 4/4 M 2/2.
Except for coati (Nasua), which is a day animal, the procynoidae are more active in the evening and in the first hours of the night. The procynoidae are plantigrade (they walk with the sole and heel flat on the ground) or semi-plantigrade (they partially touch the gound with the sole or toes, like the bear). They are extremely agile, they can rapidly climb up tall trees in order to run away from predators, and the members of the Procyon genus, which have posterior ends that support their weight, can climb down the trees headfirst. Because they are agile with heir arms, they have adapted well (especially the Procyon gnus) to handling and fixing objects. The members of the Procyon genus are excellent swimmers. The procyonidae family has adapted to a wide range of environments, whether terrestrial or arboreal: rainforests, seasonal forests, dry or semi-dry desert regions and oak woods, especially in the vicinity of water. Although they are considered carnivorous, none of he members is truly carnivorous, but rather omnivorous, being very fond of fruit (especially Potos flavus and Olingos).
The Procyon genus is undoubtedly the most adaptable of all procyonidae. It survived and multiplied after being introduced to Asian Russia, to two islands in Alaska and Germany, in 1900 and 1936, wherefrom it expanded to France and other countries. In the past 20 years, it has adapted well to life in suburban and urban areas, even in larger numbers than in "the wild".
The procyonidae family originates from an old branch of quadrupeds. The first procyonidae fossils date back to the early Oligocene in North America and the late Miocene in South America. The Procyon genus first appeared in the early Pliocene, 3 million years ago and until the early Pleistocene they were found from California to Florida. At the end of the Pliocene and during the Pleistocene the large isthmus in Central America facilitated the exchange of procyonidae between South and North Anerica, for example the descent of the Procyon towards Central America and the ascent of the Nasua and Potos flavus genuses to Central America.
They tend to be sociable, live in family groups or in larger groups. They are omnivorous and some of them feed exclusively on fruit. An interesting characteristic of all of them is the tail adorned with dark colour rings; some arboreal species use the tail to grab things.
Costa Rica served as a bridge and philtre for the expansion of the mammal species coming both from the arctic region and from the neo-tropical one. Consequently, the country's current fauna I made of a mix of species originating from northern and southern America; for example, certain carnivorous species, such as the coyote (Canis latrans) and the racoons from the heteromydae family have an arctic origin; on the

other hand, the sloth bears, the sloths and monkeys, among others, are endemic to the tropic.
As a result of the mixed origin of the species and according to their narrow geographic spread (51.900 km2) we can say that Costa Rica has a wide diversity of mammals. This diversity of mammals began to be researched in the middle of the 19th century, when the first collections and lists of species were created, in the works of Frantzius (1869), Alston (1879), Alfaro (1897) and Goodwin (1946). Coming to know the richness of the species in Costa Rica continues to be active; in the past few years various authors (Janzen, 1983; Wilson, 1983; Acevedo-Gutierrez, 1996; Rodriguez y Chinchilla, 1996; Carrillo et al., 2000; Mora, 2000; Rodriguez-Fonseca, 2001; Wilson et al., 2002) have published lists of the mammal species, adding new information for our country.

Fig.1 .Olingo picture Bassaricyon gabbii

Taxonomy : Kingdom: Animalia, Phylum Chordata
Class: Mammalia, Order: Carnivora, Family: Procyonidae,
Scientific name: Bassaricyon gabbii
Common names: Olingo, cacomistle . Location: Estrella de Cartago, Costa Rica. This town is located 10 - 13 km to the south of Cartago, near the origins of the river Estralla, at an approximate altitude of 1400 m. Previous names: certain scientists consider it co-specific with cu Bassaricyon Iasius Harris, 1932.
External physical characteristics: It has a soft, thick and long fur, of a brown colour on the back and crème or yellowish one on the belly. The ears are short and round-shaped and the eyes are big. Its face is darker than the body and neck, the cheek are smaller and pointed. The eyes have large elongated pupils and the iris is brown; when the light is reflected, the eyes are shiny and orange and contract horizontally. The tail is a little longer than the length of the head and body, it is not used to grab things, it is brown with dark coloured rings, which are little visible. It looks a lot like the Kinkajou, but it is smaller. In addition, the Kinkajou has a more reddish brown colour, a shorter fur and its tail is used to grab things. Olingo has a small size: 0.9 – 1.5 kilograms. It is 35 – 48 centimetres long, without including the tail which can measure up to 48 centimetres. Spread. It is found in the central part of Nicaragua to western Columbia and western Ecuador, it is located in lowlands up to 1,700m above the sea level.
In Costa Rica it lives in most of the country, except the lowlands along the Pacific seashore, although it is assumed to exist in Punta Burica. According to the reports (the Bilogical Station La Selva, Heredia and the Monteverde region) it is estimated that it spreads to the low and medium-height areas in the Caribbean slide, from about 30m to 1,500 m above the sea level. The spread according to conservation area: Amistad Caribe, northern Huetas, Arenal, central volcanic Cordillera, Guanacaste, Tortuguero. Diet and habits .Although it is part of the Carnivora order, the diet of the Olingo consists especially in fruit, among which “guarumo” (Cecropia spp.) and figs, insects, worms and small warm-blooded animals. In Monteverde an Olingo visited a hummingbird gazebo for several years. It has nocturnal and arboreal habits, it can be found alone or in groups. They often feed from the same trees where Kinkajou or nocturnal monkeys feed.

Fig2. Olingo ‘s Spread

They prefer to remain safe in the head of the trees in the thick forests and rarely come down to the ground because they would be vulnerable to many predators, among which the wild cat and snakes. It is limited to he wet forests, mainly primary ones, but it is also found in forests with a certain degree of change in the buds. In the latter, they visit the moor flowers to eat he nectar during the dry season. Behaviour. They are nocturnal, arboreal and solitary animals (they are very rarely seen in communities). They move around with agility, but noisily, in the thick of the forest. They sleep in the tree holes, they are excellent climbers and jumpers, they can reach 3-metre heights from branch to branch with no difficulty. The Olingo usually leave marks in the bark of the trees, although it is not very well known why they have this behaviour. In order to build a nest they use dry tree leaves; they generally have a single baby. Reproduction. The Olingo, being such an exotic species, the studies made of them have not managed to obtain very clear information about the reproductive cycle, they are limited to those general physical descriptions of the male, female and baby which will be presented below. The mating season is between February and May, mainly in March and April. The female. The Olingo female is monoestrous, namely during ovulation it develops only one egg cell which can be fecundated. Heat manifestations: Tumefaction of the vulvae (6-14 days before mating); She is receptive to the male 24-36 hours from the beginning of the heat; There is recurrent vulvar secretion; The loss of the fur around the nipples indicates that the female is pregnant; She has two nipples, but there have never been 2-baby litters reported ; Only the female makes noises while mating. Gestation: The gestation period lasts between 70 – 75 days (two and a half months); Among the species that are part of the Procyonidae family, the olingo is the one that has the shortest gestation period.Giving birth: The female gives birth to only one baby per litter;The birth of the babies takes place between May and June;The birth happens in the dry leaves nest which the mother makes before to shelter and protect herself from dangers;The oestrus cycle can appear after the birth, but very rarely.The baby: The new-born is born with the eyes and auditory channel closed; At birth, the fur is curly on the back, short and coloured in black and grey and the belly is ash-grey ; It has an obvious light grey stripe which starts from the ears and reaches the front region of the head; The baby is about 22-centimetre long ; And it weighs 55 grams;The ears and eyes open after the first two weeks; After six weeks the fur is fully developed; The milk teeth shoot forth between the third and fourth week; The permanent teeth are all in place between the weeks 17 – 20; They begin to eat solid food in the sixth week and at the same time they drink their mother’s milk; They begin to

walk confidently in the sixth week and climb up the trees beginning with the eighth week. The male .The testicles drop in the 16th week, when they are 4-millimetres long; In the 30th week they reach the adult male size; Mating is initiated by the males;The males put out long and sharp calls when they detect a female in heat. Olingo can live 12-14 years in captivity (at most 16 and a half years) and in the wild their lifespan is usually shorter.

THE MAIN DIFFERENCES BETWEEN OLINGO AND OTHER SIMILAR SPECIES

Bassariscus sumichrasti (cazamizle) . Colour: yellowish ash-grey with a blackish head. Eyes:large, with a narrow ocular ring (black circular spot around the eyes). Ears: large and round-shaped .Tail: longer than the head and body together, very thick with black and yellowish stripes, the final quarter being completely black. Spread: from Mexico to Panama; in Costa Rica it is found in the medium-height and high areas, such as the Poas volcano and Monteverde; it lives in Cordillera Central and in Guanacaste. It is carnivorous, but it feeds on rodents, larvae, insects and fruit. It is an agile bird hunter and it is arboreal. It has nocturnal habits and generally lives alone, sometimes I is sociable, being seen even in the Kinkajou group. The female gives birth to one or two babies. Colour: brown, white lips and a pale stripe that runs from the eyes to the nose. Fur: short on the head and paws and long and coarse on the rest of the body. The tail is also long, it has between six and seven less visible dark-coloured stripes, most keep their tail up all the time.

Fig 3. Bassariscus sumichrasti

Spread: the south-eastern part of the United States to Panama. In Costa Rica it is found especially in the lowlands, such as Santa Rosa, South Pacific, Sarapiqui and in the forested areas and in bushes in general. It is an excellent climber and jumper among the tree branches where it eats fruit and it can also live on the ground where it can get vertebrates, fruit, corpses, insects and eggs. It also feeds on nectar. They have diurnal habits and can be seen in groups of 8-20 individuals. The gestation period is of 65 – 74 days, the female giving birth to 3-7 babies which remain with their mother until the age of 2 and join the group about 5 weeks from birth. The male is not too sociable, therefore he often leads his life in isolation, especially when old; he is called a lonely badger. It has been proved that they are very intelligent.
Potos flavus (martilla). It is the main species which olingo can be mistaken for because of the physical resemblance. The fur is silky and short, the colour is olive-grey with reddish hues in the wet forests, but yellowish grey in the dry forests. The belly is crème yellow. The head is round and the ears are small and square and the eyes are prominent. The paws have fur on the lower part, they have odoriferous glands on the face, neck and belly. They can be suspended by the tail (unlike the Olingo), which allows them to live on trees. Spread: from the south of Mexico to Mato Grosso in Brazil, in Costa Rica it I located in the primary and secondary forests in the low wet regions such as San Carlos and Oca; or the dry ones such as Guancaste.

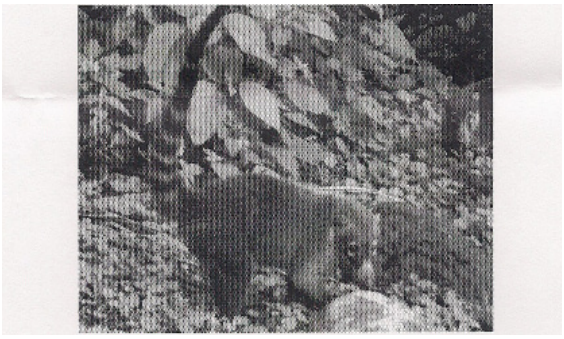

Fig.4 . Nasua larica (pizote, pizote solo)

It is also found at high altitude such as in Monteverde and the Barva volcano. It is omnivorous, it feeds on birds, mammals, eggs and insects. But 99% of its diet is represented by fruit.It has nocturnal habits and lives only on trees, sets up groups in which there is no clearly defined hierarchy.It has a characteristic cry which makes it one of the most widely heard animals. The female has a gestation period of 112 – 118 days, she has 1-2 babies which can live longer than 20 de years in captivity and a little less in the wild.

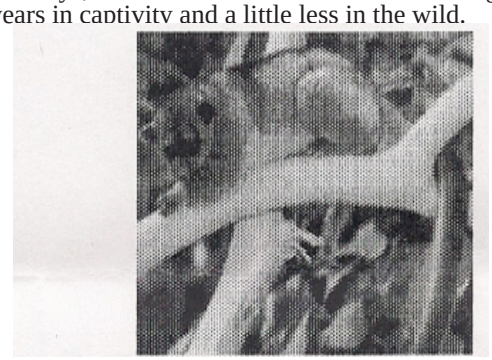

Fig.5 .Potos flavus

Porcyon cancrivorus (the crab-eating racoon) .Long and thick fur of ash-grey and reddish colour.
It gives the impression of wearing a mask on its face (black line). Long and annulated tail.Spread: from Costa Rica to Argentina, in the primary forests and more rarely in the lowlands. It can be found in the lowlands of Central and South Pacific where it is called „mapachin". It has nocturnal habits, it is generally lonely, sometimes seen in pairs or family groups. During the day it rests in tree holes, yet it is terrestrial and lives in areas near the water. It is omnivorous, its main prey is represented by crabs, river shrimps, snails, fish, frogs and certain fruits. The female has a gestation period of about two months and gives birth to 3-4 babies.

Fig .6 .Porcyon cancrivorus (mapache cangrejo)

Porcyon lotor (mapache, mapachin, northern racoon, washing bear). Its tail has 5-7 black rings, it is characterised by the black-coloured mask and the whole body is covered by long and thick, grey or dark grey fur. ***Spread:*** from the south of Canada to Panama, it was introduced in France and Russia. It is found in the wet and rainy forests and in the dry forests. It lives near rivers or waterfalls. They are nocturnal and crepuscular, they are generally seen alone. In Costa Rica they are generally seen in low and medium-height regions. It is called washing bear and mouse because it as the habit of catching the food and rubbing it in water before taking it to the mouth. For this, its hands are adapted to handling objects and the paws can support its body weight. This behaviour seems typical only of animals in captivity, although animals in the wild perform the same action. But, it is said that mapache has a deficiency of the salivary glands and therefore it must wet its food. In its natural habitat, it often rubs the food with the hand, even if it has no water. It is omnivorous, it feeds on crabs, mice, fish, fruit, eggs and certain plants, it is terrestrial and arboreal. It is active during the night and generally alone. They can gather in areas that abound in food, including the camping or garbage dumping areas in many national parks. The female has a gestation period of 73 days and gives birth to 2-6 babies which remain with their mother for 9 months. In captivity hey can live longer than 15 years, and in the wild their lifespan is 4-5 months shorter. Only the male is territorial, it is very smart and brave, therefore no felines ever hunt him.

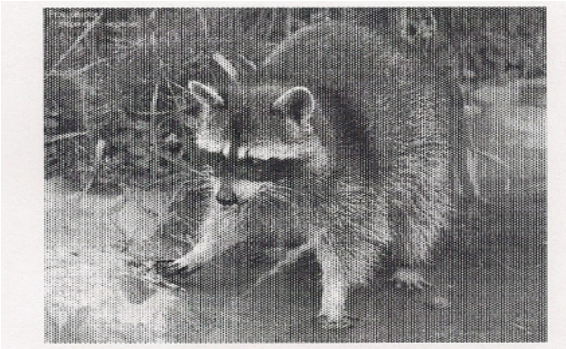

Fig.7. Porcyon lotor

Olingo is a species considered to be on the verge of extinction due to the loss of habitat caused by deforestation. It is protected and regulated by the Wildlife Conservation Law no. 7317, The Environment Organic Law no. 7554 and Decree no. 26435 – MNAE.

CONCLUSIONS

1.Costa Rica, as a first answer to the environment problem, from the moment the national parks system was created in the 1970s, has dedicated a large part of its territory to conservation, approximately 11% of the territory corresponding to national parks and 12% more having a certain degree of protection, without including private biological reserves.
2.Unfortunately, in less than 50 years, the forests in Costa Rica decreased from 80 to 20%, due to deforestations, mainly to deforestations caused for agricultural and cattle-raising purposes; in the past few years, these activities decreased their productivity and in certain areas they have regenerated, many of them being now used for ecological tourism or have simply been abandoned and are covered by secondary forests; yet, deforestation continued. The estimated deforestation rate for Costa Rica is of 450 de km^2 per year (in 2002) and 70% of the territory is now outside any protected area.
3.According to some studies, this tropical deforestation process has eliminated almost entirely the wet rainforests and the wet pre-mountainous forests in Costa Rica.
4.Precisely the loss of habitat due to deforestation is the main problem in the conservation of mammals in this country, among which the Olingo, and problems related to hunting (often very close to or inside protected areas) and environment pollution, especially sweet water pollution, are also critical.
5.The country's biological biodiversity conservation efforts must be consolidated and they are still incipient, if we take into account that in the next 30 years the human population in Costa Rica could increase by about the double of the current population.

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CONTRIBUTIONS REGARDING NITROGEN FIXATION IN THE NATURAL AREAS OF UPPER DAMBOVITA BASIN

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Key words*: Azospirillum, Frankia, Hippopheae, nitrogen fixation*

Abstract

Provided that conventional nitrogen resources are more and more expensive (Haber-Bosch method) and less accessible to the anthropic, it becomes a must to be familiar with the natural phenomenon of nitrogen fixation so as to stimulate the process and to replace synthetic fertilizers with natural ones. The paper presents the models of nitrogen fixation in three variants: 1. pattern of associative fixation under natural grasslands with prevailing gramineous flora (Azospirillum sp. and others), 2. pattern of symbiotic fixation under grasslands with prevailing Trifolium repens, and 3. pattern of symbiotic fixation in ecosystems dominated by Hippopheae rhamnoides, in symbiosis with Frankia prokaryote genus. The modelling results in establishing a very effective implementation management presented in the paper.

INTRODUCTION

Fixation of symbiotic nitrogen, free or associative, is a very useful way to replace synthetic nitrogen with natural nitrogen, less pollutant and less expensive [3], [4]. Suplimentation with synthetic nitrogen is necessary only when fixation is insufficient [5]. Fixation is also the fruit of the activity of specialized bacteria, the most important being Azospirillum (associative), Azotobacter (free) and Rhizobium or Frankia (symbiotic) [3]. In order to feed with nitrogen the natural areas in the north of Dâmboviţa basin we made condition models and also suggestions to improve the fixation, or supplement the nutrition with other forms of nitrogen, especially the grasslands and the hay-fields, and also eroded areas in order to stabilize the soil.

MATERIAL AND METHODS

Four groups of fixing microorganisms were used: free type Azotobacter bacteria fixing a small amount of nitrogen (max. 10-15 kg), associative bacteria living in the rhizosphere, especially of the gramineous, and communicating in a vectorial way with the plants (input-output) and fixing up to 80-100 kg N/ha, symbiotic bacteria fixing on the legumes roots, usually at genetical order [2] and the actinobacteria, Frankia genus fixing especially on Hippopheae rhamnoides in the studied area. Whatever the fixing pattern of atmosphere nitrogen, this is done only in the presence of nitrogenase, a MoFe coprotein, and of nitrogenase - reductase (protein F) [6]. Nitrogen fixation N º N (N2) is in itself a reduction process with a big energy consumption, according to the formula: N2 + 8H+ + 8e- + 16 ATP ® 2NH3 + H2 + 16 ADP. Energetically 1 kg of transformed nitrogen = 1 kg oil. Nitrogen fixation was indirectly measured, i.e.: a) by measuring Fe and Ca within the intraradicular area correlated with the quantity of entered ATP or ADP issued from the reaction. The work to determinate nitrogen in the upper Dambovita basin was done in the fixation areas, namely grasslands and hay-lands, and areas populated with Hippopheae r. Four patterns of fixation and accumulation came out of our work.

RESULTS AND DISCUSSIONS

Fixation and accumulation of nitrogen under the gramineous

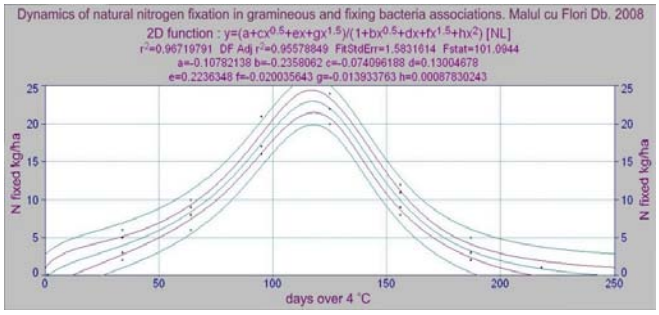

Fig. 1 – Dynamics of nitrogen fixation in gramineous and fixing bacteria associations.

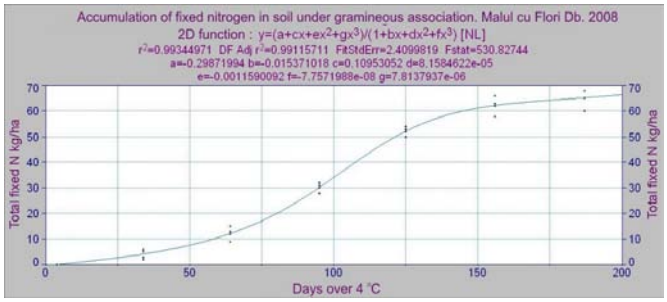

Fig. 2 – Soil fixed nitrogen accumulation under gramineous association

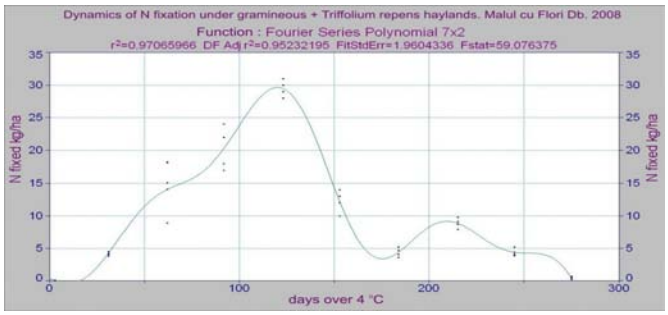

Fig. 3 – Dynamics of nitrogen fixation under gramineous grassland + clover

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association (Poa, Festuca, Dactylis). Main bacteria = Azospirillum brasiliense, as dominant, as well as others like Klebsidia and Azotobacter. Fig. 1 şi 2 present the results we got.

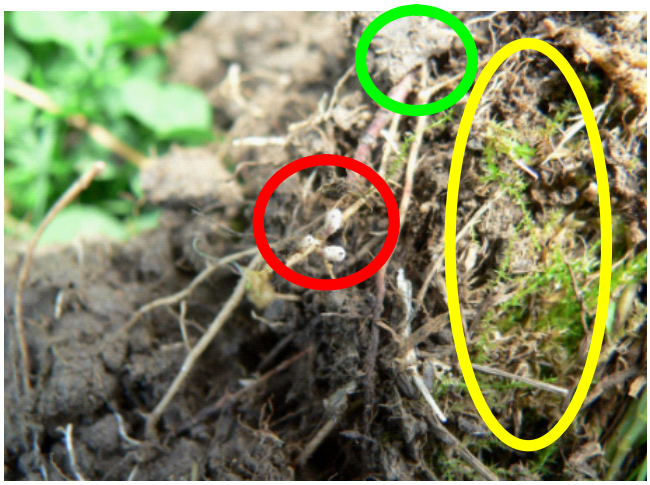

Fig. 4 - A complex of factors leading to nitrogen fixation in symbiotic. Nodosities can be noticed on the white clover (red circle), mycorrhiza and phosphorus mobilization (green circle), decay and ammonification (yellow circle). Associative bacteria are also present, but invisibile at sight.

According to fig. 1, the biggest amount of nitrogen – around 25 kg/ha is fixed in May, i.e. at abt. 100-130 days from spring coming when herbs flower and have the biggest nitrogen consumption.
Starting from our own data, the bidimensional functional pattern represented in fig. 2 was made in order to calculate the total amount of free and associative fixed nitrogen.
The function is a complex one, type „NL" describing the phenomenon with a 99% probability. This pattern leads to two conclusions:

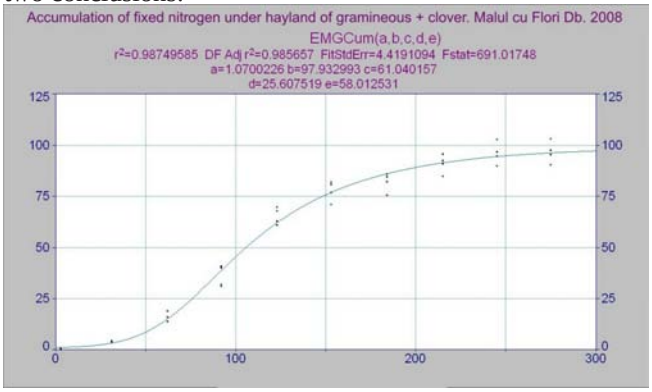

Fig. 5 – Fixed nitrogen accumulation under the hayland of gramineous + clover

a) Accumulation of nitrogen by fixation becomes maximum between 75 and 150 days from beginning of vegetation when bacteria associations fix about 80% of total nitrogen.
b) The amount of associative and free total fixed nitrogen rises to more than 65 kg/ha, which is the equivalent of 3 tons of wheat grains and about 3,4 t c.w. (complete wheat) or about 4,5 t dry hay at 12% humidity or about 25 t/ha green mass. As in the area big amounts of biomass are required, interventions are necessary, either by stimulating and increasing the amount of fixed nitrogen, either by application in stages by the pattern of consumption or fixing of elements of completion of organic elements and, in case of need, very few of the synthetic ones. For the pattern of fixing nitrogen under the hayland of gramineous + white clover the mathematical pattern is a much more complex function with a high degree of reproductibiliy (fig. 3 and 4). In the 230 days of vegetation expressed by the Fourier Series Polynomial 7 x 2 function, the biggest amount of nitrogen was achieved between the 100th and the 150th day of vegetation (30 kg/ha – month May).
Generally, the total amount of nitrogen fixed in the association gets near 100 kg, namely with more than 30 kg/ha bigger than in the gramineous association (fig. 5). We conclude that symbiotic associative mixed fixation is significantly superior to the associative one.
Our land observations show that in the superficial layer of horizon A (A1) filled with roots, dead organic matters, degradation processes are simultaneously taking place, up to ammonification, symbiosis processes, mycorrhiza and associative fixation (fig. 4). Our calculations show that with those 100 kg of nitrogen fixed by this association we can get only 625 kg protein. As in the area 1224 kg equivalent

Fig. 6 - Association formed mainly from Trifollium repens. It is the third pattern of symbiotic nitrogen fixation in the areas of grassland in the north of Dâmboviţa basin.

protein were harvested at a nitrogen consumption of 195 kg, we suppose that the other 95 kg were brought into the system through ammonification and may be by organic fertilizers.
Pattern of atmospheric nitrogen fixation under the dominant Trifollium repens population in the upper basin of Dambovita. Such an association looks like in fig. 6, where the participation of the dominant species exceeds 90%.
Figure 7 outlines an extremely high dynamics, determined especially by the climate factors and the anthropic

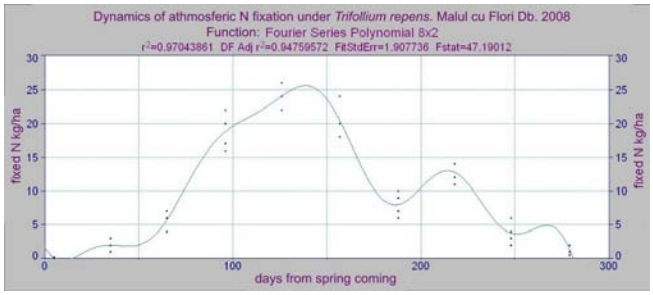

Fig. 7 – Dynamics of nitrogen fixation under the population of Trifollium repens

interventions. The increase in the rate of biological fixation begins earlier as in the previous pattern, at about 65 days from the beginning of vegetation. The maximum amount of nitrogen fixed in May exceeds a little 25 kg/ha. It is not bigger than in the gramineous + legumes association.The fact that in the other time spaces bigger fixations were kept, leads to the conclusion shown in fig. 8 that on the whole

biological dominant simbiotic fixation of nitrogen is 5 kg. approx. superior to the previous pattern, also about 100 kg/ha. Logically, we would have waited that symbiotic bacteria fix a bigger amount of nitrogen. But field studies showed that nodosities density was smaller than in a clover crop where aerobic processes would have stimulated the symbiosis. The big amount of ammoniac nitrogen generated by the decay of organic matter blocked nodosities formation due to a certain anabiosis, the clover having preferred this nitrogen to the symbiotic one. The total amount of hay (dry matter) does not excceed 7 tons, but the total amount of protein increased to about 1300 kg/ha, i.e a little bit superior to the previous pattern. We can state that, taking into account the difficulty to keep large areas with Trifollium repens, the association presented in pattern 2 can be better for the conservation of grassland areas, even for the reason that mixed association has a bigger stability in time on larger areals, and stability is given especially by a better cooperation between the two categories of species. As the animals do not need 17-18% protein in hay, the mixed association is preferred for the bigger quantities of a hay with 12-13% protein, very appropriate to feed the cattles in the area.

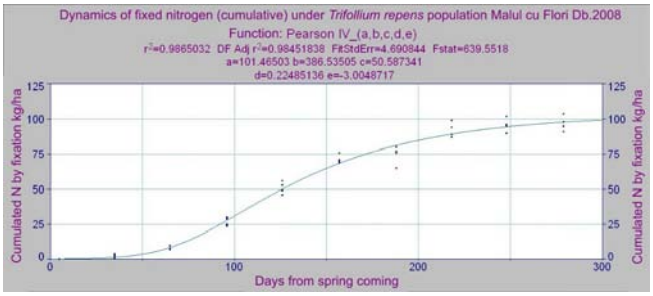

Fig. 8 Dynamics of fixed nitrogen (cumulative) under Tr. repens population

The symbiotic pattern Frankia x Hipopphae rhamnoides of symbiotic fixation of free nitrogen in the upper basin of Dambovita

For soils devoid of organic matter, those very droughty and exposed to erosion, the biological fixation becomes a problem and vegetation supply a big unknown factor. As usually, nature found the solution. The slopes in the Sub-Carpathians from the southern part of Romania are populated with a series of species which, by one side create an anti-erosional protection on soils permanently exposed to erosion,

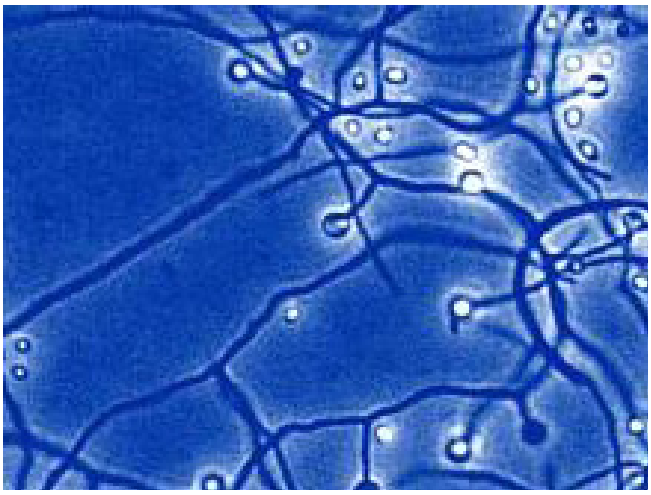

Fig. 9 - *Frankia alnus*
Genetic ACN 14a, is a symbiotic natural nitrogen fixing actinobacterium present on several species of shrubs in the Romanian Sub-Carpathians. It can be present also on Accacia species.
(Source Genoscope – Franta pl. (www.genoscope.cns.fr).

and by the other side they achieve extremeley efficient symbiosis with Frankia genus. These microorganisms were long time considered as being actinomycete. The last researches assert that they belong to some positive aerobe bacteria, made of cells which may have filaments, a kind of very fine cords which help them move through the soil (fig. 9). The above mentioned actinobacteria were isolated from the species of Alnus crispa, the most sensitive to the infections with Frankia (Berca M., 2008). In Romania, for soils very affected by erosion, M. Berca demonstrated that Hippopheae rhamnoides gets better results in erosion control. In order to fix the nitrogen Frankia uses the nitrogenasic system which follows the same way to reduce the molecular nitrogen up to ammonia which is afterwords used by plants. Morfologically, in Dambovita basin Frankia nodosities were found on all Hippopheae populations, but not in big amounts as we expected (fig. 10). However, symbiotic fixation was demonstrated and is presented in fig. 11.

Fig. 10 – Strong roots of Hippopheae rhamnoides. Frankia nodosities are very present. Due to very settled soils a big part of the nodosities were broken and they cannot be seen in the photo. (photo M. Berca).

The pattern of symbiotic fixation on Hippopheae rhamnoides is also in this case a very complex polynomial function – order 6, with a reproductibility precision of 97%. The evolution of symbiotic fixation is in many ways similar to the one of the other herbaceous patterns. Fixation begins

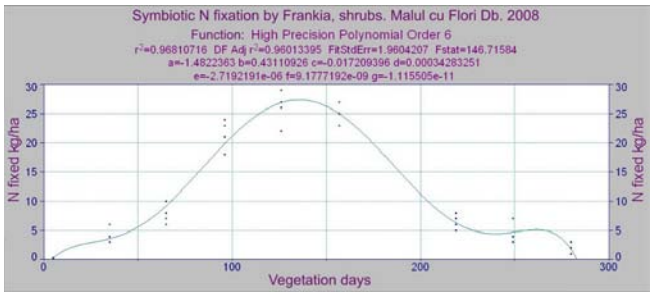

Fig. 11 - FRANKIA simbiotic fixation of nitrogen

at about 5oC, when the plant vegetation is starting and accumulates progressively, with a maximum in May/June of about 27,5 kg/ha/month. The curve is long, meaning that decrease of fixation is slower, ending at about 300 days from the beginning. During the 300 days of fixation a total amount of about 115 kg/ha nitrogen is accumulated (fig. 12).

The accumulation pattern function of nitrogen fixed by Frankia is a type NL divised exponential one, in which the probability of reproductibility in identical conditions of climate, soil and geographical position exceeds 99%. The amount of fixed nitrogen is not totally used by the plant. The

presence of fixed nitrogen within the Hippopheae rhamnoides population transforms the area in a genuine ecosystem, where a lot of perennial or annual herbaceous species associate in order to use the nitrogen. We call this phenomenon physio-nutritive attraction, all the species in the area which do not have an alternative source of nitrogen moving toward the box thorn. The root interpenetration of so many species creates a very efficient biological barrier against soil erosion, but at the same time conditions are created for the formation of a very stable profound organic soil.

Role of vegetation factors in nitrogen biology fixation modelling

As any living organisms, nitrogen fixing bacteria react in a positive way when environmental factors are favorable. Generally speaking, if aerobiosis conditions are satisfied, the main factors influencing the fixation processes are:

- soil temperature which we measured at 10 cm depth,
- soil moisture, which we expressed in % of the field capacity (FC) for water.

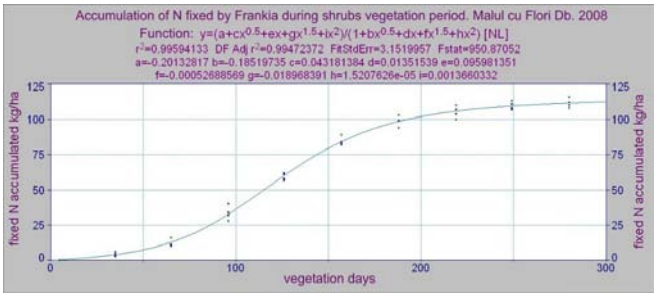

Fig. 12 – Accumulation of fixed nitrogen by Frankia on Hippophae r.

The structural architecture of soil has an important role in regulating the ratio water/air in soil. The nitrogenase, sensitive to oxygen, but also inhibitive to hydrogen surplus, acts within the soil aggregates, while aerobe bacteria act at the interface between the capilar and non-capilar spaces.

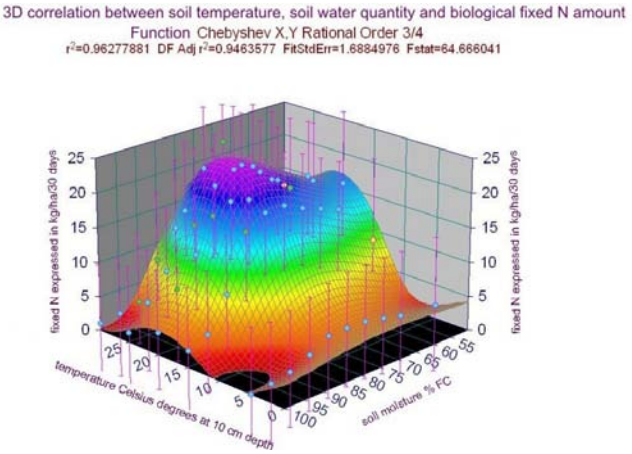

Fig. 13 – The pattern of biological nitrogen fixation depending on the soil temperature at 10 cm depth and moisture expressed in % of field capacity (FC).

The function in figure 12 is a correlation in 3-D between the above mentioned factors, which point out the following:

- The biggest amount of nitrogen per 30 days is recorded at soil temperatures between 20 – 25°C and 75 - 85% F.C.
- With any increase in moisture with 2-3% outside this interval, the biological fixation decreases with about 5 kg/ha.
- At 100% moisture fixation is 0, at 55% FC it continues to be about 5 kg/ha.
- Fixation begins at 5° whatever FC values are, and decreases at 30°C, also whatever FC values are.
- The pattern in 3D presented here below has a reproductivity of 96% and is very significant for the analysed area. The modelling of soil so that it achieves the conditions in the pattern is the key for the success of nitrogen nutrition optimization of the ecosystems we have studied.

CONCLUSIONS

1. Active processes of atmospheric nitrogen fixation, a very useful phenomenon, are taking place in the ecosystems studied in the upper Dambovița basin. Our researches showed different amounts of fixed nitrogen, depending on the vegetal association and the fixing pattern.
2. Up to 60 kg N/ha were brought into the soil by associative fixation in the haylands gramineous populations, enough for a medium nitrogen supply for the agricultural areal and a medium hay production.
3. Mixed, associative and symbiotic fixation found under the gramineous and *Trifolium repens* populations led to a good nitrogen fixation of about 100 kg/ha, enough to get a quality hay and a sufficient quantity.
4. Exclusive symbiotic fixation within the majority association which *Trifolium repens* has formed was not superior to the mixed association, the hay quantity being smaller, even if with a better protein content.
5. Symbiotic fixation *Frankia – Hippopheae*, brings into the soil a quantity of nitrogen up to 115 kg/year and has mobilized to this food numerous other annual and perennial herbaceous species which achieved an excellent ecoystem against erosion on the deficient soils.
6. Vegetation factors influence in a positive way the biological fixation, the optimum of the physiological process taking place at:

- 20-25°C temperature
- 75-80% FC (field capacity) moisture

Fixation begins at 5° and whatever the moisture, decreases significantly at 35°C.

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CONTRIBUTIONS TO MANAGEMENT IMPROVEMENT FOR PREMIUM WINTER WHEAT BREEDS

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Key words: *soil tillage management, nitrogen, Azospirillum, natural patterns*

Abstract
The need to intensify agriculture by increasing yield amount and quality, and cutting costs at the same time, requires a new approach to knowledge regarding the growing of highly productive Premium breeds. To this end two main changes are operated in the management flow of the cropping system: 1. a new soil tillage and seedbed preparation system oriented on a) soil ecologization by reactivating biological phenomena in soil, with a focus on the use of atmospheric nitrogen by biological fixation with the help of associative bacteria of Azospirillum braziliense type, and b) preserving water in soil, restructuring soil and reestablishing a balance between roots and plants; 2. a new fertilization system with synthetic nitrogen, based on natural patterns avoiding losses, pollution, and cutting costs.

INTRODUCTION

Every day of the year 200.000 more people want to live and feed better [1] and during the next 40 years, according to a FAO forecast, three other billions of people, populating the urban areas, will want the same [3]. Traditional agriculture hardly keep the pace with the increase of world population, the same about 3 billions hectars having to secure necessary food and energy to humankind. On the other side, difficult ecological problems compel superintensive agricultural technologies to give up important intput use, as fertilizers and pesticides, in order to protect the environment, to preserve natural resources, especially water, soil and air, the basis of human existence, very degraded at the moment. In these conditions the expectations are that the level of yields bringing food and their quality to decrease.
Our research team rallied to international projects in this field, launched by DLG as early as 2007, aiming to look for alternative solutions, inspired from the natural patterns which could lead to a new agriculture intensification based on the principles of economy dematerialization and respect for the inestimable values of nature.

MATERIAL AND METHOD

a. We choosed Premium wheat breeds, namely those breeds that in good crop condition yield easily 6 tons wheat/ha with at least 14% protein within the Romanian teritory.
b. We worked in Burnas Plain, Calomfireşti area. The objectives of our researches were:
study and implementation of a system of soil tillage which could keep the soil the closest possible to the natural system;
modification of wheat sowing system by reducing the sowing depth from 7-8 cm (classical recomandation) to 3-4 cm (according to our results);
a new management of the fertilization system according to the natural nutrition pattern of plants and not primarily based on farmers comfort.

Variants	Depth	Soil resistance kg/cm²	Average 0– 50 cm depth in kg/cm²	Observations
Non-tillage, determinations on stubble wheat field	10 cm	14	28,2 kg/cm²	Compacted soil unfit for wheat crop
	20 cm	22		
	30 cm	35		
	> 30 cm	35		
Scarification at 35 – 40 cm after rape stubble precursory to wheat	10 cm	14	21,2	A 25% improvement of soil physics but insufficient because it exceeds with over 50% the limits of a good soil for the wheat crop to be sowed.
	20 cm	14		
	30 cm	22		
	40 cm	27		
	> 40 cm	29		
After sun-flower scarified in 2006, 35-40 cm, disc-harrowed 2007, rape follows	10 cm	14	23,6	Soil insufficient prepared physically in order to get a good rape crop.
	20 cm	14		
	30 cm	18		
	40 cm	32		
	> 40 cm	40		
Scarification with Austrian subsoiler at 55 cm after wheat stubble	10	8	14,4	It is the only one variant for soil tillage which led the soil to a very good ecological condition on a 50 cm depth.
	20	8		
	30	16		
	40	16		
	50	16		

Table 1 – Soil resistance to penetration – Alexandria 2007

Studies were done during 2007-2008 on a chernozem soil, with an advanced degree of physical and biological degradability on Calomfireşti platform, Alexandria.

RESULTS AND DISCUSSIONS

We already showed that in Romania there are over 5 millions ha in advanced degree of ecological degradation, generated especially by hardpan formation, by the structural destruction and deterioration of the relationship water-air. On this kind

Fig. 2 Soil sequency from the settled layer. Penetrometry resistance ≈ 50 kg/cm². We have tried to penetrate the soil (pct. 1 and 2) with a pointed screwdriver, but without success.

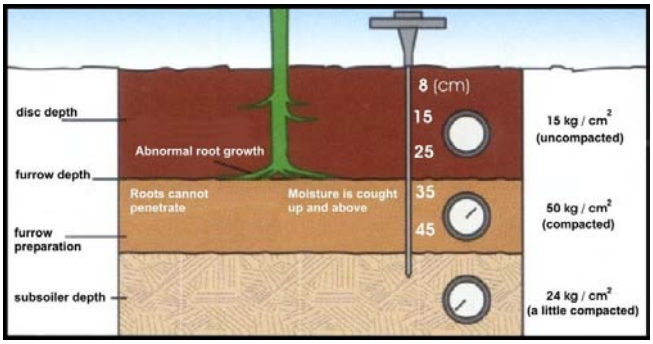

Fig. 3 – Compactity phenomenon affects seriously the soil.

by stationary water

by agricultural works

by non-tillage of soil

so looks compacted soil

penetrometer measure soil compactity

of soils during the droughty year 2007 Premium wheat yield was practically compromised. Table 1 presents results we got by testing the soil with the penetrometer in Burnas Plain.

The table shows that soils are very settled, water cannot penetrate and biological activity is not possible. Fig. 2 shows a sequency of that area hardpan. In that context, soil layers succession looks like in fig. 3 where we can see that the layer, very settled, impermeable to water, roots and microorganisms, was situated between 35-45 cm. The causes are mentioned under the figure.

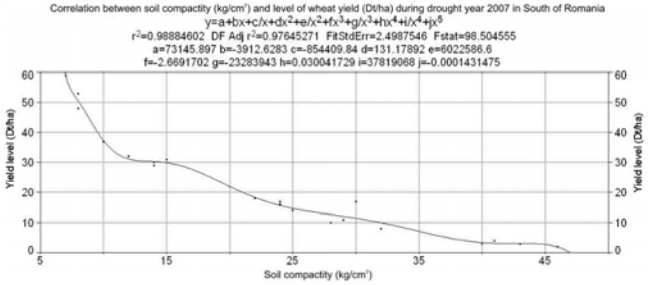

Fig. 4

These soils are called non-ecological and they need strong subsoiling interventions in order to destroy soil and remake water flows, roots in microorganisms downwards and upward. In 2007 soil compactity showed its disastrous effect on wheat yield (fig. 4).

Fig. 5 Scarifier equipment for soil scarifying up to 55-60 cm with weeds and other organic residues dislocation, vertical soil cut and horizontal weed cut at planned depth. Usually the main mass of weed is in the layer of 5-15 cm. (Photo M. Berca).

Fig. 6 Tillage of soil with tiger. (Photo M. Berca)

In this way it was demonstrated that at a 15 kg/cm2 compactity, the level of production is reduced to half. The cause of the phenomenon consists in the impossibility of roots to explore a profound soil layer, the lack of water and nutrients (fig. 9). Our studies demonstrated that the ecological reconstruction of these soils can be done as follows:

Fig. 7 Sowing machine

1. Soil scarification with big machines working in depth of 55-60 cm and 8-9 m width (fig. 5), followed by a work with a Tiger multicultivator (fig. 6) working on the same width. All weeds, including the perennial ones, (Sorghum halepense and Cirsium arvense) are dislocated and exposed to biological degradation.

Fig. 8 By profound subsoiling the massive blocks of hard soil will be wrinkled, by opening in depth ways for penetration of water, roots and other life forms. Soil vitality is restored.

Fig. 9 Hardpan destruction increases in depth roots and water access. Yield 3-4 times bigger, especially during drought.

Sowing is to be done in autumn with a big sowing machine (8 m width) equipped with a fertilizer supplying bunker, especially P and K, and their introduction at 4-5 cm under the seed (if needed).

Fig. 10 - 11

After this set of works (without ploughing) the water and the roots will penetrate through the new cracks (fig. 8) which are being formed in depth, followed by microorganisms. Soil structure will be restored and also the relationship roots/ water/air, the coming plants will develop normally and will form deep and strong roots, with favorable effects on structure, and a 3-4 times biger yield than in ecologized soils (fig. 9).

In case of severe drought, the above mentioned works can be done on straw mulch, got by its cutting by the combine (fig. 10). Straw mulch will preserve water and will secure better condition to wheat and rape sowing (fig. 11).

Before rape sowing in 2008, a very droughty year during July-August months, 4,5% more water was found in the mulched soil compared with the unmulched one. Rape could spring completely, unlike the unmulced soil which had to wait the first rain.

Fertilization: in contrast with what we know from the literature, our experiments showed that wheat does not

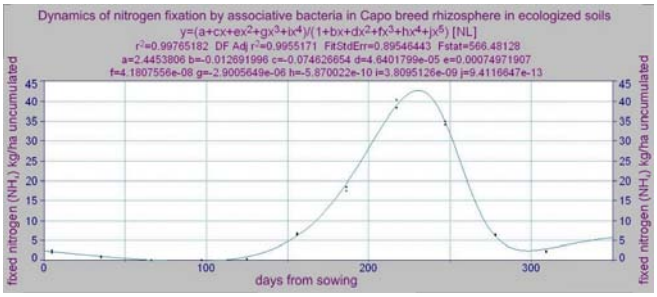

Fig. 12

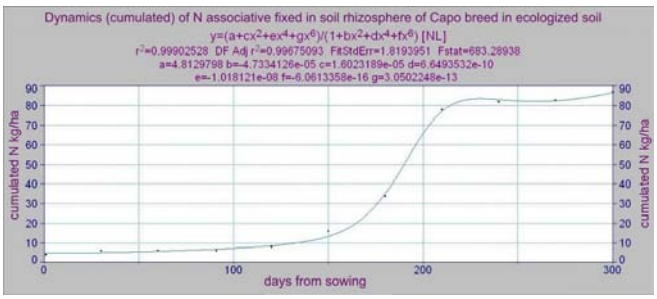

Fig. 13

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need nitrogen in autumn, especially on ecologized soils. This because we saw that in ecologized soils a series of fixing bacteria show up, of which the associative ones, Azospirillum genus. If water, air and structure conditions are good, these fix up to 90 kg/ha atmospheric nitrogen in the wheat rhizosphere, supplying a necessary for about 4 tons wheat (fig. 12). Fixation is done according to a function which practically overlaps the consumption one, a perfect communication being between the wheat plants and bacteria; the bacteria are synthesizing the needed nitrogen to secure a convenient production. Due to this reason, the function of nitrogen associative fixation shows big fixation from air of the element in April-June (with a maximum in May), after which fixation is significantly reduced (fig. 13).

In case we want to get bigger wheat yields (depending also on the climate conditions) or when the system of associative fixation does not work, we concluded, by our researches, that nitrogen must be applied in stages, at least three times in bigger doses, as the plants consumption increases (fig. 14).

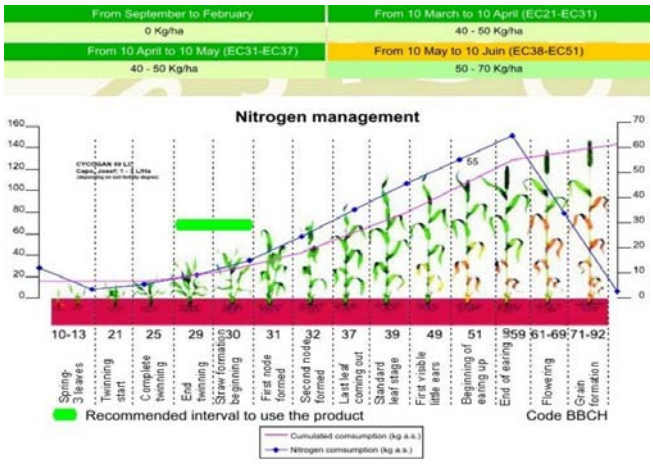

Fig. 14

Two things are achieved in this way, namely:
- increase of nitrogen agrodisponibility for plants up to 90% of the applied doses compared to 40-50% as it is in present time,
- decrease of nitrites pollution risk due to profound washing or horizontal migration toward the natural emissaries.

Fig. 15 3.12.2007. The roots of Premium Capo wheat breed have penetrated up to 20 cm depth, while the aerial part did not exceed 5 cm high and was easily twinned. Ideal situation for a good yield in 2008.

A 3-4 cm sowing depth is considered by us decisive to preserve the plant energy and formation of a single node both for twinning as for rooting. It is also decisive for crop to get into winter with a small vegetative mass and a profound root coming up, as the twins from the same node (fig. 15 and 16). Superficial sowing leads to an yield increase of 150-200 kg/ha depending on the climate conditions.

a. *b.*

Barley plants sowed at 8 cm depth (1) and 4 cm (2). Roots dimensions are equal.

30 days later the plants sowed superficially form strong and fasciculate roots and practically one single node also for roots and for twinning.

Fig. 16

CONCLUSIONS

1. Compacted soils ecologization is done by deep breaking up at 55-60 cm with special tools, scarificators and multicultivators. These works with our machines require up to 14 l Diesel oil/ha.
2. This work help to reopen water, roots, microorganisms and nutritents flows from surface unto depth. Physical and biological soil features are restored, and if there are, or are applied bacteria products, and these fix big nitrogen amounts, and K and P are mobilized, important fertilizers economy are made.
3. Up to 97 kg N/ha can be associatively fixed, according to a function and a curve which shows that this is too the anthropic pattern in order to complete the nutrition with synthetic nitrogen.
4. Our studies show that sowing at 3-4 cm leads to bigger productions than sowing at 6-8 cm.
5. Other interventions, for instance mulch application, preserve into the soil a bigger amount of water and develops a more consistent biological activity even in the first 10 cm of soil.

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THE SUSTAINABLE DEVELOPMENT IN THE RURAL SECTOR AT THE LEVEL OF CALARASI COUNTY

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Key words: *the rural, agricultural areas, sustainable rural development*

Abstract

The rural and agricultural areas represent one of the most significant contributions regarding the natural capital, the cultural heritage and the social cohesion that Romania beings to the European Union. For Romania, as member state of the European Union, the sustainable development is not one of the possible options, but the only rational perspective of national development, having as result the existence of a new development paradigm by confluence of the economic, social and environment factors.
The sustainable rural development constitutes the main strategic instrument and using it the economic and social differences that are between the rural and urban area disappear.

INTRODUCTION

The sustainable development expresses the need to harmonize the present interests with those of the future generations, it being designed as a need of reconciliation between men and nature, as a new type of development to support on long term the human progress. In Romania, the sustainable development must ensure the management of the fundamental natural resources, which are the basis of the general ecologic balance, by land, water, fauna and flora preservation, establishing a new technical and technological way of production of economic goods based on using the neo-factors, the promotion of a legislative and institutional framework for satisfying the social needs, in continuous increase and diversification, for the present and future generations. The sustainable development strategy of the Romanian economy is based on a group of general objectives that aims the formation of a functional market economy, compatible with the European Union principles, mechanisms, institutions and policies, that concern all the economic and social sub-systems, including the agriculture and the rural space. With this work we proposed a diagnosis of the steps made in the rural sector in Călăraşi county for the sustainable development.

MATERIAL AND METHOD

The environment, considered at present a political priority at international level, cannot be excluded of the Romanian economy concern. The economic development implies externalities supported by the environment, and their consideration is a condition for even the viability on long term of the process itself. The process of economic development requires the change of the natural environment, both by using environment factors as resources – regenerable or not – and by the fact that the noxa, the sub/products, the waste generated by the human activities and flowed into the environment affects, to a great or small extent, sometimes irreversibly, the ecological balance. A principle of the sustainable development is the creation of as competitive agricultural sector, to face the strong competition on the world market and using production methods and practices, to ensure the protection of the natural environment, able to ensure to obtain the quality and healthy agro food products. The agricultural definition of the rural space is given by the Recommendation no. 1296/1996 of the Parliamentary Assembly of the European Council regarding the European Card of the Rural Space. According to the Recommendation, the rural space contains an interior and coast area that contains the small villages and towns for: agriculture, forestry, aquaculture and fishing; economic and cultural activities of the inhabitants of these areas (craftsmen, industry, services); arrangement of non urban areas for spare time and pleasure (or natural reservations);other uses. The recent evolutions in the European financing system by Common Agricultural Policy (PAC) confirms two major tendencies, that could be observed even from the first years of the last decade: the predominant orientation towards funding the development programs of space and increase of financing complementarity of agriculture and rural space by other policies (especially the regional one), with the essential aim to promote the general process of economic, social and territorial cohesion. The major significance of this new financing context is that, by the community budget, the rural communities can receive at present Money to support the development strategies, and in this way the financing under programs specific to the rural sector can be correlated with financing programs, by regional policy, environment policy, enterprise policy, education policy, etc. in order to benefit efficiently by the community interventions system, the major problem for the Romanian rural communities is related to: the identification of different financing opportunities; the elaboration of project pipeline corresponding to their own development needs; finding co/ financing sources.
The territorial administrative organisation of Călăraşi county contains 50 communes and 159 villages. The county

population was on 1st January 2007 of 315440 inhabitants (1,4% of the country population). From the point of view of sector distribution, 61% of the county population lives in the rural area, the urbanisation level of the population being under the country average. The main population in the rural area has a school formation limited to the primary education at the most secondary education respectively:

* one third of the population has only primary training – 32, 4%;
* on first followed the secondary school courses – 34,6%;
* a significant percent of inhabitants did not graduate any form of school – 6,9%.

Only 1% of the village inhabitants graduated a high education institution. Most graduates of high education live in town, even if thy work in the rural area, preferring to commute. The effects of this situation reflect in the less diversified economic activities; agriculture practiced in a not performing way, without modern technique and technologies. By the study made we found out that a stringent problem at the level of rural localities was and is the problem of waste and water pollution. At the level of calarasi county projects on waste management were implemented in and for the improvement of the drinking water quality in Lupsanu commune. At present projects on sustainable system of waste management are being developed in Independenta, Cuza-Voda, Gradistea, Alexandru Odobescu, Valcelele, Ciocanesti ,Vlad Tepes , jegălia and borcea communes. The pilot project „*Pollution control in agriculture*" developed during 2002 – 2006 and had as general objective: long term reduction of nutrients and other polluting agents quantities that reach into the Danube and implicitly in the Black Sea, by means of an integrated management of soil and water and sustainable ecologic use of natural resources in two embanked precincts by harmonious combination of techniques in agriculture friendly for the environment with the ecologic reconstruction of Boianu-Sticleanu area. The most important component of the project referred to the implementation of a system of manure management produced in the individual households of the population of the 7 communes in the county : Al.Odobescu, Ciocanesti, Cuza Voda, Gradistea, Independenta, Valcelele, Vlad Tepes. The total value of the project was of 10,8 mil. USD, of which : 5,15 mil. USD World Bank, of funds from Global Environment Facility (GEF); 1,86 mil. USD Romania Government, 0,29 mil. USD Calaraşi County Council, 1 mil. USD of Government project "Support of services in Agriculture"; 2,5 mil. USD direct beneficiaries, in kind. The project results were the achievement of 15 platforms for manure storage at the level of commune and 2250 de individual platforms for manure storage and afforestation of a surface of 1207 ha during 5 years. In the period 2002 – 2007 "Rural development project" was implemented in 22 communes in the county with a total value of 7 mil. USD, project based on the principal of citizen participation in the community development and building of local capacity to plan and achieve efficient investments in infrastructure (roads and water supply) to allow the improvement of the living standards in the rural area. in 20 communes in Calarasi county, in the period 2004 -2005 the project "Calarasi village – European village" was developed with the value of 36.000 thousand euro, funded under Phare Europe 2004 Program. In the period 2000 – 2006 6 projects under SAPARD program were developed for the rehabilitation and modernisation of the water supply networks in Mitreni, Spantov, Sarulesti, Gradistea, Dragalina, Alexandru Odobescu commune, with total value of 8.175.757 RON. The population awareness by means of information events were achieved to a certain extent, but these events have to be permanent.

		2008	2009	2010	2011	2012	2013
1.	Municipal waste (domestic waste and assimilated from commerce, industry, institutions, of which:	87,091	87787	88,016	88,540	89,068	89,598
1.1	Domestic waste (collected mixed and separately)	59,869	60357	69,032	70,009	70,995	71,990
	Urban	39,301	39625	41,618	41,846	42,075	42,306
	Rural	20,568	20732	27,414	28,163	28,920	29,685
1.2 + 1.3	Waste assimilated from commerce, industry, institutions (collected mixed and separately)	8,325	8,392	8,459	8,527	8,595	8,664
1.5	Waste from gardens and parks	4,163	4,196	4,229	4,263	4,297	4,332
1.6	Waste from markets	1,041	1,049	1,057	1,066	1,074	1,083
1.7	Street waste	2,810	2,832	2,855	2,878	2,901	2,924
1.8	Generated and not collected domestic waste	10,883	4,269	2,384	1,798	1,205	606
	Urban	2,068	1,314	0	0	0	0
	Rural	8,815	2,954	2,384	1,798	1,205	606

Table 1. Prognosis of quantity generated of municipal waste for Caalrasi county in the period 2008 – 2013

RESULTS AND DISCUSSIONS

For the period 2008- 2009 the prognosis of the waste quantity generated by the rural sector (Table 1) shows that the waste will increase and the generated and not collected waste will increase from 2008 until 2013. It can be seen in this prognosis the concern for the waste management in the rural area. Within all urban and rural localities there are places designated for the waste disposal, but they do not have any protection measure of the environment factors and population health. Their location is, in most cases, inadequate, thus endangering the drinking water supply sources of the localities and the landscape. In many rural localities in the county the waste collection is not made in a systematic way, the statistics maintaining that the waste are transported individually by the citizens in the places managed by the town hall, were the disposal is tolerated. But as a rule, in order to avoid the transport, a large quantity of waste is thrown at random, producing a diffuse pollution at the level of the localities, with negative repercussions on the underground and surface water, on soil and water and with negative effects on the sustainable development of the localities and on the living conditions of the population.

Thus it results that it is very important that the responsible bodies, in the rural area, to think of optimal variants of waste management.

CONCLUSIONS

Although agriculture, by its biological nature, should contribute to the protection and improvement of environment quality, still the practice of some irrational agriculture systems can lad to the deterioration of the natural environment and the agriculture can become pollution agent of its own environment that is part and that ensures its functioning.

Putting into practice the concept of sustainable development must taking to account the need of compatibility of the main orientations of the sustainable development of agriculture and rural area and practicing ecological agriculture and zootechny. The ecological agriculture is practiced on a surface of 2154 ha on the territory of Calarasi county.

It is needed the increase of the surfaces destined to the ecologic agriculture and creation of an internal market of ecological products, with a potential contribution to the satisfaction of the society need of healthy products, not affected by pollution, food safety and development of some activities compatible to the natural environment, ensuring thus the ecological balance;

An acute problem at the level of rural localities was and is the problem of waste and water pollution. At the level of calarasi county projects on waste management were implemented but this action not being sufficient, it is needed to be completed by the population education in the rural area, for the waste management.

In calarasi county the impact of the agricultural sector on the environment is due to the excessive use of chemical fertilizers, of inadequate application of pesticides, insecticides, fungicides, herbicides and of zootechny (especially pig and poultry breeding), the pollution being very powerful, especially at the farms that do not have cleaning stations (or if there are, they do not function at the designed parameters), the waste spreading on the soil.

The sustainable use of the soil at the level of Calarasi county can be achieved by a system or organised measures, of adequate works / starting with the juridical provisions, economic facilities, continuing with the production management – and not at last – by recovering the agricultural lands affected by the destabilising and limitative factors (that needs energetic interventions of investments for ecological reconstruction)

It is very important to find remedies to solve the delays in the three dimensions of the sustainable development: the economic problems must be balanced with the problems related to the social and ecological good. So it is needed its practice for the promotion of the nature preservation and poverty elimination.

8. As a result of organisation of agricultural exploitation based on sustainable development, the infrastructure development and improvement will take place but associated to the requirements of the agriculture development. These are the main effects of practicing the sustainable agriculture. The population will have to be well informed in order to determine it to participate in the costs that involve the practice and development of a sustainable development.

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THE WORLD ECONOMIC CRISIS. THEORETICAL AND METHODOLOGICAL APPROACHES

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Keywords: *economic, crisis*

Abstract
Nowadays ample debates are in progress regarding the essence and the way of going on of economic downturn, a component part of actual crisis. That is why the theoretical approach of this complex process appears as a necessity for a deep understanding and economic, social and human implications which could affect the economy of the world. Also, it appears as a necessity the using of some specific methods and instruments recommended by the theorists of neoliberalism and even of dirigisme.

INTRODUCTION

Overproduction manifests the tendency to extend, faster or slower, over the all main production branches of a country economy, over its areas, that the overproduction is internationalized through containing other countries, becoming mondialized. Simultaneously it is manifested the tendency to transform a overproduction crises into a general economic crises, which includes besides the production and consumption, the other moments of the economic movement – the repetition and exchange.

MATERIAL AND METHOD
The causes of the overproduction economic crises are explained through different theoretical approaches. The phenomenon is explained by the errors which people perform or through the consequences of some objective necessities.
Supporters of the idea of economic crises as a consequence of human errors distinguish two errors categories. Thus the classical authors state that "the obstruction of a market" wouldn't exist if the people respected the natural mechanisms. For the authors with socialist orientation, opposed to the universalist and absolutist conceptions of the classics, the errors belong to the juridical organization of the capitalist society, to the wrong allocation of the incomes created in production.

The second theoretical approach indicates the crises as consequences of some necessary mechanisms. It is expressed in three theoretical ways. The first is the consequence of physical, naturalist approach of the crises.
The authors consider that to the origin of economic crises are natural causes, which disturbs the processes in agriculture and disadjust the production apparatus.
The credibility of this explanation is weak. The second theoretical version is named the technical version. This version puts as a basis of overproduction crises explanation, the technical and technological factors. The third version is the economic variant of crises explanation. According to these teories, the explanation of crises is in the economic processes.

In his work Business Cycles: The Problem and its Setting, Wesley Mitchell defines, in a general way, the cycle as being the fluctuations of whole economic activity. In his opinion, the economic cycle doesn't represent a unique phenomenon but "a whole conglomerate of phenomena linked together." There are retained the following elements for defining the cycles:
The fluctuation, as a present phenomenon in movement;
The succession of some moments or phases in movement;
The reiteration of the repeatability of the succession;

CONCLUSIONS

Trying to formulate a synthesis of the results of methodological approaches to examine the economic cycle, we would say those are characterized by the following characteristics:
1. The economic cycle represents a complex fluctuation of the economic activity;
2. The economic cycle comprises a succession of fluctuations to some different phases, stages of the economic movement;
3. The economic cycle is defined by the repetition with a certain regularity of the succession of fluctuations. This means that no any periodicity of the economic movement is a cycle periodicity;
4. The economic cycle constitutes the mechanism of interaction between the disorderly impulses and economic system, and between the fluctuations which give it content.

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QUALITATIVE CHARACTERISTICS OF THE WINE OBTAINED FROM SAUVIGNON GRAPES' VARIETY, DERIVED FROM WINE-GROWING CENTRE OSTROV, ALONG THREE SUCCESSIVE CROPS 2004, 2005 AND 2006

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Key words: *Sauvignon wine, quality, physical and chemical characteristics, statistic differences*

Abstract
There have been analysed the physical and chemical characteristics (d^{20}, alcohol % vol., total dry extract mg/l, free sugar g/l, unreducing extract g/l, total acidity g/l $C_4H_6O_6$, free SO_2 mg/l, total SO_2 mg/l) definitive for the wine quality made from the Sauvignon grapes'variety, in three successive years:2004, 2005 and 2006.The climatic peculiarities of the mentioned years, determined the appearance of some quality statistic differences, as follows: d^{20}_{20} decreased very significantly in 2005 and 2006 comparative to 2004, the quantity of alcohol increased significant in 2005 and 2006 comparative to 2004, free sugar decreased very significantly in 2005 and 2006 comparative to 2004, the total dry extract and unreducing extract decreased very significant in 2005 and 2006 against 2004 and the total SO_2 content was very significantly lower in 2005 and 2006 against 2004. There have been observed no differences between the annual crops, concerning the parameters: total acidity and free SO_2. Conclusevely, the wine from 2004 was demidry, more sulfiteted, comparative with the wines from 2005 and 2006.

INTRODUCTION

The analysed wine was obtained from Sauvignon grapes'variety within commercial company S.C. OSTROVIT S.A., which belongs to the wine-growing centre Ostrov from Ostrov Vineyard, placed in the region of the Danube Terrace. The temporal character of the precipitations determined the droughty specific of the zone, affecting the productive potential of the wine grapes cultivated here. The years 2004 and 2005 were exceptions, because the precipitations' amount was more over the annual average registered so far (the wine obtained having a less content of sugars and a higher acidity). Instead, 2006 was less rainy.
This study recommends a comparative characterization of the dry wine's quality, obtained from the Sauvignon grapes'variety, made by S.C. OSTROVIT S.A., in the production years: 2004, 2005 and 2006. The physical and chemical analysis emphasised the wine's peculiaryties, in the preceding stage of bottling and commercialization. The Sauvignon wine is characterized through discreet and meloudiously flavour, having the alcohol content between 11,88 and 12,5 % and being registered in the category of superior wines [1, 6, 9].

MATERIAL AND METHOD

There have been taken for analysis samples of unbottled wine, from the Sauvignon grapes'variety, three successive years, as follows: 10 repetitions in 2004, 11 repetitions in 2005 and 10 repetitions in 2006. There have been analysed the following quality parameters of the wine: d^{20}_{20} (picnometric method STAS 6182/8-71), alcohol % vol. (picnometric method STAS 6182/6-70), total dry extract mg/l (densimetric method STAS 6182/9-80), free sugar g/l (iodometric method STAS 6182/18-81), unreducing extract g/l, total acidity g/l $C_4H_6O_6$ (titrimetric method STAS 6182/1-79), free SO_2 mg/l (iodometric method STAS 6182/13-72) and total SO_2 mg/l (iodometric method STAS 6182/13-72) [2,7,8,9]. The obtained results were statistical processed using the professional program COHORT [3].

RESULTS AND DISCUSSION

In the first table are presented the quality parameters'values of the Sauvignon demidry wine, concerning 2004 year. It is noticed that the qualitative main parameters of the wines obtained from Sauvignon grapes'variety had the typical values for the white wines, of superior quality.

The average value of the Free sugar parameter overtakes the normal limits, for placing the wine in dry wines category (max. 4g/l). The obtained wine could be characterized as demidry. The variation coefficients have relative normal values, except the variation coefficient associate to the Free sugar parameter (39,2%), who passed the normal limit. The values of variation coefficients of the others parameters, for example: Alcohol (5,7 %), Total dry extract (8,4 %), Total acidity (7,89 %) and Total SO_2 (10,68 %), were in normal limits [4, 9].
In the second table are distinguished the average values of the quality's parameters of the wine obtained in 2005.

The parameters' values are placed in admitted limits for the dry wine and superior wines category. The variation coefficients associate of the environments are relative minor, excepted Free sugar parameter, for which it was noticed an characterized as dry. Concomitantly, it was remarked the increased values of the variation coefficient of the parameters

Parameter	Normal limits	$\overline{X} \pm s_{\bar{x}}$	s	CV %
d2020 (g/ml)	0.983-1.003	0,9955 ± 0,0014	2E-06	0,140
Alcohol (vol %)	10.5-12.5	11,880 ± 0,677	0,459	5,710
Total dry extract (g/l)	18-24	29,480 ± 2,474	6,124	8,400
Free sugar (g/l)	Max. 4 g/l	6,855 ± 2,687	7,222	39,2
Unreducing extract (g/l)	Total dry extract – Free sugar	22,900 ± 1,014	1,030	4,430
Total acidity (g/l C4H6O6)	4.5-9	5,444 ± 0,427	0,182	7,890
Free SO2 (mg/l)	Max. 50	40,000 ± 0,000	0,000	0,000
Total SO2 (mg/l)	Max. 200	177, 222 ± 18,919	357,944	10,680

Table 1. The variability estimates of the physical-chemical parameters, according to 2004 crop (n =10)

Parameter	$\overline{X} \pm s_{\bar{x}}$	s	CV %
d^{20}_{20} (g/ml)	0,9931 ± 0 001	1,1E-06	0,110
Alcohol (vol %)	12,400 ± 0,309	0,310	2,500
Total dry extract (g/l)	23,872 ± 0798	0,638	3,350
Free sugar (g/l)	2,109 ± 0,713	0,509	33,810
Unreducing extract (g/l)	21,800 ± 0,527	0,278	2,420
Total acidity (g/l $C_4H_6O_6$)	5,141 ± 0,233	0,054	4,530
Free SO_2 (mg/l)	38,872 ± 4,149	17,218	10,840
Total SO_2 (mg/l)	133,636 ± 17,636	311,054	13,200

Table2. The variability estimates of the physical-chemical parameters, according to 2005 crop (n =11)

Parameter	$\overline{X} \pm s_{\bar{x}}$	**s**	**CV %**
d^{20}_{20} (g/ml)	0.9930 ± 0.001	1.384E-06	0.110
Alcohol (vol %)	11.910 ± 0.536	0.288	4.500
Total dry extract (g/l)	22.841 ± 2.348	5.514	10.279
Free sugar (g/l)	1.880 ± 0.907	0.823	48.244
Unreducing extract (g/l)	20.150 ± 3.299	10.887	16.372
Total acidity (g/l $C_4H_6O_6$)	5.319 ± 0.202	0.041	3.797
Free SO_2 (mg/l)	35.700 ± 6.848	46.900	19.182
Total SO_2 (mg/l)	115.700 ± 14.221	202.233	12.290

Table 3. The variability estimates of the physical-chemical parameters, according to 2006 crop (n =10)

increased value of 30 %. The variation coefficients over 10% were registered in the case of Free SO_2 and Total SO_2 also [6, 7]. The results obtained for variability estimates of the physical-chemical parameters, according to 2006 crop, are presented in the table 3.

The parameter who had the higher variation coefficient was Free sugar (48.244%). It was also observed a relative increased value of the variation coefficient of Free SO_2 Unreducing extract and Free SO_2 [1,5].

As to the meaning of averages' differences between investigated parameters, on crops' pairs, the results obtained , as a result of the test t (Student) application are presented in the table 4.

The density of the wine decreased very significant in 2005 ($4,492^{***}$) and in 2006 ($5,629^{***}$) comparative to 2004 (figure 1).

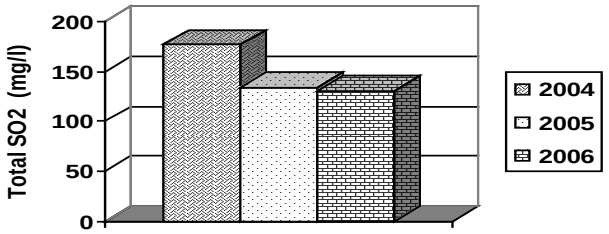

Figure 1. The meaning of averages' differences (t test) for wine's density d^{20}_{20}

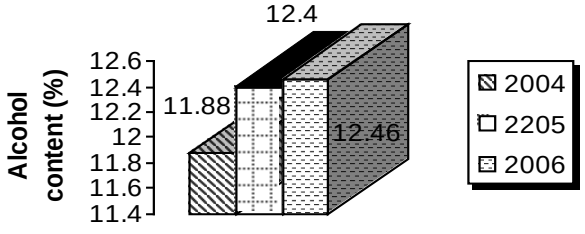

Figure 2. The meaning of averages' differences (t test) for wine's content in alcohol

(19.182%). Because the Free sugar value for 2006 was relative decreased, the obtained wine of this year was

The content (concentration) in alcohol registered along of the period, a significant increase in 2006 (2,179 *),

Parameter	Pears	Average (a)	Average (b)	t
d^{20}_{20} (g/ml)	2004 (a) – 2005 (b)	0,9955	0,9931	4,492***
	2004 (a) – 2006 (b)	0,9955	0,9926	5,629***
	2005 (a) – 2006 (b)	0,9931	0,9926	1,262
Alcohol (vol %)	2004 (a) – 2005 (b)	11,880	12,400	2,224
	2004 (a) – 2006 (b)	11,880	12,460	2,179*
	2005 (a) – 2006 (b)	12,400	12,460	0,334
Total dry extract (g/l)	2004 (a) – 2005 (b)	29,480	23,872	6,849***
	2004 (a) – 2006 (b)	29,480	23,560	7,043***
	2005 (a) – 2006 (b)	23,872	23,560	0,807
Free sugar (g/l)	2004 (a) – 2005 (b)	6,855	2,109	5,151***
	2004 (a) – 2006 (b)	6,855	1,677	5,615***
	2005 (a) – 2006 (b)	2,109	1,677	1,406
Unreducing extract (g/l)	2004 (a) – 2005 (b)	22,900	21,800	3,127**
	2004 (a) – 2006 (b)	22,900	21,703	2,890*
	2005 (a) – 2006 (b)	21,800	21,703	0,334
Total acidity (g/l $C_4H_6O_6$)	2004 (a) – 2005 (b)	5,444	5,141	2,024
	2004 (a) – 2006 (b)	5,444	5,284	1,045
	2005 (a) – 2006 (b)	5,141	5,284	1,567
Free SO_2 (mg/l)	2004 (a) – 2005 (b)	40,000	38,272	1,381
	2004 (a) – 2006 (b)	40,000	41,800	0,557
	2005 (a) – 2006 (b)	38,272	41,800	1,101
Total SO_2 (mg/l)	2004 (a) – 2005 (b)	177,222	133,636	5,323***
	2004 (a) – 2006 (b)	177,222	130,600	6,416***
	2005 (a) – 2006 (b)	133,636	130,600	0,462

Table 4. The meaning of averages' differences (t test) for all the quality parameters, between the annual crops

comparative to 2004. The evolutions are synchronous with those of the Free sugar parameter, in the analysed period, which registered a very meaningful decreased, from 6,855 g/l to 1,677 g/l. This fact suggests that the hypothesis of the wine concentration increase, due to free sugar, in the case of Sauvignon grapes' variety, might be valid (figure 2) [1,5,6].
Total dry extract decrease very significant in 2005 (6,849*******) and 2006 (7,043*******), comparative to 2004 and for Unreducing extract the tendency is similar, respective it is distinctly significant increased in 2004 (3,127**), comparative to 2005 (figure 3).
For Total acidity and Free SO_2 there were not observed

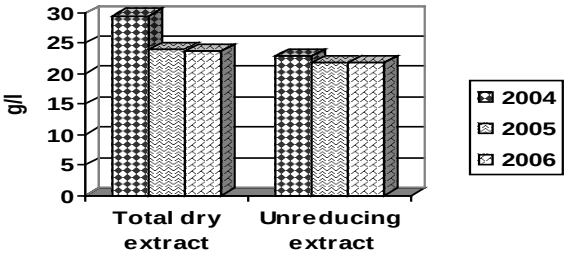

Figure 3. The meaning of averages' differences (t test) for wine's unreducing extract and total dry extract

significant differences between the wine prbes derived from the three analysed annual crops. Total SO_2 parameter was significant decreased in 2005 (5,323*******) and 2006 (6,416*******), comparative to 2004 (figure 4).

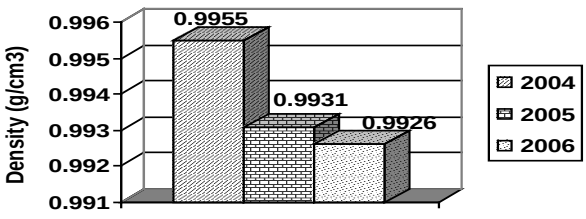

Figure 5. The meaning of averages' differences (t test) of wine Total SO_2

CONCLUSIONS

1. Concerning the Sauvignon grapes'variety we noticed that the investigated parameters were specific for the sort (white, dry or demidry, superior), but there were affected by high and very high variations.
2. Concerning the 2004 crop, the average value of the Free sugar parameter oversteped the limits of the dry wines (max. 4g/l), the obtaining wines beeing characterized like demidry.
3. On the ensemble of the anlysed period, the variation coefficients associated to the averages of the investigating parameters, had relative normal values, except the variation coefficient of the Free sugar parameter, which registered higher values than 30%, for each crop.
4. The parameters bound to the sulphitation of the wines had variations higher than 15%. A relative increased value of the variation coefficient was also notice in the case of the Total dry extract.
5. Obvious differences between the physical-chemical parameters had been registered between the 2004 and 2006 crops, respectively 2004 and 2006 crops.
6. Concerning the crops coming from successive years, namely 2005 and 2006, there were no important differences between the average values of the physical-chemical parameters.

7. The wine coming from the Sauvignon grapes'variety was characterized by typical relations between the parameters concerning the sulphitation of the wine (Free SO2 and Total SO2). Regarding this, Free SO2 correlated with Alcohol content and Total SO2 correlated with Total dry extract and Unreducing extract.
8. The climatic differences of the investigated years crops did not introduce fundamental modifications in the wines quality, even if some physical-chemical parameters varied specificaly (example: Free sugar).

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MODULAR TEXTILE COVERINGS MEANT FOR PLANT PROTECTION AND MULCHING

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Key words: *woven fabric; coverage degree; plant protection, shading cover, mulching cover*

Abstract

INCDTP accomplished new textile structures with applications in horticulture, for the plant protection (as covers) against: excesive heat; wind, rain, hail, insects and birds. The new woven fabrics CERTEX were made of UV resistant polyethylene monofilaments, with 35-60% cover degrees, and are: a) Permeable to air and water; b) Durable, by the polymer UV stabilization; c) Reflecting the solar radiation, so that the plants and the soil water content are protected by the excessive solar heat; d) Crop enhancing, because the soil cover will physically block the weed development and the crop will use all the soil nutrients. The textile structures were experimented under real utilization conditions, with good results, as shade and mulch covers installed in the USAMV Bucharest glass greenhouse.

INTRODUCTION

INCDTP accomplished new textile structures with applications in horticulture, for the plant protection (as covers) against: excesive heat; wind, rain, hail, insects and birds. The new woven fabrics CERTEX were made of UV resistant polyethylene monofilaments, with 35-60% cover degrees [1], and are: a) Permeable to air and water; b) Durable, by the polymer UV stabilization; c) Reflecting the solar radiation, so that the plants and the soil water content are protected by the excessive solar heat; d) Crop enhancing, because the soil cover will physically block the weed development and the crop will use all the soil nutrients. The textile structures were experimented under real utilization conditions, with good results, as shade and mulch covers installed in the USAMV glass greenhouse.

MATERIAL AND METHOD

The new woven fabrics CERTEX were projected from UV resistant polyethylene monofilaments, with plain weave and different cover degrees (between 35-60%), and were accomplished on a gripper weaving machine, under normal technological conditions. The woven fabrics were converted into shading and mulching covers (by adapted confectioning technologies) so as to include: a) flexible metallic/textile sustaining cables, in the shade cover; b) three textile components that can be reunite optionally, at any distance between plants on row, in the mulch cover. The new woven textile structures were installed in the USAMV glass greenhouse and experimented between 27.07-2.10.2008, under real utilization conditions, for a Lucia half-early maturing variety eggplant culture, with 3.1 plants/m^2; the reference element was the same culture without shading, without mulching.

RESULTS AND DISCUSSIONS

Table 1 contains the fabric characteristics, as value limits; the average distances between the successive warp/weft yarns assure the fabric insect-proof efficiency.

The microscopic and real aspect of the CERTEX 35-60 woven fabrics are shown in figure 1; the fabric code indicates the cover degree, in percents.
The module dimensions of the shading and mulching covers

Characteristics	Value limits
Woven fabric cover degree, %:	
-shading cover:	35; 40; 45; 50; 55; 60
-mulching cover:	55
Average dimensions of the distance between the successive warp and weft yarns, mm:	0,26 ¸ 0.71
Mass, g/mp:	94-140
Warp breaking resistance, daN:	70 ¸ 98,4
Weft breaking resistance, daN:	39,2 ¸ 63,6

Table 1 – The characteristics of woven fabric for plant and soil protection

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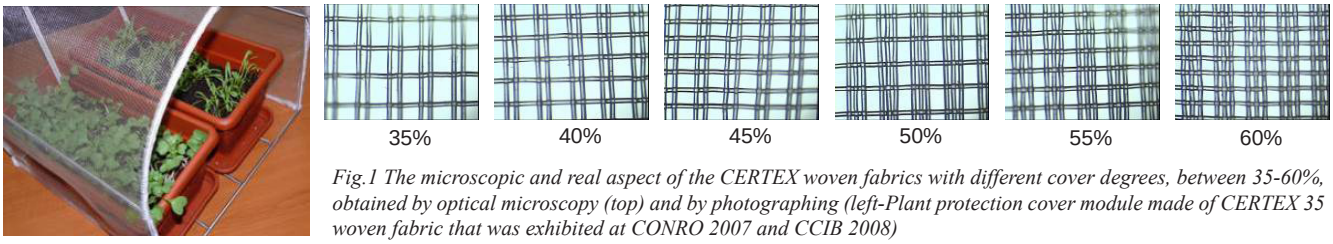


Fig.1 The microscopic and real aspect of the CERTEX woven fabrics with different cover degrees, between 35-60%, obtained by optical microscopy (top) and by photographing (left-Plant protection cover module made of CERTEX 35 woven fabric that was exhibited at CONRO 2007 and CCIB 2008)

are included in Table 2; some significant aspects during the agro-technical experiments are presented in figure 2.

Characteristics	Values
-Shading modular cover length, m:	Multiple of 5 m
-Shading modular cover width, m:	Multiple of 1.3 m
-Length of mulching modular cover for two plant rows, m:	Multiple of 5 m
-Width of mulching modular cover for two plant rows, m:	2 x distance between rows;
-Distance between rows, m:	Any distance, till 1.35 m
-Distance between plants on the row, m:	Any distance

Table 2 – The characteristics of the shade and mulching modular covers

The results of the agro-technical experiments were successful, confirming the general positive influences of the shading cover (fig.3) and mulching cover (fig.4) on the egg-plant development and production indexes and closely correlated with the CERTEX woven fabric cover degree (35-60%), reffering on:

- Average plant hight, cm;
- Average plant branches number;
- Average plant leaves number;
- Average plant flower number;
- Average plant fruit number;
- Average fruit mass, grams;
- Average production/m^2.

Figure 3 and 4 present the most important production indexes (average plant fruit number; average fruit mass, grams; average production/m^2) that clearly show, by superior obtained values, the positive influences of the shading and mulching covers on the egg-plants cultivated in the glass greenhouse, by comparison with the same culture without shading, without mulching, under similar agro-technical conditions (3.1 plants/m^2; the same egg-plant variety; the same soil; the same greenhouse; the same agro-technical operations). The mulching cover made of transparent CERTEX 55 woven fabric contributed to the weed development diminishing (table 3) and the egg-plant better development (root volume: +5.0 cm^3; root mass: +29.9 g: plant mass: +147.6 g; fruit mass: +34.9 g):

Variant	Repetition	Weed species	Weeds/0,25 m^2	Height, cm	Phenophase	Significance
Refference, without shading, without mulching	1	Digitaria sanguinalis	12	5-25	A,C,D	A = plants in rosette or stem phase; B = plants with flower buds; C = plants with flowers; D = plants with fruit; E – plants that was disseminated.
		Oxalis corniculata	35	2.5-5	A,B	
		Portulaca oleracea	1	3	A	
		Stellaria media	10	3-10	A	
	2	Digitaria sanguinalis	13	5-30	A-D	
		Amaranthus retroflexus	1	19	D	
		Sonchus spp.	1	7	A	
		Portulaca oleracea	2	7-9	A	
		Oxalis corniculata	10	2.5-7.5	A	
	3	Echinochloa crus -galli	1	18	C	
		Galinsoga parviflora	2	11-15	C	
		Oxalis corniculata	8	2.5-6	B	
		Stellaria media	1	5	B	
		Solanum nigrum	1	20	B-C	
CERTEX 55	1	Digitaria sanguinalis	2	5	A	
		Stellaria media	3	2.5-3	A	
		Oxalis corniculata	4	1.2-2	A	
		Portulaca oleracea	1	2	A	
	2	Digitaria sanguinalis	1	3	A	
		Stellaria media	2	2.5	A	
		Oxalis corniculata	4	1.2-2.5	A	
	3	Digitaria sanguinalis	1	2.5	A	

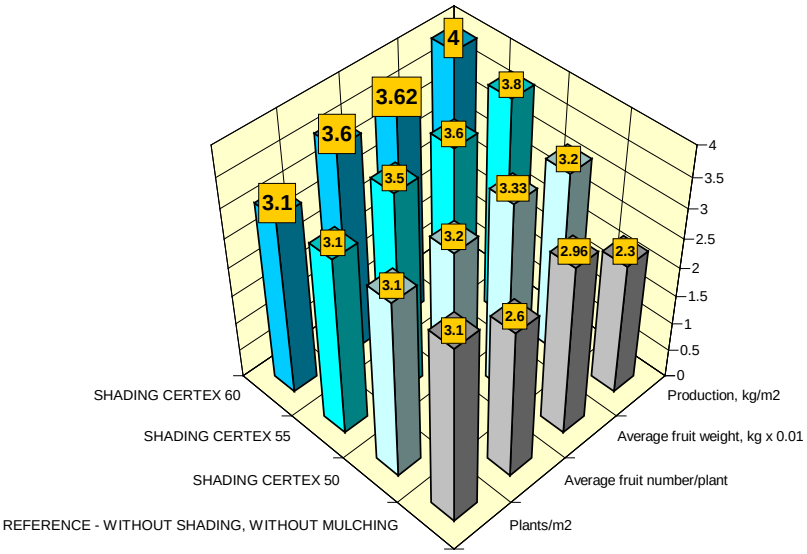
Table 3 – The weed development in the mulched and refference egg-plant culture

CONCLUSION

The shading and mulching modular covers made of the new CERTEX woven fabrics with 35-60% coverage degree, confirmed their positive influences on the egg-plants cultivated in the USAMV Bucharest glass greenhouse, by the production indexes increasing (shading 50-60%: 3.2-4.0 kg/m^2; mulching 55%: 3.7 kg/m^2), by comparison with the reference culture, under similar agro-technical conditions

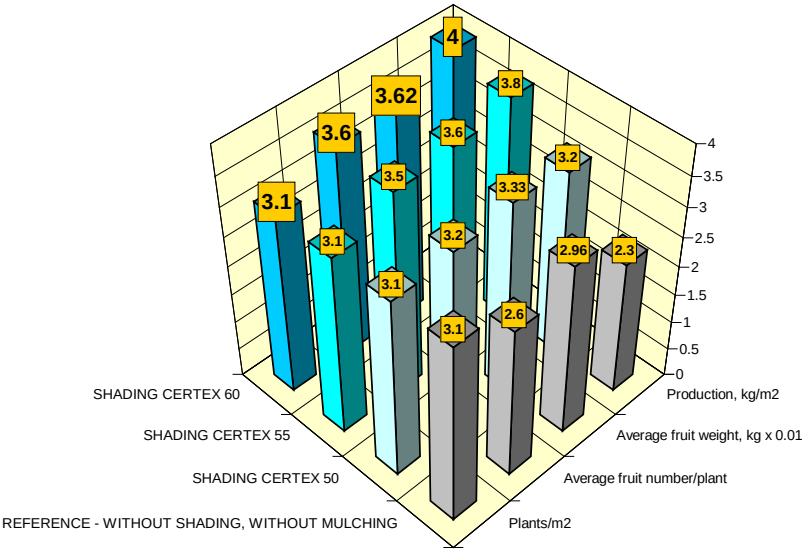
Fig.2
The aspect of the modular shade (left) and mulching (right) covers mounted in the interior of the USAMV Bucharest classic greenhouse during the experiments

FIG.3 -EXPERIMENTAL RESULTS OBTAINED IN USAMV GLASS GREENHOUSE, UNDER REAL UTILIZATION CONDITIONS, ON AN EGG-PLANT CULTURE, WITH OR WITHOUT SHADING AND MULCHING- PRODUCTION INDEXES



	Plants/m2	Average fruit number/plant	Average fruit weight, kg x 0.01	Production, kg/m2
REFERENCE - WITHOUT SHADING, WITHOUT MULCHING	3.1	2.6	2.96	2.3
SHADING CERTEX 50	3.1	3.2	3.33	3.2
SHADING CERTEX 55	3.1	3.5	3.6	3.8
SHADING CERTEX 60	3.1	3.6	3.62	4

FIG.3 -EXPERIMENTAL RESULTS OBTAINED IN USAMV GLASS GREENHOUSE, UNDER REAL UTILIZATION CONDITIONS, ON AN EGG-PLANT CULTURE, WITH OR WITHOUT SHADING AND MULCHING- PRODUCTION INDEXES



	Plants/m2	Average fruit number/plant	Average fruit weight, kg x 0.01	Production, kg/m2
REFERENCE - WITHOUT SHADING, WITHOUT MULCHING	3.1	2.6	2.96	2.3
SHADING CERTEX 50	3.1	3.2	3.33	3.2
SHADING CERTEX 55	3.1	3.5	3.6	3.8
SHADING CERTEX 60	3.1	3.6	3.62	4

(without shading, without mulching: 2.3 kg/m^2). The mulching cover improved the egg-plant development (root mass:+29.9 g; plant mass:+147.6 g; fruit mass:+34.9 g) and diminished the weed development. INCDTP and USAMV Bucharest are willing to continue their work and are looking for new interested partners.

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ECONOMIC IMPACT ASSESMENT OF THE BAN OF ROUNDUP READY SOYBEAN IN ROMANIA

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Key words*: genetically modified soybean (GMS), import, export, subsidy, economic impact*

Abstract

In Romania, the cultivation of genetically modified soybean (GMS), developed due to the unquestionable advantages this crop has. Firstly, there are the advantages related to weed control to which we add the direct economic advantages (the decrease in expenditures, safer and larger crops, increased selling price due to the quality plus, cleaner and more fertile land for the following crops, etc.). For these reasons, GMS had become one of the safest crops, both in terms of production and in terms of incomes, so that in 2006 there were over 200,000 ha cultivated with soybeans, 137,000 ha of which were declared GM by the farmers.
Beginning with 2007, as a result of the obligations taken on through the Accession Treaty, in Romania the cultivation of GMS was banned and the immediate impact was the drastic decrease in the areas cultivated with conventional soybeans to 52,000 ha in 2008. This paper attempts to assess the economic impact of banning the cultivation on the balance of trade through the analysis of the trade flows and subsidies granted for conventional soybeans.

INTRODUCTION

On January 2007, upon the accession to the European Union, Romania had, in accordance with the obligations taken on through the Accession Treaty, to ban the cultivation of GMS. This had been accepted for cultivation since 1999, developed very much until 2006 and the ban on cultivation had dramatic consequences for farmers, who had to either cultivate conventional soybean or replace it with another crop, or not to cultivate the land. Despite the fact that subsidies were stipulated to make up for the loss in competitiveness as a result of no longer cultivating GMS, the areas cultivated with conventional soybean decreased to a quarter in two years, with direct visible effects on the total productions obtained and further on the use of the production and on the trade in derived products: beans, soy meal and soy oil necessary in the mixed feed industry.
By attributing the trade flows recorded after January 1, 2007, for the three products subject to the GMS cultivation ban, we assess the economic impact and the foreign currency effort necessary to counterbalance these effects. We also assess the effort to subsidise the conventional soy crop based on the statistical data from the support bodies as well as the effect at the level of farmers by estimating the effect per hectare.

MATERIAL AND METHOD

In order to assess the economic impact of banning the cultivation of GMS, we analysed indicators such as the areas cultivated with conventional and GM soybean before and after January 1, 2007, the productions obtained, the beans imports, soy meal and soy oil, quantities and values, subsidies granted for conventional soybean and in order to appreciate the effect at the level of farmers we used the average financial result for the two types of crop, conventional and GM soybean.

RESULTS AND DISCUSSIONS

Genetically modified soybean (GMS), resistant to glyphosate (Roundup Ready soybean) was introduced into cultivation in Romania in 1999. The main arguments in favour of introducing this variety into cultivation were the fact that Romania has favourable cultivation conditions for soybean, that the farmers had a tradition for this crop (Romania cultivated in the interval 1980-1985 over 300,000 ha of soybean), that it is a reversible technology which could be given up if risks were noticed. The risk of infesting the environment with pollen from the new variety of GMS was low because on the one hand the soybean is cleistogamous and on the other hand it has no close relatives in the spontaneous flora in Romania. The risk of infesting the human food chain with GMS was also low because the main destination was animal feed in which soy was integrated as protein supplement under the form of meal or, more rarely, as beans and as energetic supplements under the form of soy oil. Soy oil could get directly into the human food chain but, in comparison to other vegetal oils, the consumers perceived it as being of low quality, for which reason the quantities that were consumed were relatively reduced. Soy oil could also get into human consumption when processed as margarine.
In addition, at that moment in Romania over 15% of the arable land was not cultivated, maize, wheat and sunflower accounted for more that 80% of the cultivated area, conventional soybean was cultivated on only 63,100 ha and solutions were looked for to diversify the crops' structure and

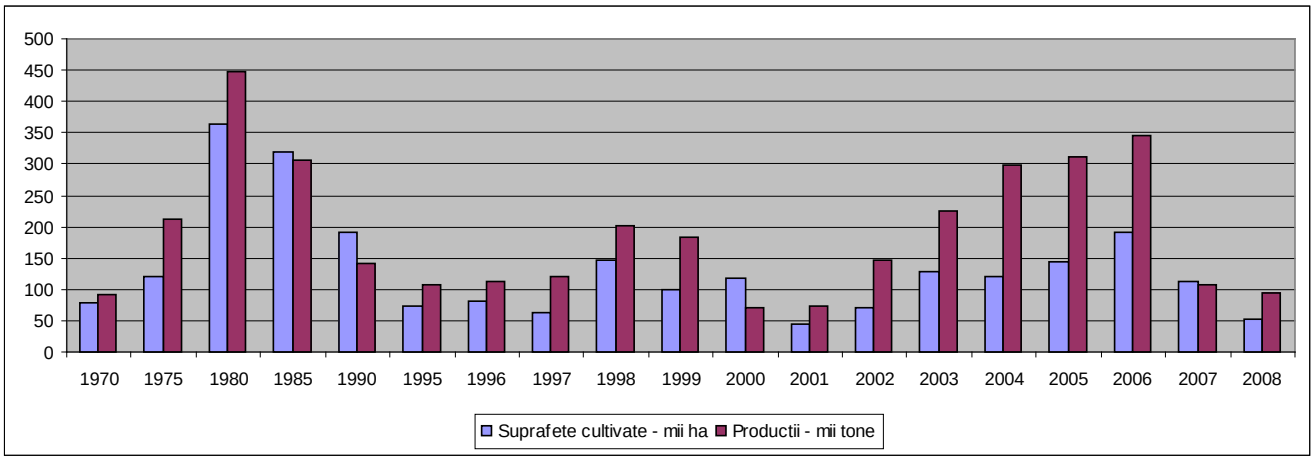


Fig 1. The evolution of the soy productions and areas in Romania. Source: [4] and [5]

alternatives were sought to counteract the tendency not to cultivate the land.

The areas cultivated with conventional soybean (CS) and the productions obtained (fig 1) varied in time, increasing from 79.1 thousand ha in 1970 to 318.8 thousand ha and 307.5 thousand tons in 1985 and even 512.2 thousand ha in 1989.

interventions, Lucian Buzdugan ([1] and [2]), speaks about a production increase of up to 30%, protection against problem weeds Phragmites communis and Sorghum halepense for which the degree of weed growth decreased by 67% and 89% in four years of cultivating GMS, the decrease of 85% in the costs for fighting weeds in the basic crop and in the

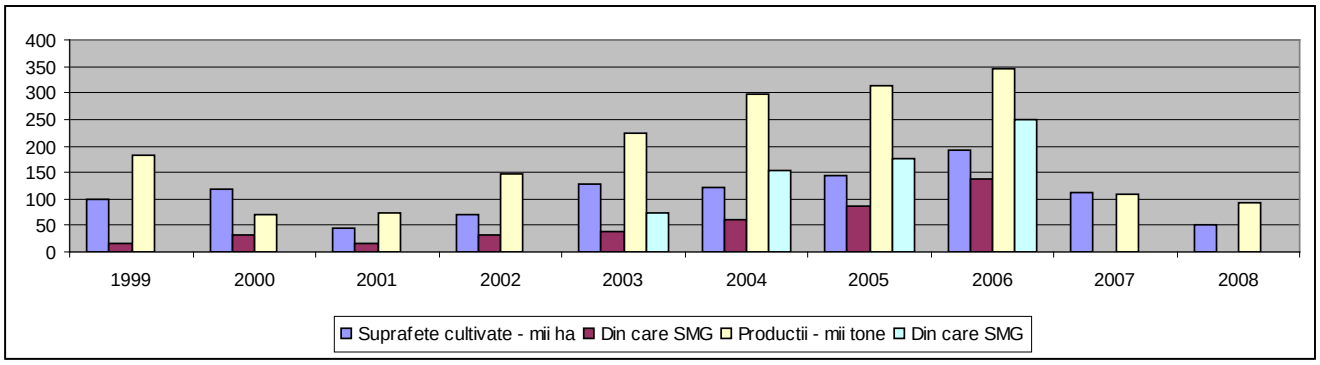
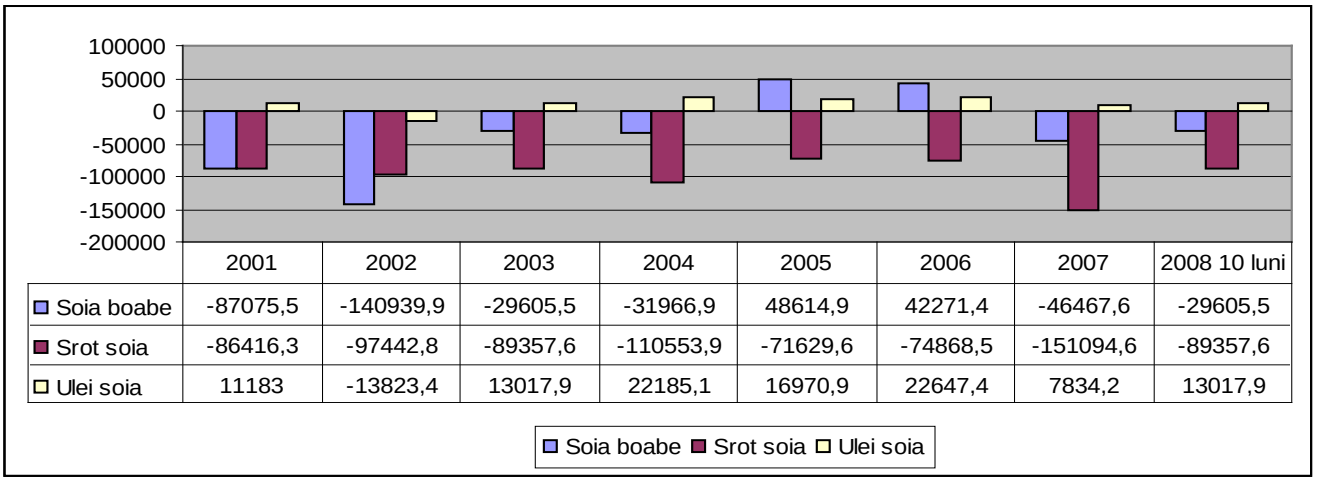


Fig. 2 The evolution of the GMS productions and areas. Source: [5]

Beginning with 1990, the interest in CS decreased, so that between 1990 and 2002, except for the years 1998 and 2000, the areas remained under 100,000 ha and the productions obtained also remained under 140,000 t.

Since 2002, the areas cultivated with soybean have grown constantly (fig 2) through the increase in the interest in GMS due to the advantages exhibited by this crop. In repeated

following crops, the reduction in fuel consumption for the entire cultivated area due to the possibility to adopt the minimum tillage system, the increase in the nitrogen reserve in the soil by about 30-40 kg of active substance as a result of the more intense activity of the symbiotic bacteria, larger incomes due to the plus in production and in the quality of the beans which attract bigger selling prices.



	2001	2002	2003	2004	2005	2006	2007	2008 10 luni
Soia boabe	-87075,5	-140939,9	-29605,5	-31966,9	48614,9	42271,4	-46467,6	-29605,5
Srot soia	-86416,3	-97442,8	-89357,6	-110553,9	-71629,6	-74868,5	-151094,6	-89357,6
Ulei soia	11183	-13823,4	13017,9	22185,1	16970,9	22647,4	7834,2	13017,9

Fig. 3 The balance account of the trade in soybean and derived products, thousand t. Source: [5]

As a result of these advantages, in 2006 190.8 thousand ha of soybean were cultivated, 137.3 thousand ha of which were declared GMS in the national Register recording genetically modified plant farmers and the production increased to345 thousand t 250 thousand t of which being GMS (fig. 2).

From the analysis of the balance account of the trade in soybean and derived products in the interval 2001-2008, we notice that, except for 2002, Romania supplies itself with the necessary soy oil with a maximum surplus of 22647.4 t in 2006 and arrived to export over 42000 t of soybeans in 2005 and 2006 after a long period in which it was a net importer of this product. In the entire period, Romania has been a net importer of meal soy. Between 2001 and 2004 the quantitative balance account of the trade in this product is negative and varies between 86000 t and 110000 t, decreases to a little over 70000 t in 2005 and 2006 and increases spectacularly in 2007 to 151094 t.

In value terms, the balance account of the trade in the three products is negative and in 2007 it amounts to €94.483m, €72m of which are due to the soy meal and €22m to the soybeans. If we compare the years 2007 and 2006 at the level of the difference between the balance account for the trade in the three products, we notice that in 2007 the processing industry in Romania had to make foreign currency efforts amounting to €60.5m to make up for the lack of these products, €30m of which for soybeans, almost €20m for the surplus of groats and about €10m for the soy oil it could not export. In real terms, this trade deficit is found as indirect loss in the farmers cultivating soy, but especially in those who had to give up GMS.

The subsidy granted for CS is of two types: a first type is related to the cultivated area, being similar to all the crops and the value amounting to €97/ha in 2007 respectively €107/ha in 2008. In the two years, the amounts allocated to CS were of €10.98 m in 2007 and respectively €5.564 m in 2008.

A second type of support is specific to CS, it is related to the production obtained and sold, it is granted as state subsidy in order to make up for the lack of competitiveness of this crop and to avoid the full abandonment of the cultivation of CS. The amounts allocated for these two years are of RON 34m (€9.7m) in 2007 and respectively RON 30m (€8.6m) in 2008. If we accept the average value of the profit of the GMS crops of €143/ha [2], it results that by giving up GMS potential indirect profit losses are added at the level of farmers amounting to over €11.1m in 2007 and €19.85m in 2008.

The farmers' indirect losses are difficult to assess, but estimates can be made which must be interpreted subject to accepting the working hypotheses. Thus, for the lack of nitrogen resulting from the activity of the symbiotic bacteria we can estimate the level of losses at €1.1m in 2007 and €1.725m in 2008. The expenses on the supplementary mechanical work are of about €30/ha which means losses of €2.3m in 2007 and €4.14m in 2008. The expenses on fighting weeds are difficult to estimate since they depend directly on the crop and fighting method adopted.

CONCLUSIONS

1. The areas cultivated with soybeans decreased dramatically to 52,000 ha after GMS was given up, with a direct impact on the production of beans and still raising questions about the providing the raw material into the transformation chain.
2. Romania becomes again a net importer of soybeans, the imports of soy meal increase significantly in 2007 and the supplementary foreign currency effort for 2007 is of €60.5m.
3. The potential profit losses of farmers and amount to €11.1m respectively €19.85m in the two years.
4. Although the state directly supports the production of CS with amounts of about €10m in 2007 and €8.3m in 2008, this support is not enough to cover the lack of competitiveness of the CS crop and it does not make it attractive to the farmers.
5. The farmers' indirect losses amount to €3.4m in 2007 and €5.865m in 2008.

AKNOWLEDGMENTS

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DESCRIPTION OF MICROCREDIT INTEREST RATE I N MICROFINANCE INDUSTRY

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Key words: *microfinance institutions, interest rate, effective interest rate, nominal interest rate, microfinance sustainability.*

Abstract
The microfinance industry in Eastern Europe and Central Asia is evolving rapidly, with more and more competition in the market. Credit providers are becoming more and more concerned with their market competitors, which increasingly include banks down scaling their operations to the microfinance sector in most countries in the region, as well as more traditional providers such as MFIs and Credit Unions. In many countries, microfinance has become more competitive in recent years. Competition is generally expected to benefit consumers by offering a wider choice of appropriate products and providers, better service, and lower prices. However, in some countries where microfinance is considered competitive, interest rates on microloans have remained stubbornly high. As a result of limited product diversification, market players are forced to start looking for ways to create competitive advantage and the customer service issue pops up as the most important factor influencing people to cooperate with one or another institution.

INTRODUCTION

In today's microfinance industry, there is still some debate about whether and when long-term subsidies might be justified in order to reach particularly challenging groups of clients. But there is now widespread agreement, within the industry at least, that in most situations MFIs ought to pursue financial sustainability by being as efficient as they can and by charging interest rates and fees high enough to cover the costs of their lending and other services.

Nevertheless, accepting the importance of financial sustainability does not end the discussion of interest rates, and where to draw the line is a complex issue. An interest charge represents money taken out of clients' pockets, and it is unreasonable if it not only covers the costs of lending but also deposits "excessive" profits into the pockets of an MFI's private owners. Even an interest rate that only covers costs and includes no profit can still be unreasonable if the costs are excessively high because of avoidable inefficiencies.

Obviously, the answer for a given MFI depends on its particular circumstances. Now, can we say anything about the overall picture worldwide? Individual observers will have their own criteria for judging what is excessive, but empirical data do shed important light on the question:

- The very high rates that get so much publicity are rare: for instance, less than 1 percent of microborrowers worldwide pay rates as high as the 85 percent for which it has been pilloried. In fact, the median rate for 2006 was about 26 percent.
- Very high profits for MFIs are uncommon; the median profit on MFI owners' equity was about 12 percent in 2006, compared with 18 percent for banks.
- MFI interest rates have been dropping fast–about 2.3 percentage points a year in 2003-2007, probably due to some combination of learning curve and competition. Commercial bank interest rates have dropped, too, but far less.
- Underlying that drop in interest rates are drops in administrative costs (about one percentage point per year) and profits (about 0.6 percentage points per year).

There is strong empirical support for the commonsense notion that it is inevitably more expensive to make many tiny loans than to make a few large ones.

MATERIAL AND METHOD

The global average interest rate is about 35 percent, but the average in Mexico is above 60 percent and in Sri Lanka is below 20 percent, in Republic of Moldova is above 30 %. Small loan sizes are the most commonly cited reason why microcredit rates are higher than normal bank rates: microcredit is a "high-touch" business, and MFIs have to process thousands of tiny transactions.

But here's a diagram of MFIs in 33 countries, showing pretty clearly that loan size by itself doesn't explain the differences between their average interest rates.

We see several other dynamics at work:

- **Operating costs** can be pushed up by factors other than loan size, such as geographic dispersion of rural borrowers, or an unusually expensive labor market, both of which affect costs in Mexico. Age of the MFI is another factor. Surprisingly, scale doesn't seem to make much difference: statistical analysis by the MIX shows that economies of scale tend to level off after the MFI gets its first 2,000 or so clients.
- **Political pressure can make a difference**. Some countries impose a legal cap on interest rates to keep them "affordable," even though this may restrict the availability of microloans. In other countries (like Ethiopia), the government provides a lot of microfinance at very low rates, and MFIs feel political pressure to do the same.
- **Management objectives differ**. In countries like Bangladesh, managers felt that high interest rates were

inconsistent with their social mission, and consequently set rates at levels that would produce very little profit, at least in the early years. In Latin America, many MFIs thought that attracting commercial capital was the best way to expand their social outreach, and wanted higher profits to attract such capital. We are now seeing players in microfinance—only a few so far—whose objective is profit, pure and simple: of course, such investors want interest income to be as high as possible.

- **Competition gives borrowers choices**, which puts downward pressure on interest rates, forcing MFIs to become less profitable and/or more efficient. This is clearly happening in some places—e.g., Bolivia, where interest rates have dropped from 60 percent in the early 1990s to about 17 percent now.
- **Financial Literacy of clients**: When clients understand the costs for the product they are in a much better position to compare and better rates are the result.
- **Cultural factors** to do with the relationship with the financial service provider - other than the loan: Some clients receive benefits that are not calculated in loan terms.

The problem is that administrative costs are inevitably higher for tiny microlending than for normal bank lending. For instance, lending $100,000 in 1,000 loans of $100 each will obviously require a lot more in staff salaries than making a single loan of $100,000. Consequently, interest rates in sustainable microfinance institutions (MFIs) have to be higher than the rates charged on normal bank loans.

As a result, MFIs that claim to be helping poor people nevertheless charge them interest rates that are substantially higher than the rates richer borrowers pay at banks. No wonder this seems wrong to observers who do not understand, or do not agree with, the argument that MFIs can usually serve their poor customers best by operating sustainably, rather than by generating losses that require constant infusions of subsidies.

Nominal interest rate	A nominal rate is the stated rate to be paid on a loan contract, usually stated as a monthly or annual percentage. It does not take into account related loan fees, commissions, and other expenses.
Effective interest rate	An effective rate converts all financial costs (e.g., interest, fees, and commissions) into a declining-balance interest calculation for the repayment period. The effective rate represents the financial cost to the borrower if no mandatory savings are required. It includes all financial charges as a percent of the loan amount used during each payment period.
Annual percentage rate (APR)	An APR is the effective interest per payment-period rate multiplied by the number of payment periods in a year.
Real interest rate	A real interest rate adjusts the interest rate to reflect the rate of inflation. A negative real rate implies that the rate of interest charged falls below the inflation rate. The term "positive rates of interest" is often used to mean that the rate is set above inflation.

Table 1. Interest Rates: Key Concepts and Definitions
Sources: CGAP Study MFI rates: Country study; Inflation and banking lending rates: IMF International Financial Statistics, www.imfstatistics.org/imf/logon.aspx

RESULTS AND DISCUSSIONS

Four main components are reflected in an MFI's interest rate: cost of funds, loan loss expenses, operating expenses, and profits. In this section, we break out these components and discuss how they may affect interest rate trends. MFIs use their interest income to cover costs, and the difference between income and costs is profit (or loss). The pricing formula, which is proposed to be used in microfinance institution is follow: **The annualized effective interest rate** (***EIR***) charged on loans will be a function of five elements, *each expressed as a percentage of average outstanding loan portfolio:* administrative expenses (***AE***), loan losses (***LL***), the cost of funds (***CF***), the desired capitalization rate (***K***), and investment income (***II***):

$$EIR = \frac{AE + LL + CF + K - II}{1 - LL}$$

All calculations should be done in local currency, except in the unusual case where an MFI quotes its interest rates in foreign currency. A basic financial calculator is sufficient to handle the necessary computations. The user enters the known loan variables, and the calculator computes the remaining variable:

PV Present Value, the net amount of cash disbursed to the borrower at the beginning of the loan

I Interest Rate, which must be expressed in the same time unit as n, below

N Term, or number of periods, of the loan.

PMT Payment made each period.

FV Future Value, the amount left in the client's hands after the loan is repaid, which is usually zero except in the case o

Base case — Declining Balance: Loan amount is $1,000, to be repaid in 4 equal monthly payments of principal and interest. Stated interest rate is 36% per year, or 3% per month, calculated on declining balances— i.e., the interest is charged only on the amount of the loan principal that the borrower has not yet repaid. In this base case, the effective monthly interest rate is the same as the stated rate. Compute Monthly Payment: PV = 1000; n = 4; I = 36 ÷ 12 = 3. Solving for PMT yields a monthly payment of 269.03.

Alternative 1 — Flat Interest: Same as Base Case, except that "flat" interest is calculated on the entire loan amount, rather than on declining balances, and is prorated over the four monthly payments. Compute Cash Flows: Total interest is 120 [1000 x 3% x 4 mos.]. Total principal plus interest is 1120 [1000 + 120], or 280 each month [1120 ÷ 4]. Compute Effective Interest Rate: PV = 1000; PMT = –280; n = 4. Solving for i yields an effective monthly rate of 4.69%, which is multiplied by 12 for an APR of 56.3%.

Alternative 2 — Flat, with Up-Front Interest: Same as Alternative 4 (each period's interest is calculated on entire loan amount), except that all the interest is paid up front at the beginning of the loan. Compute Cash Flows: Total interest

is 120, paid upon loan disbursement. Thus, the borrower's actual net disbursement is 880 [1000 – 120]. Monthly payments of principal are 250 [1000 ÷ 4]. Compute Effective Interest Rate: PV = 880; PMT = –250; n = 4. Solving for i yields an effective monthly rate of 5.32%, which is multiplied by 12 for an APR of 63.8%.

Alternative 3 — Flat, with Up-Front Interest and Fee: Flat interest is charged on entire loan amount; total interest plus a 3% commission is collected up front, at the time of loan disbursement. Compute Cash Flows: Total interest is 120 [1000 x 3% x 4 mos.]. Net actual disbursement to client is 850 [1000 – interest of 120 – commission of 30]. Monthly payments are 250 [1000 ÷ 4]. Compute Effective Interest Rate: PV = 850; PMT = –250; n = 4. Solving for I yields an effective monthly rate of 6.83%, which is multiplied by 12 for an APR of 82.0%.

Alternative 4 — Flat, with Up-Front Interest and Fee, and Compulsory Savings: Same as Alternative 6, except that the client is required to make a savings deposit of 50 along with each month's payment. The savings account yields interest of 1% per month, uncompounded, and is available to the client for withdrawal at any time after the end of the loan. Compute Cash Flows: Total interest is 120 [1000 x 3% x 4 mos.]. Net actual disbursement to client is 850 [1000 – interest of 120 – commission of 30]. Monthly payments are 300 [prin. of 1000 ÷ 4, plus savings payment of 50]. At the end of the loan, the savings account yields the client a future value of 203 [200 in deposits plus interest of 0.50 for the second month (during which the savings account has a balance of 50), 1.00 for the third month (during which the account has a balance of 100), and 1.50 for the fourth month (during which the account has a balance of 150)]. Compute Effective Interest Rate: PV = 850; PMT = –300; n = 4; FV = 203. Solving for i yields an effective monthly rate of 7.67%, which is multiplied by 12 for an APR of 92.0%.

Lowering interest rates would require lowering one of the four components on the right side of the equation.

Administrative expenses(AE)

- Tiny loans do require higher administrative expenses, which are not substantially offset by economies of scale. On the other hand, the learning curve of MFIs as they age produces substantial reductions.
- Administrative costs, at about 11 percent of loan portfolio in 2006, are the largest single contributor to interest rates, but they have been declining by 1 percentage point per year since 2003. This decline appears to be a true improvement in the cost of serving each borrower, not just the result of expanding loan sizes.
- We have no statistical way to quantify how much avoidable fat remains to be trimmed from MFI operating costs. Given the finding about the learning curve—i.e., that the level of these costs is strongly related to the age of the MFI—it would be unrealistic not to expect substantial inefficiency at a time when most MFIs are relatively young, and when most national microfinance markets are immature and noncompetitive. We are unaware of any evidence to suggest that MFIs in general are out of line with the normal evolution of efficiency for businesses in such markets.

Cost of funds(CF)

- MFIs have to pay more than banks pay when they leverage their equity with liabilities, and their cost of funds as a percentage of loan portfolio (about 8 percent) showed no sign of dropping in 2003–2006. But it is hard to criticize MFI managers for their funding costs, because they don't usually have much control over these costs, in the medium term at least.

Loan losses(LL)

- MFI interest rates are not being inflated by unreasonable loan losses. In fact, default rates are very low—about 1.9 percent in 2006.

Capitalization Rate (K):

- This rate represents the net real profit—over and above what is required to compensate for inflation—that the MFI decides to target, expressed as a percentage of average loan portfolio (not of equity or of total assets). Accumulating such profit is important. The amount of outside funding the MFI can safely borrow is limited by the amount of its equity. Once the institution reaches that limit, any further growth requires an increase in its equity base. The best source for such equity growth is internally generated profits. The rate of real profit the MFI targets depends on how aggressively its board and management want to grow. To support long-term growth, a capitalization rate of at least 5–15% of average outstanding loan portfolio is arguably advisable.

Investment Income Rate (II):

- The final element to be included in the pricing equation—as a deduction, in this case—is the income expected from the MFI's financial assets other than the loan portfolio. Some of these (e.g., cash, checking deposits, legal reserves) will yield little or no interest; others (e.g., certificates of deposit) may produce significant income. This income, expressed as a decimal fraction of loan portfolio, is entered as a deduction in the pricing equation.

Competition

This general expectation about competition's effect on pricing is qualified by the recognition that markets evolve and that the competitive behavior of firms will evolve as well. For example, competitive behavior is likely to be quite different in a new, fast-growing market than in a mature, saturated market. A conventional view of market development outlines four distinct phases (Tab. 1).

Phase 1: Pioneer. In the first phase of market development, a new product may be brought to market by one or, at most, a few providers, each with limited reach. Competition in this phase is limited to placing distribution points in new areas before others reach them.

Phase 2: Take-off. The visible success of early pioneers leads other firms to quickly enter into the market, and the market moves into the second phase. As volume and visibility of the product grow, firms compete primarily by improving products to better suit customers and by enhancing service levels. However, the market is still mainly supply driven. Incumbent firms are usually more willing to alter

other aspects of their product than to reduce their price, and often they may not yet have the scale or cost structure they need to sustain lower prices. On the demand side, consumers may be unable to compare offerings in terms of price because products are not yet standardized.

Phase 3: Consolidation. As a result of rapid growth in the second phase, the market as a whole starts to show signs of saturation at the prevailing price level. Growth may start to slow, and the market enters a third phase. Growing the market, in this phase, usually means reducing prices to allow new consumers to participate.

Phase 4: Mature. After the shakeout of firms with unsustainable, high cost structures, a mature market emerges, with a stable number of firms, and generally grows only as fast as external variables, such as demographics, allow. The firms now compete based on brand, which is the composite embodiment of the customer experience with the service, including all the traditional features of price, place, and product. Average prices may drop further if greater efficiencies are obtained through economies of scale.

Market characteristics	Market phases			
	1. Pioneer	2.Take-off	3. Consolidation	4. Mature
Growth in volume	May be slow	Rapid	Positive but slowing	Steady natural growth
Number of firms	One or a few	Increases rapidly	Reduces from peak because of consolidation	Depends on characteristics of product and market
Market struct ure	Concentrated	Fragmented although market leader may emerge	Concentrating; clear market, leaders emerge	Market leaders dominate
Arenas of competition	Little competition except as to location of distribution points	Product characteristics	Price	Brand (including pricing)

Table 2. Competition through Market Development Phases
Sources: CGAP Study MFI rates: Country study; Inflation and banking lending rates: IMF International Financial Statistics, www.imfstatistics.org/imf/logon.aspx

However, price differentials between firms may widen, because effective branding may enable premium pricing even for an otherwise similar product. The mature phase is not the end of the story for most markets. Even after reaching maturity, as defined here, technological and business model innovations may upset the prevailing market structure by introducing new competitive behavior, causing the cycle to repeat.

Comparison with other rates paid by low-income borrowers

- MFI rates were significantly lower than consumer and credit card rates in most of the 36 countries for which we could find rate indications, and significantly higher than those rates in only a fifth of the countries.
- Based on 34 reports from 21 countries, MFI rates were almost always lower—usually vastly lower—than rates charged by informal lenders.
- MFI rates were typically higher than credit union rates in the 10 countries for which data were found. But in the cases where the credit unions offered a specialized microcredit product, their interest charges tended to be the same as, or higher than, prevailing MFI rates. However, it is hard to make much of this information, not only because the sample size is so small, but also because we know little about the comparability of customers and products.

CONCLUSIONS

MFIs can charge, rates of interest that are much higher than the rates that commercial banks charge to their usual customers. Moreover, it attempted to explain why this result is not particularly surprising. But given that MFIs can charge such rates, the question remains whether they should. Most MFIs are lodged in grant funded non-governmental organizations whose overarching objective is helping the poor, not maximizing profits. And while many poor entrepreneurs can pay high interest rates, it is also clear that some cannot, and are thus excluded from programs that insist on charging interest high enough to cover all costs.

Consistent policies are needed to promote fair competition and create the conditions discussed earlier for lower interest rates to materialize. When these conditions are satisfied, the process of rate decline will start, or accelerate if it is already under way. Such policies may include the following:

- requiring transparent, comparable pricing by providers
- Promoting consumer financial literacy
- Collecting and assessing credible market-level information
- when communications infrastructure allows, developing reliable consumer credit bureaus to allow borrowers to build a good credit record that is accessible to competing lenders.

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OBSTACLES THAT FACE THE EGYPTIAN PRODUCTS TO PENETRATE THE E.U. MARKET

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Key words: *partnership agreement, volume of trade, obstacles, Egypt, E.U.*

Abstract
This study is highlighting the obstacles that face the Egyptian export to Europe whether from Egyptian side or European side.It is based on the statistical data provided by Eurostat, Ministry of Trade and Industry in Egypt, Central Bank of Egypt. I used the following indicators: movement of trade between Egypt and E.U., trade flow, top ten exports between Egypt and E.U. The volume of trade between the two parties has increased from 13,4 Billion Euro to 16,6 Billion Euro in 2006 which reflects an increase of 47%. This is due to the increase of Egyptian export from 4,1 Billion Euro in 2005 to 7,6 Billion Euro in 2006 which means an increase of 23,8% and in the same time the value of E.U. export to Egypt has increased slightly from 8,2 Billion Euro in 2005 to 9 Billion Euro, which means 10% increase. As a conclusion, the volume of trade and investment increased but was less than it was expected.

INTRODUCTION

The necessity of my research acknowledges the obstacles that face the Egyptian export to penetrate the European market, whether it was from the Egyptian side or from the European side and finds the solution for it.

The research focuses mainly on:
1. Obstacles that face the Egyptian products in the European market from the Egyptian side such as:
- lack of knowledge of European standards;
- lack of knowledge of European market requirements;
- logistic problem (transport line – no regular maritime line between Egypt and E.U.; increasing the price of airfreight);
- absence of standard of quality in the Egyptian production such as: textiles, leather.
2. Obstacles from the European side:
- logistic problem (high standard required for labeling, packing, health certificate);
- stubborn restrictions on exporting some items such as agricultural products;
- nothing is being achieved yet in the field of modernize the Egyptian industry even if it was one of the main task of the Partnership Agreement with E.U.

MATERIAL AND METHOD

In order to resume the obstacles that face the export of Egypt in E.U. I used the following indicators: movement of trade between Egypt and E.U. between 2000 and 2006, top ten Egyptian export to E.U. between 2000 and 2006, trade flow during 2003 and 2007 between Egypt and E.U., Egypt export to E.U. by product in 2007. All data were collected from Eurostat, Ministry of Trade and Industry in Egypt, Central Bank of Egypt.

RESULTS AND DISCUSSIONS

E.U. is considered the first commercial partner for Egypt and the volume of trade between the two parties has increased from 13,4 Billion Euro to 16,6 Billion Euro in 2006 which reflects increase of 7.4% . This is due to the increase of Egyptian export from 4,1 Billion Euro in 2005 to 7,6 Billion Euro in 2006 which means an increase of 23,8% and in the same time the value of E.U. export to Egypt has increased

2006	2005	2004	2003	2002	2001	2000	Statement
7634	5162	4167	4167	3301	3193	3500	Egyptian export
9000	8286	7342	7342	6597,8	7205,6	8145,7	E.U. export
1366	3124	3175	3175	3296,8	4012,6	4645,7	Balance of trade
16634	13448	11509	11509	9898,	10398,6	11645,7	Volume of trade

Table 1. Trade volume between Egypt and E.U. between 2000 and 2006 (Million Euro)

Product	2002	2003	2004	2005	2006
mineral fuels, mineral oils and products of their distillation, bituminous substances, mineral waxes	1389,3	1344,4	1677,4	2400	4283
iron and steel	95,8	114,5	260,4	267	411
articles of apparel and clothing accessories, knitted or crocheted	207,8	182,7	219,2	219	253
aluminium and articles thereof	172,3	127,2	156,7	204,9	271
88 aircraft, spacecraft, and parts thereof	0,118	146,5	140,5	195	27,9
salt, sulphur, earth and stone, plastering materials, lime and cement	35,2	109,7	220,8	125	142
edible vegetables and certain roots and tubers	122,5	122,4	155,2	168,9	189,02
cotton	181	170	134	128	141
plastic and articles thereof	74	87	88,2	116	184
edible fruit and nuts, peel of citrus fruits or melons	39,6	45,6	77,6	118,1	122,6

Table 2. Top 10 Egyptian Exports to E.U. (according to 2000-2006 statistics):

slightly from 8,2 Billion Euro in 2005 to 9 Billion Euro, which means 10% increase. But if we analyze carefully the main items of Egyptian export to E.U. we will find that the petrol and petroleum products are on the top of the list with 4,3 Billion Euro representing 78% of the total export and since the price of this item depends on the international demand and fluctuating from time to time and this reflects the instability of the Egyptian export to E.U.

The main obstacles that face the Egyptian products to penetrate the EU market have to be analyzed both from the Egyptian and the EU side as follows :

I. Egyptian side

1) Regarding the problem of the maritime line, we notice that the duration of sailing is very long, so the Egyptian port is not receiving the Mother Vessel, but only maritime through feeders to the European part which has container station relocated to another ship; this leads to prolonging the maritime transport period.

2) The Egyptian manufacturers are still incapable to acknowledge the European standard requirements.

3) Unavailability of recent commodities, market studies about European Market.

4) Many export opportunities in the field of fruits and vegetables are not used yet, by Egypt; for example, the Association Agreement quotas are really filled as fallow:

- carrots …… 13%
- lettuce……. 21%
- cut flower …… 24%
- melon…… 57%
- garlic …… 83%

* These data reflects the absence of marketing skills in this market.

5) Government impose some restrictions on export such as rice, loaded with additional inland transport expenses and reshipment of goods with port demands was a result of objection to the division of resolution no. 2987 of 2006 which issued by the governor of Cairo, which prohibits the conduct of the parking lot transported in refrigerated trucks coming from abroad to load export of agriculture crops and foodstuff.

6) Lack of serviced industrial land and facilities, as well as the lack of access for modern technology into Egypt, and fear for the international companies which enter Egypt and non-registration of intellectual property or assault on their intellectual property.

7) The deterioration of Egyptian pound against dollar is a disaster for Egyptian exporters because it creates state of speculation on exchange rates without prejudice expansion of Import-Export Development Fund to support various export transactions.

8) The technological gap between the Egyptian engineering goods and their counterparts in Europe.

9) The lack of consumer confidence in Egyptian domestic products (engineering products) and their tendency to buy products with foreign brands from Europe, which lead to reducing production capacity or closed-up factories.

10) In the engineering sector, there is also inefficient labor in factories and lack of equipment appropriate to the nature of work.

11) Lack of technological center in engineering sector for the transfer of technology and bridge the gap between Egyptian products and their European counterparts, and to assist, re-training and rehabilitation of existing employment in factories.

12) Regarding the Egyptian textiles and clothing, constrains are made by internal factors rather than by external ones. Therefore, the reform should focus first and foremost on increasing the efficiency of the industry by changing the product mix in favor of products with higher value added by reducing unit costs through improved quality control and better labor standard, and by allowing firms in the spinning industry to choose the least cost inputs for mix of cotton yarn.

13) The importance of adopting measures to reduce the administrative barriers and to modernize the infrastructure.

14) High freight cost is a big barrier especially for agriculture products, to enter the European Market despite of its enlargement to 27 countries.

15) There is a fear that the Egyptian industry can not develop itself to invade the European Market. The terms of the Egyptian products are not qualified yet, to enter the European Market. The determination of condition of the Egyptian competition products, remains a fear, as the Egyptian industry is unable to compete.

16) The weakness of marketing capability of Egyptian exporting companies and unawareness of Egyptian exporters of the laws in E.U.

17) Egyptian experts warned in the manufacture and export of building materials from the repercussions of the European specification materials from Egypt. They pointed out that the lack of harmonization of Egypt's exports of building materials to the EU markets at this time means a loss of about 130 million dollars worth of exports in this sector to European markets. Experts attributed the Non activating the specifications so far most of Egypt's exports of construction materials for the European market to ignore the industry modernization program of building materials and plants not to negotiate with those responsible in the European Union on this problem and to identify steps to be followed in order to enjoy the Egyptian building materials specifications necessary to penetrate the European markets Various European Union.

II. European side

1) The diversification of standard and specification applied inside the European Union since the diversification of the needs of every country inside the Union, comparing to other, are making the production more difficult and also applying all the conditions required in industry, packing, transportation.

2) Stubbornness in the process of applying the certificate of origin, some goods need the Domestic Value Added, not less than 80%, which is very difficult in Egypt since the basis of Value Added for products is different from a product to another; most of inputs from outside are supposed to be produced domestically and, if we add to its Value Added, the

cost of products will be very high and will not be competitive to other counties.
3) Still asking to use Euro 1 as basic requirement and difficulties to fill its data, because the lack of advertising regarding this certificate.
4) The slow down of the procedure, the reduction of custom duties for exported goods to E.U. - as many goods will be exported after 10 years from the date of entry of the Agreement , and its long period, stands against the European exports to Egypt's Market.
5) Incapability in obtaining the punctual information which show the export opportunities on the European Market, the absence of coordination works collectively in between economic sectors.
6) Incapability to fulfill the packing and labeling condition for the vegetables and fruits and foodstuff and consuming products exported to E.U. Market.
7) The European Union impose a very difficult health certificate and requirements related to quality on the agriculture products, beside the procedure related to intellectual property right which represent custom barriers on the Egyptian exports.
8) Unfair competition between Egyptian exporters and their counterpart from Europe, which are strong European producers that have high professional capabilities and high technology, the European Market is very competitive, and forced the exporting companies to offer products and services with high quality more than competitive companies.
9) The most important barrier and to take full advantage of the Convention restrictions in the routine of the requirement force of Egyptian products to the European Market, the packing, labeling, require that the materials are "environment friendly".
10) The port is located in European coast, in places with restrictions and conditions are put fro the Egyptian products when entering the market. Sometimes the product is selected, than they select a product and refuse it with excuse that the conformity with the specification is inconvenient.
11) Egyptian exporters specialists detected the lack of benefit and targeted the Egyptian – European Partnership Agreement, despite the passage of four years to sign it. They also demanded the development of Egyptian industry, pointing out that the fear of determination in their products, under European competition will remain as long as the project was not able to complete.
12) The severe competition with European Union neighbour countries, have accumulate experience in transaction with European Markets such as: Turkey, Morocco and some East-European countries.
13) The European Union impose very stubborn restrictions on exporting some agriculture products " timing-administrative obstacles such as environmental and health requirements etc., which minimize the volume of Egyptian exports, also the European terms on agricultural products, prohibited to be exported in certain seasons, because of its local availability, which originally it is to protect the products like potatoes, strawberry, tomatoes.
14) The Egyptian economic experts express their fear on the future of the Convention; Egypt does not benefit from the Convention, due to primarily transfer of technology under the Convention, in the aim of rising the industry efficiency through friction with European products, that achieve nothing in this field, admitting that the Convention is a Marketing Agreement and it does not have the necessary obligation on the European part to transfer the technology.
15) Do not allow the rules of origin in the European Partnership Agreement to recover any custom duties on imported raw materials which still did not established and applied a loan on any fees or expenses that will be recoverable only in the case of export to the European Union. These requirements have an important impact on some industries and some Egyptian export capacity, particularly on raw materials and intermediate some industries is still high in Egypt, when compared with their counterparts from the European Union or in countries that have signed the Partnership Agreement with Europe such as: Tunis and Morocco. The exports of this countries will have competitive advantage, because of the same benefits that derive from their Partnership Agreement with European Union.
16) Potato Brown Rot disease:_The EU implements a special system for importing the Egyptian potatoes based on importing from specific geographical locations. A ban is imposed on imports in case of finding more than 5 confirmed interceptions of brown rot disease within the exporting season of potatoes. For the season 2005/2006 the commission decision no. 840/2005 reopens the markets of the EU to the Egyptian potatoes on the basis of strict measures taken by the Egyptian authority. During the season of 2005/2006 five interceptions of potato brown rot were confirmed in Greece (2 cases), The Netherlands (2 cases), and the UK (1 case). Modification of the current EU import system will enhance Egypt's exports of potato to the EU. The meeting of the standing committee for plant health took place on 26-27 October 2007 and approved a commission text to extend the derogation permitting the import of Egyptian potatoes into the EU for the exporting season of 2007/2008. The Commission decision no. 2007/842/EC was published in the official journal on 18/12/2007 to re-open the season for the import of Egyptian potatoes for 2007/2008 from the certified exporters and packing stations.
17) Aflatoxins in groundnuts: Technical assistance is needed to be provided by the EU, as it specifies a maximum level of aflatoxin in groundnuts less than the allowed levels according by CODEX. This causes a rejection of several Egyptian consignments of groundnuts into the EU. The EU commission issued decision no. 504/2006 to control the imported foodstuffs contaminated by aflatoxins, which states that approximately 20% of peanuts consignments from Egypt should be subject to analysis. Egypt has been notified 13 times in relation to Aflatoxins until the 13th of may 2007.
18) Some products of animal origin: Some Egyptian products (aquaculture, poultry, dairy products, honey, eggs) are not permitted into the EU markets before submitting a complete file for each including a residue monitoring plan and documents confirming their compatibility with the European conditions and requirements. The Ministry of

Agriculture is currently preparing these files. The Ministry of Agriculture in coordination with the Ministry of Trade and Industry has contracted two European experts to help in preparing the Egyptian files of the mentioned products since November 2006. A visit by one of the experts to Brussels to meet with the European responsible in DG SANCO, took place on 23/3/2007 to submit preliminary file in which a time schedule was set for certain procedures and commitments to be taken by Egypt

19) The E.U. antidumping case against Egypt in Ferrosilicon: The Egyptian companies EFACO and KIMA submitted the questionnaire required by the E.U. on the due date in January 15th 2007. On the 29th of august 2007 the EU Commission issued its preliminary decision of imposing 20.4 % antidumping duties on the Egyptian Exports of Ferrosilicon. On the 24th of September, the EU commission received the Egyptian official reply to the EU preliminary decision. The final decision will be approved by the European parliament in February 2008.

20) Increasing the quota of Egyptian export of rice: Still the Egyptian side ask many time the European Commission to increase the quota allocated to Egyptian rice as is still fixed in 82 thousand excepted by claiming that most of Egyptian rice from broken rice.

21) Still many Egyptian business find it is difficult to get visa to European Countries, either completely or in time which obstacle those to pay business visit to these countries.

CONCLUSIONS

In spite of all effort done by Egypt and E.U. after four years of signing the Partnership Agreement between Egypt and E.U. in June 2004 and a lot of hope to increase the volume of trade and investment, was achieved so far were less than we expected.

AKNOWLEDGEMENTS

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THE DEVELOPMENT OF THE BUSINESS SECTOR IN THE RURAL AREA IN CALARASI COUNTY

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Key words: *business sector, rural area, human capital, qualification and re-qualification,*

Abstract
The development of the business sector in the rural area cannot bee made without massive investments in human capital, respectively the qualification and re-qualification of the human resources on jobs to face some new exigencies, to discover new methods of reaching the enlarged market of the European Union, to fights with new competitors in the own activities sector. In this regard, concrete modalities of identifying the opportunities of insertion on labour market of the high education graduates impose, both at the level of general information on the business opportunities and at the level of business mentality and behaviour, which will develop the business sector in the rural are, leading to the economic, social and cultural development in this area.

INTRODUCTION

In the context of Lisbon and Göteborg agenda, EU foresees the fact that a powerful economy Hill lead to the creation of jobs together with the social and environment priorities, in order to ensure the sustainable development and the social inclusion. In this sense, a key element is represented by the exploitations of the opportunities for the economic increase and creation of jobs in the rural area by mans of micro-enterprises. At present there are deep disparities between the urban and rural areas, at regional level, as regards la the business environment, as a result of a poorly developed infrastructure in the rural areas, of lack of financial resources, of difficulty to access credits and th reduced level of entrepreneurial training.

The development of the micro-enterprises is recognised as being the most significant source of creation job /obtaining incomes in the rural area, both for the already developed economies and for under developing ones.

MATERIAL AND METHOD

The study was based on South Muntenia Regional Development Plan, statistical data of Calarasi Regional Statistics Direction, Calarasi Direction for Agriculture and Rural Development and the County Office for Agricultural Consultancy.

In the rural area in Calarasi county a series of non agricultural activities are developed (tourism, agro tourism, processing of some agricultural raw materials, commerce, transports, etc.), that have a positive impact on the rural communities, contributing to ensure the complementary incomes and to increase the level of using the labour force. Regarding the general situation of SME creation in the rural area, their dynamic analysis is able to highlight a series of tendencies also regarding the economic social situation of the villages in Calarasi rural area.

RESULTS AND DISCUSSIONS

The promotion of a balanced development, in order to achieve the economic and social cohesion requires a remarkable attention to the development of the rural areas where about 50% of Romania population live. At present in Romania, the economic functions of these areas depend almost ntirely on the existence of the agricultural activities. The restructuring of the activities to the level of agricultural farms together with the improvement of the commercial farms capital and the inevitable orientation to a partial employment in agriculture determined the release of a considerable part of the labour force in the agricultural sector. Thus it is required the need to create alternative jobs, as well sources of additional incomes from non agricultural productive activities, together with the re-orientation of the labour force towards non-agricultural productive activities and towards the development of services for the rural population. The rural area does not have to be perceived anymore as a predominantly agricultural area.

The more diversified the structure is, the more favourable the social implications are: possibilities of labour force employment, population stability, keeping the young in the rural area (with possibilities to work in non agricultural activities, but close to agriculture), thus guaranteeing different sources of incomes for the rural population; complementarity in using the labour force; using the partial time of the employees in the private family agricultural farms, etc. the labour force in the rural area is based on the specific of the rural economy dominated by the primary sector, this constituting one of the key resources of the rural development. At the end of the year 2007 the active population of the county was 110.000 persons – decreasing with 15,4 % compared to the year 2001 – the gross rate of activity being of 52% for both sexes and of 52,3% for women. From the point of view of the distribution on sectors of activity, at the end of the year 2007, 51,5% of the civil employed population worked in agriculture, hunting, forestry, fishing and pisciculture, 21,4% in industries and constructions (23,8 % in 1998) and 27,1% in commercial

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and social services (27,4 % in 2001). In the last 6 years, the employed population structure highlights an increase tendency of the percent of population employed in industrial and services activities and decrease in agricultural activities. The percent of women in the civil employed population was of 51,3% at the end of the year 2007. The population in the rural area is employed predominantly in agriculture, with the statute of familial worker and has a level of education more reduced than in the urban sector. In the rural area, as it results from the table below, the employment rate is higher than in the urban area, and the unemployment level is more reduced. The positive effect provided by the high employment rate and the reduced level of the unemployment rate can not compensate other factors specific to the employment., with negative influence on the living level, as well the high percent of population employed in agriculture, season of this activity, etc. the high employment rate met in present in the rural area is determined by the low level of technological equipment in agriculture, that determines the rural population to develop activities with reduced productivity, generating of small incomes.

In the rural area, the percent of youth employed is of 45,1%, compared to only 22,1% in urban area, the comparative aspects between the rural area and urban area regarding the employment rate on age groups being mentioned in the following chart: In the rural area, the agriculture dominates as main activity, the percent at the level of region being of 48,1% of the total employed population. .

Another characteristic of the labour force in the rural area is the reduced level of training, with major influences on the productivity and living level. A last aspect related to the labour force in the rural area, resulted from the analysis of distribution on ages is the aging tendency. In general the rural area in the region faces the lack of a network of satisfying roads, that could ensure to the population useful services for the modern living environment. The network of commune and county public roads has a length of 9.321 km representing 78,8% of the total of national road network. The commune and county roads have a percent of 8,35%, the rest being covered with light covers. Regarding the technical condition most of them are inadequate, that determines the access to the national roads network of the rural population in some communities (especially in the south part of the region) to be quite difficult. Regarding the drinking water network and supply from the total of de 2.511 rural communities existing in the region, 432 are supplied with drinking water in centralised system. The public supply network of drinking water, the capacity of installations and the volume of drinking water distributed to the domestic consumers, cannot ensure the town needs of the rural population, both as number of beneficiary inhabitants, and as percent of the equipped rural localities. Under this aspect, the rural population is not ensured with acceptable conditions. Under the technical aspect most of them are inadequate, fact that determines the access to the national roads network in some communities (especially in the south part of the region) to b quite low.

The public network of drinking water supply, the capacity of installations and the volume of drinking water distributed to the domestic consumers, cannot ensure the needs of the rural population, both as number of beneficiary inhabitants and as percent of equipped rural localities. Under this aspect, the rural population is not ensured with acceptable living conditions, depending on obtaining drinking water from other sources (wells, springs) which not in all cases ensure an adequate drinking water. Also from the sewerage network of the waste waters point of view the population in the rural area is disadvantaged, in the region benefiting by such a network a number of 50 communes. The distribution services of the natural gases is ensured for a number of 104 rural localities situated mainly in the counties in the north of the region.

This situation is due to the existence in that area of resources of natural gases. One of the rural environment problems is the social infrastructure, that at the level of many rural communities is lowly developed. If the infrastructure for education in the rural area is well represented at the region level and can support the development in relatively god conditions of the educational act, not the same thing is about medical assistance infrastructure, that needs major investments.

A way of improving the rural area in the regional economic context, is the development and promotion of the specific

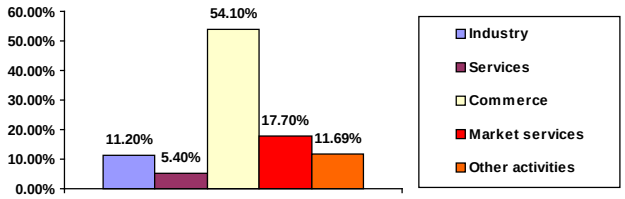

Fig. 1. Structure of SMEs on fields of activity in Calarasi county, in the year 2007

services sector and activities based on using the local resources. The potential of the rural area, seen mainly only by the existing agricultural surfaces and activities related to their work, is based on the existence of some specific not sufficiently exploited resources until present and can constitute an alternative and at the same time an opportunity of rural economy diversification. The measure aims the orientation and support of the private sector by activities related to the agriculture and with non agricultural specific in the field of agro-food products processing, manufacturing processing and agro tourism. The adequate development of this sector contribute to the formation and consolidation in the region of a middle class with decisive role in the social stability and rising the life quality in the rural environment.

In the present economic conjuncture, the development of this sector based on revival and use of traditional craftsmen and use of qualified labour force is defining for the social and economic revival of the rural space. In order to eliminate the existing disparities in the rural area, actions are needed that can favour the dynamism of the rural development and can allow the use of all types of its potential. In order to improve the situation in the rural area it is needed the support of the specific activities and the improvement of the economic value of the agriculture. The agriculture of the region has

a determining role in the creation and maintaining within the rural communities of an environment needed for the development of specific activities. As a result of the market requirement for a higher quantity of quality and diversified products is needed the development and modernisation of productions based on modern and ecological technologies, able to ensure the increase of the agriculture competitiveness. The development and modernisation of the productive capacity belonging mainly to the private sector contributes to the development of the rural sector. In the year 2008, at the country level there were about 430.000 SMEs, of which less than a quarter in the rural area. If in the urban area at 1000 inhabitants there are about 20 SMEs, in the rural areas there are only 9. this discrepancy is explained by objective and subjective reasons. Under objective aspect it related to the poor infrastructure existing in the rural area, obstacle in creating such non agricultural units and the lack of financial resources, characteristic to the rural population, that cannot pay even the most elementary services. From subjective point of view it relates to the obsolete mentality, according to which fro a better life in the rural area all has to be produced in the peasant farm. This is the reason for which the initiation and development of the education and re-qualification programs for adults in the rural area have a vital importance. Once increasing the civilisation level in the rural areas, the persons can become less dependent on agriculture and will have more money to spend, new qualifications will be necessary as well, for example, that of car mechanic, TV set repair worker, fitter etc. And these will attract labour force from the agricultural activities, and SMEs are placed ideally to provide this type of services.

In Romania, as in many other central and east European countries passing to the market economy meant, mainly, the evolution of two components: the transfer of property right on the state enterprises to persons of private right, that is the so called privatisation process, regardless the method applied, as well the appearance of some new private enterprises, as a result of some particular independent initiatives, that appeared following the changes made in the units still in the state property. These two ways of evolution manifested mostly or less simultaneously, but in different rhythms. Both had big repercussions on the labour market. While the privatisation led to the reduction of the number of jobs, especially on long term, the new particular sector crated the highest part of the jobs. Considering the fact that most new enterprises are small and medium ("SME"), it results that this sector absorbed the highest part of unemployed labour force ad contributed at the same time, to the formation of a new generation of owners and high percent of employees in the urban area and quite low in the rural area.

CONCLUSIONS

The economic development of the rural area is affected by multiple problems generated by the situation of the access ways, lack or insufficient public utilities and social infrastructure.

In the present economic conditions, the development of the rural areas under all aspects can and must ensure a social economical alternative of the urban areas.

The complex problems of the rural space involves taking some measures aimed to diminish or to eliminate the existent discrepancies and to achieve a social economical connection.

For the diversification of the economic structures and of the activities it is needed to remove the effects generated by an inadequate social and physical infrastructure.

The development and modernisation of the physical and social infrastructure constitutes a first step that must b made, this determining on one hand the increase of the rural area attractiveness and on the other hand, the penetration of the private capital within the rural area.

The lack of a global development strategy of SME sector, correlated with the needs of social and economic development of the county, determined the establishment of SMEs generally in the urban area and less in the rural area.

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CATTLE BREEDING – A CHANCE FOR THE DEVELOPMENT OF SERBIA

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Key words*: cattle breeding, production, incentives, means for development.*

Abstract
In agricultural production structure, cattle breeding production plays a very important role, because there is no developed agriculture without a stable and developed cattle breeding production. Participation of cattle breeding in the structure of gross realized value in Serbia amounts to 41.2 % , therefore poorly developed cattle breeding points at poorly developed agriculture as a sector of the economy of our country.Cattle breeding production provides products for the domestic population feeding (milk, meat, eggs) on one side, and for food industry (dairies, slaughterhouses etc.), on the other side. It could provide high-quality products for export to a great extent, especially concerning cheese, sheep cheese and goat cheese with standard quality and origin mark stated precisely. But, in order to provide the above mentioned by cattle breeding production, the existing situation of cattle breeding in Serbia has to be improved through series of measures of support provided by Ministry of Agriculture.Therefore, changes in number of heads of cattle according to classes and categories for a certain period (1991, 1998, 200, 2005-2007) and measures for the improvement and the advancement of cattle breeding situation in the Republic of Serbia are presented in this study.

INTRODUCTION

The best way to initiate and start the cycle of agricultural activities first of all would be to start with the investment of money in a development of agriculture, which, being a sector of economy, manages the most massive resources. Those resources should be reasonably and rationally used. Cattle breeding production, being an integral part and one of the most important parts of agricultural production and also a field with the most rapid turnover of capital in agriculture, directly depends on all parameters that affect the market, whether on macro-level or on micro-level.

Cattle breeding affects the development of plant production, because about three quarters of this production is spent on cattle feeding, with a remark that a great deal of that plant mass could not be used in any other way. Secondary product obtained from cattle breeding which returns to plant production is fertilizer, very important means for structure maintaining and land production capability maintaining. Cattle breeding process of production is considered to be the hardest in agriculture, because lasts continuously during the whole year, disregarding the season of the year and weather conditions.

According to the Republic Bureau of Statistics data for 2007, in the cattle breeding production structure of Serbia cattle raising participates with 42.6%, hog raising participates with 38.1%, poultry raising participates with 12.4%, sheep raising participates with 6.3% and beekeeping participates with 0.6% (Graf. 1.).

About 700.000 farms in Serbia are engaged in cattle breeding, which amounts to about 55% of total number of farms and they gain about 40% of gross agricultural public product. Serbia produces 83.000 tons of beef, 255.000 tons of pork, 20.000 tons of mutton and 75.000 tons of chicken meat per year. The total production of meat in the Republic of Serbia has a tendency of a slight decline or stagnation, retaining on a level of about 450.000 tons. In total production the production of pork dominates with participation of about 60%, 20% of beef, 15% of chicken meat and 5% of mutton.

There are between 30.000 and 40.000 of empty objects for fattening of pigs and cattle and if those objects were filled, Serbia would be classified into countries with developed cattle breeding.

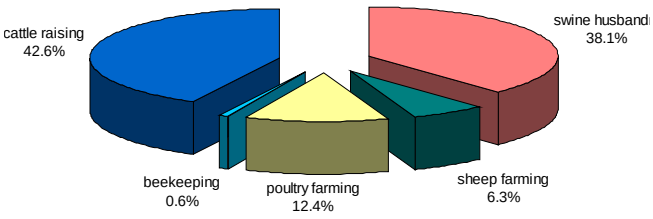

Fig.1.Structure of cattle breeding production in the Serbia, 2007.

On the other side, there are 220 of dairies in Serbia and it is produced 1.6 billion of litres of milk per year, out of which 900 million of litres is being officially refined. Consumption of milk is 65 litres per person per year, which is very small quantity.

Cattle breeding in Serbia has been suffering deep crisis because of the production decline for a long period of time : a 1.61% decrease in cattle raising, 4.15% decrease in poultry raising, 0.10% decrease in sheep raising, whether in the sector of hog raising and beekeeping the production has been stagnating, observation performed during 2007.

Negative climate conditions, expressed fully during the last few years, caused reduced production of basic hog species, while the reduced production of fodder food sold in bulk significantly contributes to the reducing of the total cattle breeding production.

Reasons for being in such a bad condition are numerous: reduced domestic market and low population purchasing

power, on one side and loss of world market on the other; transition and privatization; absence of a long-termed strategy for the cattle breeding development; technological and technical incompetence of most of manufacturing realized during the whole period. Minimum production was recorded in 2007. and it was 1549 million of litres (2663 per one milked cow), which is 74 million of litres less compared with the average number realized during the observed period.

	1991.	2000.	2005.	2006.	2007.	Index–total production (1991=100)
Cattle, total	1.483	1.246	1.079	1.106	1.087	73.30
Calves up to 3 months	177	128	111	124	129	72.88
Young cows from 3 months to 1 year	244	158	150	193	190	77.87
Young cows over 1 year	123	109	81	106	113	91.87
Cows	847	759	672	622	602	71.07
Heifer in calf	59	58	48	52	46	77.97
Bulls of breeding stock	3	4	8	3	2	66.67
Oxen	30	30	9	6	5	16.67
Young cows in fattening	168	118	157	223	187	111.31

Table 1. Number of cattle by category –in 000 -
Source of data: Statistical office of the Republic of Serbia

export capacities; impossibility to produce larger contigents of equal quality, disorganized primary production and bad connection between cattle breeders and manufacturers; as well as unsatisfactory and slow regeneration of cattle breed composition. Cattle breeding has been completely marginalized as far as the export of agricultural products is concerned, therefore it is certain that Serbia must increase its export in order to increase the production.

Production in the cattle breeding

Compared with the base 1991., the total number of heads of cattle in 2007. had been 26.7% reduced, the total number of calves up to 3 months old had been 27.12% reduced, the total number of young cows from 3 months to 1 year old had been reduced 8.13%, the total number of cows had been 22.03% reduced, the total number of heifer in calf had been 33.33% reduced, the total number of bulls of breeding stock had been 83.33% reduced, while the number of young cows in fattening had been 11.31% increased (Tab.1.). An average annual production of cow milk in the Republic of Serbia (1998-2007) according to the Bureau of Statistics data amounts to 1623 million of litres (2347 l per one milked cow). Maximum production of milk was realized in 1998 and it was 1967 million of litres (2663 per one milked cow), which is 344 million of litres more compared with the average quantity Production of cow milk in the Republic of Serbia in 2007. is 21.25% reduced compared with the base 1998.

The total number of hogs in 2000. compared with the base 1991. was 4.62% reduced, in 2005. reduction amounted to 25.76%, in 2006. reduction amounted to 6.19% and in 2007. it amounted to 10.11%. Reduction was constant in the last 15 years approximately (Tab. 2).

Year	Piggies up to 2 months	Swines from 2 to 6 months	Sows	Jungsau	Boars for breeding	Other swines	Swines in the fattening	Total	Indeks– total production (1991=100)
1991.	1.119	1.731	708	168	35	503	1.023	4.263	100.00
2000.	1.174	1.603	695	192	25	377	890	4.066	95.38
2005.	963	1.201	522	132	30	316	1.137	3.165	74.24
2006.	1.453	688	1.132	565	196	136	57	3.999	93.81
2007.	1.431	850	887	517	192	122	33	3.832	89.89

Table 2. Number of swine by category - in 000 -
Source of data: Statistical office of the Republic of Serbia

Considering the number condition, sheep raising in Serbia has been drastically reduced, and the quality stagnates and falls behind more developed world countries. The total number of sheep in 2000. compared with the base 1991. had been 24.26% reduced, in 2005. it had been 25.9% reduced, in 2006. it had been 26.85% reduced and in 2007. it had been 24.5% reduced (Tab.3.). According to the Bureau of Statistics data, an average production of sheep milk in Serbia amounts to 25 million of litres (44 litres per one milked sheep). Average production of sheep milk in the Republic of Serbia per year amounts to 18 million of litres (44 litres per one milked sheep). Maximum production of milk was realized in 1998. and it was 32 million of litres (48 litres per one milked sheep), which is 14 million of litres more compared with realization during the period 1998-2007. Minimum production of milk was recorded in 2003. and it was 13 million of litres (39 litres per one milked sheep), which is 19

Year	Sheep to 1 year	Sheep for breeding	Rams and barren sheep	Total	Index–total production (1991=100)
1991.	419	1.588	121	2.127	100.00
2000.	271	1.233	107	1.611	75.74
2005.	314	1.169	93	1.576	74.10
2006.	269	1.167	120	1.556	73.15
2007.	295	1.192	119	1.606	75.50

Table 3. Number of sheep by category - in 000 -
Source of data: Statistical office of the Republic of Serbia

million of litres less compared with the average realization during the ten-year long observation period. Production of sheep milk in the Republic of Serbia compared with the base 1998. has been 46.88% increased. An average production of

Year	Total -000 qty. -	Index–total production (1991=100)
1991.	23.997	100.00
2000.	20.373	84.90
2005.	16.631	69.30
2006.	16.595	69.15
2007.	16.422	68.43

Table 4. Number of fowl
Source of data: Statistical office of the Republic of Serbia

wool amounts to about 2696 t (1.7 kg per sheep), whereas the production of lamb and mutton is at the level of about 24000 t. Considering the available natural and human resources, as well as the market, our country shoud have more intensively developed sheep production.

The number of poultry has been reduced during the observation period, also. A decrease in number of poultry was recorded -15% compared with the base 1991. The decrease was even larger in 2005. -30%, in 2006. -30.85% and in 2007. -31.57% (Tab.4). The production of poultry meat is more easily performed because of the short cycle and followed by several minor problems compared with the other kinds of meat. About 65000t of poultry meat had been produced that are mainly used for domestic population feeding and that production is relatively stable as well as the production of eggs.

Possible means for development

● Stopping and reducing decrease in the number of heads of cattle considering that for the decades the production has been falling 1-2% per year.

● There are extremely favourable climate conditions for an intensive cattle breeding production in Serbia. Large pasture area is an extremely huge potential. Ownership of land has been divided and therefore the land has not been sufficiently and appropriately exploited. Small ownerships have limited capacities for cattle breeding production exactly because of limited hog production. Most of the farms are limited on 5 and less cows. Mountainous area has extremely bad infrastructure, there is no water quality control which is being used in cattle raising production and the technology is rather obsolete. There are also numerous ways of pollution which have been causing endangerment of cattle health and milk particularly in the chain of production. Ways of overcoming and solving the above mentioned problems are, first of all, enlargement of land ownership and education of producers. It is necessary to help and stimulate development of country as well, so that the differences between the country and the town could be reduced through financial help in order to unite farms, to secure project and technical documentation of farms which would start cattle breeding production, and it is necessary to provide strengthening of inspection corps.

● Considering that food is one of the most important paragenetic factors of contemporary cattle breeding production, it is necessary to provide fodder quantities that are needed, food sold in bulk and and concentrated food. In that way not only cattle breeding production, but better quality of cattle breeding products as well would be provided.

● Cattle breeding in Serbia has strong genetic base that should be improved through appropriate genetic and selective measures in order to enable larger production potential. In relation to the genetic resources development priority should be given to strenghtening the selective and adisory services. The basic problems are skilled labor deficit and unfavourable age structure of the producers. Beside standard methods of selection, molecular genetics methods have been used lately. These methods are based on identification of genes that are appropriate for certain production characteristics, and after applying these methods production potential of certain cattle classes and breed improves faster.

● Introduction of a new technology has been performed in order to improve efficiency and competitiveness in the world market. Primary production has been independent of export and mainly based on domestic resources. On the other side, dependance of export appears in purchasing the necessary equipment. A possible solution would be improvement of domestic production and cooperation with foreign producers of equipment and machines necessary for cattle breeding production and fodder production. Through the improvement of cattle breeding production larger export of cattle breeding products would be enabled which acquires necessary state support through stimulative measures and also satisfying the world market standards considering the products. Bigger opportunities to export cattle breeding products and to improve cattle breeding production should be looked for exactly in introducing the appropriate standards applying contemporary methods of control (HACCP,GAP etc.) for monitoring products from the beginning of production to the final consumers. Larger export would be stimulating to the producers as well.

● Favouring private farming should be oriented to the market. Producers which are oriented to the market should be united in associations because of rational use of the available means. Producers´ and manufacturers´ associations of interest is the sore point in the system of cattle breeding production. Our producers are not familiar with their market and there are no functional associations of interest which could deal with connecting producers with the market (vertical connection) and mutual connecting in order to rationalize production and create better approach to the market, both because of the purchase of necessary raw material, as well as because of the product sale. In order to realize these aims, laws related to the cooperative movement and citizen´s association should be improved.

CONCLUSIONS

Results of the analyses performed lead to the conclusion that cattle breeding condition in Serbia could be estimated as unfavourable because the number of all domestic animal heads has been permanently reduced. At the same time with the reduction in the number of heads of cattle, reduction in the production appeared, especially in the production of

meat. During the ten year period (1998-2007) production of cow milk in the Republic of Serbia in 2007. had been 21.25% reduced comparing to the base 1998., and production of sheep milk had been 46.88% increased. The production of wool had been 13% reduced, while the production of eggs had been relatively stable.

Agrarian problems that Serbia has been dealing with for years have not been solved accurately, therefore cattle breeding production has been declining for decades. In order to solve accurately the above mentioned problems, appropriate strategy should be carried out with suggested measures which have to be long- termed and up-to-date for the following period of 30-50 years, because only in that way the improvement in production will be certain.

First of all it is necessary to stop the decrease in number of heads of cattle, to enable cattle production increase and improvement of the quality of cattle breeding products, applying the suggested strategy and additional measures. This is of the greatest importance for export, that cattle breeding development in Serbia depends on in a certain future period.

In recent years unsatisfying condition in cattle breeding production has been slowly but positively changing thanks to the stimulative measures of the government of the Republic of Serbia, and also to the increase in agrarian budget and great effort of local self-management, through its expert services, Fund for stimulating agricultural development of comunes and Agricultural Department and slowly, cattle breeding production has been getting or more exactly has been returning its merited place in the economy.

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EFFECT OF TURNING PLOW TYPE ON SOIL INVERSION DEGREE

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Key words*: turning plows, soil inversion degree*.

Abstract
The present study showed the effect of three turning plows on the inversion degrees of soil at four levels of soil moisture contents, plowing speeds and plowing depths under local prevailing conditions. The results showed that the maximum values of soil inversion degrees were found to be 40.63, 43.75 and 68.75% for these plows, respectively, at plowing speed of 2.18km/h, plowing depths of 29.30, 18.80 and 28.23 cm, respectively, and soil moisture content of 19.98% whilst the minimum values of 30.2, 28.9 and 45.2% were obtained with the same plows at plowing depths of 8.1, 8.4 and 7.5cm, respectively, and soil moisture content of 16.81 and plowing speed of 5.37km/h.

INTRODUCTION

Plowing is considered the major operation in seedbed preparation. The moldboard plow is considered to be one of the most important tillage tools used for primary tillage in seedbed preparation (Kepner et al., 1982). It lessens and pulverizes the soil efficiently to the tilled depth and has the unique ability to completely invert the soil, burying surface residues, killing surface growth and bringing up a new layer of' a better aggregated structure (Richey, 1969). Also, the moldboard plow does not harm arthropod fauna which conserves the soil fertility (Helmy et al., 1994). Disc plow is now used increasingly for multi-purpose uses. A knowledge of tilt angle and soil moisture content is essential for deciding the depth of penetration as the former parameters greatly influence the later (Panigrahi et al., 1990). Plowing requires more traction energy than any other single crop production operation. It is most important to utilize this energy efficiently by selecting and using only the most suitable type of plow to existing conditions (Korayem and Hindey, 1974).

Bukhari et al. (1981) reported that the degrees of inversion were 51.4, 51.0, 51.7 and 51.6% for the mouldboard plow, mouldboard plow plus packer, mouldboard plow plus subsurface packer and mouldboard plow plus spring-tooth harrow, respectively. The field speed ranged from 4.06 to 8.65 km/h and working depth ranged from 22.0 to 25.5 cm.

Imara (1996) indicated that by increasing the implement forward speed the degree of soil inversion tends to decrease, while increasing the plowing depth, the degree of soil inversion tends to increase. The maximum degree of soil inversion was 44.44% at an implement forward speed of 2.57km/h, soil moisture content of 20.24% and plowing depth of 19 cm.

The main objective of the present work is to study the effect of three turning plows the degree of soil inversion at four levels of soil moisture content, plowing depth and plowing speed under local prevailing conditions.

MATERIALS AND METHODS

The field experiments were carried out in the research farm of the Rice Mechanization Center at Meet EI-Dyba, Kafr EI-Sheikh Governorate, Egypt.

A three bottom mouldboard plow (general purpose mouldboard) with cutting width of about 120cm. (b = 40 cm) and height of bottom is 80cm was used to be compared with a five bottoms modified mouldboard plow (area of modified mouldboard = 1/3 general purpose mouldboard) with cutting width of about 120 cm. (b = 24 cm), height of bottom is 90 cm, and a three bottoms disc plow with cutting width of about 92 cm. (b = 3 1cm), disc diameter is 61 cm, disc angle 0.78 rad (45 deg.), and tilt angle 0.384 rad (22 deg.). These plows were drawn by using a two WD, Diesel engine tractor (Model Ford 6610, 55.97 kW, 75 hp), 4 cylinders and water cooled. The experimental plowing speeds were 2.18, 3.26, 4.43 and 5.37 km/h. The soil mechanical analysis and organic matter are presented in Table 1.

Sand %	Silt, %	Clay, %	Organic matter, %	Soil textural class
29.12	17.45	53.43	1.82	Clay

Table 1: Soil mechanical analysis.

The experiments were carried out at four levels of soil moisture content of 16.81, 19.98, 23.54 and 26.43% on dry basis.

The net – work of wooden blocks

Three rows of marked small wooden blocks (1 x 1 x 1 cm) were placed in a vertical plan perpendicular to the direction of plow travel to form a network of blocks according to the procedure mentioned by Korayem and Hindey (1974) and Helmy (1995).

The three-dimensional frame meter

Figure. 1 shows the designed frame-meter parts. It meansures of the wooden blocks in the plowed soil in three dimensions (X,Y and Z). It consists of a wooden farme which is supported on four pins of iron and rest on the unplowed soil. So, both X and Y directions are divided into millimeters and centimeters. The vertical distance (Z) was measured by using a plumb line connected with a movable

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scale (vertically up and down) from the beginning of surface of the movable scale till the measured block position.

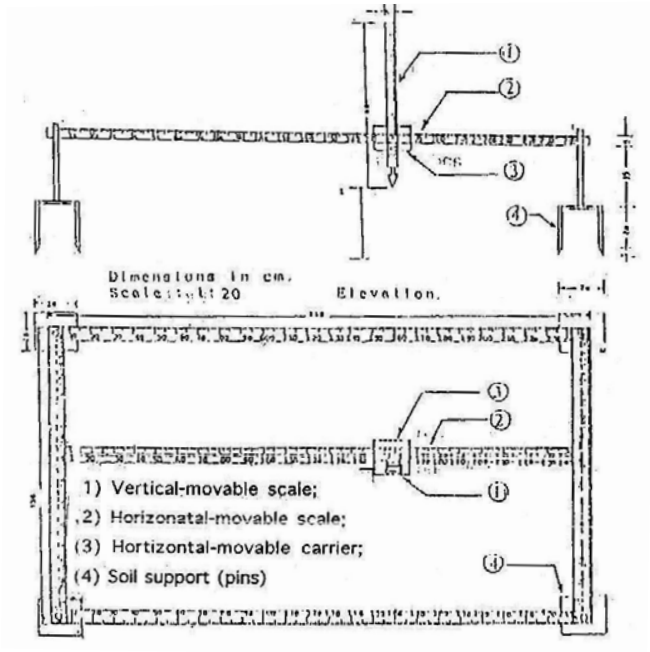

Fig 1: Three dimensional frame-meter - Plan

The degree of soil inversion

The top and bottom rows of blocks should exchange positions. In an attempt to evaluate this quality, the cross-section of the turned slice was divided into three layers of equal thickness on top of each other. The layer thickness was equal to one third of the maximum profile height. A block belonging originally to the top row when moved to the bottom layer was given 2 points and when moved downwords to the middle layer was given only the point. The same was done for blocks of the bottom row considering their upward movement. In this manner, for an ideal inversion (the soil slice rotates a half rotation around x-direction) a score of 32 points must be obtained (each of bottom and top rows had 8 blocks).

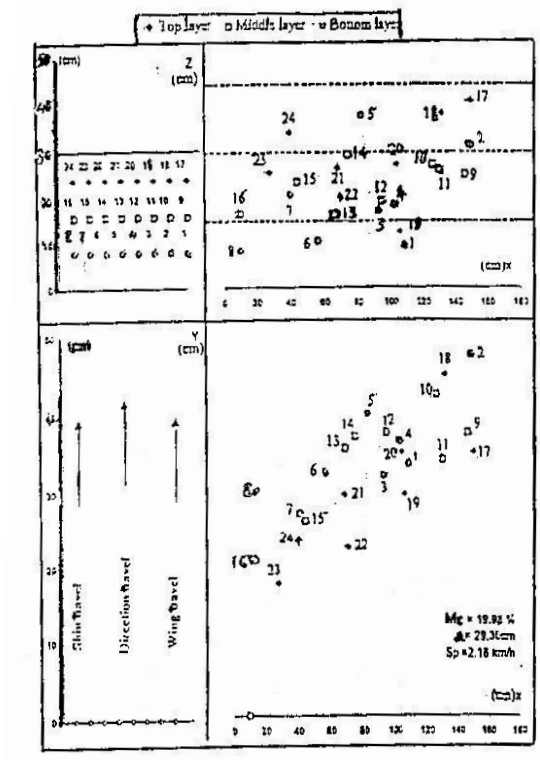

Fig 2: Position of marked blocks before and after tillage operation by using disc plow

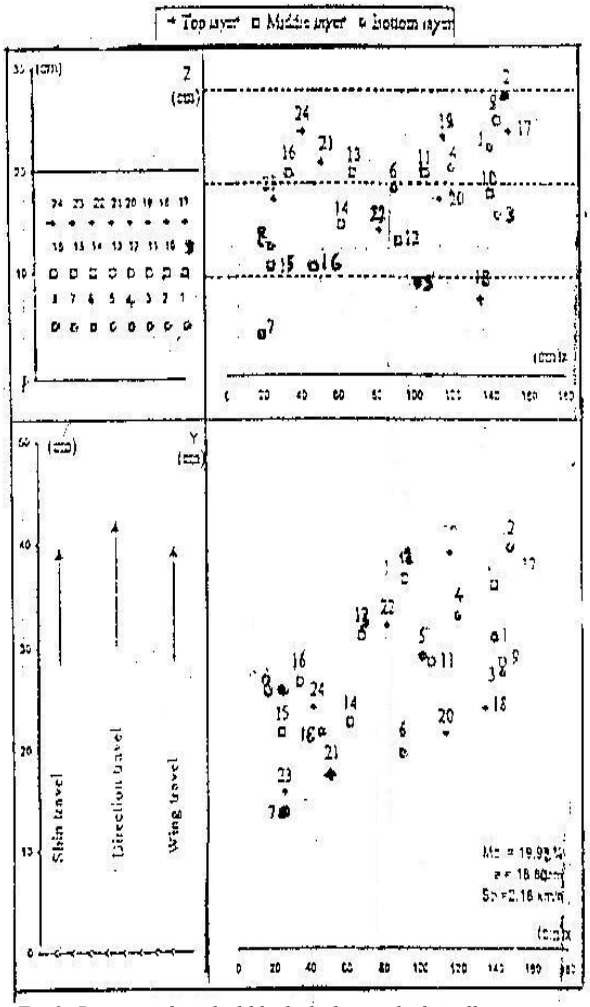

Fig 3: Position of marked blocks before and after tillage operation by modified moldboard plow

RESULTS AND DISCUSSION

Degree of soil inversion (Id)

Figures 2, 3 and 4 show the movement of blocks in the dimensions X, Y and Z for turning plows(Disc, modified mouldboard and mouldboard plows). The soil slices are turned to the right (X direction). This side movement is accompanied by a nearly proportional forward movement in the Y direction. The line shows the proportionality drawn in the X - Y plane.

Figure 2 indicates the treatment which has the maximum inversion degree (Id) 40.63% as a typical example for disc plow. Examination of the bottom layer shows that there was three blocks belonging to the bottom layer and one block belonging to the top layer, while for the middle and the top layers have a score of 7 and 4 points, respectively. Thus the

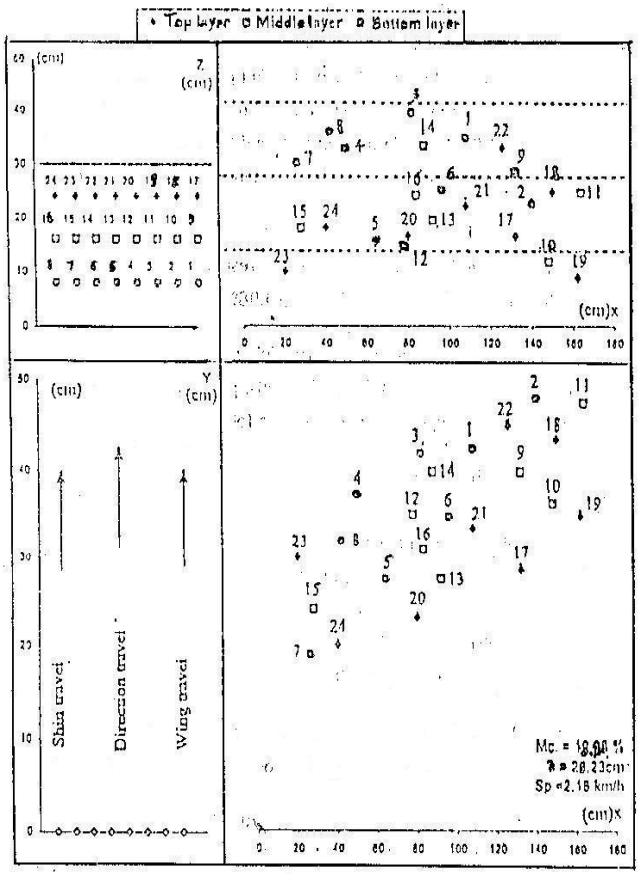

Fig 4: Position of marked blocks before and after tillage operation conventional moldboard plow

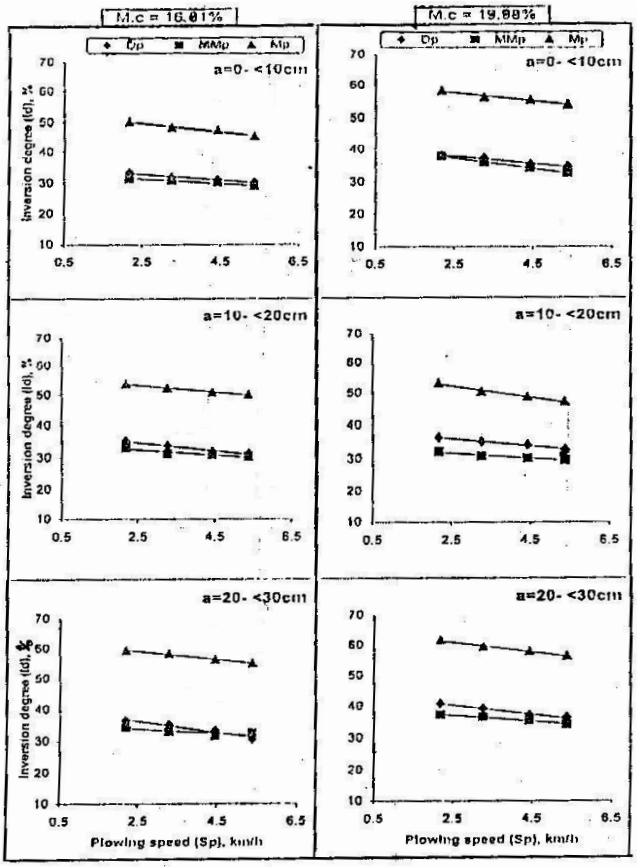

Fig 5: Effect of plowing speed (sp), plowing depth (a), three turning plows on inversion degree at soil moisture contents (Mc) of 16.81 and 19.98%.

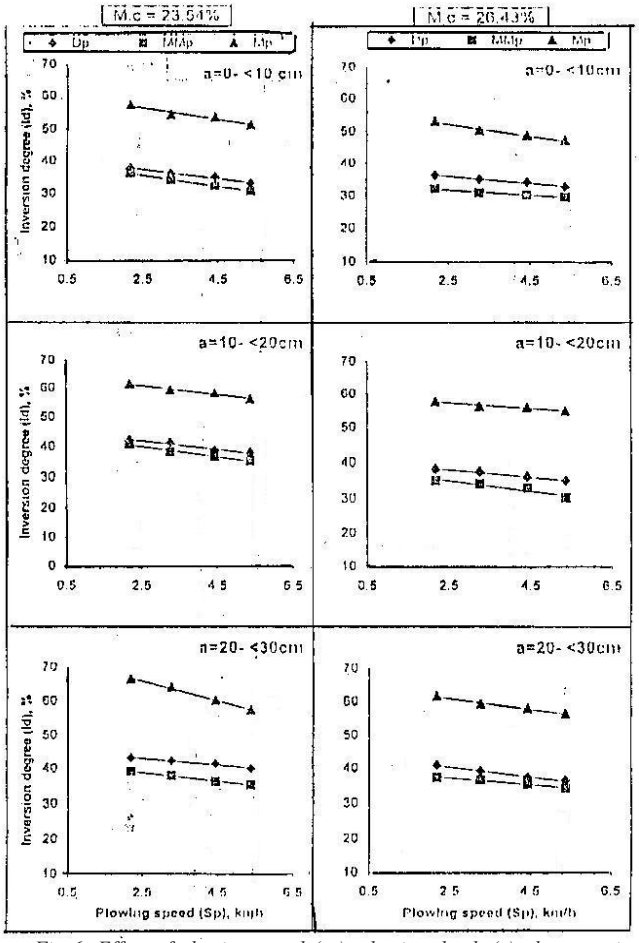

Fig 6: Effect of plowing speed (sp), plowing depth (a), three turning plows on inversion degree at soil moisture contents (Mc) of 23.54 and 36.43%.

total actual score ·for this treatment is 2+7+4 = 13 points. Then the inversion degree (Id) = (13/32)100 = 40.63%.

Figure 3 indicates the treatment which has the maximum inversion degree (Id) 43.75% as an example for modified mouldboard plow. Examination of the bottom layer shows that there was only one block belonging to the top layer, while for the middle and the top layers have a score of 6 and 6 points, respectively. Thus the total actual score for this treatment is 2+6+6=14 points. Then the inversion degree (Id) = (14/32)100 = 43.75%.

Technical parameter	Turning plow type	Regression coefficients				r^2
		b	b_1	b_2	b_3	
Inversion	Dp	37.592	0.10	1.00	-0.30	50.00
Degree	MMP	39.079	0.20	0.40	-0.40	38.00
Plowing	Mp	57.528	0.40	1.00	-1.00	62.00

Table 2: Effect of implement forward, speed, soil moisture content, plowing depth and turning plow types on regression coefficients b, b1, b2 and b3 and the determination coefficients (r2). Dp = Disc plow. MMp = Modified Mouldboard plow. Mp = Mouldboard plow.

Figure 4 indicates the treatment, which has the maximum inversion degree (Id) 68.75% as an example for mouldboard plow. Examination of the bottom layer shows that there were two blocks belonging to the top layer, while for the middle and the top layers have a score of 8 and 10 points, respectively Thus the total actual score for this treatment is 4+8+10 = 22 points. Then the inversion degree (Id) =

$(22/32)^{100}$ = 68.75%. Figures 5 and 6 show the effect of three plows, plowing speed (Sp), soil moisture content (Mc) and plowing depth (a) on the degree of soil inversion (Id). It is seen that inversion degree (Id) decreased by decreasing plowing depth (a) and by increasing plowing speed (Sp). Degree of soil inversion (Id) at soil moisture content (Mc) of 19.98% was higher than that at soil moisture contents of 16.81, 23.54 and 26.43% for all turning plows, respectively.

From the data of the experiments a multiple regression equation was deduced to explain the effect of implement forward speeds, plowing depths and soil moisture contents on the soil inversion degree as follows:

$Y = b + b_1 x_1 + b_2 x_2 + b_3 x_3$ 1

Where:

Y = soil inversion degree,

X_1 = implement forward speed, Km/h

X_2 = soil moisture content, %.

X_3 = plowing depth, cm and

b, b_1, b_2 and b_3 regression coefficients.

It was evident that there was a positive effect of the implement forward speed, plowing depth and soil moisture content on the soil inversion degree.

The regression coefficients (b, b_1, b_2 and b_3) and the determination coefficient (b, b_1, b_2 and b_3) and the determination coefficient (r^2) are listed in Table 2.

CONCLUSION

The conclusion can be summarized as follows:

1. The maximum degreess of soil inversion of 40.63,43.75 and 68.75% at plowing speed-of 2.18 km/h. and plowing depths of 29.30, 18.80 and 28.33 cm and soil moisture content of 19.98% for the plows, respectively. The minimum values were 30.2,28.9 and 45.2% at plowing speed of 5.37 km/h, plowing depth level of 0-< 10 cm and soil moisture content of'16.81 %, respectively.

2. In general, the inversion degree was found to be maximum at a soil moisture content of 19.98 %

Applied Recommendations

In clayey soil, the implement forward speed of 2.18 km/h could be used in case of much vegetative residuals or weeds on soil since this speed gave the highest inversion degrees (40.63, 43.75 and 68.75% at plowing depths of 29.30, 18.80 and 28.23cm and soil moisture content of 19.98% for the plows, respectively.

In saline soil, the implement forward speed of 5.37km/h may be used to obtain the lowest inversion degrees of 30.2, 28.9 and 45.2% at soil moisture content of 19.98% and plowing depth level of 0-<10 cm for the plows, respectively.

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VARIABILITY OF GENETIC PARAMETERS WITHIN GENETIC STOCK OF SILKMOTH BOMBYX MORI L. SP.

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Key words: *Bombyx mori L., genetic stock, correlation, heritability*

Abstract
Native genetic stock of silkmoth Bombyx mori L. sp. resulted by: identification of local populations gene sources, bilateral exchange of biologic material with similar foreign institutes, creations of new genotypes, using specific breeding methods. Within its structure, the genetical stock of silkmoth includes 72 races. Selection activity destined for creation of silkworm races or new hybrids, or improvement of the existing ones, impose the knowledge of genetic parameters, correlation between characters and their heritability, respective characters hereditary propagation degree. The genetical parameters study – the phenotypical, genotypical and environmental correlation, between the main selected characters, emphasize different values, having characters couples with a strong and positive correlation (prolificacy (number of eggs/laying)-laying weight 0.91-0.99, cocoon weight-laying weight 0.62-0.81, cocoon weight-cocoon shell weight 0.60-0.91) and also character couples with moderate values (prolificacy-hatching, cocoon shell weight-pupa weight, fiber length-fiber-weight) or even small values of correlation coefficient (laying weight-hatching, raw cocoon weight-hatching, fiber length-waste weight). The heritability coefficient varied according to race and studied character, having small values for prolificacy, hatching and pupation rate, medium values for raw cocoon weight (0.510-0.732), cocoon shell weight (0.506-0.716), cocoon silk shell (0.505-0.648).

INTRODUCTION

The importance of a gene bank existence, as an essential condition for some breeding programs, is unanimous recognized for all plants and animals species. Because of that, there is a constant preoccupation for its diversification and maintenance through “in situ” and “ex situ” preservation methods. In this way, losses of biological material, especially of breeds resistant to diseases and adapted to environmental conditions are avoided. The genetic stock of silkmoth Bombyx mori L sp. from Romania consists of 72 races. The variability of individuals forming a population referres to quantitative and qualitative aspects as follows:

- quantitative variations which can be measured, referring to differences between metric characteristics, most common with economical implications;
- qualitative variations which can not be measured, but described.

The appearance of some variations regarding organisms’ characters is based on heredity and environment conditions. From this point of view, in the field of breeding we can distinguish:

- hereditary genics variations with origin into hereditary patrimony;
- non hereditary, somatic variations, produced by environmental factors during the organisms life.

Selection activity destined for creation of silkworm races or new hybrids, or improvement of the existing ones, impose the knowledge of genetic parameters, correlation between characters and their heritability, respective characters hereditary propagation degree.

MATERIAL AND METHOD

In order to study the genetic parameters, there were used 4 races (AB, B1, AC 29/T and AC/T) for correlation coefficients and 7 races (AB, B1, AC 29/T, AC/T, AJ 5, RG 90 and IBV) for heritability, which cover the existing race structure both as a geographical variability and criteria used for race classification in sericulture. The characters taken into account were those with a wide variety in silkworm breeding, and were materialized into 19 character couples for correlations study and of 8 characters for heritability. For correlations study the variant and co-variant of the two characters were used [16]. Heritability estimation was made by the calculation of offspring parent-environment regression [16], [5].

RESULTS AND DISCUSSIONS

1.Study of phenotypical, genotypical and environmental correlations to some silkworm races Bombyx mori L. sp.

The correlation coefficient represents a statistic indicator used to measure the dependance degree between 2 variables, as a base for other more complex calculations. For the first situation, it needs to establish if there is any connection between the two variables, this being or not a causality relation. For the second situation, there are different aspects.

Character families can be created using as criterium the correlation coefficients value. Also, it may be established – into a characters system – where one character is determinated by the other system's components. With other words, the correlation coefficient may help the heritability estimation.

For breeding processes, knowing the correlation level of different characters helps to identify in what measure one character's breeding would challenge simultaneous changes and if, in time, there will be more characters challenged. Also, it helps to choose judicious characters which are subject for silkworm selection [11], [3], [4], [14], [15]. The calculations allow us to estimate that between the 19 analysed couples it is a variable phenotypical correlation degree, which may be classified into 3 groups based on their size and direction.

There is a positive and very powerful correlation (r_F 0.6-0.9) for some character couples such as: prolificacy (number of eggs/laying) – laying weight (0.91-0.99), cocoon weight – laying weight (0.62-0.81), cocoon weight – coccon shell weight (0.60-0.86 for females and 0.63-0.91 for males), cocoon weight – pupa weight (0.98-0.99 for females and 0.87-0.92 for males), cocoon shell weight – pupa weight (0.52-0.77). There were established moderate and positive values for phenotypical correlation coefficients (r_F 0.5-0.6) regarding: prolificacy – hatching (0.52-0.66), cocoon shell weight – pupa weight (0.46-0.57), fiber length – fiber weight (0.42-0.53), dry cocoon weight – fiber weight (0.39-0.50). There were distinguished small but positive values, for phenotypical correlation coefficients ($r_F < 0.2$) regarding the following couples: laying weight – hatching (0.12-0.21), raw cocoon weight – hatching (0.12-0.20), fiber length – waste weight (0.05-0.15), fiber weight – waste weight (0.13-0.22). There were also negative character correlations, such as: chrysalis weight – hatching (-0.14; -0.47), raw cocoon weight – silk percentage (-0.26; -0.54 for females and -0.20; -0.42 for males). The genetic correlation (r_G) is the simultaneous action which results of a gene or a poligenic system upon different characters, and because of that, it will appear a genetic correlation between the characters controled by the same gene. The correlation level resulted from the pleiotropical genes action expresses the measure to which are influenced, by the same gene, two or more characters. Some genes may increase both characters, resulting a positive correlation, while others increase one character and decrease another, resulting a negative correlation.

Another cause for genetic correlations is the linkage among genes. For the analised races assortment there were distinguished tight and positive genetic correlations (r_G 0.6-0.9) between prolificacy – laying weight, raw cocoon weight – cocoon shell weight, raw cocoon weight – pupa weight. Moderate and positive genetic correlations (r_G 0.2-0.4) were establish between fecundity – hatching, cocoon shell weight – silk percentage, filamented length – dry cocoon weight. The experimental data show low genetic correlations ($r_G < 0.2$) for the following character pairs: cocoon weight – prolificacy, filament length – waste weight. The environmental correlation (r_E) is the result of simultaneous actions of the exogenous factors on two or several characters. As in case of genetic correlations, the general effect of all environmental factors can determine the evolution of two or several characters in the same or opposite directions. Our studies have put in evidence high values of the environmental correlation coefficients for 14 character pairs, but in most cases, they were negative, for example prolificacy-hatching (-0.73), raw cocoon weight-hatching (-0.77), laying weight – hatching (-0.51) and cocoon weight – silk shell percentage (-0.48 for females and -0.49 for males).

2. The heritability study for the main quantitative characters for some silkworm races Bombyx mori L. sp.

The heritability coefficient represents a very important genetic parameter for estimating the reproductive genetic potential of animal populations, selection precission and for optimizing the breeding programmes. This was the main objective for some researches of silkworm, made by Petkov N. and coll. [10], [12], Ozdenska B. and coll. [9], Tribhuwan S. [15]. The mentioned authors distinguished variable values of the studied parameters, being influenced by race, sex, conditions and experiments.

2.1. Prolificacy and hatching heritability

The heritability coefficient for the number of eggs layed by a female was between 0.115-0.210, and for hatching, between 0.08 and 0.145. The registered values for both characters show a low hereditary transmission capacity [17].

2.2. Pupation rate's heritability

The pupation rate can be characterised by a small heritability coefficient, with a value between 0.105-0.205, compared to values presented by different authors, 0.190 [15].

2.3. Raw cocoon heritability

For raw cocoon weight, the heritability coefficient had values between 0.510-0.732. For the character pointed out, the literature gives us the following values: 0.299 [9], 0.506 [2], 0.25 for males and 0.46 for females [8], 0.76 and 0.82 [13], 0.736 [15], and for Phylosamia ricini species 0,41 for males and 0.59 for females [6]. The data obtained by us reflect a medium heritability character, which through selective breeding can provide sufficient variability for initial material for further breeding activities.

2.4. Cocoon shell weight heritability

For cocoon shell weight, high values of heritability coefficient were revealed, with a maximum value of 0.716 and a minimum of 0.506. For the same character, Ozdenska B. and coll. [9] obtained a medium value of 0.347 and Petkov N. [10], 0.68 for females and 0.46 for males. The data offered by Abbasov B. [1] revealed for this character values of h^2 = 0.38-0.45, while Tribhuwan S. [15] estimated a heritability of cocoon shell weight to 80.20%, and Jayasawal K.P. and coll. [7] estimated the same character heritability to 81.79%.

2.5. The silk heritability

Based on our obtained values (0.505-0.648) it is pointed out that silk percentage is one of the characters with high heritability, with appreciable chances for improvement

through selection, although these values are lower than the ones presented by other authors: 72.40% [15], 75.03% [7], but comparable with the ones found by Petkov N. and coll. [12], 0.509-0.620.

2.6. Fiber length heritability

In the case of breeds studied by us, fiber length showed medium values for heritability coefficient, close between races, with values between 0.375 and 0.486. The values are comparable with the ones presented by Petkov N. and coll. [12], but lower than the ones mentioned by Jayaswal K.P. and coll. [7], 54.43%.

2.7. Fiber weight heritability

Like the previous character, the fiber weight presented medium values for heritability character, between 0.473-0.540. For the same character, Ciulu M. [2] obtains 0.354-0.573.

CONCLUSIONS

1. The genetical parameters study – the phenotypical, genotypical, and environmental correlation, between the main selected characters, emphasize different values, having character couples with a strong and positive correlation (prolificacy-laying weight (0.91-0.99); cocoon weight-laying weight (0.62-0.81), cocoon weight-cocoon shell weight (0.60-0.91)) and also character couples with moderate values (prolificacy-hatching; cocoon shell weight-pupa weight; fiber length-fiber weight) or even small values of correlation coefficient (laying weight-hatching; raw cocoon weight-hatching; fiber length-waste weight).

2. The heritability coefficient varied according to race and studied character, having small values for prolificacy, hatching and pupation rate, medium values for raw cocoon weight (0.510-0.732), cocoon shell weight (0.506-0.716), cocoon silk shell (0.505-0.648).

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NUMERICAL EVALUATION OF THE LAND FUSION IN LARGE EXPLOITATIONS

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Key words: *agrarian structures, numerical evaluation of agrarian structures, average size, degree of concentration of surfaces in large size exploitations.*

Abstract
Using an original methodology, the paper emphasizes the fact that to characterize the agrarian structures of a country, it is not enough to determine the medium size of the agricultural exploitations. It is highlighted that such averages are the result of the different distributions of agricultural surfaces on size classes. The comparative results emphasize that the degree of concentration of agricultural surfaces in exploitations of large sizes is comparable with some country from west European countries.

INTRODUCTION

The structure of agricultural exploitations in Romania has the seal of secular gap compared to the developed European countries. The reality of excessive crushing of the land property in Romanian agriculture, leads to the necessity of diversification of options to expand the perimeter of land exploitation as a form of exploitation. The presence of organizational alternatives, validation, the development or their restrain by the principle of competition represents reasonably options. The individual farms are predominant and they have a very small size (1,73 ha). Beside that, we can mention the associations with juridical personality (Table1).

specialization of production and implicitly of the extension of the organizational frame of land exploitation has been accentuated. The different historical ways of development of the countries from the western and eastern Europe has determined different strategies and effects.

In Western European countries the optimization of the organizational frame of land exploitation has been done under the specific conditions of the market economy, based on the competition principles. In France, Denmark and majority of developed countries has been adopted the consolidation strategy of optimal dimension familial farms, strategy completed in present by the renting of the land system and by the association based on social reasons.

Juridical status of agricultural exploitation	Agricultural exploitations		Used agricultural surface		Average surface of exploitation (hectare)
	Number	%	hectare	%	
Individual agricultural exploitation	4462221	99.49	7708757.61	55.34	1.73
Exploitations with juridical personality	22672	0.51	6221952.49	44.66	274.43
Agricultural associations	2261	0.05	975564.26	7.00	431.47
Commercial societies	6138	0.14	2168792.03	15.57	353.34
Public administration units	5698	0.13	2867368.41	20.58	503.22
Cooperative units	87	0.00	2365.14	0.02	27.19
Other types	8488	0.19	207862.65	1.49	24.49
TOTAL	4484893	100.00	13930710.10	100.00	3.11

Table 1 Agricultural exploitations by juridical status (2002)
Source: INS, Diseminarea Rezultatelor Recensământului General Agricol 2002

Class of size	Surface		Number of farms		Average surface
	Ha	%	Nr.	%	
From 0 to 2 ha	410	0.015	510	1.154	0,80
From 2 to 5 ha	2780	0.104	750	1.696	3,71
From 5 to 10 ha	63260	2.376	8780	19.860	7,21
From 10 to 20 ha	121420	4.560	8430	19.068	14,40
From 20 to 30 ha	118860	4.464	4840	10.948	24,56
From 30 to 50 ha	218330	8.200	5630	12.735	38,78
From 50 to 100 ha	509530	19.137	7090	16.037	71,87
Over 100 ha	1628010	61.144	8180	18.503	199,02
T O T A L	2662600	100.000	44210	100.000	60,23

Table 2 Size of agricultural exploitations in Denmark (2007)
Source: Eurostat; Date of extraction: Sat, 14 Feb 09 09:28:31

MATERIAL AND METHOD

Under the request of modernization, of the performance and competitively increase, the phenomenon of concentration and

Statistical data indicates the fact that the increase rhythms of average size of agricultural exploitations in very developed countries (Denmark, Netherlands, France) continue to be

Specification	1990	1993	1995	1997	2000	2003	2005	2007
Denmark	34,3	37,2	39,8	42,8	45,9	55,1	54,1	60,23
Netherlands	16,5	17,2	18,0	18,9	20,3	23,8	24,4	25,54
Greece	4,3	4,3	4,5	4,3	4,4	4,8	4,8	5,17

Table 3 Average size of agricultural exploitations in Denmark and Greece
Source: Eurostat; Date of extraction: Sat, 14 Feb 09 09:28:31

very high. In countries (Greece) with social structures lees advanced, despite of their considerable stage in the integrated system of European Union, the modernization rhythms of the agricultural structures are insignificant.

A special case is represented by Italy, a country where the average size of agricultural exploitation remains at low levels.

Class of size	Surface		Number of farms		Average surface
	Ha	%	Nr.	%	
From 0 to 2 ha	10200	0.290	12550	32.606	0,81
From 2 to 5 ha	19260	0.547	6380	16.576	3,02
From 5 to 10 ha	31290	0.889	4500	11.691	6,95
From 10 to 20 ha	56390	1.603	4030	10.470	13,99
From 20 to 30 ha	51500	1.464	2130	5.534	24,18
From 30 to 50 ha	89460	2.543	2330	6.054	38,39
From 50 to 100 ha	161150	4.581	2310	6.002	69,76
Over 100 ha	3098830	88.083	4260	11.068	727,42
T O T A L	3518080	100.000	38490	100.000	91,40

Table 4. Size of agricultural exploitations in Czech (2007)
Source: Eurostat; Date of extraction: Sat, 14 Feb 09 09:28:31

The explanation lies on horticultural preponderant profile a don the fact that some properties which are exploited under cooperative system are recorded as individual properties.

In Eastern European countries, the absence of the land market has caused the conservation of relative primitive agricultural structures of the between world war period. In order to reduce this historical drawback, Romania needs juridical system which will allow the optimization of

Class of size	Surface		Number of farms		Average surface
	Ha	%	Nr.	%	
From 0 to 2 ha	1807510	13.143	2485570	64.530	0,73
From 2 to 5 ha	3021900	21.973	965590	25.069	3,13
From 5 to 10 ha	2017540	14.670	300000	7.789	6,73
From 10 to 20 ha	924230	6.720	70130	1.821	13,18
From 20 to 30 ha	230100	1.673	9550	0.248	24,09
From 30 to 50 ha	251160	1.826	6560	0.170	38,29
From 50 to 100 ha	328250	2.387	4740	0.123	69,25
Over 100 ha	5172370	37.609	9660	0.251	535,44
T O T A L	13753060	100.000	3851800	100.000	3,57

Table 5 Size of agricultural exploitations in Romania (2007)
Source: Eurostat; Date of extraction: Sat, 14 Feb 09 09:28:31

organizational frame by all possible ways: selling, renting, and association. The absence of continuity in development of agricultural structures modernization strategy has lead to very strong polarization of the agricultural exploitations by their size.

A significant exception, from this point of view, is represented by Czech, country which has preserved the structures of associative type. These structures have been transformed based on a new juridical status. As a consequence of this fact, Czech has today the largest size (91,4 ha) of agricultural exploitations of all Europe.

Distribution the number of agricultural exploitation by size class presents a big difference from country to country (figure 1).

In the some time, the surfaces distribution of agricultural exploitation by size class are different, but the concentration about these indicator it's most nearly from country to country (figure 2).

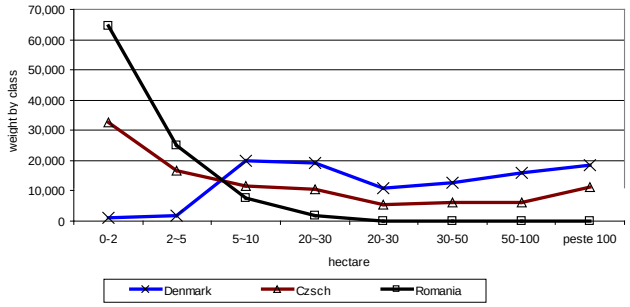

Figure 1 - Distribution the number of agricultural exploitation by size class

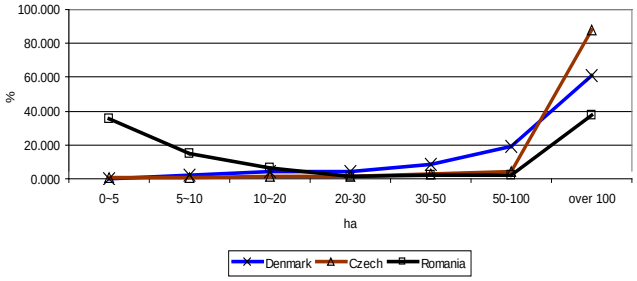

Figure 2 - The surfaces distribution of agricultural exploitation by size class

RESULTS AND DISCUTIONS

Between the distribution of the exploitations by agricultural size class and owned surfaces by agricultural size class usually appear major discrepancies. In west european countries one can see a relative harmonious migration and stratification of agricultural exploitation surfaces from small exploitation to large size exploitations. In central and east european countries, with traditional crushed agricultural surfaces, an accentuated phenomenon of polarization between small size agricultural and large size agricultural surfaces has been produced.

In the case of the countries with polarized agriculture between the two extremes is risky and unsound to appreciate the agricultural structures only by average size of exploitations. It is extremely important to reveal from which classes of size comes such of average size. The elimination of such a drawback can be done through the calculus of the concentration degree of agricultural surfaces of large size. The need of numerical evaluation of concentration degree in agriculture has also generated multiple methodological approaches one can mention, this way, largely scattered methods and practices like:

- Average size of agricultural exploitation method [1];
- Gini concentration coefficient method [4];
- Concentration coefficient of surfaces on large

Country	Romania	Poland	Italia	France	Denmark	Czech
Average size (ha)	3,57	6,50	7,60	52,64	60,23	91,40
Conc. of surfaces (%)	38,5	21,6	32,6	69,7	70,5	88,7

Table 7 The correspondence between average size and the degree of concentration of surfaces
Source: computed data

The classification of european country by average size of agricultural exploitation				The classification of european country by concentration degree of agricultural exploitation surfaces			
Number	Country	Average size of exploitation	Degree of surfaces concentration	Number	Country	Average size of exploitation	Degree of surfaces concentration
	Czech	91,40	88,7		Slovakia	29,11	90,6
	United Kingdome	64,79	75,1		Czech	91,40	88,7
	Denmark	60,23	70,5		Bulgaria	5,24	76,1
	Luxemburg	56,91	69,4		United Kingdome	64,79	75,1
	France	52,64	69,7		Estonia	39,00	71,5
	Germany	45,86	60,2		Denmark	60,23	70,5
	Sweden	43,21	61,1		France	52,64	69,7
	Estonia	39,00	71,5		Luxemburg	56,91	69,4
	Finland	33,76	44,3		Hungary	7,47	67,9
	Ireland	32,33	39,2		Spain	24,17	61,7
	Belgian	29,16	45		Sweden	43,21	61,1
	Slovakia	29,11	90,6		Germany	45,86	60,2
	Nederland	25,54	38,4		Portugal	12,67	59,0
	Spain	24,17	61,7		Belgian	29,16	45,0
	Austria	19,38	34,1		Finland	33,76	44,3
	Leetonia	16,50	43,2		Leetonia	16,50	43,2
	Portugal	12,67	59,0		Lithuania	11,51	40,1
	Lithuania	11,51	40,1		Ireland	32,33	39,2
	Italia	7,60	32,6		ROMÂNIA	3,57	38,5
	Hungarian	7,47	67,9		Nederland	25,54	38,4
	Poland	6,50	21,6		Austria	19,38	34,1
	Slovenia	6,49	10,5		Italia	7,60	32,6
	Bulgaria	5,24	76,1		Cyprus	3,66	25,7
	Greece	5,17	14,2		Poland	6,50	21,6
	Cyprus	3,66	25,7		Greece	5,17	14,2
	ROMÂNIA	3,57	38,5		Malta	0,95	12,6
	Malta	0,95	12,6		Slovenia	6,49	10,5
	UE - 27	12,80	53,1		UE - 27	12,80	53,1

Table 6 The classification of European countries by size of each concentration indicator
Source: computed data

exploitations method [3]

The distinction between the concept of concentration of exploitation by class of size number and the concept of the surface concentration by class of size is essential to be done. The numerical evaluation of the surfaces concentration as agricultural size can be done using concentration coefficients included in interpolation method. (E. Merce, 1992). The formula of evaluation of the surface concentration phenomenon on large exploitations can be presented as follows: [3].

$$C(x) = \frac{\sum x_i f_i - \bar{x}(m)}{\bar{x}(M) - \bar{x}(m)} \cdot 100$$, which becomes:

$$C(x) = \frac{\bar{x}(E) - \bar{x}(m)}{\bar{x}(M) - \bar{x}(m)} \cdot 100$$

x_i - the average of size class

f_i - the weight of surfaces by size class

$\sum x_i f_i$ - average size of size classes by country

$\bar{x}(m)$ - minimum size

$\bar{x}(M)$ - maximum size

According to the proposed methodology and specifically data regarding the distribution of agricultural exploitation by class size of the owned surfaces, one can proceed to perform the calculation of the degree of agricultural surfaces concentration on exploitations of large size. (Table.6)

The degree of surfaces fusion on large size agricultural exploitations shows the fact that this process is very obvious in developed west european countries, but also in the countries from east Europe which have preserved the associative forms of land exploitation.

The comparative analysis of large size agricultural exploitations from different countries and the degree of

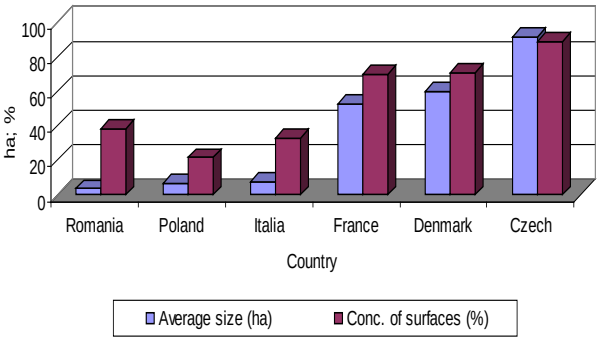

Figure 3 – Comparison situation of surfaces degree fusion on large exploitations

surfaces fusion , distinguished the fact that average size is not very relevant in the appreciation of the degree of agricultural structure modernization .

The comparative study of the computed data used to calculate the two indicators confirms the fact that countries like Romania have a significant degree of surfaces concentration on large size units which surpass the same indicator computed for Netherlands, Austria, Italy, Poland even though average size exploitation is incomparably smaller (Figure 3).

CONCLUSIONS

1.Although the modernization of agricultural structures represents an anterior preoccupation for all European countries, the accomplishments differ substantially from country to country.

2.The major gaps between agricultural structures of different countries have as cause a long historical process of economic stratification and these gaps still continue to be preserved as a consequence of a very different economic development from area to area and from country to country.

3.The characterization agricultural structure degree of modernization through the average size of agricultural exploitation is not enough relevant. One can appreciate in this way that the computation surface fusion degree on large agricultural exploitation represents a much realistically manner of quantitative evaluation.

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DIFFICULTIES OF DESIGN TRANSFER IN CULTURAL CONTEXT AS A CASE OF MANAGEMENT OF GLOBAL VALUE CHAIN THROUGH INTEGRATION

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Key words: *Design Transfer, Management of Global Value Chain through Integration*

Abstract
Cultural &Socio-Economical potentials of different countries allow challenging opportunities especially through globalization in marketing, design, production and service industries. The design transfer is the contemporary way of integrating these potentials. However in the particular domain of new product development, cultural features, user expectations &needs keep their dominancy. When the innovation &evaluation and design &quality cycles neglected, ultimate course of the design transfer would be disappointing

1. INTRODUCTION

Recently the new product development has been divided into various stages through cultural &socio-economical context. For example, the theoretical studies are being done in the country A, market research is being done in the country B, product is being designed in the country D, produced in the country C and marketed in the country F. This is mainly because different countries, lets say different cultural and socio-economic structures, have rewarding potentials for each single product development stage. The design transfer is the way of allocating and integrating various potentials from product development to market launch stages. Nevertheless there are also some risks of the design transfer in cultural and socio-economic contexts for a successful product development.

In this paper, new product development and design transfer background will be reviewed first. Then the case of a design transfer through new product development will be examined. Lastly the present material will be summarized and main elements for a successful design transfer will be advised.

2. CONCEPTUAL FRAMEWORK

2.1. NEW PRODUCT DEVELOPMENT

An invention generally aims to satisfy a certain need and/or in order to solve a particular problem. However the initial stage of invention is far from satisfying its ultimate expectations. Therefore cyclic innovations and user &customer interactions play an important role for the new product development.

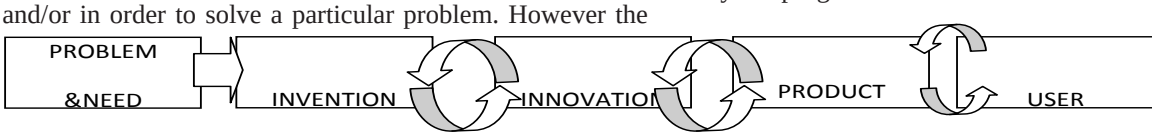

Figure 1. New Product Development Stages

The emergence of the prototype is the first step of new product development. The prototype aims to visualize and materialize the invention and validate proposition in terms of user satisfaction and completion of the need, (Er &Ergin, 2001):

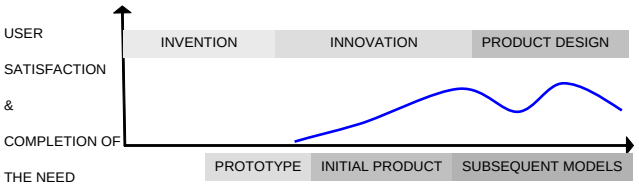

Figure 2. New Product Development Stages versus user satisfaction &need completion

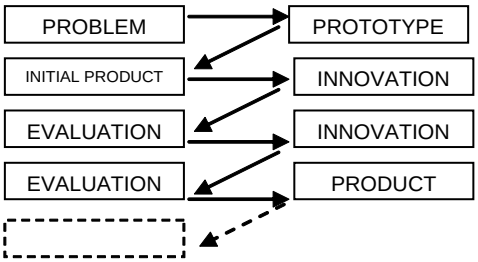

Figure 3. New Product Development Cycles

Cyclic progress of innovation &evaluation takes place in the core of new product development. Unforeseen problems of the invention determined through prototype evaluation.

2.2. DESIGN TRANSFER

Through the globalization; products, goods, raw materials, human, know-how, knowledge, money, technology, etc have been flowing through cultural and socio-economic boundaries. In the Wikipedia the Design Transfer defined as the process in which the New Product Design is translated into Quality, Production, Distribution and Installation specifications. Zenner, underlined that design transfer is an integral process in the early life of a product. It must be well executed, especially for complex devices, (Zenner, 2001). Satisfactorily design transfer steps are:

- Establish and maintain procedures to ensure that the device design—its components and configuration—is correctly translated into production specifications.
- Transfer the product design into production methods and procedures.
- Create a production environment that ensures the product complies with regulatory requirements and industry standards

2.3. PROBLEMS IN DESIGN TRANSFER

The design transfer may not be necessarily about a finished &complete process. The new product development process may also be transferred through cultural and socio-economic boundaries. For example problem &need can be defined prototype be developed and the product be innovated in the same cultural context, then the combination of these steps can be transferred to an other cultural context and finalized there.

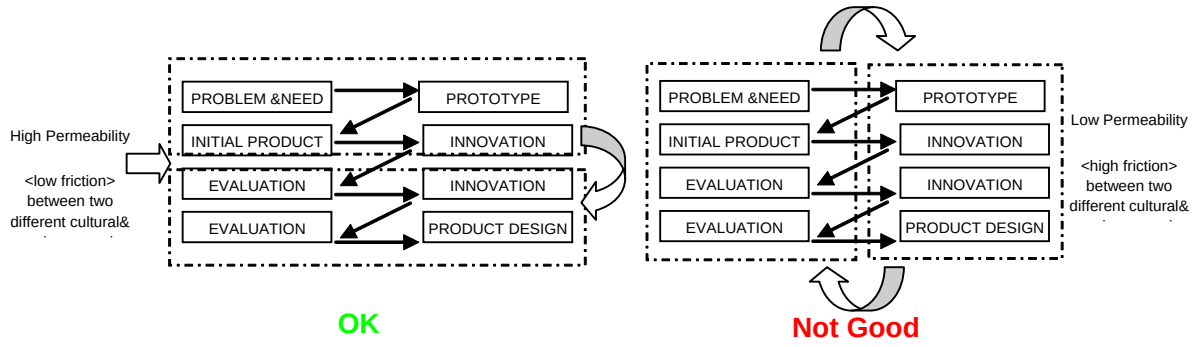

Figure 4. Design Transfer Matrixes

Zinner underlined that the effectiveness of the best-conceived design transfer process will be diminished if it is not properly supported and carried out. He claimed some of the common problems in design transfer as follows, (Zinner, 2001):

- Product developers do not have a finalized design.
- Business managers and technical experts do not grasp the scope of the design transfer effort and underestimate the amount of time and effort required.
- Manufacturing processes have not been developed, documented, or validated.
- Developers bring unresolved cost, reliability, or safety issues to the manufacturer.
- The design transfer process is well understood by both parties, but the inability to plan the transition of a product design into a controlled manufacturing environment results in slow starts and unacceptable delays.
- The workflow of the manufacturing organization is disrupted by having to wait for released materials, procedures, and test fixtures.

3.1. THE CASE OF A HOME APPLIANCE

This study mainly relies on studies about a home appliance. This appliance was developed to overcome difficulties of mixing soups and puddings during cooking. This saucepan stirrer is specially designed to be hands-free so one can work on other kitchen tasks while soups are on the stovetop. The adjustable arms unfold to fit any saucepan from various diameters. When it is not in use, it folds easily to be stored in your utensil drawer.

In the new product development endeavor, firstly patent examination completed. It was found that there was no related product record in the patent literature. After the patent survey the first prototype was developed in 1996 and the second prototype was remodeled in 1997. The appliance was studied as an ergonomics case in the Industrial Design Department of the Middle East Technical University. Based on these research findings, a paper explaining the implementation of the usability analysis on the case of a new product development was issued, (Ergin, 2000b). In this study it was underlined the current prototypes are not satisfactory to meet customer needs &expectations of Turkish people. It was concluded that setting of the stirrer to the pot and cleaning of the appliance was very difficult therefore prototype should be improved, (Ergin, 2000b).

At the same time a US company interested in the appliance. The company was informed about the prototypes, utility model application and research results. However the company contented to the immature product because of commercial expectations.

The company developed the production dies, usage manuals, packaging, etc based on the latest but incomplete level of the stirrer in very short period of time. In 2003 the product, Stirchef, lunched in the US market. Nevertheless Stirchef never marketed in the Turkish market because of present deficiencies. Table 1 summarizes the development of the stirrer in two different contexts.

Dramatically US customers buying and using the Stirchef were completely unsatisfied. They were unhappy mainly

because the appliance doest fit to present pots. They were also concerned about the quality of the product.

As a result, Stirchef has been an unsuccessful product to meet customer needs and expectations. Obviously it was also a commercial failure. When we look at the main reasons of the failure we can see that incompletion of the prototypes was the first link of the failure. From the beginning, the company should have trusted previous usability analysis and research findings, (Ergin, 2000b). Then it should have carried out similar inquiries for the intended market where customer expectations are different. Nevertheless none of the customer expectations could be reflected to subsequent models. Stirchef has halted at the stage of invention and could not be innovated. Product quality also played secondary role in the failure. As glue integrating design &innovation &marketing, the quality of the Stirchef was also inadequate which effected customer feelings directly.

CONCLUSION

Cultural &Socio-Economical potentials of different countries allow challenging opportunities especially through globalization in marketing, design, production and service industries. The design transfer is the contemporary way of integrating these potentials. However in the particular domain of new product development; cultural features, user expectations &needs keep their dominancy. When the innovation &evaluation and design &quality cycles neglected, ultimate course of the design transfer would be disappointing

A product can be developed and manufactured in different countries for economic or technical reasons. Nevertheless, it should always be designed for the intended users with respect to their particular cultural/social context. Thus, even if a product idea originated elsewhere, before its introduction to a country, it should first be used as a prototype to test its suitability to the particular context. Such a correctly executed design process should prevent most of the cultural and practical misfits described in this paper.

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SATISFYING THE EXPECTATIONS OF CUSTOMER THROUGHOUT THE VALUE CHAIN: VALUE CHAIN IMPLICATIONS ON SUPERMARKETS VERSUS GROCERIES

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Key words: *Value Chain, Customer Satisfaction, Role of Consumer*

Abstract

There is a fundamental and revolutionary transformation of the industrial system over the role of consumer in modern value chain. This is the transformation of the role of consumer from passive audience or simply buyer towards active participant in co-creating value. Consumers today are increasingly engaged in a direct and explicit dialogue with companies to become an integral part in value creation process. Furthermore, consumers are becoming business collaborators who have as much to contribute to value creation as companies themselves do. This changing role of consumers through the value chain raised our enthusiasm to examine the overwhelming influence of consumers on value chain as the ultimate purpose of this study.

1. INTRODUCTION

Everyday people partake in a wide range of purchasing activities. The decision as to whether to purchase a good or a service or not is affected by a great many of factors such as price, promotion, advertisement, quality, after sales service and attitude of the salesperson. Consumers, usually unconsciously, give feedbacks to the companies by the fluctuations and changes in their buying behaviors. Thus, companies setting their sights on remaining competitive in the market, try to analyze and interpret buying behaviors of the consumers in order to achieve high levels of customer satisfaction and to establish long-lasting relationships with the customer.

In the traditional ways of doing business, receiving feedback from customers primarily depends on examining customer behavior at the point of sale. Which is, fundamentally, a limited source of information as this data solely reflects whether the product or service is preferred or not. On the other hand, an attentive researcher may ask , many incidental questions with a view to discover the real causes of this observed behavior and respond accordingly.

With the changing trend in positioning of companies from traditional good or service seller to value conveyor, the importance of the value chains burst on the scene. Value chains, in this circular reasoning, are the paths the value is delivered to the customer. The theory of these paths value is delivered through, enables customers to get involved in the value creation process long before they face the end product at the point of sale. There is a fundamental and revolutionary transformation of the industrial system over the role of consumer in modern value chain. This is the transformation of the role of consumer from passive audience or simply buyer towards active participant in co-creating value. The new departure, while providing a platform for the customers to raise their voice and express their expectations, needs and demands accurately, also benefits the companies as it enables them to better understand the customers and to give timely response.

Consumers today are increasingly engaged in a direct and explicit dialogue with companies to become an integral part in value creation process. They are becoming business collaborators who have as much to contribute to value creation as companies themselves do. This changing role of consumers through the value chain raised our enthusiasm to examine the overwhelming influence of consumers on value chain as the ultimate purpose of this study. In the next section, the literature on value chain will be discussed. The principal subject matter, satisfying the expectations of customer throughout the value chain, will be explained. In the last section, practical and real life applications will be cited and conclusions will be noted.

2. LITERATURE REVIEW

The main objective of this section is to give the reader a brief overview about the value chain concept. We aim to introduce the theoretical background of value chain process based on the previous studies prevailing in the literature. Examination of value chain is crucial for any business success or failure since ultimate customer satisfaction is directly linked with the value chain. Today, organizations are increasingly becoming aware of the vitality of customer satisfaction and consumer loyalty while moving from a production oriented era towards a customer oriented era. It should be noted that this is a learning process for companies to review and reevaluate their existing business processes, organizational structures and some key business activities from the viewpoint of consumers. As Bennett and Forrester argued, firms are gradually shifting their emphasis from economy of scale, where a company relies on self-defined specifications and high volume production, to economy

of scope, where a company gains the agility in offering largely customized products. (Bennett, & Forrester, 1993). When such characteristics above mentioned are taken into consideration, it is apparent that value chain analysis is becoming more significant and meaningful in our current era.

The concept of the value chain is considered as a strong

.

Figure 1. The generic value chain model

and reliable tool which enables the firm's decision makers to diagnose and create competitive advantage in the marketplace. Value chain analysis begins with the separation of the particular underlying key business activities. As Porter argued it was these underlying activities that contained the seeds of competitive advantage.

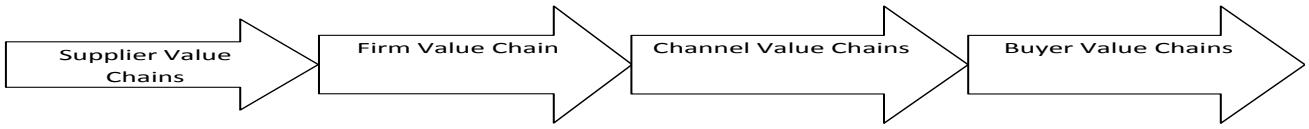

Figure 2: The Value System

Having stated the major sources of competitive advantage, it will be much better to go further insights about the value chain. First, we should begin by defining what the value is before going into details about the value chain. Barbon stated: "By value, is to be understood the price of things; that is, what anything is worth to be sold…"(Barbon, 1969:2). Nowadays, the concept of value is defined differently and has often a pronounced market orientation. Coyle et al. state: "An important consideration is that value must be viewed from the customer's perspective, because it is value to the customer that is most important." (Coyle, Bardi, & Langley, 1996: 548).Most contemporary writing on the topic of customer value stresses this concern from the viewpoint of the customer. According to Porter, value is defined as "the amount buyers are willing to pay for what a firm provides." (Porter, 1985: 38). Therefore, the value chain was designed to display total value and consisted of firm's value activities and its margin (the difference between total value and the collective costs of performing the value activities) As it has been illustrated in Figure 1, the generic value chain for a single firm consists of three main components which are primary activities, support activities and the margin

Let us briefly examine those key activities that took place in the value chain. Primary activities includes the creation of the product, its sale to the buyer and after sales service. There are five types of primary activities which are inbound logistics, operations, outbound logistics, marketing and sales and service. Inbound logistics includes warehousing, materials handling and inventory control. Operations consist of activities that turn inputs into finished products. Outbound logistics consist of activities that store and distribute products to customers. Marketing and sales are related to activities that make the buyer to purchase the product by advertising and sales force operations and etc. Finally, service includes the activities which maintain the value such as installation. Support activities are the ones which support primary activities. These are procurement, technology development, human resource management and firm infrastructure. Procurement means systemic purchasing. Companies need to purchase the required items in the cost effective manner while maintaining superior quality. Procurement's job is to provide the relatively cheap but quality raw materials on time. Technology development is broader than research and development. It also also contains engineering and process development. Human Resource Management includes the selection, training, development and compensation of all employees within the organization. As Porter points out that the skills and motivation of employees and the costs involved may be critical to competitive advantage. Firm infrastructure includes general management activities as well as finance, accounting, legal, corporate affairs and quality management. After all, it should be said that the purpose of analyzing the value chain is to identify areas that might provide competitive advantage. Firms should identify their own individual value activities within particular industry. Each of the main categories in the generic value chain can be subdivided into discrete activities. For example, let us assume sales and marketing activity. It could be separated into marketing management, advertising and promotion. This process of subdivision may continue down to increasingly narrow activities if they are discrete.

Even though we have discussed the significance of disaggregating a firm into its strategically relevant activities in the value chain and gaining competitive advantage by performing these strategically important activities more cheaply or better than its competitors, one should not think that the value chain is a series of independent activities. On the contrary, it is a interdependent system rather than being independent. Competitive advantage emerges from linkages among the activities in the value chain. Managing such linkages is a more complex organizational task than managing value activities themselves. This leads us to say that the ability to manage linkages yield a sustainable source of competitive advantage. In the literature, Gattorna and Walters point out the same concern: The value chain identifies the linkages and interdependencies between and among suppliers, buyers, intermediaries and end-users.

Its primary benefit is the ability to examine these linkages and identify the "value" that is created for customers (or that which may be created), and how this in turn creates competitive advantage for a company. (Gattorna, & Walters, 1996: 99).

Furthermore, it should be said that it is beneficial to extend the value chain concept as value system. Individual firm's value chain is inevitably embedded in a larger stream of activities. At least three additional value chains should be taken into consideration which are supplier value chains, channel value chains and buyer value chains. Therefore, managers should understand not only their own firm's value chain, but also how it fits into the industry's overall value system. In other words, competitive advantage does not just emerge within the firm. Instead, it can be achieved by looking at the whole system and recognizing that different firms can adjust and improve their own value system.

Normann and Ramirez argue that the focus of analysis should not be on the fixed activities along a value chain, but on the value creating system itself, where mutual value is created as a consequence of cooperative interactions. (Normann, & Ramirez, 1993: 65-77) Clearly, supply chain profitability is limited by consumers' perceived value gained from obtaining or consuming the product and their willingness to pay for it. For value chains to be sustainable several conditions apply: a chain needs to generate sufficient value for each member; consumer requirements must be communicated accurately throughout the chain; and the relevant types of consumer value a product represents must be revealed and communicated to the target market. Superior knowledge of customers' perceptions of value is recognized as a critical success factor in today's competitive marketplace. Despite this, the voice of the consumer is often poorly integrated within the value chain. The voice of the customer is a description of the consumer value from the consumers' view point. There is a continuum of research and practitioner material regarding the methods for capturing and analysing the voice of the customer. (Griffin, & Hauser, 1993: 1-27). Merely listening to the voice of customer is not enough; firms should understand and characterize the voice of customer and use the appropriate techniques to translate the voice of customer into meaningful product and process features. (Knowles, 2002:57-80).

For instance, Quality Function Deployment (QFD) is a system for translating customer requirements into appropriate product attributes in a meaningful language for the designers and engineers. (Akao, 1990). It is equally valid to think of QFD as a way of identifying the true voice of the customer.

Having stated the many aspects of the value chain, we should also bring a point of criticism about Porter's value chain model. There are numerous discussions in the literature indicating that Porter's value chain model was codified in a way that made it more suited to manufacturing rather than service industries. The model has been criticized for being too linear, too unidirectional and too sequential.

3. HOW CUSTOMER SATISFACTION IS ENSURED THROUGH THE VALUE CHAIN

Customer satisfaction is an evident fact for those firms willing to entrench their positions in the market by keeping their current market share and even increasing their share if there exists any possibility. Understanding the needs and behaviors of the customers is the primary step in ensuring customer satisfaction. In other words, if the companies do not know what their target market demands, they can not satisfy their customers, and inferentially their product or service will not sell in the market.

Though, it is not only the product or service that has to meet the expectations of the customer but it is a whole chain of operations and activities the product or service passes through. This chain, called the Value Chain in literature, includes a wide range of activities. Looking below at Figure.1, a simple value chain starts with design and development stage and ends with consumption and recycling.

In today's consumer-focused world, the companies which utilize the involvement of consumers in their value chains, are more adaptive to the changing needs and demands of customers in their target markets, and so more successful they are. Building competitive advantage on ultimate consumer involvement in the value chain requires intense communication with the consumers at every stage of the value chain. This communication mainly takes form feedback receipts from customers.

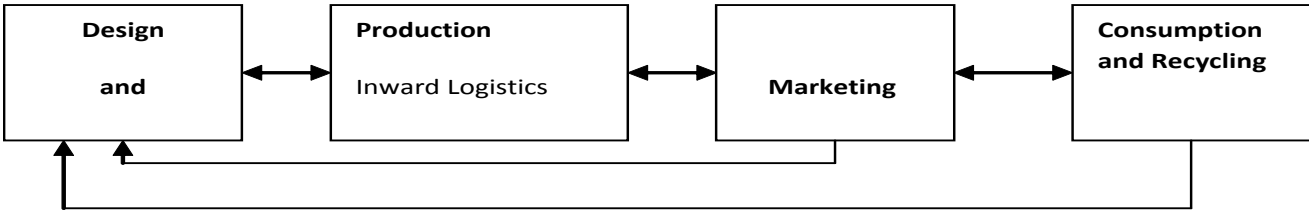

Figure. 3 Value Chain (Kaplinsky and Morris, 2001)

Companies may receive feedback in two ways which are direct feedbacks and indirect feedbacks. Direct feedbacks can be counted as questionnaires, interviews, point of sale communication, toll-free support lines and official websites of the companies. Direct feedbacks are advantageous to companies, since they can directly communicate with the customer and step in where necessary. Per contra, indirect feedbacks are more difficult to realise and most of the time the results are already obtained and company's controlling power on communication is weak. Increases and decreases in sales, complaint platforms, open-communication media that enables free flow of word of mouth are indirect feedback forms. Yet, these are not under the control of the company and sometimes, as in the case of sales decrease, it is too late

that the customer is already lost to a rival company.

According to the different stages of the value chain, consumer feedbacks differ at each step. What a firm has to do is to establish close relationships between the consumer and the company and form a ground for the consumers so that they can express their demands and expectations clearly.

3.1 DESİGN AND PRODUCT DEVELOPMENT

The value chain starts with the imaginative power of the designer. It is a hard work reading consumers' minds and developing a brand new product that satisfies them while performing artistry. Thus, using focus groups, using test marketing and questionnaires helps the designer better understand the customer.

3.2 PRODUCTİON

Production stage is composed of three sub-stages which are inward logistics, transforming inputs, and packaging. Inward logistics is the step where inputs arrive at the company. For some products, the method of transportation influences production schedule, the quality of the goods that are being transported or the cost of the final good. Then at the transformation stage, to comply with the standards the customer expects from the company, superior communication is necessary. After the transformation stage, the last stage of production, packaging, is also related to marketing. The packages used by the company must not offend the eyes of the consumers. Furthermore health standards must be satisfied.

3.3 MARKETİNG

Another stage of value chain which is vital for a product's sales strategy is marketing. A good marketing plan can sell even an unsuccesful product. On the other hand, sometimes a strategic mistake made in advertisements, for example, offensive advertisements due to cultural differences can harm the sales of a successful product.

3.4 CONSUMPTİON AND RECYCLİNG

At this stage, a company has to know how to touch the right key. The environmentally conscious consumers give emphasis on recyclable products.

4. CONCLUSION

As a result, large body of evidence in the literature demonstrates that today supply chain management is emerging into value chain management, which recognizes the importance of demand in addition to supply as Marzian et al., argued. (Marzian, McLaughlin, & Andraski, 2003). The point of origin of any supply chain activity should take into account the values that are or are going to be of importance at the final consumer market. Michael Porter has popularized the term value chain to mean the entire production process from the input of raw materials to the output of the final product consumed by the end-user. It is called a value chain because each link in the process adds some value before the product or service is delivered to the ultimate customer. Under these circumstances, not only the product but also the entire chain of business activities from raw material through to the final point of consumption should be effectively managed to deliver the end-consumer's value. In today`s world, the traiditional retail formats are being replaced by contemporary ones, which can monitor and react to consumer preferences faster, while reconfiguring their supply chains around the consumer demands. On the other hand, the consumers are increasingly becoming a part of the value chain as the supermarkets use more of the monitoring tools in order to customize their sales / merchandising methods and ster the sales towards the consumer-related data gathered from those practices. They also have the competitive advantage of low cost operations resulting from working with large volumes and enjoy economies of scale when compared to small groceries.

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THE AUTOCTONOUS ANIMAL BREEDS IN THE RURAL DEVELOPEMENT OF A REGION: THE ANDALUSIAN EXPERIENCE

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Key words : *rural development, domestic animals, autochthonous breeds,*

Abstract
The economic production in marginal areas is very interesting from the strategic point of view for its social and economic repercussions and it doesn't be reject. The adaptation of the autochthonous resources to the depressed local conditions can be transcendental in the production of these areas and its effectiveness. In fact, the loss of these resources (adapted breeds of domestic animals) would produce, not only the loss by itself with the implications for the humanity and the nature, but the loss of certain resources (for example natural grasses) without those they would get lost, becoming the area more and more poor and obviously not helping the objective of development. One of the main important guest of one action that maintained throughout the time, it has gone modelling the landscape so it has allowed the production, the stability and the subduing of the fluctuations of the adverse climate, are the farmers. This has left getting offering the biological diversity, the wealth of the landscape and the stability of the European ecosystems. Andalusia is a region with a great diversity of traditionally depressed areas but that it has known, with a lot of effort, perseverance, shortcomings and successes, to maintain some resources autochthonous genetic animals that have allowed, allows and they will allow a rural correct development with a progressive enrichment of the inhabitants of the area and without damage of the environment.

INTRODUCTION

The domestication process taken place in the animal species has originated a great "biodiversity", domestic could be say, that should not lose under any concept: the biodiversity represented by the autochthonous breeds. We should preserve it for diverse reasons, historical and cultural reasons among them. The domestication has gone producing "ecotypes" perfectly adapted to very different conditions in those the human has gone being developed. Obviously these varieties conserve own characteristics very different in relationship with domestic varieties in which selection processes have been established originating homogeneity in them. Those without doubt represent a possibility to being used in a future to be able to satisfy necessities and demands nonexistent today. This is the main importance to maintain the biodiversity of the autochthonous breeds and the concern for the use and abuse of more productive varieties in damage of those.

In Andalusia the productive specialization has relegated until levels next to the disappearance to the autochthonous breeds in benefit of others that have bigger production. Therefore the Andalusian autochthonous breeds are in a deep crisis originated by the sinking of the rural culture and the systems of sustainable agrarian and livestock production and of course the culture of a secular tradition.

The above-mentioned origin is necessary to look in the change of an extensive livestock, based on the natural and local renewable resources, to another intensive one fed with foreign products with high energy value but, without a doubt, producing more quantity and as consequence less quality and for the future less economy and independence.

It is not necessary to forget that the loss of genetic autochthonous resources also originates a loss of diversity of the landscape for the disappearance of certain traditional systems that it can add alterations of the local environmental balances.

THE AUTOCHTHONOUS ANIMAL BREEDS

Nowadays nobody denies the importance that has had the environment in the determination of the personality of each town, their people and their animals. A mutual influence among the physical-geographical environment and the human group, that inhabits it, some ways of life has formed and a unique use of the domestic animals. Thus the breeds of domestic autochthonous animals are the result of a phylogenetic evolution modelled by the natural and cultural forces that have ended up characterizing a certain geographical region. This confers them an undeniable superiority in this environment on other breeds that has allowed denominating the animals from the same ethnic group by their geographical area of origin and even by their morphological character.

According FAO [2] animal autochthonous breeds daily disappear from almost all domestic species. These extinctions can be evaluated in more than 200 weekly in the entire world and these have an enormous graveness without a doubt. What is the reason? It seems that one only reason doesn't exist but sure that the unifying tendency is intimately linked that it is one of the characteristics of the new aggressive industrial cattle production, together with indifference as much from the Administration as the own society.

But everything won't be negative. It is evident a concern at world level on the conservation of the genetic resources of our planet due to the rapid deterioration of them and to the genetic absorption of the autochthonous animal breeds by other breeds more selected and all of this with some productiveness objectives.

Which were the reasons of our autochthonous breeds fall? The answer is multiple as we have been able to verify [1].

Among them it is necessary to point out:

-The intensive National Plan of Reforest started in 1940.

-The entrance of the swinish African pest that affected the swinish autochthonous livestock strongly getting lost more than 90%.

-The establishing of the Plans of Development from the 60's stimulated by the World Bank with a substantial increase of the intensive cattle production.

-The massive entrance of selected livestock.

-The mechanization of the field.

-The general sinking of the rural world due to the conjunction of many and diverse socio-economic reasons.

In Spain and particularly in our region the certain fact is a serious loss of genetic autochthonous resources has existed and as consequence a serious problem of rural development.

THE AUTOCHTHONOUS BREEDS AND THE RURAL DEVELOPMENT

The cattle production systems in Andalusia have suffered during the time a series of changes and adaptations that have affected directly to its autochthonous breeds. These changes have been produced by the necessity of negotiating the animal production inside the European context with the only objective of improving the competitiveness, with a clear increment of the agrarian rents but creating problems of conservation of genetic resources, in the quality of the agrarian systems and a delay in the capacities of the territories to obtain a rural satisfactory development. The inadequate agrarian livestock politics, as some authors indicate, have taken to many administrations and scientific institutions to look for new production forms without degrading the environment, the sustainable agriculture. There is a world clamour in pro of the breeds and local varieties and to defend the traditional ways of animal and vegetable exploitation that fundamentally can be considered correct.

In Andalusia the methods of traditional livestock production have been based on the system of the "Dehesa", that is to say, in the shepherding in a very extensive space [6]. In it the own livestock production, the wildness and the perfect adaptation to the environment are coordinated. The "Dehesa" is also characterized by some very poor lands and a very hard climate. These characteristics impede an agrarian good exploitation being substituted by the animal's exploitation. Everything in the "Dehesa", the environment, the animals, the humans and their intervention cohabit in perfect balance, being the point of union the presence and exploitation of the autochthonous breeds. These one have gone being substituted by other breeds with bigger level of productivity but broken the existent balance.

But, in our case, we could ask which have been the causes producing the current situation. The answers are multiple and we could summarize them in [3]:

-Disappearance of some conditions of use of the autochthonous breeds, for example the use of the animals in the agricultural works.

-The changes taken place in the agrarian structures.

-The smallest productivity in certain breeds.

-The demand of the market as for a greater level of competitiveness demand.

-The politics of subsidies carried out based on the production.

The crisis of the pastoral society has produced environmental serious problems being in a committed situation in these moments as the forest big fires, the expansion of the heath, the regression of the pastures and natural forests, the decadence of the rural architecture and the repopulation of the mountain areas.

At the moment we are observing a revaluation of the autochthonous breeds based on the principle of to develop and to revalue the quality overhead of the quantity, what supposes, as a very important asset, the conservation of the racial autochthonous genotypes since they possess some characteristics that make them unique. These, among other, can be:

- Bigger capacity of adaptation to the environment.
- Bigger longevity.
- Bigger capacity of use of the forage resources in areas with unfavourable environmental conditions due to the climate, the floor or the vegetation.
- Bigger natural diseases resistance.
- Maintenance of the genetic biodiversity.
- And we cannot forget the reasons of cultural and sentimental nature.

The technological development, the modernization and the sophistication of the production systems have put of relief the necessity to have autochthonous breeds by their wildness characteristics and adaptation to the environment. The abandonment of the rural zones as consequence of its "urbanization" in the last decades has produced manpower shortage, loss of rich lands and the abandonment of mountain pastures. This reality is allowing that the knowledge and rational exploitation of the autochthonous breeds in a sustainable environment could be the solution of the problem for many inhabitants of the rural areas that can reach a bigger quality of life and to create wealth in the territory. It is necessary to explode and to capitalize the autochthonous breeds rationally, it is not possible to conserve the local cultures without conserving their ecosystems and fundamental part of them is, without a doubt, their autochthonous breeds. As the conservation of the autochthonous animal resources requires an economic high cost, Rodero Serrano [5] proposes that it is necessary to consider that a form of compensating this cost is to use them for leisure activities. More and more the society demands a service of this type so that many of our rural areas in Andalusia have developed projects that have given and they are giving now benefits in the ambit of the rural sustainable development.

We can conclude with the words of Hodge (2002)[4]: "The breed's conservation must necessarily depend on its integration in projects of sustainable development, with consideration about the quality of the products, ecological production, agrotourism (landscape, leisure activities.), etc. It supposes the best way to reduce the costs of the conservation

and of assuring a patrimony directly available for the future generations."

THE MAIN ANDALUSIAN AUTOCHTHONOUS ANIMAL BREEDS

Equine breeds:

Andalusian donkey (Equus asinus, L.)

-Characteristic: Wildness, high longevity, adaptation.

Pure Spanish Breed Horse (PRE) (Equus caballus (L.)

-Characteristic: Nobility, wildness, adaptation to the warm local climate.

Pig breeds:

Iberian pig (Their scrofa domestica, L.) and all their varieties (Dorado Gaditano, Negro Entrepelado, Mamellado, Negro Lampiño, Torbiscal, Iberico Negro, Iberico Retinto), Manchado de Jabugo (híbrido de Iberico Negro and Iberico Retinto).

-Characteristic: Adaptability to the mediterranean climate, exploits natural resources of the "Dehesa", special quality of its products.

Ovine breeds:

Merina (Ovis aries, L.), Segureña, Churra lebrijana

-Characteristic: Adaptability, special qualities of their products (cheese, wool).

Caprine breeds:

Malagueña, Blanca Serrana Andaluza, Negra Serrana Cárdena, Celtibérica, Rayada, Malagueña, Granadina, Florida, Payoya.

-Characteristic: Wildness, adaptability to the extreme Andalusian environment, qualities of their products (cheese, meat, skin).

Bovine breeds:

Retinta, Pajuna, Cárdena, Berrendo en Negro, Berrendo en Colorado, Negra Andaluza, Mostrenca, Levantina (practically extinguished)

-Characteristic: Wildness, adaptability to warm, resistant natural climates to parasites, qualities of their products.

Bird breeds, hens:

Zararías (practically extinguished), Negra Andaluza, Castellana Negra, Andaluza Perdiz, Andaluza azul, Utrerana, Franciscana

Bird breeds, turkeys:

Negro, Roano (at the present time almost extinct if it is not).

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IMPORTANCE OF ENABLING EXTERNAL INSTITUTION FOR SUSTAINABLE AGRICULTURE AND RURAL DEVELOPMENT-CASE STUDY OF WESTERN SERBIA

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Key words: *SARD, PRA, RRA, livelihoods, participatory extension, farmer to farmer extension.*

Abstract
SARD hopes to reduce the negative environmental impacts of farming by adapting agricultural technologies, which have been employed by farmers operating outside the 'productive' agriculture, such as low external input agriculture. The paper presents the results of a qualitative research that analyzed a successful story regarding sustainable agriculture and rural development with emphasizes on enabling external institutions' importance. It could be concluded that enabling external institution has irreplaceable role for sustainable agriculture. In this paper activity of an international development agency, dealing mainly with agriculture (FAO), which conducted a project in order to promote sustainable development of livestock production, in the region of Sandzak (Raska) in western Serbia, has been presented.Results have shown that participatory approach, respecting the local customs, local knowledge, local culture and capacity of the people to work together, may have significant influence on agricultural sustainability, considering all three pillars of sustainability, an economic, an ecological and a social one.

INTRODUCTION

Countries created after the decomposition of former Yugoslavia still suffer from the problems created by the war that lasted almost for a decade. Isolation of Serbia by the international community resulted in many severe problems. Industrial capacities, road infrastructure, agricultural production and all other parts of the society were severely damaged, which resulted in an increase of poverty and environmental degradation. Bombing of Serbia in 1999 additionally worsened already bad situation.

Along with an increase in poverty, unemployment and ethnic tension became a crucial problem. Rural urban migration resulted in marked ageing of the village. Negative demographic trends, with low birth rate and high emigration created a paradox situation where an agricultural country has no people able to work in the rural areas. Poor accessibility to infrastructure and services (hospitals, schools, municipalities, markets, etc.), placed rural population in a less favorable positions than urban and thus stimulated the migration. Multiethnic rural areas suffered from the rural urban migration in higher degree, as a result of the conflict, where ethnic groups have tended to move to the developed countries or mother countries.

Although the investigations have shown that rural areas have a much lower incidence of poverty and extreme poverty, relative to urban areas, it was found high among older people who have remained in rural areas despite the deterioration of social services, farmers in more remote areas far from markets, farmers with very small farms and/or those with low fertility land, and minority rural populations.

Regionally, southern Serbia is likely to have higher levels of rural poverty, due to the lower historical levels of household income, greater isolation of rural communities, and less favorable conditions for intensive agriculture, especially in the mountainous area.

To effectively address the problems in the livestock sector, the most important agricultural activity in Raska (Sandzak), the FAO started a project whose results were subject of investigation during the research. The objective was to facilitate the gradual economic recovery of the agricultural sector, by revitalizing and developing livestock production for farmers in the different agro-ecological situations in this mountainous region.

Having in mind that sustainable agriculture is only possible when resource conservation technologies are available, along with local institutions and organizations that have a support from enabling external institutions (Pretty, 1995), in this case it was interesting to consider FAO's action as an enabling activity promoting sustainable agriculture. World agriculture in the twenty-first century is faced with three main challenges: 1) to improve food security, rural livelihoods and income; 2) to satisfy the increasing and diversified demands for safe food and other products; and, 3) to conserve and protect natural resources. These challenges have been articulated by the international community through the World Food Summit Plan of Action and the Millennium Development Goals with specific targets to be met by 2015.

Agriculture is expected to assure food security in a range of settings, now and in the future, and is increasingly called upon to produce positive environmental, social and economic benefits. The stated objective of SARD is to meet the challenge of feeding a global population which is expected

to grow rapidly at a time when modern agricultural practices have actually degraded the resource base on which agriculture depends. Sustainability means capability of a subject to persist for a long time, and to recover after unexpected events. Thus, rural unemployment can be touched by diversification of rural activities; pollution can be minimized by using lower levels of external inputs, together with greater use of crop rotations, integrated pest management, biological control and higher integration of animal farming, in order to support biodiversity and natural balance (Milosevic, 2007). During such a process (FAO/SIDA, 1989) priority has to be given to specific participatory approaches for problem identification and project design, development of practical, easily learnt and applicable approaches and methods, and finally, to human and institutional capacity building, especially in the areas of training and communication.

Objectives of the research were to find valid answers on what was the real impact of the FAO in terms of sustainable agriculture principles and how the above mentioned priorities in rural development by implementing participatory approach, influence on the rural reality. The key questions can be summarized:

Did farming technology and practices change?

Did agricultural production change (area, milk yield, production mix, etc.)?

Did rural financial institutions change?

Did local public institutions and service provision change?

Did rural people feel empowered in relation to local and national public authorities and development partners? (Do they play more effective role in decision-making?)

Did social cohesion and local self–help capacity of rural communities change?

Did rural people organizations and institutions change?

Did farm households' physical assets change (i.e. farmland, water, livestock, trees, equipment, etc.)?

Did infrastructure and people access to markets change? (transport, roads, storage, communication facilities, etc.)

Did the natural resource base status change (land, water, forest, pasture, fish stocks…)?

Did exposure to environmental risks change?

MATERIAL AND METHOD

In order to effectively provide answers to the questions given in the introduction a qualitative analysis methodology (FAO, 2001) has been applied and RRA (Rapid Rural Appraisal) approach has been chosen. Semi-structured interviews with key informants and with focal groups were the primary tool for gathering information. Every interview was very similar in dynamics and discussions, with very small differences and regard the data valid and acceptable.

During the interview farmers and other stakeholders have been asked to draw a perception of their environment. Trend lines gave farmers opportunity to visually illustrate their perception regarding trends in natural resources such as forests, pastures, livestock numbers, and living standard from the past to the present.

By transects natural conditions (climate and soils) and agricultural activities (farming and other activities) used to exploit the natural resource base, have been explored.

Venn-diagram was used to illustrate FAO's relationships to other organizations in order to define the interaction between different stakeholders and their importance for the success of the project.

RESULTS AND DISCUSSIONS

NATURAL RESOURCE BASE, FARMING TECHNOLOGY AND PRODUCTIVITY

By using the RRA tools it was found that, although in that area haven't been used techniques and technologies associated with intensive agriculture, up till now significant degradation of natural resource was noticeable. In the area of concerned municipalities, at 1200 m of altitude, the land is devoted to pastures. The soil is quite acidic so that pastures, meadows and legume fields are dominating. Problem was overusing the pastures without trying to recover it. So, nowadays, more and more, thorns and other unwanted plants in pastures is present, which degrades the feeding quality and causes animal poisoning. Also erosion, according to farmers, is a growing problem, especially in the hills with slopes. Cattle are predominant at this attitude, with also significant number of sheep and small number of goats.

Historically, this region has enormous capacity for livestock husbandry, especially sheep breeding. In the past, there were more than 130 000 sheep, and today only about 14000. The migration of people in 1990, war and crisis caused the problems in this region. Enabling external action significantly changed the natural resource utilization and farming technology. At first great deal of pastures are improved. Floristic content of pastures has been changed in favor of leguminous plants, influencing the land quality and forage nutritive value.

Technologies of haymaking have changed radically as the result of the training and demonstration. Farmers harvest hay in proper moment, which is influencing the hay quality. Bu using appropriate, modern mechanization, storing the hay is easier and durability without spoiling is assured.

The strongest impact of the project on farming technology and productivity has been determined in the field of silage making. Namely, in this region silage was not used for animal feeding. During the winter, feeding was based only on hay, so that milk and meat production at high level couldn't be reached. Today every serious farmer in this region has silage facilities and is making silage. At first, farmers, especially older, didn't want to give the silage to their animals. Very soon afterwards farmers started visiting the farms making silage. It was obvious that silage is not hard to make and that silage is improving the milk and meat yield. It was the beginning of a kind of FFS (Farmer Field Schools), where farmers instructed other farmers how to make and how much to give to the cow. More and more agricultural land is devoted to leguminous plants in order to make silage for cattle feeding; the productivity is much higher.

RURAL ORGANIZATIONS, SOCIAL COHESION AND EMPOWERING

The FAO recognized the capabilities of this people to work together and hospitality and mutuality that are probably the result of the rough geography and climate. Organizing associations, cooperatives and machinery groups lifted

economical, social and institutional aspects on higher level. Six machinery groups, 1 wool cooperative, 2 milk collection associations and 1 trade cooperative, have been formed.

These local organizations created a farmer union that does not exist only on the paper. The real conclusion is that it really works. The farmer union today has very rigid rules for the new member acceptance. Namely, the union provides services to the farmers that influence all parts of the society, urban and rural population. Since the connection with foreign partners, farmer union attracted attention of farmers all over the country. The FAO donated a machine for wool packing, which was precondition for wool export. Wool that was stored without any value became a valuable stock.

Very important result of the project was changing the farmer's attitude about associations and cooperatives. Most of them, in the past, were forced to enter cooperatives and to participate in this common work not only by attendance, but also with some percent of their arable land and livestock. Cooperatives served as a mechanism of the state to take the profit from farmers and to take over the most productive resources. As a result farmers were working together but were not willing to legalize the existing of such an institution.

Today farmers, trough these institutions realize their goals such as better market access, higher prices, changing policy etc., proving that common work, which are based on a win-win solution, is positive and useful for the all sides included. Collective spirit and teamwork was a guarantee that project would have no just a short-term effect.

People feel empowered and able to cope with problems, which was not the case in the past. Farmers are ready to ask what they need for better production and higher incomes. Farmer's union contacted institutions that can offer them educational services, and is ready to pay for it. Farmers are empowered and searching for new knowledge with willingness to pay for it. Traditional consciousness about the need for conserving the natural treasure of that area has been more stimulated and resulted in interests of the farmers for organic production.

INFRASTRUCTURE AND ACCESS TO MARKET

Mountainous terrain has made the provision of infrastructure very expensive; which increased the remoteness of villages from markets and other important institutions. Farmers very often used to say "no road no life" which is illustrating their view of what is the source of problems for this area. Road infrastructure has not been tackled by the project. Only a small number of villages in the area have an asphalted road. However, during the survey activities registered by the government oriented to road infrastructure revitalization, which could be very important factor for project effects sustainability. Concerning infrastructure at farm level situation is quite different. Many farmers constructed new facilities for silage, haulage, round balls, maize and other necessary inputs. It was obvious that facilities are new which indicate infrastructure changes in positive, sustainable way.

Regarding the access to market, freely could be said, it was improved as a result of the project activities. Modern district livestock market has been opened providing very good conditions for animal marketing. Sanitary, veterinary and quarantine services are available, and also parking places and places for animal binding, with water and animal feeding devices, and veterinary services. This market increased farmer's access to market and improved livestock sale for more than 40%, or what someone said "market has been brought to as".

Another important form of improving equitable access to market was Sjenica's Agricultural Show, which completely fulfilled its magnificent role. Main idea was to connect suppliers with farmers and to persuade the traders from other parts of Serbia and even from foreign countries to come to this region in order to understand that it has a very good potential, good customers and stable market.

The show connected farmers, producers and buyers from all over the country and created deep linkage resulted in much higher selling in comparison to the previous years. The subject of selling, besides livestock, was also milk products, woolen handicrafts and services, such as sheep machine clipping. During two days, every year farmers competing and presenting the local culture and admirable vivacity and hospitality which opens possibilities for overgrowing in big tourist attraction.

The fact that its organization is not any more under control of the FAO is enough to illustrate level of sustainability. Enabling external institutions completely contributed to the expression of multifunctional agricultural role in this area.

LOCAL PUBLIC INSTITUTIONS AND ACCESS TO INFORMATION

Farmer's opinion about local public institutions, especially the part dealing with agriculture, is not too good. In fact, it is very bad. According to them, institution that exists because of farmers doesn't care about farmers at all. Reasons for their inactivity maybe one can find in their ignorance of the reality. Most of them graduated many years ago and during their stay at local institution did not work on their upgrading at all. Farmers said, lecturers coming from other parts of the country, from the institutes, faculties and companies have very friendly approach and that ascribe to their high level of knowledge. It is necessary to involve young people, who are ready to introduce something new; who are ready to go to the village and who are enjoying the success. Trust in local public institutions doesn't exist and it will take time to change the situation.

Farmers' access to information changed as a result of the project introduction. Introduced marketing information system, collecting information from market and broadcasting them everyday on the local television. According to that, many farmers are creating and changing their production and selling strategy. During the research it was amazing how frequently words can be heard, even from the illiterate farmers, such as expenses, income statement, balance statement, revenues, business plan, loan, interest etc. Impression is that farmers are planning their production and are market oriented. That was very significant change and regarded as a result of the project, as a result of an enabling external institution's activity.

ENVIRONMENT

The roots of many environmental problems in agriculture lie, to a great extent, in the process of "commodization" of the land, which means a process of transformation of landscapes from a place for living, to industrial complex. Mountainous areas in Southwest Serbia still represent an area in which agricultural industry has not come yet.

Clean and healthy environment has not been disturbed by any activity of the FAO; moreover, traditional consciousness about the need for conserving the natural treasure of that area has been more stimulated and resulted in interests of the farmers for organic production. Farmers, empowered by the training, want to utilize the advantages of their agricultural production, considering the healthy and clean environment and healthy and natural way of animal breeding. They are aware of advantages offered by the organic production and want to adapt their way of production to the standards of organic production, hopping that government will help them in the certification process.

Today in the region, intensive agricultural production is not a frequent appearance. The need for clean and environmentally friendly technology in agriculture has been built in policy document of the local authorities.

INSTITUTIONAL COOPERATION

From the previously elaborated it was not hard to realize the importance of an enabling external institution in sustainable agriculture and rural development. In order to depict the roots of the success, it was of great importance to define the cooperation activities and approaches of the FAO's staff in creating and maintaining the network. Organization and implementation of project training activities created linkages and working relationships with different subject specialists from the state and private sectors.

These institutions included teaching staff from faculties of agriculture, agricultural institutes and research organizations, state and private veterinary services, primary product processors and traders, lawyers and accountants and others. This network expertise is now available to project beneficiaries on demand where specialists and they expertise are available, organizationally and economically (to be paid) through the established associations and cooperatives. Dissemination of project activities and results has been performed through local TV stations and newspaper publication, which gives evidence of good and productive cooperation. Sjenica's show, previously mentioned, represents evidence about good cooperation of the FAO and Municipality.

CONLUSIONS

Importance of Enabling external institution for sustainable agriculture is irreplaceable, which is clearly evident from the case of Western Serbia,

Natural capital has been significantly improved by applying technology and practice in favor of agricultural productivity and environmental acceptability,

Human capital has been improved by empowering farmers and other stakeholders regarding the knowledge and capability for performing actions that increase their self-reliance,

Social component has been improved by increasing the value making opportunities and by improving the access to the resources.

Participatory approach and creating development strategy according to local needs and priorities representing the best way for fulfilling the goals of sustainable rural development.

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THE POSSIBILITIES FOR IMPROVING OF VITICULTURE IN MOLDOVA REPUBLIC, USING THE SEEDLESS GRAPES VARIETIES

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Key words: *seedless grapes, viticulture, Moldova Republic.*

Abstract
Viticulture in Republic of Moldova is the main branch of the agricultural complex. At the present, the vineyard area constitute about. 120.000 Ha, but approx. 25.000 Ha are young vineyards planted after 2000 year. According to the decision No. 1313/7.10.2002 of Moldova's government - the new vineyards area should be in 2020 about 100.000 Ha, including varieties of table grapes up to 20.000 Ha. The grape varieties, approved in the republic at the present moment, not totally sure the consumers' requirements. Therefore the proposed research is based on evidence of seedless varieties, which are to improve the general viticulture and, in particular, for farmers. The grapes for direct sale will produce a profit over 5.000 USD on 1 ha, but after storage depending on the duration of the increases even at 10-15 times. As a result, research has revealed the seedless grape varieties with good quality after treatment with gibberellin: Loose perlete, Thompson seedless.

INTRODUCTION

Viticulture in Republic of Moldova is the main branch of the agricultural complex. At the present, the vineyard area constitute about. 120.000 Ha, but approx. 25.000 Ha are young vineyards planted after 2000 year. According to the decision No. 1313/7.10.2002 of Moldova's government - the new vineyards area should be in 2020 about 100.000 Ha, including varieties of table grapes up to 20.000 Ha [3]. The grape varieties, approved in the republic at the present moment, not totally sure the consumers' requirements.

Therefore the proposed research is based on evidence of seedless varieties, which are to improve the general viticulture and, in particular, for farmers. The grapes for direct sale will produce a profit over 5.000 USD on 1 ha, but after storage depending on the duration of the increases even at 10-15 times [2,5,6]. At this moment in order to stimulate the establishment of vineyards with table grapes varieties, the State pays a subsidy of $ 4000 per hectare [4,5]. Improving the technology of table grape varieties, as well as exploring new varieties in the climacteric condition of Moldova republic are the main objectives of our research [1].

These studies are related to the fact that the climatic conditions of Moldova Republic permit to cultivate about 300 hectares of vineyards, but because Wineries already established their vineyards, but the small farms are only profitable to cultivate the table grapes.

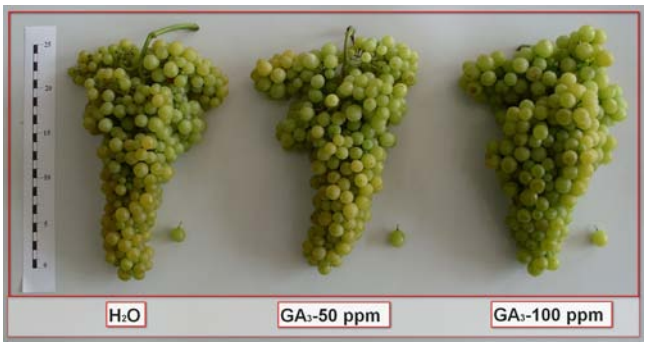


Photo 1. Effect of gibberellin (GA3) on the appearance of bunches and berries of Loose perlete variety

Indicators	Variants					
	Control - H_2O		GA_3-50 ppm		GA_3-100 ppm	
	$\bar{x}$	%	$\bar{x}$	%	$\bar{x}$	%
Weight of bunches, g	656,0	100,0	663,8	101,2	929,6	141,7
berries	640,8	-	652,3	-	914,9	-
The number of berries in the bunch, (normal / abnormal), pieces	619,0	100,0	481,5	77,8	504,5	81,5
	98,5	-	15,7	-	0,0	-
Weight of 100 berries, g	138,4	100,0	158,1	114,2	221,6	160,1
	± 3,8	-	± 10,1	-	± 9,5	-
Yield, kg per vine	5,00	100,0	5,10	102,,0	7,10	142,0
content of sugars	164	-	161	-	146	-
content of acids	9,2	-	9,2	-	10,6	-
The level of profitability, %	118		172		185	

Table 1. The reaction of Loose Perlete variety for processing of cauliflowers with gibberellin (GA3) on the stage after fecundation period (2008).

MATERIAL AND METHOD

Studies performed in 2008 at the experimental station with seedless grape varieties: Loose perlette and Thompson seedless, in The Central part of the Moldova Republic. We used the methods recommended for this type of research in viticulture. During the period of vegetation we studied the

Indicators	Variants					
	Control - H_2O		GA_3-50 ppm		GA_3-100 ppm	
	$\bar{x}$	%	$\bar{x}$	%	$\bar{x}$	%
Weight of bunches, g	857,2	100,0	970,1	113,2	865,6	101,0
berries	842,9	-	947,9	-	846,7	-
The number of berries in the bunch, (normal / abnormal), pieces	416,0	100,0	444,5	106,9	249,5	60,0
	111,5	-	78,5	-	61,0	-
Weight of 100 berries, g	188,2	100,0	228,7	121,5	242,1	128,6
	± 3,9	-	± 17,2	-	± 10,2	-
Yield, kg per vine	6,01	100,0	6,79	113,0	6,06	101,0
content of sugars	180	-	196	-	182	-
content of acids	8,1	-	8,3	-	7,4	-
The level of profitability, %	115		223		174	

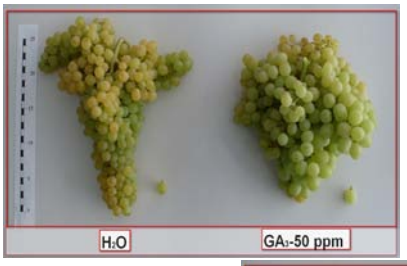
Table 2. The reaction of Thompson Seedless variety for processing of cauliflowers with gibberellin (GA3) on the stage after fecundation period (2008).

agrobiological properties of varieties. The cauliflowers were treated with gibberellin: 50 and 100 ppm.

RESULTS AND DISCUSSIONS

The results of our researches are shown in Tables 1 and 2, as well as in photos 1 and 2.

As a result of processing cauliflowers with gibberelin the Loose Perlete seedless grape variety adds to the weight of bunches of 656 g to 929,6 g or 141,7% (100 ppm), but the Thompson variety - of 857,2 g to 970,1 g or 113,2 % (50 ppm).



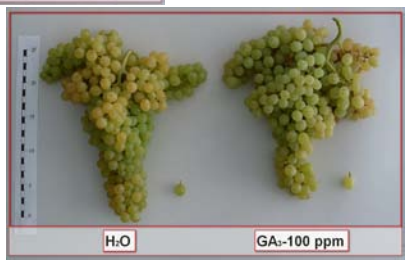


Photo 2. Effect of gibberellin (GA_3) on the appearance of bunches and berries of Thompson seedless variety

The number of berries in the bunch of both varieties decreased. The Loose Perlete variety from 619,0 to 481,5 pieces or 77,8 % (50 ppm), and 504,5 pieces or 81,5 % (100 ppm), but the Thompson seedless - from 416 to 249,5 pieces or 60 % (100 ppm).

Decrease in the number of berries is accompanied with the increase of their mass. The Loose Perlete seedless variety, had risen to 114,2 % (50 ppm) and 160,1 % (100 ppm), but the Thompson seedless variety - had risen to 121,5 % (50 ppm) and 128,6 % (100 ppm).

The yield increases only on the Loose Perlete variety, but the Thompson seedless variety showed the minor changes. Also minor changes observed on indicators of quality.

The main indicator of economic efficiency is the level of profitability. This indicator amounted to the Loose Perlete variety 185 % (100 ppm) and 172 % (50 ppm), and control – 118 %, but the Thompson seedless variety – 223 % (50 ppm) and 174 % (100 ppm), and control – 115 %. The level of profitability is based on prices in the market of Moldova in 2008.

CONCLUSIONS

1. As a result of the test gibberellin on seedless varieties of grapes, it was found that the effect of the drug depends on the biological characteristics of variety and concentration of the drug solution.

2. The processing of cauliflowers of seedless variety Loose Perlette with gibberellin, during after fecundation period, occurs the increase in mass bunches of berries in bunch weight, mass, and the crest of change of the structure of clusters. The optimal concentration of the drug is GA_3-100 ppm. The yield of the vines growing on 42,0-92,3% and improves the quality of grapes, compared with control.

3. The reaction Thompson Seedless varieties clone (FPS 05) characterized by high productivity, compared with the original variety, seen in the dose of GA_3-50 ppm. Yield increases by 13,0 %, increasing size and improving their taste quality.

AKNOWLEDGMENTS

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THE NEOLIBERAL CONCERNS REGARDING THE TRANSITION FROM THE SOCIALIST ECONOMY TO THE FREE MARKET ECONOMY

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Keywords: *economy, market*

Abstract
The specific doctrine for neoliberalism is becoming nowadays more actual because it is focused in particularly on two objectives: on one hand many theorists speak about the actual state of the real market economy, comparing with other currents of opinion. Regarding the market economy, the neoliberals admit the inadequate organization of the economy under the different forms of monopoly, some defects of the market mechanism and monetary circulation, suggesting the consolidation of free trade, preconizing the intervention of the state to assure a fair competition between economic agents.

INTRODUCTION

At the same time with the collapse of totalitarian system in the European countries, at the end of '80s, economists search new measures for structural reorganization of the scheduled economy, the predominant opinion being the passing to the market economy. Theoretically, this option is normal and easy, but practically it is knocked against social and economic structures inherited from the last regime, as also against enormous social costs for their replacement.

MATERIAL AND METHOD

A general opinion for passing to an efficient economy of former socialist countries, including Romania, is its liberalization and privatization, aim which was entered in the Government Programme of our country, after the revolution in December 1989.

Differen opinions appeared between various thinkers, in reference to the rhythm of democratic changes, as follows: "shock" therapy; "slow" therapy or a combination between these; types of property, as follows: the pluralism of property forms or the opinionate of private property; the role of state in this process.

The liberal representatives, especially Anghel Rugină, an American, native of Romania, support a social market economy with some measures of social security for deprived people, the coexistence of public property with private property, accent on the own effort and as much as possible the avoidance of contracting extern debts.

Anghel Rugină said that ideal for our country was "a new monetary, financial, economic, and social order, based on freedom, social justice, equity, equality and durable stability."

Milton Friedman, an American, has concerns in the domain of economic research methodology, in defending the contemporary market economy, in monetary issues and also microanalysis. We note from his idea:

The sovereignty of the consumer as a characteristic of market economy. He is a defender of modern market economy based on property and small company's activity, a supporter of individualism and adverse of socialism, collectivism and planning.

RESULTS AND DISCUSSIONS

The key for functioning of market economy is freedom of people to choose, the consumer sovereignty. He considers that the impulse of economic activity started from consumers, from their capacity to choose goods in the market, suggesting what products to be produced by the manufacturer.

The key element of this mechanism is represented by the price, which, in his conception, fulfils three functions: of transmitting information, stimulating in adapting the efficient production methods and allocating the income.

The criticism of dirigisme. He declares against the intervention of the state in economy because it brings some prejudices and favors corruption and contains the germ of dictorship. He is against state interference in establishing the prices, against budget subsidies, especially those for agriculture and industry, against the increase of property tax, of budget deficits, of social insurance for deprived people.

Monetary theory and policy have represented his basic concern. His conception about money has on its basis the quantitative theory of money and prices, namely that: the purchasing power of money is in inverted ratio with monetary mass in circulation, so with the ratio between monetary mass and the volume of existing goods in a market. (D. Ricardo)

Lionel Stoleru, a French economist, said that passing from planned, centralized economy to the market economy, supposed a "rupture" in the nature of system and "transition" in time, passing from a system to another. This sustains a "programmed evolution" instead of "a reform" which has already adapted through these fluctuations the economic system to its internal impulses and assures the auto regulation of economic movement.

CONCLUSIONS

In conclusion, the economic cycle can be defined as a economy-wide fluctuations in production or economic activity over several months or years, around a long-term growth trend. It typically involves shifts over time between periods of relatively stagnation or decline (expansion or boom)

and periods of relative stagnation or decline (contraction or recession). These fluctuations are often measured using the growth rate of real gross domestic product. Despite being termed cycles, these fluctuations in economic growth do not follow a mechanical or predictable periodic pattern.

According to the duration, there are distinguished the following cycles:

1. Cycles with an average duration of 40 to 60 years, which are also named Kondratieff cycles, after the name of French economist originating. This type of cycles is related by technological revolutions.

2. Kuznets cycles are cycles of 15-20 years and are referred to the houses construction area, which knows a special cycle of 18 to 20 years. The demand of built houses, with every new generation, increases. These cycles have the name of an American economist, S. Kuznets, and are also named hyper cycle.

3. Weeler cycles have the name of an American economist and are cycles of 100 years, 500 years and 1000 years. These are climatic cycles which verge on the cycles of human civilization.

4. Decadal cycles have a duration between 7 and 11 years. This type of cycles is also named conjectural, average cycle or major cycle and fit the American notion of business cycle.

5. Kitchin or minor cycles have an average duration of 40 months.

6. Seasonal or interannual cycles take place and are unrolled within a calendar year.

In an economy that crosses a crisis, the state intervention has to be materialized in:

a) Elaborating some macroeconomic programmes;

b) Using the public budget to solve some social problems;

c) Using the fiscal policy to stimulate the demand on the market.

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THE PRODUCTION OF BIOFUELS AND ITS PERSPECTIVE ON THE GLOBE AND IN ROMANIA

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Key words*: oil, biofuels, production, factors, strategies*

Abstract
The scientific paper presents the requirements regarding the biofuel production on the globe, in the main EU countries and in Romania, the positive aspects and the limits of this production. We also present the perspectives for the biofuels of the first generation and for those of the second generation.

INTRODUCTION

The increase in the demand for energy combined with the geopolitical factors, especially the situation in the Middle East, has led to the increase in the oil price, which made certain states intensify their efforts to develop fuels that are alternative to oil. On the globe the main regions that produce biofuels are Brazil, the USA and the EU. Within the EU, large biofuel producers are Germany, France, Spain and Sweden.

In Romania, the activity in this domain is only beginning and in the elaborated strategy it is forecast to produce about 330 thousand tons/year (5.75%). In 2008 there are already 27 authorised producers in operation and 5 investors in the biofuel production.

MATERIAL AND METHOD

The performed research targets the resources and the production of biofuels on the globe, in the EU as a whole and in each country, the factors that influence the strategy in the production of biofuels in the future, using specific statistical methods and the SWAT analysis.

RESULTS AND DISCUSSIONS

The existing oil reserves are limited quantitatively and are found in a few regions of the world. The new existing reserves are difficult to use, and the high oil prices lead to disequilibrium in the balance of payments of importing countries.

Climatic changes, the increase in the concentration of greenhouse gases are another basic factor which makes the production and consumption of biofuels increase rapidly nowadays.

The main advantages for the production of biofuels are considered to be the following:

- the decrease in the use of fossil energy;
- the superior use of the energy crops production;
- they are renewable and environmentally friendly fuels;
- they can be used in modern vehicles with slight or no structural changes;
- the existing marketing infrastructure can be used;
- they offer a perspective for the development of the rural economy and regions;
- the possibility to obtain high profits;
- national security

On the globe, the main regions that produce biofuels nowadays are Brazil, the USA and the EU. In the first two, bioethanol (from sugar cane, respectively form maize) dominate the market, and in the EU biodiesel from rapeseed (table 1).

	2005	2007
World, total, of which:	46.0	88.0
Brazil	16.7	28.0
The USA	16.6	47.0
The EU	3.0	-
Asia, total, of which:	6.6	-
China	3.8	5.0
India	1.7	2.0
Africa	0.6	-

Table 1 – The world production of biodiesel and bioethanol (in billion litres)

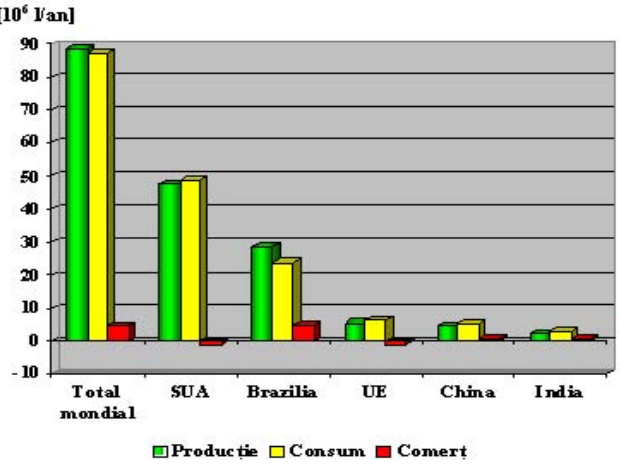


Fig.1 The Bioethanol World Market

	2004		2006
	Biodiesel	Bioethanol	Production capacities for biofuels
Total	1933	491	4690
Germany	1035	20	2180
France	348	102	670
Italy	320	-	690
Spain	13	194	270 (with Portugal)
Denmark	70	-	-
Austria	57	-	-
Sweden	1	52	-
Poland	-	36	710 (with CZ, SL, A)
Ukraine-Bulgaria	-	-	270

Table 2 – The biodiesel and bioethanol productions in the EU (thousand tons)

The European Union is undergoing the process of beginning an ambitious development of biofuels before 2020. For 2010, the EU directive regarding biofuels has established

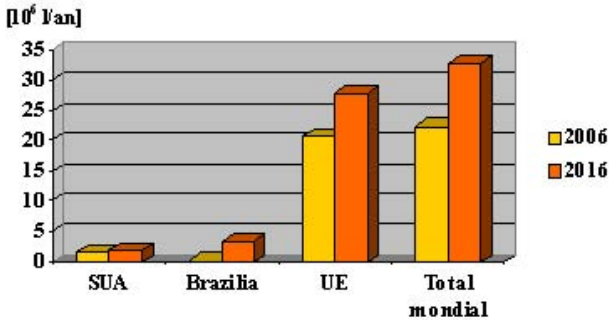


Fig. 2 The World Biodiesel Market
(PDE-EPE-2007, FAPRI Agricultural Outlook)

an indicative objective of 5.75% which will probably lead to a supplementary increase soon. Moreover, the European Commission proposed a compulsory objective of 10% for all the member states, which should be achieved by 2020.

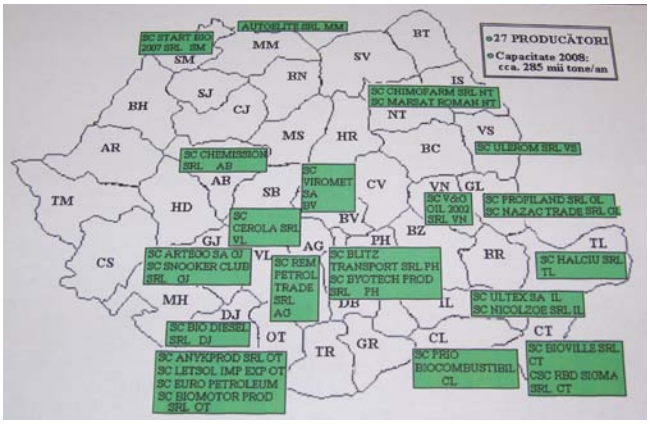
The production of biodiesel and bioethanol in the UE is mainly obtained in Germany, France, Spain, Italy, Sweden, these countries accounting for over 80% of the total production (table 2).

Eastern-European countries and Ukraine have the resources potential to produce the necessary quantities of raw materials at low costs. An important premise is here the fact that the use of biomass for electricity and thermal energy remains limited to the materials from forestry and to residue, without requiring agricultural land.

Romania, in accordance with the obligations undertaken in the accession process, the Position Document Chapter 14 – Energy, the Government Decision No. 1844/2005 was adopted regarding the promotion of the use of biofuels and other renewable fuels for transport, which entirely transposes the provisions of the Directive 2003/30/EC.

The need for biofuels for 2010 at a quota of 5.75% is of about 330 thousand tons/year, and for 2020 - at 10% it is of about 600 thousand tons/year.

In 2008 27 biodiesel producers are operational with a capacity of about 285 thousand tons/year and 5 investors for the production of bioethanol with an estimated capacity of 450 thousand tons/year (see the map below).



The forecast of the evolution of the production of biofuels is as follows:

⇒ 2005-2010 □ Biofuels of the first generation and the improvement in the existing technology

⇒ 2020 □ Biofuels of the second generation produced from lignocellulosic raw materials

⇒ 2050 □ Bio-refining integrated complexes

In order to promote and use biofuels, the EU targets the following axes:

1. To stimulate the demand for biofules;
2. Actions in favour of the environment;
3. The development of the production and distribution of biofuels;
4. The expansion of the supply with raw materials by providing special support to energy crops;
5. Actions for trade facilities;
6. Support in developing countries;
7. Research and development (especially in the bio-refining concept)

CONCLUSIONS AND RECOMMENDATIONS

The transition to biofuels already begun, with the advantages and issues it raises, requires the definition of well-founded global and national strategies. The factors that must be taken into account are: the price of classical fuels, the cost and reserve of raw materials, the governmental policies for energy crops, and the improvement in biofuel production technologies.

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GREEN ENERGY - AN ALTERNATIVE OF COSTS REDUCTION FOR TOURISM, AGROTURISM AND RURAL DEVELOPMENT

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Keywords *- Reduce costs, protect the environment.*

Abstract
"Green Energy" is a term which refers to renewable and clean energy sources. Electricity generated from renewable sources is becoming more available. By choosing such sources of renewable energy consumers can support development of clean energy that will reduce environmental impacts associated with conventional energy generation and will increase energy independence. Moreover, these technologies can help consumers by reducing bills for various utilities (water, heating) and a short time damping systems for heating domestic water, the adoption of such an investment becomes extremely profitable for households, hotel, guesthouses etc.

INTRODUCTION

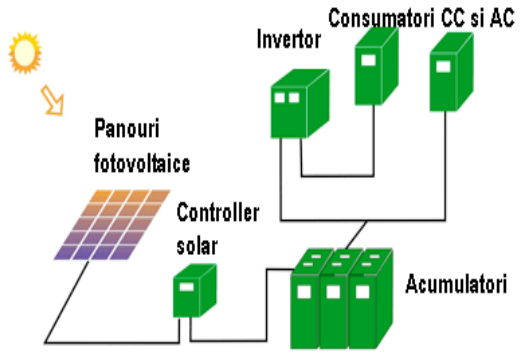
"Green Energy" is a term which refers to renewable and clean energy sources. Electricity generated from renewable sources is becoming more available. By choosing such sources of renewable energy consumers can support development of clean energy that will reduce environmental impacts associated with conventional energy generation and will increase energy independence. Moreover, these technologies can help consumers by reducing bills for various utilities (water, heating) and a short time damping systems for heating domestic water, the adoption of such an investment becomes extremely profitable for households, hotel, guesthouses etc.

MATERIAL AND METHOD

Compact solar system for domestic hot water The systems include a compact solar panel with a variety of solar tubes, a reservoir built a framework for mounting an electrical resistance controlled by additional control panel. These systems are usually set up on the roof of the house and works on the principle of the thermal bottle: collecting solar heat and transfer it by heating

the water. This principle is based on two phenomena: Dark colored objects absorb heat. Hot water in the reservoir rises. Tubes collectors absorb sunlight, warm water in the reservoir, it rises, cold water is moving in the collectors where the process is repeated. Such systems may be used for late spring until autumn and provide between 60% and 100% of daily domestic hot water. Are the simplest and most economical systems for heating of domestic hot water, while very reliable.

Photovoltaic panel, ES photovoltaic modules are specially designed for high energy consumption. Photovoltaic panel has a long life, approximately 25 years and can be used both for systems connected to the national energy systems and independent. Solar cells: monocrystalline solar cells have a



high efficiency, even if solar radiation is low, the solar module can produce power at full capacity Specially treated glass: anti-reflex glass with a high rate of transmission increases the amount of energy supplied by the module and the mechanical strength of how solar. EVA and TPT: To increase the mechanical resistance and that the panels can operate in a more harsh environment were used tedlarpolyester- tedlar sheets (EVA / TPT). They prevent water penetration into the solar cells. Aluminum framework: It is easily installed by Schottky diodes by pass 10A 1000V. Lifetime: more than 25 years, with a decrease of less efficiency, to resist extreme environmental conditions (wind, humidity, etc.).

Photovoltaic modules are specifically designed for high energy consumption, having a long life, approximately 25 years and they can be used both for systems connected to the national energy systems and independent.

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Photovoltaic panels: A number of photovoltaic panels connected in series or in parallel providing continuous power by transforming solar radiation. Orientation and angle of inclination of the panels are important system parameters, so the settlement of the panels in areas without shade. Photovoltaic Controller: controls the batteries, they load and unload it safely Inverter: a power inverter to convert DC from the panels into alternating current. Output signal characteristics must be in accordance with the voltage, frequency and the network Batteries: can be one or more battery connected together. Choosing capacity batteries is a very important decision because they need to ensure constant supply of electricity Consumers: electrical appliances in the building fed to inverter or network

CONCLUSIONS

Ministry of Environment allocates 20 million Euro for renewable energy projects, funds from car pollution tax. Individuals and associations of owners will receive financial assistance for installation of solar panels on homes, so the old boilers and power plants used traditionally to produce hot water in every house will be replaced with solar panels mounted on the housing. Reduced pollution, lower costs: The main sources of renewable energy in Romania are solar energy, wind, biomass and geothermal energy. In Romania we currently produce most of the renewable energy resources from hydropower resources. One of the solutions that could be developed in Romania to promote use of renewable energy investments would be the correlation of tourism using European funds with the use of renewable energy installations (solar, wind, etc.).. For example, in Mangalia, several operators have built solar panels, which ensure, at least during summer, most of the hot water needed.

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THE IMPACT OF GENETIC SELECTION FOR INCREASED MILK YIELD ON HEALTH, FERTILITY AND WELFARE OF DAIRY COWS

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Keywords: *dairy cows, fertility, health, welfare, genetics*

Abstract
In many countries milk production per cow has more than doubled in the last 40 years. The increase in production has been accompanied by declining fertility, increasing incidence of health problems, and declining longevity in modern dairy cows. Genetic selection for increased milk yield is increasingly viewed as increasing profit at the expense of reducing animal welfare. The welfare problems should be addressed before there is widespread condemnation of breeding and management practices. A sustainable breeding goal aimed at improving fitness and tolerance to metabolic stress is recommended.

INTRODUCTION

The dairy industry's goal has always been to produce quality milk for the consumer market. In many countries yield per cow has more than doubled in the last 40 years. The dramatic increase in yield per cow is due to rapid progress in genetics and management. The average ECM (Energy corrected milk) yield for Swedish dairy cows increased from 4200 kg to 9000 kg between 1957 and 2003 [24]. Data from National Milk Records in the UK show an increase in average yields of dairy cows of about 200 kg/year from 1996 to 2002 and 50% of the progress in milk yield is attributed to genetics [19].

The picture is similar in the US where between 1993 and 2005 the average milk production/cow increased by 1737 kg and 920 kg of this increase, or 53%, was due to genetics. Interesting to note that, until mid-1980s most of the increase in milk yield was the result of improved management, in particular better application of nutritional standards and improved quality of roughage. Since then, genetics has become the major factor due to effective use of artificial insemination (AI), intense selection based on progeny testing of bulls and worldwide distribution of semen from bulls with high genetic merit for production.

High milk production and its undesirable consequences

There are several practical reasons why high production should be viewed with concern: a) the increase in milk yield has been accompanied by declining fertility, increasing incidence of health problems, and declining longevity in modern dairy cows; b) substantial antagonistic genetic correlation exists between milk yield and fertility and between milk yield and several production diseases indicating that, if selection for production continues unchanged, further genetic deterioration in fertility and health is expected; c) high disease incidence, reduced fertility, decreased longevity and modification of normal behavior are indicative of substantial decline in the welfare of dairy cows; d) the success of the dairy industry depends upon public perception of its products and production methods and increased public concerns regarding modern animal agriculture, particularly animal welfare, puts sustainability of the dairy industry at risk.

1. Declining fertility, health and longevity of modern dairy cows

Calving interval increased from < 13.0 months to > 14.5 months and number of inseminations per conception from 2.0 to > 3.5 from 1980 to 2000 in 143 US commercial herds [12]. A decline in pregnancy rate to first service of 0.5% per year between 1975 and 1997 was reported in the US [1]. Norman et al. [14] evaluated US national trends for reproductive traits and reported a decline of 10% for 70 days non-return rate at first service in Holstein breed between 1996 and 2005. Poor reproductive performance often leads to premature culling of dairy cows.

Declining reproductive efficiency is not limited to the US. In the UK [22] pregnancy rate to first service decreased from 56% in 1975-82 to about 40% in 1995-98, a decrease of about 1% per year. Similar decreases in conception rate and other reproductive measures have been reported in Sweden [21] and many other countries.

The incidence of production-related diseases has increased greatly over the last decades. A case in point is lameness. Its incidence increased in UK dairy herds from lactational incidence rate (LIR) <10% reported prior to 1980 to >20% after 1990 [5] and, in a recent study, Whay et al. (2003) reported an annual incidence rate of 2% for the best 10% of herds and 46% for the worst 20% of herds. For the US, Guard [7] reported a 38% LIR and estimated direct cost due to lameness in a 100-cow herd to be $7,600 per year.

Ingvartsen et al. [9] reviewed the literature on the relationship between milk performance and health in dairy cattle. The review dealt with production diseases as defined by Kelton et al. [11]: dystocia, parturient paresis, ketosis, displaced abomasum, retained placenta, ovarian cyst, metritis, mastitis and lameness. The review of 11 epidemiological studies showed clear evidence that cows with high yield in the previous lactation are at increased risk of mastitis and ovarian cysts in the subsequent lactation, but for other diseases the phenotypic association was weak due to the large variability between studies. These results lead Ingvartsen et al. [9] to conclude that examining the relationship between level of milk production and disease incidence as a direct a direct cause – effect relationship is inadequate but it should be viewed in its complexity as cows producing more milk

are also likely to eat more and make greater use of their body reserves in early lactation [27].

2. Unfavorable genetic association of milk yield with fertility and health in modern dairy cows

Several published studies [17; 21; 22] have reported strong unfavorable genetic associations between milk yield and fertility measures -- indicating that the decline in fertility observed on the dairy farms is, at least in part, an unwanted consequence of successful selection for higher yields.

Ingvartsen et al. [9] reviewed 14 genetic studies on the relationship between milk performance and health in dairy cattle. These studies showed an unfavorable genetic correlation between milk yield and incidence of ketosis (0.26-0.65), ovarian cyst (0.23-0.42), mastitis (0.15-0.68) and lameness (0.24-0.48) indicating that continued selection for higher milk yield will increase LIR for these production diseases.

3. Declining adaptability of modern dairy cows

It is clear that selection for production may lead to problems in health and fertility. As animals tend to adapt to the environment in which they are selected, it is likely that selection for increased yield may also lead to environmental sensitivity expressed as a genotype × environment (G × E) interaction. Castillo et al. [4] and Kearney et al. [10] showed that the magnitude of the antagonistic genetic correlations between milk yield and somatic cell score and between milk yield and conception rate were significantly higher in a poor environment relative to a good environment. Dairy producers in several countries with grazing systems have expressed concern regarding the declining fertility of cows with increased proportions of Holstein genes. Harris and Winkelman [8] and Verkerk et al. [29] reported significant superior performance for conception rate, services per conception, and days to first service for cows of New Zealand origin relative to cows of North American origin. These changes in the genetic correlations between traits are indicative of genotype by environment interaction; suggesting a decline in fitness and adaptability associated with selection for increased production, and leads to welfare problems, especially when the animals are exposed to a different environment.

4. Major welfare performance indicators

One definition of animal welfare put forward by Broom [2] states that "The welfare of an individual is its state as regards its attempts to cope with its environment". Animal welfare ranges from poor to good and an objective way to assess it is in terms of directly measurable biological functions such as reproductive success, disease incidence, survival and behavioural changes [30]. Duration, prevalence and severity are aspects that need to be considered to assess the importance of any welfare indicator. A total of 22 scientists participated anonymously (Delphi method) to develop a conceptual framework for assessment of farm animal welfare, to identify the major welfare performance indicators and rank them in order of importance. For dairy cattle the major welfare indicators in order of priority were: lameness, mastitis, other metabolic disorders, sub-fertility, and longevity [30].

5. Sustainability of dairy industry in a changing culture

For the most part of the 20th century the goals for animal agriculture were increased production and increased efficiency to satisfy a consumer market that demanded an abundance of animal products at low cost. Under these circumstances, it is not surprising that the main aim of dairy cattle breeding for the last 50 years was to improve production and efficiency, with genetic selection focused on increasing milk yield. This goal has received wide support because, other things being equal, it should optimize the use of resources, increase farm profit and reduce cost for consumers. However, this approach has also led to undesirable and ethically problematic consequences, particularly with respect to welfare and the adaptability of the modern dairy cow. Today, the attitude toward farm animals in the developed countries has changed and other issues, particularly animal welfare, are of primary public concern.

6. Selection for high production and metabolic stress

As the genetic ability to produce milk increases, more cows have sub-fertility or production diseases. As more cows are culled for health or fertility reasons, i.e., involuntary culling, the productive life of modern cows is declining. The associations between increasing production and deterioration of the most important indicators of welfare are well documented, but less is known about the biological mechanisms behind these relationships.

Reviewing the negative side effects of selection for high production Rauw et al. [20] concluded that "when a population is genetically driven towards high production… less resources will be left to respond adequately to other demands like coping with (unexpected) stressors; i.e. buffer capacity is [negatively] affected".

To address the growing perception that the pursuit of ever-increasing milk production is detrimental to cows' welfare, Ingvartsen et al. [9] developed a framework for future research. The framework links the genotype, nutritional environment and management of the cow through its metabolic status to fertility and disease susceptibility and suggests that mobilization of body reserves has the potential to be the key factor. High producing dairy cows need to mobilize body reserves to support their milk production. In the first third of the lactation period, until energy intake catches up with requirements, high producing cows enter a state of negative energy balance (NEB) losing excessive amounts of body condition. The terms "metabolic load" (ML) and "metabolic stress" (MS) are used to describe the effects of high production on dairy cows. The ML is defined [9] as "the burden imposed by the synthesis and secretion of milk" and MS as "that amount of ML which cannot be sustained, such that some energetic processes, including those that maintain good fertility and general health, must be down regulated." The extent and type of down regulation would be indicative of the degree of MS. The term ML is often used to describe only the part of the total energetic burden of lactation that is met by mobilization of body reserves, i.e., ML is the same as NEB.

Selection for yield increases the demand for energy and also shifts the priority in partitioning energy to support milk synthesis. It also increases feed intake but, with a genetic correlation between yield and feed intake ranging from 0.46 to 0.65 [27], the gap between energy input and output during early lactation increases. There is little evidence for more efficient digestion or utilization of metabolizable energy in high-genetic-merit cows; so, the correlated response to selection for yield is increased body-tissue mobilization and increased ML. Unfavorable genetic correlations were reported between NEB and interval to first luteal activity [28], incidences of nutritional (milk fever, ketosis, displaced abomasum, diarrhoea and indigestion) and locomotive (laminitis, leg problems, hock problems, and inflamed thigh) problems [6], and average somatic cell count [25]. These

reports suggest that a major part of the decline in health and fertility observed over time is the result of the increased MS associated with the success of the genetic selection for milk yield.

There is even greater concern that, if the single-goal genetic selection for milk production continues unchanged, the future welfare of the dairy cow may be severely compromised. Consideration of animal well-being in any livestock production system is a determining factor for its social acceptability and, therefore, its sustainability [13]. The double-edged sword of genetic yield improvement and associated metabolic-stress symptoms raises important challenges for sustainability of the dairy industry.

Welfare assessment is based on establishing norm values for animal related parameters (health, fertility, longevity, behavior, etc.). With selection, the genetics of the entire dairy population is continuously and cumulatively changing and the genetic improvement for production is accompanied by genetic deterioration of major welfare indicators. Unless this deterioration is stopped, appropriate norm values with long term relevance can never be established.

7. Selection for improved welfare in dairy cattle

Broom [3], pointing out positive correlations between milk production and the major welfare problems in dairy cows (lameness, mastitis, impaired reproduction, inability to show normal behavior), stated:

"Genetic selection has not taken adequate account of the adaptability and welfare of cows. Current trends towards ever greater milk production should not be continued unless it can be insured that welfare is good. It is important to the dairy industry that welfare problems should be addressed before there is widespread condemnation of breeding and management practices."

The major advantages of genetic improvement for any trait are that changes are cumulative, permanent, cost-effective and sustainable. This is true for the selection trait as well as for correlated responses on other traits. As pointed out, these very advantages have facilitated a rapid increase in milk yield per cow and detrimental effects on the welfare of the animals when breeding objectives have centered on production, with little attention given to fitness traits, such as fertility and health.

PRACTICAL IMPLICATIONS

The unfavorable genetic relationship between milk production and welfare indicators means that the most effective route to stop the decline or even improve welfare is by developing and adopting a selection index in which welfare related traits are included and appropriately weighted. With such an index the genetic progress for any of the traits considered is smaller then if selection is for a single trait, but overall economic response is greater than in single trait selection.

Animal welfare is often portrayed as opposed to animal production [23] and selecting for welfare traits is assumed to be uneconomical. This is not the case. The current breeding goal in the UK includes milk, fat and protein yields plus lifespan. These traits are combined into Profitable Lifetime Index, or £PLI. Calculations suggest that expansion of £PLI to include mastitis resistance and measures of fertility (calving interval) could increase economic response to selection by up to 80%, compared with selection for milk production alone [18]. Selection on such an index could also halt the decline in fertility and mastitis resistance, compared with selection for milk production alone. This example illustrates that it should indeed be possible, through genetic selection to address the welfare without a reduction in profitability.

One example of a successful multi-trait selection comes from Sweden and other Nordic countries [16] where breeding goals have been formulated to include not only production but also fertility and health for the last 20 years. By implementing more balanced selection goals it has been possible to limit the decline of fertility in the Swedish Holstein breed to about half of what has been observed in other Holstein populations and prevent it in the Swedish Red and White breed which is much less influenced by germplasm from outside Scandinavia. Resistance to mastitis follows similar trends. There have also been recent improvements in the health of cows in Norway as a consequence of a more balanced selection program [15].

For the Holstein/Friesian breed, which is the dominant dairy breed in the world and accounts for about 80% of all dairy cows in Europe [26], increased emphasis on selection for fitness traits should occur in all countries, particularly those that dominate the international germplasm market. Since mid 1990's several breeding organizations in Europe as well as North America have included fertility and health (at least mastitis) in their breeding objectives. Recently several Nordic Countries included lameness in the breeding objectives and their lead should be followed by other breeding organizations. A multi-trait selection program in which health, fertility and welfare traits are included in the breeding objective is needed. For multi-trait approach to be effective in improving welfare, higher weight should be given to fitness and welfare traits, a total merit should be calculated via selection index and selection should be based on total merit. Europe should urgently address the animal welfare issues in its breeding programs to avoid public condemnation of breeding and management practices for dairy cows.

In order to improve the welfare and adaptability of dairy cows through genetic selection long term, the cooperation of breeding experts, geneticists, epidemiologists, nutritionists, ethologists and others concerned with animal welfare problems is required. Sustainable breeding goals aimed at improving fitness and robustness are necessary to prevent the decrease in the quality of life of the animals and, perhaps, enhance it. The effectiveness of a selection program to improve welfare should be enhanced if selection acts directly on causes of poor welfare and not only on its symptoms. To implement such a program, research is needed to clarify the relationship between production, negative energy balance, metabolic stress and welfare indicators and to develop practical methods for measuring negative energy balance and metabolic stress. This research should identify traits directly related to welfare status, such as negative energy balance, body condition score, onset of cyclicity after calving, etc., and, ultimately, provide better selection tools to improve welfare status in dairy cows.

CONCLUSIONS

A multi-trait selection program in which health, fertility and welfare traits are included in the breeding objective is recommended. For multi-trait approach to be effective in improving welfare, higher weight should be given to fitness

and welfare traits, a total merit should be calculated via selection index and selection should be based on total merit.

Research aimed to clarify the relationship between production, negative energy balance, metabolic stress and welfare indicators and to develop practical methods for measuring negative energy balance and metabolic stress is needed. This research should identify traits directly related to welfare status, such as negative energy balance, body condition score, onset of cyclicity after calving, etc., and, ultimately, provide better selection tools to improve welfare status in dairy cows.

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THE WAYS OF DISTRIBUTION OF AGRICULTURAL PRODUCTIONS IN THE COMPETITION ECONOMY

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Key words*: consumer, economic efficiency, distribution, incomes, price*

Abstract

The paper aimed to present the distribution of agricultural production and food production of all the activities through going of these categories of goods from producers economical agents to final consumers or users.The development of agriculture and increasing of the economical efficiency can cot be concepted without a modern and efficient distribution system. In contrary case, all eforts of rising of agricultural productions, vegetal and animal, will fail. An efficient distribution can be asure in the meantime whith producers, at the salling of the production to consumers as well as at the changing of the owner where take an active part and other enterpriser structures. All the organisations, particular persons, which help production promotion from producer to consumer make up the ways of distribution. The level of distribution ways is determining through intermediaries number, which can asure accomplishment of one or other measures for drawing nearer the goods to final consumer.

INTRODUCTION

Distribution activity has a great importance, because the efficiency of agricultural production is conditioning by organization and unfolding in good conditions of permanent and favourable sales production, as well as by supplying of consumers with fresh agricultural products and processing industry with raw materials [3].

MATERIAL AND METHOD

In the research, the authors used dates from the Statistic Yearbook and the specialized formulary of the agricultural enterprises in the territory plan. In quality of methods of approached problems there were applied: selected, comparation and monographic method.

RESULTS AND DISCUSSIONS

The producers relations systematization of agricultural production with processing enterprises and with others subjects of the markets as well as stabillity of economical relations between them each mutual favourable have a great importance. One of the main functions in the system of ”production-consumption” is sales production which constitutes the connection link.

Sales production presents operative information about the potential possibilities of consumers by buying a lot of certain production. The connections between producers and consumers, between production and markets must be developed on the basis of equal principles of prices through selling – buying, through negotiation.

This needs a clear monitoring of demand, supply, market organisation where the main adjustment of production volume becomes consumption supply. The distribution system of agricultural production represents a totality of organisation and persons, which are presented as intermediaries or participations at the sales. This is an economical, technologial, organisational, social system which has the goal the promovation of products from producers to consumers.

The organisation of agricultural production distribution needs the cognition of ways, methods of distribution on the frame of market agricultural productions, wich aimes as the main productions as well as the secondary ones, used before or after preliminary depositing, processing etc. in or out of agricultural production sphere.

The producer through direct ways of salling, sales the production of course to the consumer. Through indirect way of salling between producer and consumer appears one or more intermediaries. As intermediaries can be the *gathering* and processing organisations, comercial and industrial enterprises through store, booth, on the free markets and other comercial structures.A more efficient distribution can be asured if at once with producer at the selling production to consumer and at the moment of changing of the proprietary an active part take and other antreprenorial structure.

The totalities organisations, persons wich help promotion of production from producer to consumer are called ways of distribution. The level of distribution can be determined through the number of intermediaries, wich can asure the accomplishment of one or more measures for appropriation of production by the final buyer.

As a result of reforming of the whole economy, begining with the year 1993 in Republi of Moldova has constituted nowadays market of agricultural production with different ways of distribution.

Passing at the market conditions in agroindustrial complex has accompanied by big problems not only with an economical character but as well connected with the lack of normal market infrastructure, lack of experience of activating in knew conditions, as well as lack of knowledge in the branch of agricultural marketing. This situation

conditioned big difficulties for agricultural production in the process of salling production.

Further on we will analyse the structure of returns from sales of vegetable production in agricultural enterprises from Republic of Moldova.

The structure of sales returns calculated in table 1 shows that more than 50 % goes to enterprises and organisations on the market through store, booth followed by enterprises and organisation of gathering and processing of agricultural production, about 30%. It is observing the percentage diminution of following market sales people through public housing nourishment, sale and acquit of labor work remuneration, the production assigned on dividends account and payment for land rent and barter (trade) transactions. Further on we will research the ways of distribution of different kind of productions according with competition power, which is reflected through sales prices.

Market sales	The structure of returns from sales of vegetable production, %				
	2004	2005	2006	2007	Average 2004-2007
Enterprises and organisation of gathering and processing of agricultural production	26,9	29,5	33,2	30,0	30,0
Others enterprises and organisations on the market through store, booth	50,5	52,8	52,8	55,3	52,8
People through public housing nourishment, sale and acquit of labor work remuneration	6,9	5,0	3,8	3,6	4,8
The production assigned on dividends account and payment for land rent	12,3	10,0	8,2	9,0	9,8
Barter transactions	3,4	2,7	2,0	2,1	2,6
Total	100	100	100	100	100

Table 1. The dynamic structure of returns according to the structure of the market sales of vegetable production in agricultural enterprises from Republic of Moldova
Source: The author calculation in accordance with the specialized formulary (Nr. 21 sales), years 2004-2007 of the agricultural enterprises

The analysis of distribution ways in corporative agricultural enterprises from Republic of Moldova demonstrates that in other enterprises and organisation, on the market through store, booth the weight from sales returns of cereals-beans, sun flowers, vegetables and fruits are in the limits of 50,8-66,2% from total amount, sales prices of 1 q of vegetables and fruit are higher in comparation with average, respectively with 17,2% and 18%. The grapes-wines are sale in the volume of about 48% on two ways - enterprises of gathering and processing and other enterprises on the market, individual store etc. where the price is higher with 8% than average. The sugar beet is sale in the main part, totaly to the enterprises of gathering and processing with the price of 33,7 lei per 1 q.

The results of authors researches obtained from 2006 data analysis in comparation with 2005, allow us to consider that the higher influence on price increase for 1 q cereals-beans with 3,54 lei has sale market of gathering and processing enterprises, followed by others enterprises and organisations, market, individual sores and others. On the average of all researched enterprises in 2006 year, price for 1 q of cereals-beans has increase with 1,69 lei as a result of improvement of market structure of sales which influenced on increasing of profit with 13189 thousands lei (1,69 · 7804,7) [2, p.123].

But the analys of data of the year 2007 in comparation with 2006 demonstrates that the weight of sales productions by first ways of distributions, have diminished, which conditioned decrease of sale price of 1 q of cereals-beans with 3,1 lei and 4,3 lei, respectively. On the average of all researched enterprises in 2007, the price for 1 q of cereals-beans declined with 1,99 lei as a result of worsened market sale structure which contributed to reduction of the profit with 7498,7 mii lei (1,99 lei · 3768,2 q).

From 2002 year the export of cereals-beans became an important element in the process of exporting goods from our republic. The volumu of exported wheat reached 346 thousands tones. Beside the fact that sale price of 67,99 US dollars where lower than in other exporting countries.

In 2003 republic of Moldova, having a reserve of 438,1 thousands tones of wheat, inclusive 229 thousands tones of nourishment wheat, exported 13 thousands tones of beans with the average price of 111,5 US dollars. In the period of 2004, 2005, 2006 and 2007 the average price of one tone of exported wheat was respectively: 95; 89; 68 şi 119 US dollars.

The dynamic analysis of exported cereals-beans on the last of 6 years demonstrate us, that with the extension of wheat sales on the stock exchange market of goods was posible to:

increase export price of 1 tone of wheat, which contributed to rise money returns from republic;

form monitoring system of cereals market;

influence of volume increase of exports from republic.

In total amount of exported goods the higher weight of about 30% is hold by alchoolic and non-alchoolic drinks.

As regard the weight of cereals-beans export in percents given total export in republic the higher level was reached in 2002 (7,4%) with an reduction of 2,4%, 2,5% and 1,3% in the period of the years : 2003, 2004, 2007 and with an increase of 4% in 2005 year. The place of cereals export is after fruit export (5,6%) and nourishment productions from vegetables and fruits (4,3%).

The main direction of wines exports remains countries from ISC (Independent State s Comunities), the export in these contries reach about 20,7 thousands US dollars. The most higher importers are: Ucraine -7,3 thousands US dollars, Belarus Republic – 6,6 thousands US dollars and Russia Federation – 5,4 thousands US dollars. The exports in EU countries constituted 3,5 thousands US dollars. The

larger quantity was exported in Poland – in the value of 1,4 thousands US dollars, followed by Romania – 888,4 thousands US dollars and Germany – 416, 6 thousands US dollars.

Nowadays, the EU market (EU-27) absorbes about 80% from the export of moldavian dried fruits (plump – 70%, cherry – 15%, apples -12%, pears -2%) and for the year of 2008 EU offerdes to the exporters of dried fruit from Republic of Moldova the posibility to export goods at quota zero of imported tax.

CONCLUSIONS

A great importance has the forming of common market of countries from ISC, with the goal to : 1. Accomplish the interstate programs of agro-industrial complex.

2.Forming on stages of unique custom territory with unique custom policy in the branch of agricultural production trade.

3.Developmement of cooperation, reaching of a stable ensurance in nourishment and food security.

4.The sustaining of agricultural producers from each contry on the global market, keeping the level price food taking into condideration the power of buying and demand.

The stimulation of integration relations with ISC countries, development and coordonation of agro-industrial complex specialization will allow to keep the division of labour.

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UTILIZATION OF HUMAN RESOURCES OF RURAL SPACE IN THE REPUBLIC OF MOLDOVA

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Key words: *active rural population, activity rate , employment rate, unemployment rate, underemployment rate.*

Abstract
Human resources reprezent the most dynamic part of rural space and an important factor of rural prosperity. The significance of an effective management of human resources in rural space in Republic of Moldova is also supported by the fact that the highest percentage of the country's population is rural. The goal of this paper is the examination of the evolution of active rural population in the Republic of Moldova. Also, we analyse the utilization degree of human resourses in rural space using indicators like : activity rate, imployment rate, unemployment rate, underemployment rate
From the presented information, we can conclude that the evolution of the following indicators: activity rate, employment rate, unemployment rate and also the current underemployment situation, underline a low utilization degree of human resources in the rural areas of the Republic of Moldova and the need for more efficient actions, oriented towards a qualitative management of these resources.

INTRODUCTION

Considering the fact that the Republic of Moldova is an agrarian country, the role of rural space in the economic prosperity of our state is beyond all doubt. At the same time, we noticed that human resources represent one of the most important tools of the efficient functioning of rural space, which is also designated as the most important and dynamic resource in village developing. Consequently, the development degree of labour force in the rural zone is one of the basic factors of its economic and social performance.

MATERIAL AND METHOD

In order to characterize the evolution of active rural population and the utilization of human resources of rural space, the following indicators were used: active rural population, activity rate, employment rate, unemployment rate, underemployment rate.

The period analyzed in this study is between 2000-2007. The data, collected from Statistical National Office and from other studies in these problem, have been analyzed and interpreted.

RESULTS AND DISCUSSIONS

Starting with the last decades of the 20th century, there has been noticed a constant reduction of the rural population and urbanization. Worldwide this, in 1960 about ¾ of the world population lived in rural space, in 2000 the rural population was approximately 54 % and by the year 2015 a further reduction to about 20-25 % has been forecast.

The decreasing tendency, absolute and relative, of rural population manifested on world level does not at all mean to be a decrease in the importance of rural space in economic and social life. There are many arguments in favour of maintaining and even stressing the importance of rural space [1].

The tendency of rural population decrease is more proeminent in the developed countries, but it is also present in the developing countries, as well as in the ex-socialist countries like the Republic of Moldova.

Thus, when examining the evolution of Moldova 's population on the average, we noticed that in 2000 the rural population was 2114,3 thousand inhabitants, in 2007 it decreased to 2103,1 thousand inhabitants, and in 2008 the rural population continued to decrease, until 2096,6 thousand inhabitants [2].

Year	Population, thousand inhabitants			Percentage points	
	total	urban	rural	urban	rural
A	1	2	3	4	5
2000	3643,5	1529,2	2114,3	42,0	58,0
2001	3634,5	1501,4	2133,1	41,3	58,7
2002	3627,2	1500,2	2127,0	41,4	58,6
2003	3617,7	1499,1	2118,6	41,4	58,6
2004	3606,8	1492,9	2113,9	41,4	58,6
2005	3600,4	1476,0	2124,4	41,0	59,0
2006	3589,9	1469,8	2120,1	41,0	59,0
2007	3581,1	1478,0	2103,1	41,3	58,7
2008	3572,7	1476,1	2096,6	41,3	58,7

Table 1. The evolution of Moldova's population at the average

Unlike the situation in developed countries, the rural population decrease in the Republic of Moldova is not conditioned by a significant urbanization. Therefore, we observe strictly speaking, a significant decrease of the population generated a series of factors, among them the following two being the most important:

1. Negative natural growth;
2. Migration of the population abroad.

	2004	2005	2006	2007
A	1	2	3	4
Born	38272	37695	37587	37973
Deceased	41668	44689	43137	43050
Natural growth	-3396	-6994	-5550	-5077

Table 2. The natural movement of Moldova's population between 2004-2007, persons

The affirmation concerning negative natural growth is confirmed by data presented in table 2 where the natural movement of Moldova's population over the period of 2004-2007 is presented [2].

Regarding the migration of the population, we noticed that only in 2007, 335, 6 thousand persons aged between 20-49 went for work abroad, including 103.000 persons from urban areas and 232.600 persons from rural areas [3].

In order to obtain a qualitative assessment of the development degree of human resources in the Republic of Moldova we'll use the following indicators: activity rate, employment rate, unemployment rate, underemployment rate which, according to the International Work Bureau methodology, are the most important indicators of the utilization of degree labour force [3].

Economically active population comprises all the persons providing labour force, available for the production of goods and services during a reference period, including employed and unemployed population.

Population activity rate - the ratio of active population aged between 15 years and over 15 in the total population of the same age group.

- unemployment definition as total absence of work;
- evaluation of the parameters of underemployment of labour force.

Population employment rate – the ratio of employed population aged between 5 and over 15, in the total population of the some age group.

Unemployment rate - the ratio between the unemployed persons and the active population.

Underemployment rate – the ratio between the number of underemployed persons and total number of employed persons.

Underemployed persons are those employed persons who worked, beyond their control, less than 40 hours per week actually being available to work additional hours. This phenomenon is widespread in traditionally agricultural countries.

The data presented in table 3 allows to make a reflection about the number evolution of the active population in the Republic of Moldova as well as about the indicators that reflect the utilization degree of human resources

The data presented in the table indicate a constant decrease of active population in the rural space, fact that almost natural considering the significant reduction of population in that area.

Also, on the basis of data presented in table 3, we noticed that activity rate had a negative evolution between the years 2002-2007. The decrease of the activity rate is especially determined by the migration of a large number of working people abroad, but also by the aging of the population, tendency especially outlined in recent years.

Employment rate was in a constant decrease between 2002-2006, and in 2007 it increased unessentially. The unemployment rate naturally registers opposite tendencies in the studied period.

We can analyze the exact evolution of the indicators in figure 1.

Another negative feature of the labour market in the Republic of Moldova is represented by underemployment. The rural population is especially subjected to this phenomenon. Thus, the total number of underemployed persons living in rural areas in 2007 was 73,6 thousand people, or 74% of the total number of underemployed persons.

Period	Activity population, thousand persons			Activity rate, %	Employment rate, %	Unemploy-ment rate, %
	Total	Employed	Unemployed			
A	1	2	3	4	5	6
2002	943,1	914,7	28,3	57,9	56,2	3,0
2003	810,9	774,5	36,4	49,3	47,1	4,5
2004	786,7	747,3	39,3	47,4	45,0	5,0
2005	776,2	745,1	31,2	46,4	44,5	4,0
2006	739,4	696,4	43,1	43,7	41,2	5,8
2007	724,5	698,6	25,9	43,1	41,6	3,6

Table 3.Distribution of the rural population of the Republic of Moldova according to their participation in the economic activity over the period of 2002-2007 [3]

Employed population covers all the persons of 15 years and over, which carried out an economic or social activity producing goods or services for at least one hour during the reference period (one week), in order to achieve certain incomes in form of salary, in kind remuneration or other benefits.

When defining employment, it was adopted the standard criterion of "at least one hour", recommended by the international Labour Office, both for ensuring the international comparability and for the following reasons:

- coverage of activities carried out under part-time, occasional or seasonal activities;

CONCLUSIONS

From the information presented above, we can conclude that the rural population in the Republic of Moldova, as in many other countries of the world, has a constant decreasing

tendency. At the same time, we noticed that, while in developed countries the rural population reduction is joined by an obvious process of urbanization, in the Republic of Moldova the ratio between rural and urban population in the last 8 years is relatively stable.

We can also point out the fact that, together with the decrease of the rural population, there is a continuous number

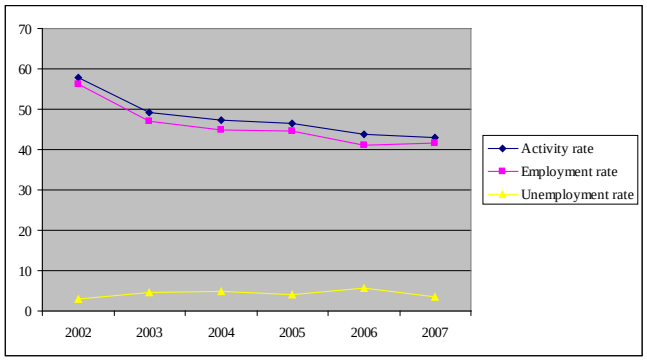

Fig.1 The evolution of human resources utilization indicators in the rural space of the Republic of Moldova between 2002-2007

reduction of the active persons.

The evolution of the following indicators: activity rate, employment rate, unemployment rate and also the current underemployment situation, underline a low utilization degree of human resources in the rural areas of the Republic of Moldova and the need for more efficient actions, oriented towards a qualitative management of these resources.

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EMPIRICAL ANALYSIS OF TECHNICAL CHANGES AND EFFICIENCY IN DANISH DAIRY FARMING 1985-2006

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Keywords: *technical efficiency, technical change, distance function, dairy farming, returns to scale*

Abstract

This paper analyses technical changes and changes in efficiency within the Danish dairy sector during the 21 year time-period 1985-2006. The analysis is based on the estimation of an input distance function, using individual farm account data from 3.053 representative full time dairy farms. The results show that while there have been technical changes of 1.3 % per year, technical efficiency has stayed almost constant at around 79 % through the whole period. Returns to scale has improved over time indicating that Danish dairy farmers have moved towards a more optimal scale of production.

INTRODUCTION

Technical changes and changes in efficiency influence the competitiveness and therefore the economic performance of the agricultural sector. In an EU context it is important to know how the technology and the efficiency develop within the individual countries. In this paper I use a distance function approach to estimate technical changes and changes in efficiency within the Danish dairy sector based on farm account data covering the period 1985-2006. The paper also includes analysis of the returns to scale within the dairy sector.

THE MODEL

The input distance function was first introduced by Shepard (1970). It describes how much an input vector may be proportionally contracted with the output vector held fixed. The input distance function D is formally defined as:

$$D(\mathbf{x},\mathbf{y},\mathbf{r}) = \max\left\{\theta: \theta > 0, \frac{x}{\theta} \in L(\mathbf{y},\mathbf{r})\right\}$$

$$D(\mathbf{x},\mathbf{y},\mathbf{r}) = \max\left\{\theta: \theta > 0, \frac{x}{\theta} \in L(\mathbf{y},\mathbf{r})\right\} \quad (1)$$

where L(y, r) is the set of input vectors $\mathbf{x} \in \mathcal{R}_+^N \mathbf{x} \in \mathcal{R}_+^N$, which can produce the output vector $\mathbf{y} \in \mathcal{R}_+^M \mathbf{y} \in \mathcal{R}$ given the vector of $\mathbf{r} \in \mathcal{R}^B \mathbf{r} \in \mathcal{R}$ of exogenous factors (i.e. a vector of external production determinants such as technical and regulatory factors).

The input distance function D is non-decreasing, linearly homogenous and concave in x, and non-increasing and quasi-concave in y (Färe & Primont, 1995). If x Î L(y,r), then D(x,y,u) ³ 1. If x belongs to the frontier of the input set (the isoquant) then D(x,y,r) = 1.

Following Lovell et al. (1994), I exploit the property of linear homogeneity of an input distance function, i.e.:

$$D(\lambda\mathbf{x},\mathbf{y},\mathbf{r}) = \lambda D(\mathbf{x},\mathbf{y},\mathbf{r}) \qquad (\lambda > 0)$$

$$D(\lambda\mathbf{x},\mathbf{y},\mathbf{r}) = \lambda D(\mathbf{x},\mathbf{y},\mathbf{r}) \qquad (\lambda > 0) \quad (2)$$

Setting $\lambda = 1/x_1 \lambda = 1/x_1$, where x_1 denotes the (arbitrarily chosen) first element of the input vector x, the previous equation is expressed in logarithmic form as:

$$\ln D(\mathbf{x},\mathbf{y},\mathbf{r}) = \ln x_1 + \ln D(\mathbf{x}/x_1,\mathbf{y},\mathbf{r})$$

$$\ln D(\mathbf{x},\mathbf{y},\mathbf{r}) = \ln x_1 + \ln D(\mathbf{x}/x_1,\mathbf{y},\mathbf{r}) \quad (3)$$

To empirically implement the distance function outlined in (1), a functional form must be specified. Using a translog functional form, we get the following:

where D^t (x, y) is a measure of the radial distance from (x, y) to the production function in year t, x is the input

$$\ln D^t(\mathbf{x},\mathbf{y}) = \beta_0 + \sum_{n=1}^{N} \beta_n \ln x_n + \frac{1}{2}\sum_{n=1}^{N}\sum_{k=1}^{N} \beta_{nk} \ln x_n \ln x_k + \sum_{m=1}^{M} \alpha_m \ln y_m + \frac{1}{2}\sum_{m=1}^{M}\sum_{l=1}^{M} \alpha_{ml} \ln y_m \ln y_l + \sum_{m=1}^{M}\sum_{n=1}^{N} \gamma_{mn} \ln y_m \ln x_n + \sum_{s=2}^{T} \tau_s C_s \quad (4)$$

vector $\mathbf{x} = (x_1, \ldots, x_N) \in \mathcal{R}_+^N \mathbf{x} = (x_1, \ldots, x_N) \in \mathcal{R}_+^N$, y is the output vector $\mathbf{y} = (y_1, \ldots, y_M) \in \mathcal{R}_+^M$ $\mathbf{y} = (y_1, \ldots, y_M) \in \mathcal{R}_+^M$ and t is a time index (t=1,…, T) allowing for technical change over time, C_s (s=2…T) are 21 dummy variables with the value 1 if the observation is from the year in question and zero otherwise, and the Greek letters are parameters of the translog function.

The condition for linear homogeneity can be imposed by normalizing the input vector by one of the inputs (see (2) and (3) above). Choosing (arbitrarily) one of the inputs, input $x_1 x_1$ as the normalizing input and including an index i for farms and t for time, I arrive at the following estimation model:

$$-\ln(x_{3it}) = \beta_0 + \sum_{n\neq 3}^{N}\beta_n \ln x^*_{nit} + \frac{1}{2}\sum_{n\neq 3}^{N}\sum_{k\neq 3}^{N}\beta_{nk}\ln x^*_{nit}\ln x^*_{kit} + \sum_{m=1}^{M}\alpha_m \ln y_{mit} + \frac{1}{2}\sum_{m=1}^{M}\sum_{l=1}^{M}\alpha_{ml}\ln y_{mit}\ln y_{lit} + \sum_{m=1}^{M}\sum_{n\neq 3}^{N}\gamma_{mn}\ln y_{mit}\ln x^*_{nit} + \sum_{s=2}^{T}\tau_s C_s + \sum_{k=1}^{2}\rho_k \mathrm{REG}_k + v_{it} - u_{it} \quad (5)$$

where i is a farm index, t is a time index, $x^*_{nit} = x_{nit}/x_{1it}$ $x^*_{nit} = x_{nit}/x_{1it}$ $(\forall\, n, i, t \forall\, n, i, t)$, v_{it} represent a random statistical noise, and u_{it} is a technical inefficiency measure equal to $\ln D_i^t(\mathbf{x}_i, \mathbf{y}_i) \geq 0 \ln D_i^t(\mathbf{x}_i, \mathbf{y}_i) \geq 0$ where $D_i^t(\mathbf{x}_i, \mathbf{y}_i) \geq 1 D_i^t(\mathbf{x}_i, \mathbf{y}_i) \geq 1$ is the value of the input distance function of the i'th farm using the input vector x_i and producing the output vector y_i in year t. Specification of the error term v_{it} follow the standard assumptions (Kumbhakar & Lovell, 2000)), i.e. that v_{it} is an independently and identically distributed (iid) random error terms $N(0,\sigma_v^2$ $\sigma_v^2)$.

The inefficiency terms u_{it} are assumed to follow the specification:

$$u_{it} = u_i \exp\left(-\eta(t-T)\right) \quad (6)$$

where u_i are farm specific inefficiency terms assumed to be iid as truncations at zero of the $N(\mu, \sigma_u^2 \mu, \sigma_u^2)$ distribution, η is a parameter to be estimated, and T is the last time period. The specification allows the level of inefficiency to vary between farms (farm specific $u_i u_i$-terms). Inefficiency is also allowed to vary over time but changes in efficiency over time are restricted to be the same (the time factor η η) for all farms. According to Battese and Coelli (1992), the minimum-mean-squared-error predictor of the technical efficiency (TE_{it}) of the i'th farm in time period t is:

$$\mathrm{TE}_{it} = \mathrm{E}[\exp(-u_{it}) | v_{it} - u_{it}]$$

The change of technical efficiency of farm i from period t to period t+1 is obtained by:

$$\mathrm{TEC}_{it,t+1} = \frac{D_i^t(\mathbf{x}_i, \mathbf{y}_i)}{D_i^{t+1}(\mathbf{x}_i, \mathbf{y}_i)}$$

Following Coelli et al. (2005), an index of technical change (TC) from period t to t+1 is obtained directly from the estimated parameters by simple calculations:

$$\mathrm{TC}_{it,t+1} = \left\{\left[1 + \left(\frac{\partial \ln D_i^t}{\partial t}\right)\right]\cdot\left[1 + \left(\frac{\partial \ln D_i^{t+1}}{\partial t}\right)\right]\right\}^{0.5}$$

which is the geometric mean of the technical change in two adjacent periods.

A local measure of elasticity of scale may be estimated as:

$$\epsilon^t(\mathbf{x}^t, \mathbf{y}^t) = -\left[\sum_{m=1}^{M}\frac{\partial \ln D^t(\mathbf{x}^t, \mathbf{y}^t)}{\partial \ln y_m^t}\right]^{-1}$$

DATA AND ESTIMATION

The data used are farm account data from the database of individual farm accounts collected by the Institute of Food and Resource Economics (FOI), University of Copenhagen. The farms included in the database are selected annually using stratified random sampling from the total Danish farm population to obtain representativity concerning farm size, geographical location and economic size (FOI, 2006). The data used in the present analysis covers the 22-year period 1985-2006. The data used in the present paper only include full-time farms, defined as farms with a standard labour requirement of 1,665 hours or more, and comprises specialized dairy farms. There are 12,829 observations including 3,053 farms which correspond to an average of 4.2 years of observations per farm. Thus, the data is an unbalanced panel data set.

The individual outputs were aggregated into three main outputs, cash crop products (Y1), cattle products (beef and milk) (Y2), and other products (Y3), where 'other products' (Y3) includes pigs and other animal products (except cattle products).

Aggregation of outputs into the above mentioned product categories was performed by dividing total revenue of all the outputs in question with Törnqvist price indices (Törnqvist, 1936) for the output elements in question. The general form of the chain version (Diewert, 1978) of a Törnqvist price index is calculated as (Diewert, 1981):

$$P^{t+1} = \left[\prod_{i=1}^{n}\left\{\frac{p_i^{t+1}}{p_i^t}\right\}^{½(S_i^{t+1}+S_i^t)}\right]P^t$$

where $P^t P^t$ is the price index of the output aggregate in question (for instance cash crop products) in year t, $p_i^t p_i^t$ is the price of output i in year t, and $s_i^t s_i^t$ is the revenue share of output i in year t.

Inputs were aggregated into six categories of aggregate inputs, fertilizers (X1), feedstuff (X2), land (X3), labour (X4), machinery (X5) and other capital (X6). The procedure is the same as just described for aggregation of output.

RESULTS AND DISCUSSIONS

The results are shown in the following Table 1. The column TE shows that the average technical efficiency has been almost constant or decreased slightly through time. The second column TEC shows indices of within-farm changes in technical efficiency calculated according to equation (8). The numbers are very close to one, indicating almost no within farm changes in technical efficiency. The third column shows indices of technical change (TC) from period t to

		Efficiency	Indices of change		Elasticity of scale
Year	Obs.	TE	TEC	TC	
1985	669	0.79			1.30
1986	670	0.80	1.000	0.965	1.31
1987	621	0.79	1.004	1.006	1.32
1988	604	0.79	1.004	1.084	1.31
1989	596	0.79	1.006	1.015	1.30
1990	612	0.79	1.004	0.962	1.33
1991	614	0.79	1.007	1.018	1.33
1992	584	0.79	1.005	0.978	1.31
1993	608	0.79	1.002	1.092	1.31
1994	599	0.79	1.004	0.981	1.32
1995	619	0.79	1.000	1.018	1.31
1996	645	0.79	1.001	1.027	1.31
1997	606	0.79	1.001	1.039	1.31
1998	494	0.79	1.003	1.005	1.28
1999	569	0.79	0.998	0.988	1.31
2000	612	0.79	0.999	1.012	1.29
2001	596	0.79	1.000	0.999	1.28
2002	586	0.79	1.000	1.028	1.26
2003	533	0.79	0.998	1.023	1.24
2004	503	0.79	1.000	1.026	1.24
2005	483	0.79	1.003	0.974	1.19
2006	406	0.79	0.999	1.044	1.13
Average	583	0.79	1.002	1.013	1.29

Table 1. Estimated results, Dairy farms

t+1 (t=1985... 2005) estimated according to (9). Technical changes show considerable variation from one year to the other, primarily due to climatic changes influencing roughage production.

The last column shows elasticity of scale. A number greater than one indicates that production is on the increasing part of the production function, and that therefore it would be an advantage to increase the scale of operation. While the elasticity of scale has been almost constant until year 2000, the elasticity of scale has decreased to a level of 1.13 in 2006, indicating that dairy farms have move towards a more optimal scale of production during the last six years.

	TEC	TC
1985-1992	1.004	1,003
1992-1999	1.001	1,021
1999-2006	1.000	1,015

Table 2. Average change of within farm technical efficiency (TEC) and technical change (TC) in three sub-periods

The technical efficiency measures (TE) in Table 1 seem relatively low. However, this is often the case with many observations as here. And efficiency numbers at the same level have been estimated by others. Key, McBride, & Mosheim (2008) found an average technical efficiency of 0.70 for a sample of around 500 American hog farms in 1992, 1998 and 2004. Hadley (2006) estimated predicted average technical efficiency of 0.754, 0.897 and 0.887 for English and Welch cereal, dairy and pig farms, respectively, for the period 1982-2002 using random farm samples consisting of 702, 1431 and 199 farms, respectively, and applied stochastic frontier analysis.

As mentioned before, the estimated changes over time in technical efficiency and technology may partly be due to changing weather conditions. To level out the influence of changing weather conditions, average values for the three 7-year sub-periods have been calculated and are shown I Table 2.

While the changes in technical efficiency within farms (TEC) have been very low in all three sub-periods, technical changes (TC) were much higher in the second than the first sub-period, and then decreased to a level of 1.5 % per year in the last sub-period. Technical changes thus contributed significantly to productivity changes in Danish dairy production during the 1990s.

CONCLUSION

There have been almost no changes in within-farm technical efficiency from1985 to 2006

Technical changes vary considerably over time because it includes the consequences of changes in weather conditions. On average, technical changes on Danish dairy farms have been 1.3 % per year during 1985-2006.

Comparison of the three sub-periods 1985-1992, 1992-1999, and 1999-2006 shows that technical changes were highest in the sub-period 1992-1999.

The elasticity of scale is larger than one for all years at the mean input/output level. This means that for average farms there has been a potential benefit of increasing the farm size during the whole period.

The elasticity of scale has decreased substantially from 2000 to 2006 indicating that Danish dairy farms during that period moved towards a more productive farm size.

Concerning the methodology used, the stochastic frontier approach based on an input-distance function seems to be a promising tool for empirical investigation of changes in productivity over time.

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QUANTITATIVE AND QUALITATIVE EVALUATION OF THE ROMANIAN FARM BEHAVIOR THROUGH TECHNICAL ENDOWMENT INDICATORS

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Key words*: agricultural holding, technical endowment, sustainability*

Abstract

The technical production potential is a determining factor of the economic viability of agricultural holdings, contributing to sector sustainability in time. The future economic development of the agricultural holding and, implicitly, the possibility of sound soil management, largely depend on the quantitative, structural and qualitative evolution of the fixed capital.The paper presents the results of a field survey conducted on agricultural holdings, concerning similar aspects of farm management, by supplying quantitative and qualitative evaluation indicators of the behaviour of Romanian agricultural holdings with regard to the technical farm endowment with animal shelters and agricultural mechanization means.

INTRODUCTION

The technical endowment of agriculture represents and will represent in the future as well one of the main elements for the best use of the agricultural potential and implicitly for ensuring food security. The future economic development of the agricultural holding and the sustainable management of soil resources largely depend on the quantitative, structural and qualitative evolution of fixed capital. From this perspective, the paper investigated the way in which the technical endowment of the Romanian agricultural holdings responds to the requirements to ensure agriculture sustainability, based on the economic viability and competitiveness of agricultural holdings, in which the technical production potential is the determining factor [1]. For this purpose, the field surveys favoured supplementing the statistical information for the evaluation of the situation and real development potential of the agricultural holdings.

MATERIAL AND METHOD

The survey conducted on a sample of 800 agricultural holdings, selected from the eight statistical regions of Romania [2], provided data on the basis of which the indicators necessary for the evaluation of farm technical endowment were developed. In order to obtain detailed information at farm level the direct interview method was applied, effected by specialized interviewers. The centralization and processing of data collected on questionnaire basis permitted drawing up certain conclusions on the endowment of farms with mechanization and technical means, on the degree in which the location and characteristics of animal shelters comply with certain minimum animal welfare and environment protection requirements.

RESULTS AND DISCUSSIONS

The analysis of certain farm management aspects, based on the farm survey, provides information that permit quantitative and qualitative evaluations of the Romanian farm behaviour regarding the technical endowment and mechanization of agricultural activities.

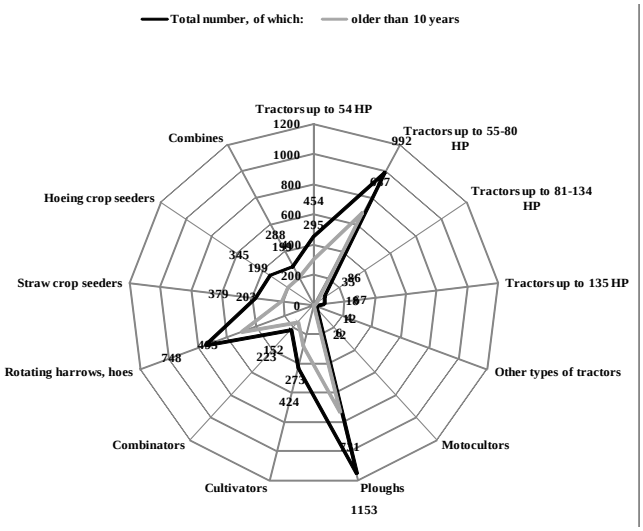

Figure 1. Number of tractors and agricultural machinery in use – total and older than 10 years

Farm endowment with tractors and agricultural machinery

At the level of investigated farm sample, out of the tractors and agricultural machinery bought with own funds, 25% are from the energy class up to 54 HP, and more than half

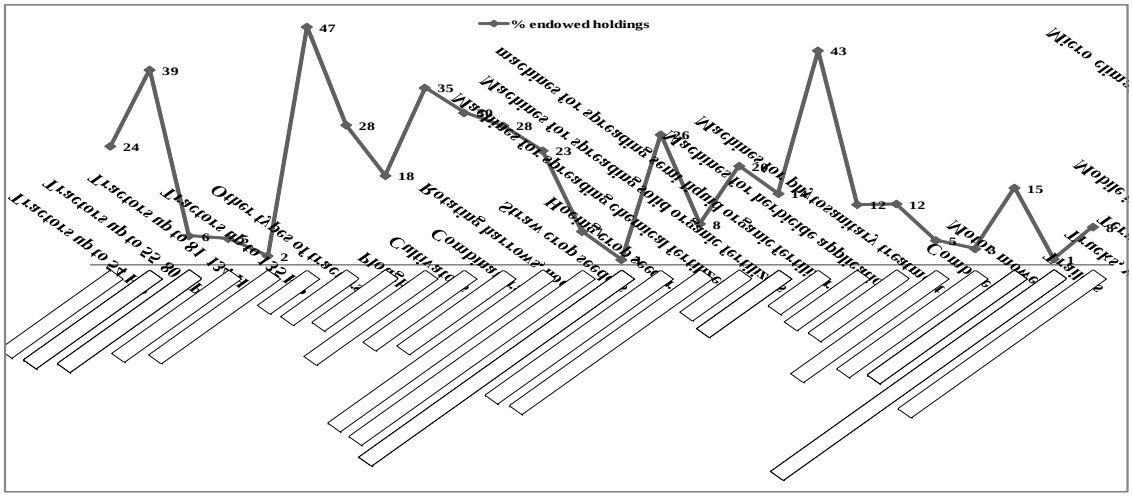

Figure 2. Technical endowment of farms

from the 55-80 HP class (Figure 1). It should be mentioned that the medium to high powered tractors, of over 55-80 HP, represent over 75 % of total, a great part of these being found on farms with small-sized land areas. This situation can be explained by the fact that some of the machinery owners render agricultural services, which would justify, on this type of holdings, the apparent over-sizing with mechanization means.

As a result, the soil preparation works, ploughing, harrowing, are performed with high energy consumptions and at low speed, in the conditions in which heavy soils are found on about 70 % on the country's land. The situation is even more difficult if we take into consideration the high wear- and-tear of agricultural equipment, as on the average, 69% of combine harvesters, 64% of existing tractors, ploughs and mechanical cultivators, 66% of the harrows and rotating hoes and 68% of combinators are older than 10 years (Figure 1). Despite this, a positive aspect is worth mentioning, as the large equipment and motocultors have a lower obsolescence level, indicating a tendency of orientation towards the adjustment of the machinery fleet to the land operation structure situation.

At the same time, 43% of farms are endowed with trailers, while 12% are endowed with vans and terrain vehicles. The analysis by development regions reveals that the largest number of tractors is found in the Regions South and South-East, i.e. 20% of total, followed by the Regions West and Center, with 18% each. It can be noticed that the 4 regions have 75% of tractors. The situation of combines is quite similar, with regard to the same regions that have the highest share and those with a poorer endowment.

Analyzing the arable land load per tractor, it results from the survey an indicator value comparative to the situation at national level, i.e. about 56 ha/tractor (while the EU average is 12.7 ha per tractor). In reverse, concerning the harvesting activities, the field survey indicate a much higher load, of 314 hectares per combine on the average, comparing to more than 100 ha/combine at national level (by 20% higher than the EU average, i.e.79 ha). Consequently, considering the old-aged machinery fleet which implies extra time for repair works, it can be estimated a double load in practice.

The territorial analysis by development regions reveals a different distribution of the technical fleet over the main agricultural areas. In the areas highly favourable to agriculture, for example in the zones from east and south-east, the load is extremely high, both by tractor and by combine harvester (Table 1). This situation is also the result of the fact that in these areas, a large part of the technical fleet has too many years of service, which implicitly leads to high maintenance costs, delayed works and high fuel

Region	Tractors < 54 HP	Tractors 55 - 80 HP	Tractors 81-134 HP	Tractors >135 HP	Combines
	(ha/tractor)				(ha/combine)
Region 1 (N-E)	142	46	1566	..	147
Region 2 (S-E)	254	119	840	1365	475
Region 3 (South)	546	164	1748	1399	583
Region 4 (S-V)	138	53	498	..	166
Region 5 (West)	174	113	1429	1093	295
Region 6 (N-V)	84	53	1519	1519	190
Region 7 (Center)	91	43	678	2710	185
Region 8 (Ilfov)	268	161	1125	1406	469

Table 1. Arable land load per tractors and combine harvesters
Source: processing of field survey data

The technical endowment of farms provides a relevant picture of the under-sized mechanical fleet and of the low technical potential of agriculture. Thus, 39% of the agricultural holdings are endowed with 55-80 HP tractors, while 24% with tractors under 54 HP, while only 20% of farms have their own combine harvesters (Figure 2).

consumption. At the same time, the areas where the load of arable land per tractor is under the national average, or it has values close to the national average, yet without being considered optimum values, are found in the Regions North-East, Center, South-West and North-West. In the remaining high-powered machinery and in combines, the extremely high load reveals the absence of investment potential, as well as the dependence on mechanization services rendered by third parties.

The level of endowment with agricultural machinery is even lower; the largest endowment level being found in ploughs, owned by 47% of agricultural holdings, in harrows 35%, while in straw cereal seeders or hoeing crop seeders, up to 30% of holdings. The machines for chemical fertilizer application are found on 30% of farms, 26% of farms use their own machines for herbicide application, while only 8% own machines for phyto-sanitary treatment, as well as fixed or mobile irrigation equipment.

As critical situation feature the electronic equipment for farm mechanization and automation, as it is owned by only 1% of holdings, while the electronic equipment for technical-economic evidence is owned by 15% of the interviewed farms. It can be noticed a distribution of computers by all regions, with maximum endowment in the Region South-East, followed by the regions Center and South and a minimum endowment in South-West. Compared to these, the automation equipment used in glasshouses and animal shelters is less represented, more important in this respect being the regions South and South-East.

Nevertheless, the fact that more than half, i.e. 57% of the interviewed farms have animal-drawn equipment, mainly carts and wagons, ploughs and harrows, reveals an anachronic farming pattern, highlighting the underdevelopment level and a chronic material and financial scarcity. The regional analysis reveals that the carts represent the most common animal-drawn equipment, the regions North-East, North-West and Center being the most representative in this respect, with regard to ploughs, harrows and carts in particular. Yet, from organic farming perspective, this aspect is favourable to organic farming development, mainly on the small farms, as well, at a certain point the surprising live-museum landscape could be valuated by tourism objectives.

Endowment with animal shelters

The analysis of data on the characteristics of animal shelters started from the premise that the shelters should provide: enough space for the animals, a minimum endowment so that the animals should be well cared, receive feed and water in time; the facilities on the shelters should permit a good management of animal waste.

In the sample, more than 60% of interviewed holdings have animal shelters, on the same holding all the types of shelters can be found, i.e. stables for bovines, pig shelters, sheep pens, poultry houses.

Location of livestock activities

The location of livestock production activities and of the buildings for animals in the territory is important, from the perspective of the population's comfort in the first place. However, among the agricultural holdings that raise animals, 85% carry out their activity inside the locality. An adequate location of buildings in relation to the dominating winds presupposes that the shelters are built with their longitudinal axis on the direction of the main winds, so as to expose the smallest area possible of the building to the winds. The distribution of answers within the sample reveals that only 7% of shelters have a suitable orientation, 52% are oriented with their frontage to the wind and 41% with their backward part to the wind.

Characteristics of bovine shelters

Out of total agricultural holdings from the sample, 456 have stables for bovines, representing almost 60% of the number of interviewed holdings. In this group, only 5 holdings attracted SAPARD financial support for this kind of investments, the remaining shelters being built up or bought with the farmers' own resources.

As regards the age of shelters, 10% of stables are almost 50 years old, while more than 55% were built in the period 1960-1989. The North-East Region stands out as the most dynamic region from the point of view of the new investments. While in the period 1990-1999 the stables were built with an average capacity of 5 animal heads, after the year 2000 the investments were oriented to stables with 10 to 60 heads capacity.

The average area available per animal head in the sample, i.e. 6.13 sq.m. provides sufficient and even extra space from the animal welfare point of view, with small exceptions at regional level, namely 4.09 sq.m. per head in the region Center and 9.46 sq.m. per head in the region Bucharest-Ilfov.

As maintenance modality, the free stabulation of cows is the system that is almost exclusively used in the developed countries [3]. This situation is the result of both economic and animal welfare considerations: a) saving labour and bedding, b) lower costs of building, d) living environment closer to natural environment.

The low share of holdings where free stabulation is practiced (7%) reveals that the improvement of animal raising systems is still a desideratum for the Romanian farmers.

As regards the equipping of stables with systems maintaining the environmental factors in optimum conditions and ensuring water and feed in time, the following types of facilities can be listed:

the stables for bovines have a natural ventilation system,

on most holdings the watering system and the waste disposal system is manual.

Manure storage infrastructure

The available infrastructure for manure storage represents a main component of the farm management system. The manure storage need derives from the sustainable management of soil resources, the long-term storage infrastructure providing maximum flexibility with regard to the moment of manure application.

Such characteristics of the modern livestock production systems are absent in more than 70% of the investigated holdings, where manure is mainly stored in open spaces on the non-protected soil. This fact signals out the risk to lose nutrients because of the inadequate storage conditions and

also the presence of pollution risks.

Only a small part of agricultural holdings made investments in suitable storage facilities; by regions, the region Center stands out in this respect, while the most deficient holdings are found in the region South-West Oltenia.

Characteristics of pig shelters

In the investigated sample, the shelters ensure the necessary space conditions (2.04 sq.m./head); this criterion is also met at regional level, the indicator being also checked up by the structure of herds.

The high share of animals that are accommodated in shelters with concrete floor in the sample is worth mentioning. By regions, this modality is used in more than 80% of the existing capacities, except for the region North West, where 31% of animals are accommodated on straw bedding.

Specification	On the ground	Concrete septic tank	Concrete platform	Other system	No answers
Total sample	71%	10%	11%	1%	7%
North East	75%	13%	9%	0%	4%
South East	72%	12%	12%	0%	5%
South Muntenia	63%	13%	17%	0%	7%
South West Oltenia	90%	2%	2%	0%	6%
West	76%	7%	11%	0%	7%
North West	79%	6%	9%	2%	6%
Center	52%	19%	22%	1%	7%
Bucharest Ilfov	25%	0%	0%	0%	75%

Table 2. Manure storage system
Source: processing of field survey data

In the sample, the good environmental practice is found only in very few cases. For example, in total shelters, only 2% are endowed with air filters and no shelter is endowed with bio-filter; in 97 % of the holdings with fattening pigs, the manure disposal is by hand, while manure is directly stored on the ground in 91% of cases.

CONCLUSIONS

The low level and quality of Romanian farms technical endowment is a sign of the acute need for investments.

As regards the mechanical endowment, the tractor and machinery fleet is under-sized, obsolete, while the extremely high arable land load in the high-powered implements and in combines reveals the lack of the investment potential, as well as the dependence on mechanization services rendered by third parties.

The location of livestock production activities is constrained by the situation of the communication ways and mainly by the possibility of getting connected to electric power supply sources, while the old age of animal shelters reveals the unfavourable social and economic circumstances of the rural communities.

Although the new investments are not significant as regards their share, a new orientation of investments to larger capacity shelters can be noticed.

Through their precarious endowment, the agricultural holdings run the risk of ground water pollution.

The agricultural activity does not confer to the agricultural holding the necessary modernization sources, while the extremely low level of attracting external finance reveals that the lack of entrepreneurial will.

As a concluding remark, it has to be highlighted the significant needs of the Romanian farms with regard to: supporting the development of the mechanization services sector; supporting the farmers in buying machinery and equipment for farm mechanization and automation; support to the access to information; supporting farmers through extension and advisory services, for drawing up business plans, application of organic farming technologies, orientation to an adequate structure of technical endowments, to the utilization of agricultural technology suppliers offers, up to date; education and professional training of agricultural equipment users, for a maximum efficiency in their operation and development of farmers' capacity to absorb the existing financial opportunities.

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PROTECTED AREAS AS A TOOL OF REHABILITATION THE ARID SYRIAN STEPPE (AL-BADIAH)

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Key words: *Steppe, land cover, wild life, soil deterioration, wind erosions.*

Abstract
The Syrian steppe (Al-Badia) receives rainfall less than 200 mm/annum and is considered inappropriate for dryland agriculture. Hot summers and strong winds lead to high evaporation rates and cold winters permit a short growing season. Soils are generally calcareous and gypsiferous, shallow, rocky and extremely poor in organic matter. The top soil is commonly covered by a crust that limits infiltration, burying of seed and subsequent germination and emergence. Chronic water deficit and low soil fertility limit forage production and livestock production activities. Therefore, the Syrian Government with the support of FAO established a pioneer protected area in 1991 near Palmyra (Tadmor), the capital of the steppe. The goal was to rehabilitate the rangelands and to reverse the decline in land productivity and living standards by developing strategies for improved land use. Moreover, to enhance human resources and improve communication abilities, data analysis and planning capacities of national officers for the development of improved techniques and new national regulations for the use of communal grazing land.

A. BACKGROUND AND JUSTIFICATION

The Syrian steppe (Al-Badiah) area is estimated to be around 10.2 million ha in Syria, forming 55% of the country's area in nine provinces, with 35% falling in Homs Province. Al-Badiah is the main grazing land supporting most of the national sheep herd (around 94%), goats (83%) and all camels (100%), (NAPC database, 2008). Currently, it shows a decline in the provision of sheep feed requirement (around 20 - 40%) comparing to the figures of the 1993 (FAO, 2000).

The Ministry of Agriculture and Agrarian Reform (MAAR) through the Directorate of Statistics and Planning conducted a survey covering the Bedouin communities in Al-Badiah and the study showed that the population number was around 1.5 million and can be divided into:

1. Landless Bedouins whom depend mainly on sheep breeding (500,000) inhabitant;
2. Sheep breeders whom own land in the marginal area (750,000) inhabitants;
3. Sheep breeders whom own land in the interior area (250,000) inhabitants (MAAR, 2005).

The number of actual nomads among the tribesmen is steadily decreasing because of government settlement policy and the extension of law to the desert (Jones, 2001).

Al-Badiah rangelands are deteriorating due to:

- Increased population;
- Destruction of vegetation cover by ploughing the land for dryland cultivation;
- Early and overgrazing by an increasing sheep population;
- Fuel collection through cutting and uprooting of fodder shrubs as source of firewood;
- off-road driving of vehicles that has destructive effect on vegetation and soils;
- The extraction of underground water (mainly for the irrigation of the orchards of oases, but also for households and livestock to use as drinking water), and for extracting salt from seasonal salt lakes (sabkhas). (FAO, 1998, 2003).

The amount and distribution of rainfall regulates the grazing period in Al-Badiah, but in general it takes place during January - May of each year.
Al-Badiah is considered a state-owned land according to the Syrian law, which permits everybody to access and use the available resources (J. Rae, 2000). On the other hand, traditional rights of use also exist. Overlapping systems of resource management have frequently led to resource degradation. Thus, conservation and development of rangeland resources of Al-Badiah are considered as major contributions towards the socio-economic development of the Bedouin inhabitants. Likewise, conservation and development of these resources is essential for combating desertification and maintaining the ecological balance.
The major political priorities for Syria are: to be more self-reliant in food; to prevent rangeland degradation and reverse the desertification process; to augment environmental quality; to develop the economic and social welfare of the Steppe people; to sustain the use of available resources through increasing the value added; and to improve rules and regulations governing land tenure (Legislative act No.140 from 1970).
The challenge in front is to reverse the degradation of natural resources resulting from loss of vegetation cover, erosion, salinity, overgrazing of the rangelands; to improve agricultural services such as extension support to farmers

with highlighting low cost technologies, water saving devices and resource conservation; and to offer equal social and economical opportunities and increasing incomes of farmers and their families.
Institutional and infrastructural policies in support of agricultural policies are to strengthen interaction between public and private sector; to link individuals and groups at various levels to shape and apply agricultural policies; to invest in the future development of human resources.

PROTECTED AREAS –THE SYRIAN EXPERIENCE

In order to preserve biodiversity, establish reserves and set models for the correct use of fragile resources, Syria had established the first wildlife reserve in Al-Badiah named (Range Rehabilitation and Biodiversity Conservation in the Syrian Steppe) in 1991 (GCP / SYR / 009 / ITA). Currently, the number or reservoirs in the Syrian steppe (Al-Badiah) have reached 65 covering more than 300 000 ha.
Wildlife used to be abundant and a common feature of the Al-Badiah environment, where gazelles historically formed flocks of various sizes. Though, indiscriminate and uncontrolled hunting has exterminated these animals. Many interesting vertebrate species are still found but require protection and saving of habitats. Therefore, Al-Talila Wildlife Reserve was established by the Government to rehabilitate habitats, protect wild animals and to generate additional income for local communities through tourism (FAO, 2000).
The project was expected to initiate investigations and observations that would improve knowledge and skills of national staff to conserve and manage wildlife and their habitats. So, they will be able to expand this initiative and establish similar reserves in other parts of Al-Badia.
The Government disseminated acts/laws to develop and protect Al-Badiah resources. These laws prohibited cultivation in Al-Badiah. But, the legislation proved to be insufficient to control utilization of grazing lands, protection of wildlife reserves and to ensure their sustainable use. Therefore, an Italian funded FAO/Ministry of Agriculture and Water project was designed and started in 1996.

PROJECT RELEVANCE AND OBJECTIVES

The project identified the major causes of degradation of the Al-Badiah region such as: overgrazing, large herd sizes, barley cultivation in marginal areas. It further, recognized that Government policy of subsidizing feed was both economically unsustainable and led to over-exploitation of land resources. Within these broad parameters, the project aimed at restoring the productive capacity of the region that could serve as a development model for the rest of the rangelands.
The project was established over an area of 110,000 km^2. The land is communal land owned by the Government and assigned to three cooperatives, but traditional users' rights and recurrent drought that allow free entrance to the pastures, determine a severe overuse of the resource and make difficult any form of useful control and management of the rangelands.

Objectives of the project

The immediate objectives presented in the project document are:

- To help national institutions to develop appropriate techniques for a sustainable use of the grazing land;
- to establish an integrated model for the use and maintenance of an area grazed by wild and domestic animals
- To rehabilitate the rangelands and to reverse the decline in land productivity and living standards by developing strategies for improved land use;
- To enhance human resources and improve communication abilities, data analysis and planning capacities of national officers for the development of improved techniques and new national regulations for the use of communal grazing land (FAO, 1998, FAO, 2000)

During project, that started in February, 1996, the following actins were done:

- Rehabilitated 10,000 ha of cooperative land using a cheap seeding technique and native seed;
- Wild animals were introduced from Jordan and Saudi Arabia and local personnel trained in many different veterinary, managerial and administrative fields related to the maintenance of the reserve and rangeland management and rehabilitation techniques.

Developments in the project area and results achieved

1. Direct reseeding of native range species, in the high potential areas, proved to be an effective methodology for range improvement; 710 ha of rangeland has been directly reseeded, and as a consequence improved 8200 ha of range land, located between the reseeding stripes, through protection from grazing, allowing natural plant recovery.
2. Reintroduction of Arabian Oryx and Sand Gazelle in Talila reserve was successful; integrated grazing management plan for camels (owned by cooperative members) and wildlife in Talila reserve has been developed and tested.
3. Technical skills and capacities of national project staff for implementing project activities improved significantly through intensive regular training activities in the technical fields of the project.
4. A fruitful dialogue and atmosphere of intensive collaboration between the local communities/ cooperatives and the project has been established. Through the launching of a sound extension/ communication strategy for settled, semi-mobile and mobile herders and extensive training in participatory community development methodologies, the communities and national project staff were (a) prepared to initiate participatory range rehabilitation activities, and supported in (b) setting-up local grazing

committees to elaborate and implement effective grazing management plans.

5. Options for income generation and employment for local community members have been identified and implemented. Training for women groups on possible income generation activities has been initiated.
6. Data on livestock production economics have been collected in annual surveys, a data system set up and staff trained in socio-economic data collection and simple economic analysis techniques.
7. Environmental monitoring system has been set up and is being pre- tested.
8. The Government recognized the project achievements and became increasingly aware of the importance of the project outputs and willing to take necessary actions to apply the same approach in other areas in the Syrian Steppe (Al-Badiah), (FAO, 2000).

B. IMPACT OF THE PROJECT

1. Impact on population

During the first two years of the project, where an excellent rainfall occurred (and consequently excellent forage growth) all members of three cooperatives (over 3100 people) were very much impressed by the introduced technologies that resulted in a tremendous amount of forage production.

Members of cooperatives became very aware of the positive effect on the environment produced by the rehabilitation and protection of vegetation, through continuous training, involvement in the decisions and the management of the rangelands, participatory planning, and income diversification demonstrations.

After two good rainy seasons the productive potential of the managed rangelands was more than doubled producing over 400 Kg dry matters/ha. Most of cooperative members were ready to participate to the preparation of range management plans of the area assigned to their cooperatives. This despite tremendous problems related to existing traditional users rights in conflict with the rights of the cooperatives; and despite an unclear position of the government related to the rights of use of the land.

Unfortunately, two terribly drought years followed. Protected areas were declared open access by the government and over 600,000 sheep invaded the project area, grazing without any control. Vegetation was destroyed, Bedouins lost trust in the government because rights of use were not respected, and confidence of population in the project assistance reduced remarkably.

The biggest impact of the project has been the training of technicians (over 12 project technicians, over 10 extension officers including three women extensionists, 4 Bedouin promoters and over 20 short training courses for national and international technicians), the training of Bedouins (almost half of the population was trained through field days and short courses).

The introduction of a new, cheap technology using local seed was initially not accepted by national technicians and since the project was designed based on old techniques (using heavy machinery, transplanting and tank watering systems); it was difficult to modify the project document. The astonishing results of the new techniques resulted in a tremendous technical impact, and today in all Al-Badiah it is fully accepted that rangeland rehabilitation should be done using direct seeding technique and native species.

2. Impact on the wildlife reserve

- The fencing of 22,000 ha for the wildlife reserve created an initial negative reaction by the population. Today, it is fully accepted that the area is protected for wildlife. Technicians have been trained, awareness creation material produced, animals are in excellent condition.
- Raising the participation of surrounding population into all activities related to the reserve like (tourism, establishment and maintenance of an eco-museum, preparation of material to be sold through the eco-museum).
- The project observed that the protected area should be extended to the salty lake that is vital for migrating birds. Bedouins are working together with project's staff to prepare a proposal for the government (FAO, 2000).

3. Impact on the rangelands

- Recover the destroyed pasture plant species and emerging the distinct plants in the rehabilitated rangelands.
- Reduce wind and water erosion and dust storms beside the improvement of soil penetrating due to the recurrence of the vegetation.
- Increase rangeland contribution to fodder provision through grazing and as a result reduce the breeding cost for herders.

C. CONCLUSIONS AND RECOMMENDATIONS

1. conclusions and recommendations related to Bedouin population

- Bedouins are the users and not the owners of Al-Badia. Therefore, any improved management of the steppe should be proposed by them, but, endorsed by Government and peasant's union.
- The changes introduced must deal with a very arid and unpredictable climate and planning must be flexible.
- Participation is a long process, and all actors involved must be committed to continue and build on preceding activities. Coherence and long term assistance are therefore crucial to any sustainable option related to maintenance and production of the steppe (Mirreh, 2005).

2. conclusions and recommendations related to steppe environment

- Experimentally, vegetation cover could vary

tremendously ranging from 2,000Kg dry matter/ ha production in good rainfall years to almost 0-100 kg production in drought years. This means that it is urgent that the government prepares and adopts drought management strategy plans based on early warning prediction of dry matter production.

- Government livestock production subsidies and support should be consistent with an environmental protection policy and therefore promote selective reduction of grazing animals, promotion of income diversification activities, improvement of herd management through selection, breeding, and marketing prices, establishment of feeding reserves, promotion of range use and management plans by the population, promotion of integrated crop-livestock systems on cultivated arable land (FAO, 2003).

3. conclusions and recommendations related to wildlife and protected areas

Specific technical expertise is necessary to establish a wildlife reserve and a protected area. But, as soon as the wildlife is adapted and vegetation established, it is imperative that the population is fully involved in all operations related to management and use. For this purpose, it is advisable to establish a new concept for the use of the Syrian steppe based on the concept of protected areas .So, population living in the steppe changes its attitude from being users (and often predators) to being guardians and protectors of the steppe.

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THE REGIONAL DEVELOPMENT OF THE ROMANIAN CEREAL PRODUCTION

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Key words*: cereal, regional development, cultivated area, production*

Abstract
The present research approach regarding the assessment of the development stage for the cereal sector at regional level is inscribed under the coordinates established by the occasion of the EU Romania's accession. In order to delimit the place and role of the cereal sector at the level of each of the "eight development regions", statistical data were taken into account, referring to the cultivated area and the crop agricultural production. Their analysis permits a shaping of the possibilities for re-orientation of the national support for those cereal crops' efficiency, for which there is a growing demand on European and world plan.

INTRODUCTION

The cereal profile of our agriculture corresponds to the ecological offer, to the tradition and agrarian structures. The organization and the stage reached for the development of the cereal market represents an important factor for the rural development of our country, in the context in which the harmonious development of a country can never be the result of some dispersed initiatives. Thus, taking part into the enlarged EU, the cereal market must find us with genuine quality cereal products, which should face the changing conditions [1].

After 2000, the cereals were cultivated, averagely, on the 67.8% of the country's arable area [2]. In each of the eight Development Regions, agriculture was and still will be dominated by the cereal cultivation, and this corresponds not only in function of the relief, climate, soil quality, but also in function of the need for some territorial self supply of the population [3]. In this context, the paper presents an analysis of the evolutions of cereal productions in the period 2000-2006 on eight Development Regions.

MATERIAL AND METHOD

In order to de-limit the place and role of the cereal sector, within the regional and national market, there were taken into analysis, the statistical data referring to the area cultivated and to the average and total production for main cereals for grains: wheat, rye, barley and two-row barley and maize. The period analyzed in this study is 2000-2006 taking in to account the data in the Romania's Statistical Yearbook for the eight Development Regions (South-Muntenia, South East, South West Oltenia, North-East, West, North-West, Center, Bucharest-Ilfov). The regional approach of the cereal market permits the analysis of the Romanian potential for the cereal market and the promotion of a social and economic policy, which should help to the recovery of the rural regional gaps through the diversification of the rural local/ regional economies and the sketching out of the possibilities for reorienting the national support for making efficient those cereal crops for which there is a demand, a raising one, on internal and external plan.

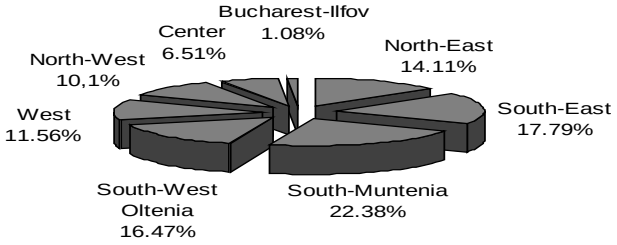

Fig. 1 The share of cereal area by development regions

RESULTS AND DISCUSSIONS

The Romanian cereal cultivated area is shared between the eight Development Regions (South-Muntenia, South East, South West Oltenia, North-East, West, North-West, Center,

Development Regions	Arable area		Arable area under crop		Cereal area	
	ha	%	ha	%	ha	%
North-East	1381306	14.66	1273566	15.03	827500	14.11
South-East	1827024	19.39	1636451	19.32	1043482	17.79
South-Muntenia	1975561	20.97	1885424	22.26	1312724	22.38
South-West Oltenia	1255049	13.32	1154445	13.63	966202	16.47
West	1088809	11.55	908639	10.73	677994	11.56
North-West	1016132	10.78	887633	10.48	592505	10.10
Center	767146	8.14	625669	7.38	381758	6.51
Bucharest-Ilfov	109178	1.15	96065	1.13	63506	1.08
Romania	9420205	100.00	8467892	100.00	5865671	100.00

Table 1. The area cultivated with cereals by Development Regions

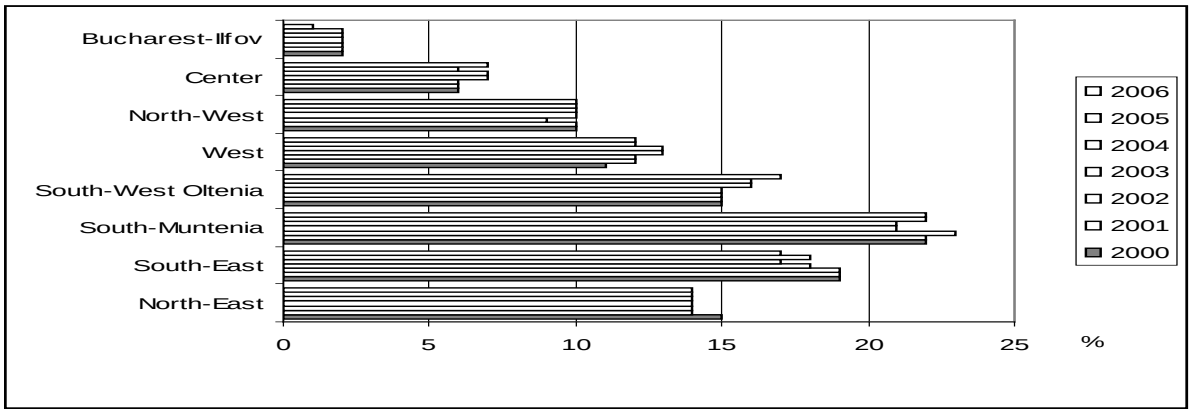

Fig. 2 The dynamics of the share of the regional area in total area with cereals

Bucharest-Ilfov) in function of the agro-pedo-climatic specific of each region, as well by function of the farmers' option.

During the analyzed period (2000-2006), the South-Muntenia Development Region is cultivating with cereals for grains, the greatest areas (over 20% of the national area, cereal cultivating), the South East Development Region area is getting close to 20%, the South West Oltenia Development Region is exceeding 15% of the total area cereal cultivated for grains in 2004, 2005 and 2006 years, the North-East Development Region holds around 14%, the West Development Region exceeds 10%, the North-West Development Region holds 10%, the Center Development Region exceeds 5%, and the Bucharest-Ilfov Development Region is cultivating only 2% of the total area cultivated with cereals for grains of Romania.

In regional profile, wheat (important bakery cereal) is cultivated under most different pedo-climatic conditions, ensuring satisfactory yields. In the period 2000-2006, over 25% of the total wheat area of Romania was cultivated in the South-Muntenia Development Region, which obtained over 25% of the total wheat production of Romania. But the best average yields were recorded in the West Development Region. Nevertheless, the annual variations were smaller not only in the West Development Region, but also in the North-West Development Region and in Center.

In the analyzed period, the wheat harvest has recorded different annual variations, from one region to another, as it follows:

- in 2002 the total wheat production was smaller in the Oltenia South West Development Region, but also in the South-Muntenia Development Region;
- in 2003 the drought affected the wheat production, mainly in the North-East Development Region, South-East and South-Muntenia Development Region, but in the other regions, wheat has yielded well with an obvious raise in the West Development Region, where the wheat production represented 28% of the total wheat production of Romania;
- in the last three years of the analyzed period, the total productions did not recorded such great variations, especially in the South-Muntenia Development Region and South-West Oltenia Development Region.

The graphic representation of the statistical data

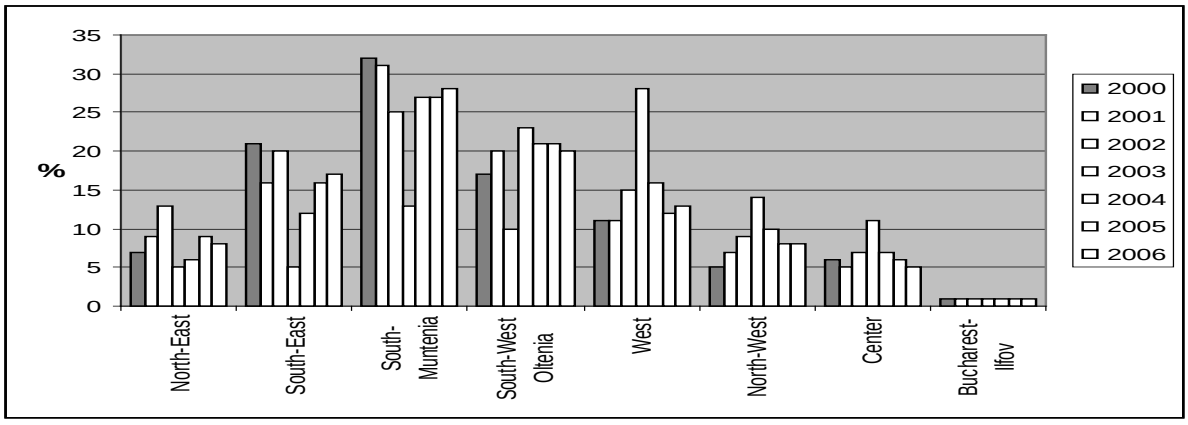

Fig. 3 The dynamics of the share of wheat regional production in total production

regarding the dynamics of the average wheat production by Development Regions, in the period 2000-2006 (figure 4), puts into evidence :

- average yields under 3500 kg./ha with great annual and regional variations;
- the smallest yield (490 kg./ha) in the South-East Development Region in 2003;
- the highest yield (4000 kg./ha) recorded in 2004 in the West Development Region;
- the best and most uniform yields (over 3000kg./ha)

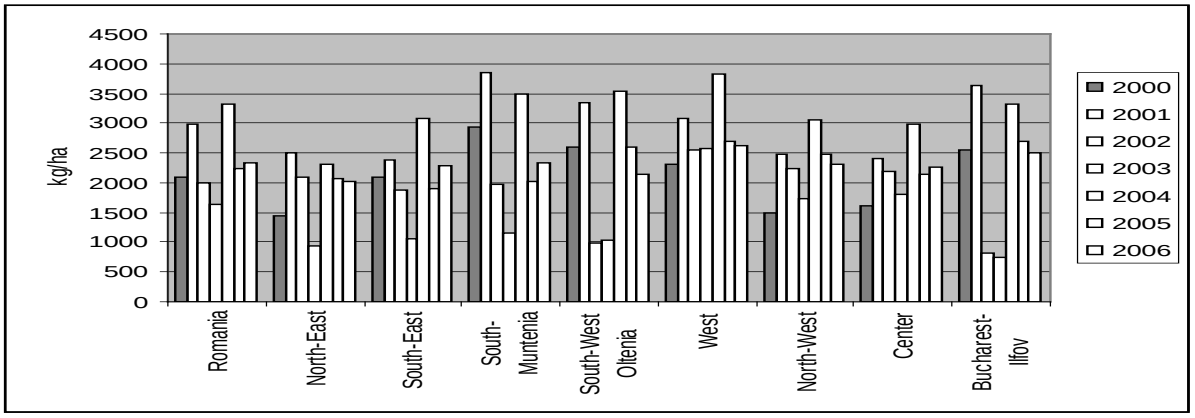

Fig. 4 The dynamics of the average wheat production

recorded in the West Development Region;

- the last three years of the analyzed period, with average wheat productions, relatively good (over 2000kg./ha), etc.

Rye, is a straw cereal, with a nutritious value approximately the same with that of wheat, to which we could add: the high capacity of putting into value the less productive soils, a highly developed root system, being able to be cultivated under rather bad pedo-climatic conditions, on poor soils, spring, in a very stressed rhythm, being different, from this point of view, from the autumn wheat and barley.

In regional profile, this crop is spread, mainly in: the North-East Development Region (which is cultivating over 25% of total Romania's area, with small annual variations), the Oltenia South West Development Region (where the areas are variating from one year to another between 15 and almost 35% of total area), the North-West Development Region

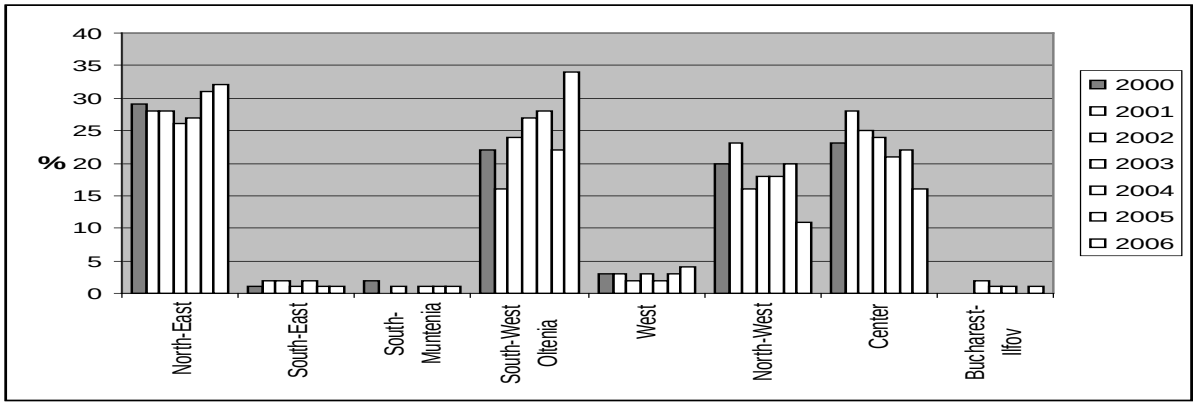

Fig. 5 The dynamics of the share of regional areas in total rye area

where wheat gives small yields; the property of very well putting into value the water reserve of the soil, as the twinning takes place especially during autumn (the twinning node forming itself closer to the soil surface than that of the wheat), the prolonging of the straw takes place very early in (where the area in the year 2006 lowered to almost 10% of total area) and the Center Development Region, which in the year 2006 reduced the area under rye to almost half towards the year 2001.

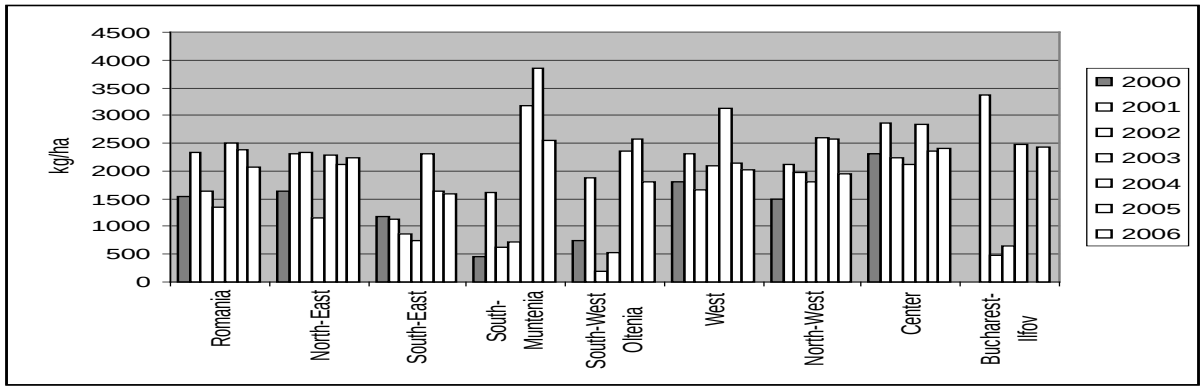

Fig. 6 The dynamics of the average rye production

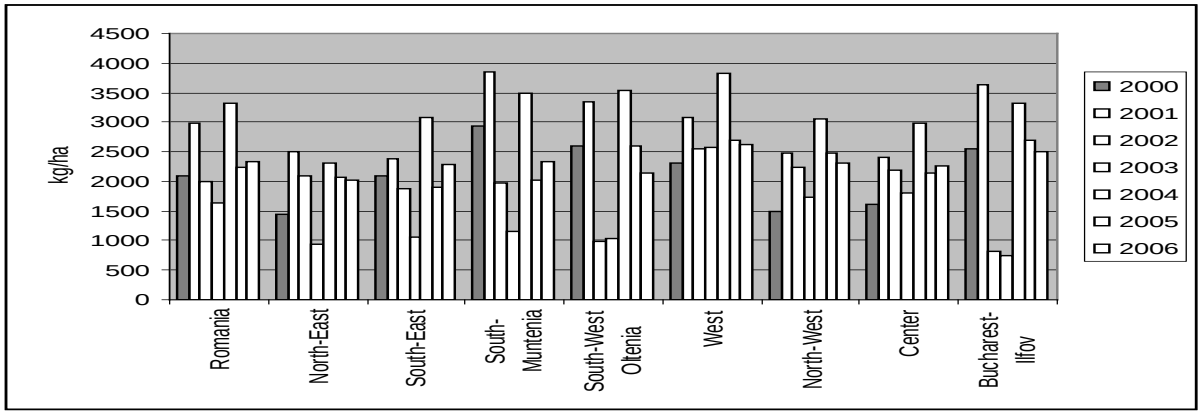

Fig. 7 The dynamics of the average barley and two-row barley production

In the period 2000-2006, the total rye production obtained in the four developing regions registered annual variations, marked by the agro-weather conditions, as well as by the technical ones. Thus, in 2002, in the Oltenia South-West Development Region, the total production obtained at rye, represented under 5% of the total rye production of Romania. The North-West Development Region is evidencing itself through relatively constant annual productions and in the Center Development Region we can observe a stressed

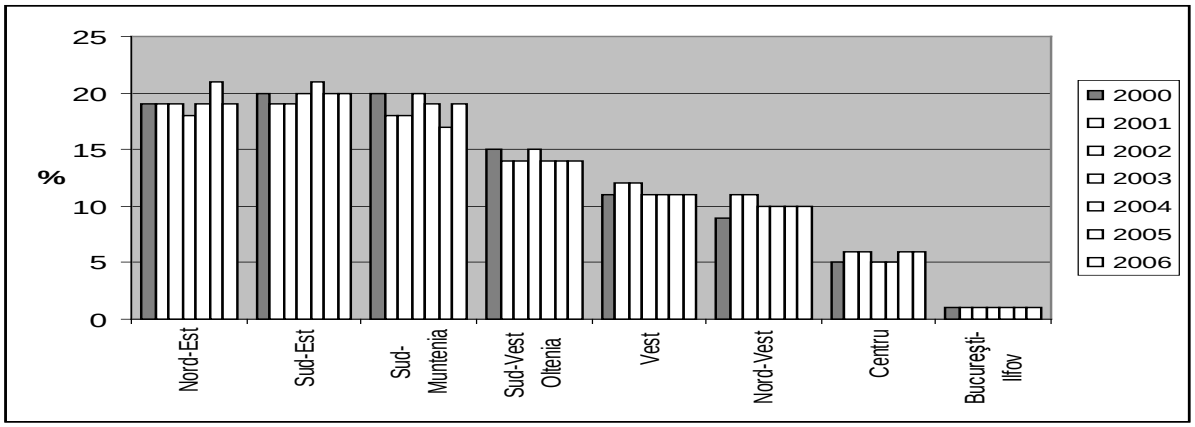

Fig. 8 The dynamics of the share of maize regional production in total production

decrease of the productions obtained during the three years of the analyzed period. The average productions obtained at rye registered over 2500kg./ha in the regions, in which the areas cultivated were meaningless, as: the South Muntenia Development Region in 2004, 2005, 2006, the West Development Region in 2004 and the Bucharest-Ilfov Development Region in 2001.

The barley and two-row barley are cultivated in Romania on areas exceeding 300 thousand of hectares at national level. From these, over 15% are cultivated in the South-East Development Region, South-Muntenia and West Development Region. The best production at barley and two row barley was recorded in the West Development Region in 2003, representing 36% of the total production obtained in that year at national level. The dynamics of the average production at barley and two- row barley is characterized by obvious variations in all development regions.

Maize is the most important fodder crop, being extended under crop, due to some fito-technical characteristics and special biological features, as: a resistant plant to drought, with few diseases and pests, cultivated on very different land areas, and under different climatic conditions, it supports the monoculture, it leaves the land clean of weeds, it makes a good pre-runner of many plants, even for the autumn wheat, it puts into value very well the organic and mineral fertilizers, it very strongly reacts to irrigation, it can be seeded in successive crops, either for beans, or for green fodder or silo one, and has a very high reproduction coefficient.

In the analyzed period, the North-East Development Region, South-East and South-Muntenia Development Region cultivated with maize for beans between 15 and 20% of the total maize area of our country. The production obtained has known annual variations, as the other crops analyzed, the best being registered in the South-East Development Region in the years 2003 and 2004 (in 2003, compensating for the losses in straws).

The average productions obtained at maize crop registered, at national level, a minimum of 1603 kg./ha in 2000 and a maximum of 4441 kg./ha in 2004. The lowest yields registered in 2000 year were in the Development Regions: Bucharest-Ilfov (540 kg/ha) and South West Oltenia (890kg/ha). In 2004 the average maize production exceeded 4000kg/ha at national level, it got close to 5000 kg/ha in the Development Regions: South-East, South-Muntenia and West, attained 5580kg/ha in the Bucharest-Ilfov.

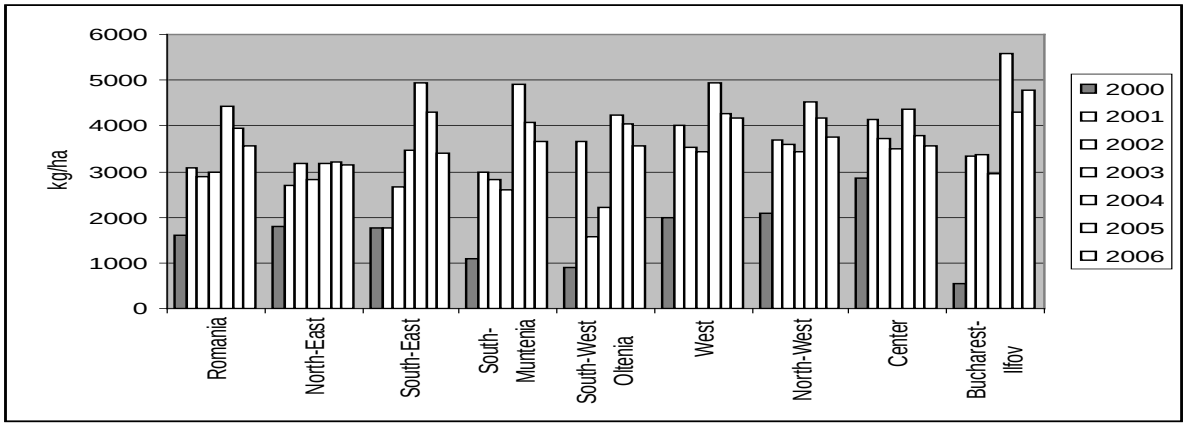

Fig. 9 The dynamics of the maize average production

CONCLUSIONS

1. The Development Regions, in their ensemble, are rather different through the natural and human resources, through geography and climate, through water courses and relief, through the nature of the main economic activities developed, etc.

2. The regional profile of the Romanian agriculture was and still will be dominated by the cereal cultivation; this corresponds to the ecological offer, to the tradition and agrarian structures.

3. The analysis is realized only for the segment of agricultural production, as the regional statistical data do not refer to costs, prices and trade.

4. In the period 2000-2006, the dynamics of the internal cereal production at regional level reveal the fact that:

- the "grainer" of the country is situated in the South Muntenia Development Region, which is cultivating over 25% of the total wheat area of Romania, which obtained over 25% of the total wheat production of Romania;
- the rye, which has a nutritious value alike the one of wheat's is cultivated mainly in four Development Regions (North-East, South-west Oltenia, North-West and Center), but it registrates the best average productions (over 2500 kg/ ha in the South-Muntenia Development Region;
- the barley and two row barley occupy rather important areas in the Development Regions: South-Muntenia, South East and West (over 15% of the national area), the best productions being obtained in the Development Regions West and South Muntenia;
- maize is the crop, the area of which does not vary too much from one year to another in regional profile, the Development Regions: South East, North East and South Muntenia are cultivating over 15% of the national area, and the Development Regions; West, North west and Center are obtaining the best yields.

5. The farm products are becoming, as a rule, raw material for the industries in the processing sector.

6. The analysis of this kind are offering useful information for the European structural funds' attraction, solutions for the improvement of the economic agents' activity from the sphere of agriculture and processing, as well as some solutions leading to the elimination of the existent distortions of these products on the regional markets.

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PRODUCTION OF MEDICINAL PLANTS IN ASIA

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Key words : *medicinal plants, Asia*

Abstract
Medicinal plants (MP) have played a significant role in many ancient traditional systems of medication and still do today in both developed and developing countries in Asia. They generate incomes via sale of collected, wild products or cultivated products. Collection of naturally-occurring MP has been practiced in Asia since prehistoric time for use in traditional medicine or for processing into pharmaceutical products. Cultivation of MP in Asia is characterized by (i) subsistence cropping systems, (ii) scattered farming areas, (iii) poor quality, and (iv) lack of integration. Compared to other economic crops, MP received much less attention in their genetic and cultural improvement. Cultivation techniques are quite primitive, resulting in poor yield and quality of the materials. Due to higher demand of raw material for industrial processing, coupled with the loss of natural habitats of most MP, large-scale cultivation of promising species has recently been attempted in several countries.

INTRODUCTION

Medicinal plants (MP) had a significant role in various ancient traditional systems of medication such as Ayurvedic and Unanic (India), Chinese traditional medicine and their derivatives. Today, MP still play an important role in developing countries in Asia, both in preventive and curative treatments, despite advances in modern western medicine. People of many Asian countries earn a living from selling collected materials from the forest, or from cultivation on their lands.

The development of modern medicine with the introduction of modern drugs produced by pharmaceutical companies, has dealt harshly with traditional medicine which was accused of being inefficient, laborious in preparation and unavailable due to scarcity of raw material. This is exacerbated by the lack of traditional doctors who cannot earn a living without basic material (MP) and demand (customers). The high cost of modern drugs (mostly imported), their unavailability in remote areas, and most importantly the serious side effects of certain drugs, have resulted in a significant return to traditional medicine.

The importance and value of traditional and indigenous herbal medicine were the subject of WHO's campaign during the 70s in an appeal to all member countries to preserve their national heritage of ethno-medicine and ethno-pharmacology and to re-include the use of known and tested MP and derivatives into their primary health care in rural areas and as an alternative when modern medicine was not available. Since a large portion of pharmaceutical drugs are derived from MP, the demand for these raw materials is steadily rising. Such demand is met by obtaining naturally-occurring plants through indiscriminate collecting or by cultivating them.

MEDICINAL PLANTS AVAILABLE IN ASIA

The vast number of species known to Asian people makes listing all MP found in Asia difficult and impracticable. Thus, in order to provide a meaningful list of MP, we have categorised promising species in the following groups.

Medicinal plants that are collected from the wild .It has been estimated that four out of five MP used by man are collected from the wild (Srivastana et al., 1995). See Table 1.

Medicinal plants that are cultivated .Due to higher demand of raw materials for drug manufacture and to meet other requirements such as standard quality, reliable supply, reasonable price, many MP are now being cultivated. See Table 2.

Countries of production of major Medicinal Plants in Asia . Although most countries are capable of acquiring MP for their traditional uses, only China, India, Indonesia, and Nepal produce them in commercial quantity. A few countries are able to produce MP on a commercial scale, but the quantity produced is still quite small, and mainly used domestically. See Table 3.

Collecting naturally-occurring medicinal plants

The present status

As the result of population explosion and forest clearing for food production, most Asian countries, which until recently collected MP from the wild, have almost completely ceased

such practice as MP are quite scarce or non-existent. Nepal, Bhutan and Lao PDR and to a lesser extent, Bangladesh, China, India, Indonesia and Pakistan, maintain considerable natural forest cover are still able to collect MP from the wild (Table 1).

Objectives of collecting

1. For use in traditional medicine. For native people in remote areas and those who cannot afford to buy expensive western drugs, traditional medication, e.g., Ayurvedic, Unanic, Jamu, are the only means to cure illness. Such systems depend almost exclusively on MP with about 90% being collected from the forest.
2. For processing into pharmaceutical products. Due to the scarcity of MP occurring naturally, transportation costs, the variability and irregular supply of collected material, very few countries are able maintain the practice. Nepal is the exception to this predicament and processes and exports wild MP.

Measures to conserve naturally-occurring Medicinal Plants

Realizing that naturally occurring MP are threatened, several conservation measures have been undertaken by various approaches or agencies.
1. Systematic and reasonable collecting. Sustainable collecting can be achieved if it is done appropriately as in Nepal where proper harvesting techniques and appropriate methods of post-harvest treatment (Rawal 1996) mutually benefit the collector and local processor providing incentives for conservation of species for future collection.
2. Reduction of pressure on collecting. Cultivation, whether small or large scale, backyard garden or subsistence can reduce the pressure on collecting MP in the wild.
3. National Legislations. A few countries have formulated legislation to conserve MP - (i) administrative regulation for "Protection of Wild Medicinal Plant Resources", in China since 1987 (Chen, 1996); (ii) an "Action Plan for Conservation of Biodiversity", in Sri Lanka including conservation of MP as a project (Arambewela, 1996); (iii) all wild MP have been banned for export from India since 1993 (Uniyal, 1993).
4. International Regulations. It is a common practice of international conferences to come up with a "Declaration" or "Resolution", within which measures to conserve MP are included. Examples can be seen in: (i) "Washington Convention - 1973" which includes a statement, "The trade and use of some of the MP collected from wild sources are restricted" (Hussain, 1996); and (ii) the "Chiang Mai Declaration" exhorted governments and the public to pay attention to the potential inherent in MP (Henle, 1996).

CULTIVATION OF MEDICINAL PLANTS IN ASIA

Characteristics of Medicinal Plant cultivation

At present, cultivation of MP is characterized by the following traits:
1. Subsistence cropping systems. As cultivation is new for MP, most are grown by small-holders in subsistence or mixed cropping systems with low yield and quality.
2. Scattered farming areas. With few exceptions, most growing areas are widely scattered resulting in difficulty in collecting harvested raw materials by the middlemen.
3. Poor quality. This is due to various factors including the use of unimproved cultivars, poor cultural techniques, and poor post-harvest handling.
4. Lack of integration. In some areas, MP are grown commercially as inter-crops. There is no systematic integration between primary crops and MP. Even in China, where total production of MP is high, monoculture (usually by industrial enterprises) is very small.

Advantages of commercial cultivation of Medicinal Plants

Commercial cultivation may become increasingly popular among farmers as naturally-occurring MP diminish and demand increases. Cultivation advantages are:
1. Conserve endangered species in their natural habitat. Many species are listed as endangered due to indiscriminate collecting for the pharmaceutical industry.
2. Permit production of uniform material. Commercial cultivation of selected clones or improved cultivars should produce uniform material resulting in consistent, standard MP of high quality, a pre-requisite for successful pharmaceutical industrial use.
3. Provide good income to farmers. MP are high-valued crops and should bring higher income to the growers if improved, high-yielding clones or cultivars are used.
4. Provide opportunities for value-adding through processing.

Species	Family	Country of collection
Aesculus indica	Sapindaceae	PAK
Alocasia macrorrhiza	Araceae	LAO, VIE
Alstonia scholaris	Apocynaceae	LAO, VIE
Amomum	Zingiberaceae	LAO, VIE
Amorphophallus rivieri	Araceae	LAO, VIE
Artemisia maritima	Compositae	PAK, VIE
Artocarpus lakoocha	Moraceae	LAO, VIE
Blumea balsamifera	Compositae	LAO, VIE
Catharanthus roseus	Apocynaceae	LAO, VIE
Cassia alata	Leguminosae	PHI, VIE
Cinchona ledgeriana	Rubiaceae	LAO, VIE
Coscinium usitatum	Menispermaceae	LAO, VIE
Costus speciosus	Zingiberaceae	LAO, VIE
Dioscorea deltoidea	Dioscoraceae	PAK, VIE
Drymaria fortunei	Caryophyllaceae	LAO, VIE
Embelia ribes	Euphorbiaceae	LAO, VIE
Ephedra gerardiana	Gnetaceae	PAK
Glycyrrhiza glabra	Leguminosae	PAK, CPR
Kaempferia galanga	Zingiberaceae	LAO, VIE
Lagerstroemia speciosa	Lythraceae	PHI, VIE
Leonurus heterophyllus	Labiatae	LAO, VIE
Moringa oleifera	Moringaceae	PHI, VIE
Rauvolfia serpentina	Apocynaceae	IND, NEP, LAO, THA, VIE
Schefflera elliptica	Araliaceae	LAO, VIE
Smilax glabra	Liliaceae	LAO, VIE
Stephania rotunda	Minispermaceae	LAO, VIE
Sterculia lygnophora	Steculiaceae	LAO
Styrax tonkinensis	Styracaceae	LAO, VIE
Swietenia macrophylla	Meliaceae	PHI
Vitex negundo	Verbenaceae	PHI, VIE
Xanthium strumarium	Compositae	LAO, VIE

Table 1. List of Medicinal Plants collected from the wild in Asia

Species	Family	Country of cultivation
Aconitum napellus	Ranunculaceae	NEP
Adhatoda vasica	Acanthaceae	NEP, VIE
Alisma orientale	Alismataceae	CPR
Allium domesticum	Liliaceae	THA
Aloe barbadense	Liliaceae	THA
Ammi majus	Umbelliferae	NEP, VIE
Andrographis paniculata	Acanthaeae	THA, INS, VIE
Angelica gigas	Umbelliferae	ROK
Areca catechu	Palmae	THA, VIE
Angelica acutiloba	Umbelliferae	VIE
Artemisia annua	Compositae	CPR, THA, VIE
Astragalus membranaceus	Leguminosae	CPR, VIE
Atractylodes macrocephala	Compositae	CPR, ROK,VIE
Atropa belladonna	Acanthaceae	IND, NEP, VIE
Baleriana lupilina	Acanthaceae	THA, VIE
Cassia angustifolia	Leguminosae	IND, THA, VIE
Catharanthus roseus	Apocynaceae	IND, VIE, PHI
Cephaelis ipecacuanha	Rubiaceae	IND
Chrysanthemum cineraria	Compositae	IND, VIE
C. morifolium	Compositae	CPR, THA, VIE
Cinchona ledgeriana	Rubiaceae	IND, THA, VIE
Cinnamomum camphora	Lauraceae	CPR, THA, VIE
Clinacanthus nutans	Acanthaceae	THA, VIE
Coptis chinensis	Ranunculaceae	CPR, VIE
Cornus officinalis	Cornaceae	CPR
Corydalis yanhusua	Papaveraceae	CPR
Costus speciosus	Zingiberaceae	NEP
Croton sublyratus	Euphorbiaceae	THA
Curcuma domestica	Zingiberaceae	IND, INS, PAK, SRL, THA, VIE
Cymbopogon winteriamus	Gramineae	IND, INS, NEP, SRL, THA
Dendranthema morifolium	Asteraceae	CPR
Dioscorea deltoidea	Dioscoreaceae	IND
Dioscorea opposita	Dioscoreaceae	CPR
Dioscorea vomitoria	Dioscorea	IND
Hibiscus sabdariffa	Malvaceae	THA, VIE
Isatis indigotica	Cruciferaceae	CPR
Kaempferia galanga	Zingiberaceae	INS, VIE
Lonicera japonica	Caprifoliaceae	CPR
Lycium barbarum	Solanaceae	CPR
Magnolia officinalis	Magnoliaceae	CPR
Matricaria chamomile	Compositae	NEP
Mentha arvensis var. *piperascens*	Labiatae	CPR, IND, NEP, PAK, THA, VIE
Morinda officinalis	Rubiaceae	CPR, VIE
Ophiopogon japonicum	Liliaceae	CPR, VIE
Paeonia lactiflora	Ranunculaceae	ROK, VIE
Panax ginseng	Araliaceae	CPR, ROK
Panax notoginseng	Araliaceae	CPR
Panax pseudoginseng	Araliaceae	CPR, VIE
Panax quinquefolia	Araliaceae	CPR
Panax vietnamensis	Araliaceae	VIE
Papaver somniferum	Paperveraceae	IND
Philodendron chinense	Rutaceae	CPR, VIE
Piper betel	Piperaceae	SRL, THA, VIE
Piper nigrum	Piperaceae	IND, INS, MAL, SRL,THA,VIE
Piper retrofractum	Peperaceae	IND, INS, SRL, THA
Plantago ovata	Plantaginaceae	IND
Platycodon grandiflorum	Campanulaceae	ROK
Rauvolfia serpentina	Apocynaceae	IND, NEP, VIE
Solanum khasianum	Solanaceae	NEP
Solanum laciniatum	Solanaceae	NEP
Solanum trilobatum	Solanaceae	THA
Solanum viarum	Solanaceae	IND
Sophora japonica	Leguminosae	VIE
Swertia chirata	Gentianaceae	NEP, PAK
Syzygium aromaticum	Myrtaceae	IND, INS, MAL, SRL
Tinospora crispa	Menispermaceae	IND, PHI
Trichosanthas bracteata	Cucurbitacea	NEP
Valeriana jatamansi	Valerianaceae	IND, NEP
Valeriana officinalis	Valerianaceae	NEP, PAK
Vitex negundo	Verbenaceae	PHI
Withania somnifera	Solanaceae	IND
Zingiber purpureum	Zingiberaceae	THA
Zingiber officinalis	Zingiberaceae	CPR, IND, INS, ROK, SRL, THA

*Table 2. List of Medicinal Plants cultivated on commercial scale in Asia**

Processing technology is available in many developing countries. Commercial cultivation would provide raw material for local processing where cultivation takes place.
5. Provide a better environment; utilize waste and unproductive land. As MP yield high incomes to the growers, costly inputs can be used for their cultivation.
6. Provide continuity of supply. Cultivation is less risky for supply of raw material allowing manufacturers to set production targets well in advance.

Genetic improvement

Compared to other economic crops, MP receive much less attention in their genetic improvement - evident in the low number of named cultivars used in commercial cultivation. This is due to the lack of germplasm conservation, facilities, breeders and of the demand for large-scale cultivation.

Cultural improvement

Cultural improvement contributes significantly to the success of commercial cultivation of any economic crops including MP. High yield and desirable quality of the products can be achieved by good agricultural practices (GAP) such as: proper soil preparation and fertilizer application; the use of good planting material; correct plant spacing; control of weeds, insects and diseases; timing and correct techniques of harvesting and post-harvest treatment

CONCLUSIONS

MP are man's best friend in time of need. As technology and development advance, the need for them is much greater and the chance to collect them from the forest is receding. Rural property and constant demand for cultivated land are threatening the forests homes of uncountable numbers of species of valuable MP. The only solution to save this inheritance is to cultivate them systematically providing socio-economic benefits to rural people and satisfying the need of urban people who want to go 'back-to-nature' with the use of MP as raw material for pharmaceutical manufacture.
MP continue to play a significant role in the peoples' welfare as they have been for several millennia. Due to higher demand of raw material for industrial processing and the loss of natural habitats of most MP, large-scale cultivation of promising species has been attempted in several countries. Collecting in the wild will cease due to over-exploitation, unless the campaign to conserve biodiversity is successful. MP have not been subjected to intensive breeding programs so yield and quality are quite low. To start any breeding program, germplasm collection and conservation are most essential. As most natural habitats are on the verge of being destroyed, there is an urgent need to collect and conserve valuable germplasm of MP before they become extinct and many breeding programs initiated. They should be supplemented with R&D on agro-technology to obtain optimum yield and quality of the source raw materials for pharmaceutical products.

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SUSTAINABLE DEVELOPMENT AND THE ENVIRONMENT PROTECTION (SUSTAINABLE ENERGY. THE REDUCTION OF THE CARBON DIOXIDE EMISSION WITH 80% UNTIL 2020)

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Key words: *sustainable development, renewable energy, environment protection, carbon dioxide emissions*

Abstract
The paper aimed to clarify the term of the sustainable development presenting the plans for a sustainable development, emphasizing in the same time the actions taken to get to the new energy source and the measures taken to fulfill the sustainable development. "Long term development is the development that meets the needs of the present without compromising the ability of future generations to meet their own needs", this definition has been given by the World Commission on Environment and Development in the Brundtland Report, also known as "Our Common Future". The EUSEW is the key annual reference point for sustainable energy issues in Europe. The events organized during EUSEW and other similar events highlighted the need for everyone to work together towards a common goal which is the reduction of the carbon dioxide emission, the environment protection in way to reach the sustainable development.

INTRODUCTION

Sustainable development is a form of economic development which satisfyes the needs of the society on a short, medium and long term. The term underlays on the reason that the development has to face the present needs, without putting in danger the future generations. In the same time, sustainable development marks the forms and methods of social – economic development, that provides a balance between the social - economic systems and the elements of the natural capital.

Primary, the sustainable development was defined as a solution to the ecological crisis conditioned by the intense industrial exploitation of the resources and by the continously degradation of the environment and by the crisis of the natural resources, especially those 30 years ago regarding the energy that had as a goal to preservate the quality of the environment. The new goal of the sustainable development are nowadays the concern for justice and equity between states, not only between generations.

MATERIAL AND METHOD

The most known definition of the sustainable development is, for sure, the one given by the World Comission on Environment and Development in the report „Our Common Future", knowned also as Brundtland Report: „development that meets the needs of the present without compromising the ability of future generations to meet their own needs".

The International Community decided to treat the environment problems with collective measures at global level, that tried to define and to put into effect trough a proper international frame. This action frame at international level was buildt in time and is in a dynamic evolution, endfolding legal measures with incumbency in the guise of pacts, conventions or optional measures in the guise of deliverances, resolutions or sets of management lines and political views, institutional measures and viable financing devices. The problems of the world environment and of the necessities of developing were debated by the International Community for the first time in 1972, at the Stockholm Conference regarding the Human Environment. After the Conference, followed:

- The Declaration from Stockholm, which contains 26 principles;
- The Action Plan for the Human Environment, with 3 components:
  - The program for the evaluation of the world environment (Earthwatch);
  - Activities for the environment management;
  - Support measures.
- United Nations for the Environment Program, whose Leading Council and Secretariat were founded in December 1972 by the United Nations General Assembly, Environment Fund, Environment Honorary Fund, founded in January 1973, according to the financial procedures of the United Nations.

Starting with its foundation, based on the Conference from Stockholm, United Nations for the Environment Program developed a number of activities in way to highlight its accelerator and coordinator roll in the area of the environment inside of the ONU system.

The program's activities can be classified in:

a) Activities orientated on the sectorial problems of the environment agents: water , air and soil pollution

b) Activities orientated on the Earth's problems: acid rain, the depletion of the ozone coat, climatic changes, deforestation and desertification, the preservation of the biodiversity, international traffic of the products and toxic and dangerous offcuts, protecting the environment during the wars.

Under the umbrella of the Sustainable Energy Europe Campaign (SEE), the European Commission's Directorate-General for Energy and Transport, the European Institution and also the Slovene Presidentship of the European Union and also all the members of the European Union including Romania, initiated in 2008 the event called "European Union Sustainable Energy Week" (EUSEW), which took place in Bruxelles, Belgie and also in other cities from Europe (28 january – 1 february).

European Union Sustainable Energy Week is the principal reference for the aspect regarding sustainable energy in Europe.

The European Union Sustainable Energy Week is the key annual reference point for sustainable energy issues in Europe. The events organized during European Union Sustainable Energy Week cover key topics that highlight the multi-sectoral nature of sustainable energy development and stress the need for everyone to work together towards a common goals:

a) From the renewable energy sources to the energy efficiency;

b) From the European Union politics to the local actions with the aim to produce energy descentralization and transit to a scheduled energy system;

c) New technologies of producing the sustainable energy that are accepted by the markets;

d) Legislation, behaviour, education regarding the new tipes of sustainable energy.

With the start of the European Union Sustainable Energy Week, European Commission launched "Mayor's Pact" which involves the participation of the citizen to fight against global warming. The pact was born after an informed consultation of many cities from Europe whose City Halls were with the Commission for the foundation of the pact, this meaning a formal commitment for development of the cities and villages in way to cross over the European Union goals regarding the reduction of the carbon dioxide emissions trough the energy efficiency actions and renewable energy.

RESULTS AND DISCUSSIONS

The Parliament and the European Council started the cooperation in way to promote a sustainable development in the urban environment. This decision is addressed to the members of the European Union and also from Central and East Europe. This cooperation materialized into a plan called Agenda 21.

Regarding the "Mayors Pact", almost 150 cities from Europe, including 15 capitals, and also 300 rural areas, gave their support for this pact.

"Mayors Pact" is a initiative orientated on results given by the materialization of the projects with variable results in the reduction of the carbon dioxide emissions with more than 20% until 2020 in Europe with the development of the sustainable energy.

The Commission will support the spreading of the best practices of the world in the area of the sustainable energy in cities, the regions that participate at "the Pact" trough a "stabilization of excellence marks" device.

The Commission wants to negotiate the involvement terms of the other great participants at "The Pact", a "Pact's" Secretary, financed by the "Smart Energy Europe" Program, will release the grid tasks supervision and of the promoting actions of these new challenge.

CONCLUSIONS

It's stipulated the reduction of the carbon emission with 80% by 2020 at earths level.

Robert Socolow from the Princeton University, with Stephen Pacala, published a study in "Science" Magazine, which shows that the annual emissions generated by the fossil fuels can be maintained at 7 millions tons instead of growing at 14 millions in the next 50 years, how is possible to happen if we will continue our activity as did until now.

Those two researchers, one is ecology and the other one in engineer, from the Princeton University managed to stop the growing of the atmospheric concentration of carbon dioxide, close to 375 ppm at over than 500 ppm, stabilizing over than 15 ways, all using tested technologies, which one by one can drop the dioxide carbon emissions with 1 million tons by year until 2054.

Those two started the idea that any 7 of their hypotheses use with advanced technologies will lead to the reduction of the carbon emissions with 2 million tones by year until 2014, a level that can absorbed by the potential carbon reserves from the land and ocean.

Transposing the "Pacala – Socolow" concept is very useful to understand the ways that the carbon emissions can be reduced.

Agenda 21 has in his plan of action the introduction and materialization of the 40 chapters addressed to some programs and areas that promote the sustainable development giving an incorporated approach of the social, economic and environmental problems.

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EVOLUTION OF GRAIN PRODUCTION IN ROMANIA, UNDER THE INFLUENCE OF CLIMATIC FACTORS DURING THE PERIOD 2004-2008

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Key words: vegetal production, cereal production, climatic factors, risk climatic

Abstract

The paper presents the variation in time of the cereal cultivated surfaces, of the cereal production obtained and of the average production. At the same time, there are presented considerations about the way in which the risk climatic factors influenced the cereal production during the above mentioned period.

INTRODUCTION

Having in mind the importance of the cereal culture within the vegetal production of the agricultural sector of Romania, I thought that it is necessary to present the evolution of the cereal sector during the last five years, 2004-2008, as well as the way the risk natural factors influenced the cereal sector results.

MATERIAL AND METHOD

During the documentation for this study there were consulted as well official statistic data sources, Anuarul Statistic al României (Statistical Yearbook of Romania), issued by the Statistical National Institute, as administrative data sources, such as the statistical reports AGR2a - "Spring productive surface in the year…" and AGR2b - "Harvested surface and obtained yield, use of fertilizers, amendments and pesticides, planting and clearing vineyards and orchards in the year…", processed by the Office of Agricultural Statistics from the Ministry of Agriculture, Forests and Rural Development. We must mention that the surveys that are on the base of the two reports above mentioned are included in the "Program of Statistical Research in the year…", approved each year by Government Decision.

RESULTS AND DISCUSSIONS

In order to review the cereal production evolution in Romania and the climatic factors influence, we will present data on the cultivated surfaces, harvested surfaces, total productions and average productions. There will be presented also technological data: fertilizers consumption, agricultural machinery endowment, as well as data on the surfaces affected by risk natural factors. All these data are about the period 2004-2008.

Cultivated surfaces. In Table 1 there are presented data on the surfaces cultivated with the main cereals for grains. It can be seen a continuing reduction of the cultivated surfaces, between 2004 and 2007, of about 1,185 thousand hectares, the biggest reduction being registered between 2005 and 2006, of about 759.7 thousand ha. The reduction of the cereal cultivated surfaces is due mainly to the increase of the interest for oleaginous plants culture, especially raps. Big reductions are registered as well for the wheat cultivated surfaces, as for those cultivated with corn. For barley, winter and spring two-row barley the reductions of the cultivated surfaces and the variations are much smaller. Non-relevant increases can be observed for the surfaces cultivated with winter triticals, winter barley and other cereals. Unlike the common winter wheat culture, where in 2008 was registered an increase, faced to 2007, of about 150 hundreds ha, by the culture of corn the whole reviewed period was marked by a decrease of the cultivated surface. The biggest decrease was registered between 2004 and 2005, and was of about 600 thousand ha.

The surfaces cultivated with wheat and rye represent in the reviewed period an average of 39% from the surface cultivated with cereals for grains. Even if this surface decreased in absolute value, its share increased from 37% in 2004 to 40% in 2008.

The surfaces cultivated with corn decreased during the reviewed period as well in absolute value, as its share from the total grain cereals cultivated surface - from 52% in 2004 to 47% in 2008.

Fertilization of the grain cereals cultures. From the total grain cereals cultivated surfaces , the surfaces cultivated with wheat + rye and those with corn, which were fertilized, represent in average 55.5% in the period 2005-2008, following an ascendant trend: 53% in 2004, 54% in 2005, 57% in 2007 and 58% in 2008. The share of the surfaces cultivated with wheat + rye, fertilized, from the total of

	2004	2005	2006	2007	2008
Cereals for grains	6,265,391	5,821,670	5,091,882	5,080,488	5,193,935
Common winter wheat	2,278,131	2,383,570	1,951,585	1,902,230	2,059,317
Common spring wheat	13,775	7,657	3,870	4,164	6,819
Hard winter wheat	3,488	2,199	2,531	1,349	1,049
Hard spring wheat	554	392	50	542	1,632
Winter rye	21,327	19,733	16,842	12,806	12,797
Spring rye	580	120	133	262	170
Winter triticals	27,929	29,690	29,867	30,574	31,654
Spring triticals		2.436	204	509	909
Barley	248,190	223,626	126,618	135,916	153,436
Winter		51,485	28,394	60,363	73,977
Spring two-row barley	176,338	204,644	171,318	171,846	170,479
Winter oats		4,367	1,083	2,087	12,176
Spring oats	207,514	215,004	202,241	212,643	199,133
Corn grains	3,274,101	2,669,637	2,549,165	2,532,110	2,446,603
Other cereals	13,464	7,110	7,981	13,087	23,784

Table 1 Cereal cultivated surfaces during the period 2004-2008 in ha

fertilized surfaces is decreasing from 40% in 2005 to 32% in 2006. During the years 2007 and 2008 there was a slight increase - 35%, respectively 36%.

The share of the corn for grain cultivated and fertilized surfaces remained during the whole period between 26% and 28%.

The average quantity of fertilizers applied per hectare, for the wheat + rye cultures is decreasing from 103 kg/ha in 2005 to 92 kg/ha in 2006, following a slight increase from 94 kg/ha in 2007 to 97 kg/ha in 2008.

during the reviewed period between 55.34 ha in 2004 and 53.71 ha in 2008, and the load per combine was 102.01 ha in 2004 and 98.29 ha in 2008.

Harvested surfaces . From space reasons, without affecting the technical reasons and the results obtained, we will group the grain cereals in the following big groups: wheat + rye + triticals (WRT), barley + two-rows barley, oats, corn for grains and other cereals. In Table 3 are presented the cultivated surfaces (CS), harvested surfaces (HS) and the total production obtained in the structure above defined.

	2005	2006	2007	2008
Fertilized surface seeded with wheat + rye	1,826,007	1,484,687	1,652,696	1,693,962
From which: nitrogen fertilized	1,576,184	1,356,523	1,486,956	1,559,669
% nitrogen fertilized surface	86	91	90	92
Fertilized surface seeded with corn	1,233,220	1,265,988	1,247,600	1,319,499
From which: nitrogen fertilized	1,061,113	1,074,419	1,070,291	1,205,717
% nitrogen fertilized surface %	86	85	86	91

Table 2 .Fertilized surfaces and the share of nitrogen fertilized surfaces from the total fertilized surfaces for wheat and corn cultures in the period 2005-2008

The quantity of nitrous fertilizers applied during this period had the following evolution: decrease from 79 kg/ha in 2005 to 71 kg/ha in 2006, followed by a slight increase between 2007 and 2008 respectively from 74 to 77 kg/ha.

The share of the nitrous fertilizers in total fertilizers applied, for the wheat + rye culture is in increase during the reviewed period: 67% in 2005; 71% in 2006; 74% in 2007 and 77% in 2008.

For the corn for grains culture, the average fertilizer quantity applied per hectare is decreasing from 86 kg/ha in 2005 to 74 kg/ha in 2007. In 2008 it was registered a slight increase up to 77kg/ha.

The average quantity of nitrous fertilizers applied per hectare for the corn for grains culture was as follows: 66 kg/ha in 2005, 63 kg/ha in 2006, 62kg/ha in 2007 and 61 kg/ha in 2008, following a decreasing trend. However, the share of nitrous fertilizers applied, for the corn for grains culture, from total fertilizers is increasing from 66% in 2005 to 73% in 2008.

The increasing evolution of the share of nitrous fertilizers applied, from total fertilizers applied, is due mainly to the increase of the share of the surfaces on which there was applied the nitrogen fertilizing from total fertilized surfaces. This can be seen in Table 2.

Endowment with agricultural machines . About this, we have to remember that the load of arable land per tractor was

There are presented also the average productions for WRT and corn for grains.

Agricultural year 2004 was a good year, without special climate events. For this year we can consider harvested surfaces equal to cultivated surfaces.

Begining at 2005 the average yields at WRT and grain maize decrease, reaching a dramatically level in the year 2007: 1,624 kg/ha at WRT and 1,833 kg/ha at maize grains. Decreased of average yields and cultivated surfaces, total production decreased attract. Total production of cereal grains of 2007 is 31% of production in 2004, production of WRT is 37% of production in 2004, while production of maize grain is 27%.

Decreased total production of cereal grains for the year 2005 in absolute value of approx. 5,433 thousand tons, is due in particular decreased production of grain corn 4,262 thousand tons. A significant decrease is recorded and the WRT, about 815 thousand tons. Decreased production of maize grain is in good measure due to decreased cultivated surfaces. Thus taking into account decreased by about 604 thousand hectares of cultivated area with maize grains, and the average yield achieved in 2005, to 3,916 kg/ha, can appreciate that because this, production of maize grains decreased by a quantity of 2,367 thousand tons.

Decrease the average yield per hectare remains the main factor of the disastrous reduction of total production in

	2004	2005	2006	2007	2008
Cereals for grains (CS) -ha-	6,265,391	5,821,670	5,091,882	5,080,488	5,193,935
(HS) -ha-	6,265,391	5,715,522	5,060,256	4,535,252	5,180,988
-tone-	24,403,005	18,970,153	15,354,350	7,701,215	16,931,745
Wheat+ rye+triticals **(CS)** -ha-	2,345,784	2,445,797	2,005,082	1,952,436	2,114,347
(HS) -ha-	2,345,784	2,398,230	1,985,028	1,837,852	2,111,762
-tone-	7,968,429	7,153,258	5,353,350	2,984,580	7,281,107
Average yield kg/ha	3,397	2,983	2,697	1,624	3,448
Barley + two-rows barley -ha-	424,528	467,549	322,813	342,747	394,640
-tone-	1,405,996	1,129,148	755,035	519,283	1,262,770
Oats -ha-	207,514	218,800	202,894	211,698	210,142
-tone-	447,079	390,596	346,221	253,437	422,914
Corn for grains (CS) -ha-	3,274,101	2,669,637	2,549,165	2,532,110	2,446,603
(HS) -ha-	3,274,101	2,624,727	2,541,745	2,133,067	2,441,749
-tone-	14,541,066	10,278,689	8,874,976	3,910,539	7,875,502
Average yield kg/ha	4,441	3,916	3,492	1,833	3,225
Other cereals -ha-	13,464	6,216	7,776	9,888	22,695
-tone-	40,435	18,462	24,768	33,376	89,452

Table 3 .Cultivated areas, harvested areas, total production and average yields obtained in the main cultures of cereal grains in the period 2004-2008

agricultural year 2007.

Climatic phenomenons . In the period under review there has been a series of weather phenomena with large deviations, often significant and persistent, from the average characteristics. Thus in 2005, during the period 01 April to 30 September, rainfalls, storms and hail have affected large areas of crops. Crops of wheat + rye were affected in the country on over 205,277 hectares. Were affected almost all counties. The phenomenon has caused the greatest damage in the counties: Braila 13,203 ha, 15,627 ha Calarasi, Giurgiu 25,670 ha, 18,453 ha Olt, Teleorman 41,917 ha, Timis 26,251 ha. All these counties are in the area most favorable to the cultivation of wheat. In the same period corn grain crop was affected on an area of 136,438 hectares. Among counties with the largest areas affected: Bacau 10,454 hectares, Braila, Calarasi over 6,000 hectares each, Dambovita, Iasi 9000 ha each, Teleorman 10,124 ha, Valcea 15,870 ha.

The year 2006 started with low temperatures, below the resistance limit of plants. During January-March, the phenomenon has affected about 304 thousand hectares of wheat and about 80 thousand hectares of barley and two-row barley. In spring and summer of 2006 some counties, especially those situated along the Danube, had suffered from natural or directed floods. Were affected crops of wheat + rye on an area of approximately 296,765 hectares. In autumn 2006 he started to install drought.

Year 2007 is characterized by excessive and prolonged drought. Other climatic phenomenons like torrential rain of short duration, hail, etc were on small areas. For example on 25 July 2007 registering 25,652 hectares of grain maize and 10,807 hectares of winter wheat hail affected. At the same time drought affected 1,217,693 hectares cultivated with winter wheat, about 220,000 hectares planted with barleytwo-row barley, oats and 237,743 hectares cultivated with maize grain.

CONCLUSIONS

In light of the above we can conclude that the production of cereal grains in Romania for the period under review had a continuous decrease from 2004 to 2007. This is mainly due to the influence of two factors: the decrease in cultivated areas and risk climatic factors.

Between 2004 and 2007 the share of cultivated areas with cereals for grains fell from 66% to 54%. In 2008 year there was a slight increase, the share reached 55%.

Endowment with agricultural machinery during the period examined is relatively constant, the load of arable land per tractor and the load per combine. Also the amount of fertilizer applied per hectare did not differ substantially. In these circumstances it can be concluded that production of cereals for grain has been strongly influenced by meteorological phenomena.

Besides the negative influences that drought in 2007 produced to the growth and development of crops in different stages of vegetation, this has contributed to the reduction in harvested area from 114,584 hectares wheat and 399,043 hectares of maize grain.

The negative effects of drought were amplified by the dysfunction in irrigation system.

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SURVEY CONCERNING TECHNOLOGICAL FLAW OF VALORIZATION FOR FRESH PERISHABLE FRUITS, ON EXPERIMENTAL STORAGE SPACE WITH CONTROLLED ATMOSPHERE, IN ORDER TO DIMINISHING THE POST-HARVEST RISKS

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Key words: *storage, risk, fruit, valorization, monitoring*

Abstract
The study presents a technical description of some particular stages of the fresh perishable fruits valorization activity. The experimental storage space is placed in Research Laboratory for Storage and Marketing for horticultural fresh products. The objective of this study is to obtain preliminary information concerning the conformity controls in fresh perishable fruits valorization and marketing activities, especially referring to the management of the post-harvest risk factors. The experimental methods were conducted in three directions:

1. *the management of the post-harvest risk factors;*
2. *the experimentation of the instruments for risks evaluation and also for applying a control system, in order to prevent the consumption of the fresh fruits as unsafely food ;*
3. *the optimization of perishable fruits shelf-life.*

The technological steps of valorization were analyzed starting with potential risks that are associated with the fruits pathway on technological flow. Potential risks identified were classified in three categories: microbiologic, chemical and physical. The survey has put into evidence only potential risks not all possible risks.

INTRODUCTION

In Romania, the way of valorization of the fresh perishable fruits are orientated in three different directions: internal consumption as fresh products; export as fresh commodities and commodities for food industry. The consumption of horticultural fresh products represents an important objective in order to ensure the demands on the internal market.
Getting fresh fruits through the specific market channel and valorization chain follows specific stages of fruits production: some fruits have emphatic temporary attribute concerning the harvest, but a constant consumption over the whole year (apples); another group of fruits has more or less longer maturation stage which has a correspondence with the consumption period (apricot, peach, plums, sour cherry, cherry); the last group of commodities has a very short production period with a short period of consumption (strawberries). The conformity controls according with common quality standards, represents one of the most important elements which ensure a correct operation on common market organization in fresh horticultural products.

MATERIAL AND METHOD

The survey was carried out in the research laboratory for horticultural fresh produces storage and marketing. The quality of the perishable fresh fruits is a complex concept, therefore has been analyzed from several points of view: agronomical, commercial, taste, nutritional and sanitary. In the quality standards of fresh fruits, quality concept is determinated by commercial aspect of fresh fruits exposed for sale, through visual characteristics (freshness, caliber, shape and color) and conditioning (sorting, packing, labeling and exposition). The principles of hazard analysis and control of critical points were used as instrument for risks evaluation and also to apply a control system in order to prevent the consumption of the fresh fruits as unsafely food.
The survey has been started by analyzing the implementation of the first five principles of the system: 1. risk analyze; 2. determination of critical control points; 3. establishing of critical limits; 4. elaboration of monitoring procedures; 5. elaboration of corrective actions.
The implementation of the these five principals, was started in order to apply following stages: a) description of the products; b) elaboration of the storage process diagram; c) control of the technological flow of fresh fruit valorization in the experimental space for storage and marketing.
The risks in fresh fruit valorization were classified in three main categories: biological, chemical, and physical. The methodology concerning risks analyze applied was the analyze dividing in two main activities: risks identification and risks analyze.

RESULTS AND DISCUSSIONS

a) Description of the fresh fruits category. The elements that are completely describing each product – fruits for fresh consumption (species/variety) are following:

1. The moment of harvesting – referring to the date of harvesting and maturation stage.
2. Transport – modality and duration of the transport to the valorization/storage space.
3. Technical conditions - referring to the most important commercial characteristics of the fresh fruits: authenticity, shape, color, shape, epidermal aspect, freshness, presence or absence of the peduncle, health and cleaning, maturation stage, color, firmness, consistency and succulence of the

flesh, taste, aroma and internal defects.
4. Physical and chemical composition.
5. Biological, physical or chemical treatments post-harvest applicable.
6. Package respecting the general regulations concerning fresh vegetable and fruits.
7. Storage conditions and delivering, distribution or retail methods.
8. Indication concerning shelf-life useful in special stores.

b) Elaboration of the storage process diagram (Figure 1).

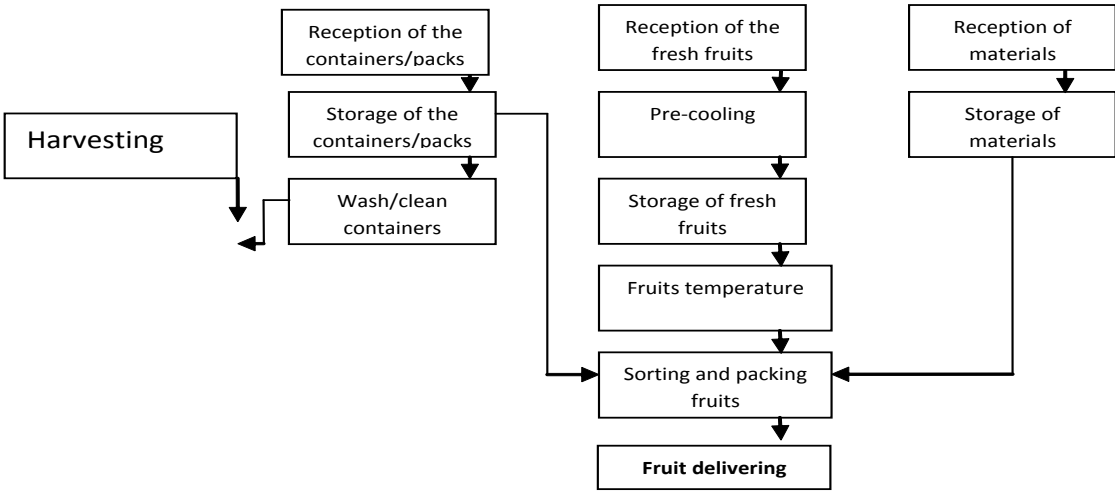

Fig.1 The diagram of the fresh fruits storage process

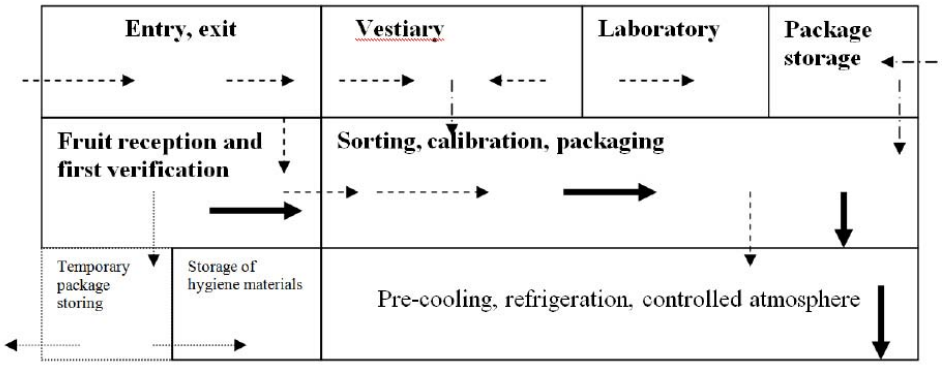

Fig.2 Circulation of products, materials and pearsons on the fresh fruits valorization flow
Legenda:Fruits flow ;Personal flow ;Fruits package flow;Package storage flow

The diagram of the fruits storage process was built for one species of fruits and there were taking into consideration initial stages of the valorization flow (harvesting) and also the final stages (delivering of fresh fruits), technical information of the process, product and equipment. The following requests were integrated in the analyze system: cleaning and disinfection procedures; the personal training and good practice in hygiene, storage and delivering conditions of the fruits.

The diagram indicates all stages of valorization and also material inputs correspondent to each stages, which can be the causes of the food safety risk. The stages of the fresh fruits storage are the following: reception of the fresh fruits, preparation for storage, packing (if necessary), pre-cooling, storage, distribution, delivering and/or placing the product on the market.

c) Control of the technological flow of fresh fruit valorization in the experimental space for storage and marketing .

The control followed all the diagram stages, and also the circulation of products, materials and persons on the fresh fruits valorization flow, if these were respected, and also the duration of each processing stages, in the purpose to update the diagram, if it necessary(Figure 2). The approval of the diagram represents the confirmation that the process flow is correct and conformed.

1. Risk analyzes. Risks identification
Potential biological risk

The identification of biological risks on fresh perishable fruits valorisation is a very important activity which request an objective and a correct decision. A high number of human deseases were caused by mycroorganism associated with fresh fruits consumption, and much more of these are bacterias and viruses: *Cl. botulinum A,B,E and F, Shigella dysenteriae, Salmonella typhi, Salmonella paratyphi A, B, hepatic vyrus A, Virusul hepatitei E, Brucella abortis, Brucella suis, Vibrio cholerae O1, Vibrio vulniicus, Listeria monocytogenes ,Salmonella sp. Shigella Shigella sp., Escherichia coli enterovirulenta, Streptococcus pyogenes, Rotavirusul ,Grupul virusurilor Norwalk Vyrus Group, Entamoeba histolyitica, Diphyllobothrium latum.*

Potential chemical risks

The chemical risks are the chemical substances which can be applied accidentally or non-accidentally in fresh perishable fruits in crop management, valorization or distribution stages. This group of risks is vast and includes animal food, potable water, fertilizers, chemical substance used in equipment function (lubricants, cleaning stuffs, etc.):

- Residues of pesticides in fresh fruits over the Maximal Accepted Limits (MAL). The pesticide products, there are not use or approved to be used for specific treatments in crop management, has MAL =0.
- Hard metal residues from fertilizer products, or water, upon the MAL: Zinc, Copper, Arsenic, Plumb, Cadmium, etc.
- Natural toxins.
- Contamination with chemicals products others then crop chemicals, for example: mineral oils, diesel fuel, and hydraulic oil.
- Allergic agents, components which can cause sever reactions on some sensitive consumers (asthmatics, law immunity)

Potential physical risks

A physic risk is an unforeseen component in a fresh fruits commodity which can cause diseases or injuries on consumer. The physic risks identified are:

- Foreign bodies from crop background: soil, stones, weeds seeds.
- Foreign bodies from containers, packs and equipment: glass, wood or metal chip, plastic stuffs, dye flaks.

Risks analyze

The second stage in risk analyzes is the identification of preventive measures which can be used in each risk monitoring. The registered risks completed with preventive registered measures can reduce each risk on an acceptable level. Analyzing and description of identified control measures, particularly on each risk, is an important activity. Control measures must be supported by specific procedure and specifications, in order to ensure an efficient implementation. This procedure must respect the national hygiene standards, or the standards requested by clients, being conformed by the most exigent requirements. An efficient modality to prove the decision, in the moment of risk analyze, is the use of an index card risks analyze. The index card includes all the steps of the procedure: potential risk identification, potential risk evaluation, justification of the decision, control measures and recommended registrations.

2. Determination of critical control points

The identification of critical control points of the process represents the stage where a risk is essential to be prevented, reduced on an accepted level or eliminated, and the control can be applied[2]. The identification of one critical point for a risk control involves a logical approach. This approach can be accomplished by using a decisional branch (based on information and experience of the quality team). In order to applying the decisional branch, each stage of diagram for fresh fruit storage process must be individually analyzed. On each stage the decisional branch must be used for each potential risk and for determination of control measures. The decisional branch approach must be flexible, having in consideration the whole technological process, in order to avoid (where is possible) necessary critical points (Figure 3).

3. Determination of critical limits

Each control measure referring to one critical point must be completed by the specification of critical limits [2]. The critical limits have to:

- Correspond to acceptable values referring to the product safety;
- Divide the acceptability by non-acceptability;
- Establishing the values for visual and measurable parameters in order to demonstrate that the critical point is under control;
- They must be based on document proves to demonstrate that the selected values will have as result the control of the process.

As examples of parameters measured were the following: temperature, storage duration, pH, the level of relative humidity, sensorial parameters (external aspect, texture) etc. In order to reduce the passing on critical limit, for one risk, cause by the variation of the preserving process, is necessary to establish the target levels in order to ensure the observance of critical limits.

When the critical limits not respect a specific standards or good hygiene practice guides, therefore is necessary to establish their validity according to identified risks control and registered in monitoring form.

4. Elaboration of monitoring procedures

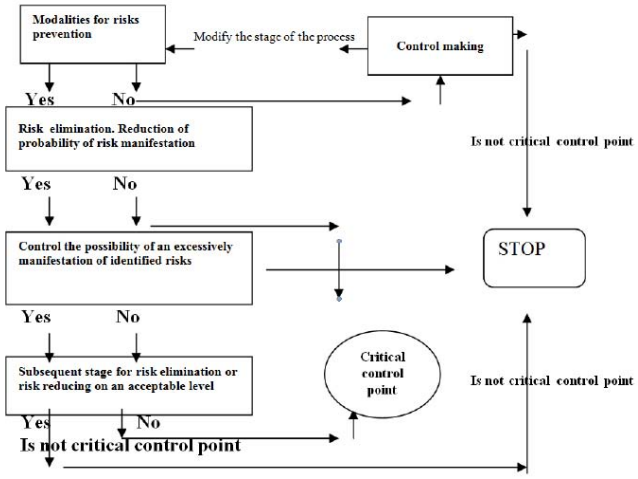

Fig.3. The decisional branch for crtical control points identification

An important part of the risk analyze system consist of the elaboration of monitoring procedure and planning measures, for each critical point, in order to ensure the observance of the established critical limits. The monitoring and measures must identify the control lose of the critical points and must offer the information for corrective actions. The process has been adjusted when the results of the supervision indicated some signals of the control losing for one critical point. The monitoring and measuring can be realized continuous or intermittent, with the specification that on intermittent monitoring and measuring is necessary to determinate the relevant frequencies of these two actions.

As a conclusion, for all control critical point, the monitoring procedure must have the ability to:

- Describe the monitoring methods;
- Establish the frequency the monitoring and measures;
- Establish the registering procedure;
- Documenting the registering date of the monitoring and verification;
- Establish the modality of the supervision and verification;
- Establish the risks parameters;
- Establish the corrective actions in the case of control losing tendency.

5. Elaboration of corrective actions

For each critical control point, on time, were established corrective actions in order to be used without hesitation in the moment when the verification indicates deviations from critical limit. These kinds of actions must include:

- exactly identification of the person charging with the implementation of corrective actions;
- description of the modalities and actions necessary correction of the emerged deviation;
- getting the actions referring to the damaged products (fresh fruits) on the storage process deviation;
- registers, documents, concerning the measuring and verifications realized which have to indicates relevant process and product data).

Monitoring (the verification equipment, verification of the person which labors with fresh fruits, the verification of efficiency of precedent corrective actions made), can

indicates the necessity of the application for the preventive measures in the case of a repetitive implementation of corrective actions for the same procedure.

CONCLUSIONS

1. The space designed for experimental valorization of fresh perishable fresh fruit, which include the storage in controlled atmosphere experimental cells, was analyzed concerning the potential risks associated with fruits reactions on the process, indifferent of the process level, and even there not exists the perception of some potential risks.
2. The critical control point and risk analyze can be used as instrument of risks evaluation and also for establishing a control system, which has the purpose to prevent the consumption of fresh fruits as insecure food. The system can be applied on entire food chain, starting with fruit growing and finalizing with the consumer. The implementation of the system must be based on scientific results concerning the risks for human health.
3. The fresh fruits contamination can be possible directly by breaching of the good agricultural practices or indirectly by equipments or other materials which has contaminated surfaces.
4. For the actual Romanian distribution system, is necessary the correct provisional estimation of useful fruits production. The main characteristics of fresh fruits referring to seasonality and perishability, requests a specific methodology for the implementation of the risks evaluation system, in the purpose to diminishing until the accepted limits, or completed elimination from valorization process.

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PRIORITY DIRECTIONS OF THE EFFICIENCY OF AGRICULTURAL PRODUCTIONS IN CONDITIONS OF ECONOMICAL COMPETITIVENESS

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Key words: *competitiveness, competition, efficency, quality, productivity*

Abstract
Once by passing at the new economical relations of competitiveness economy is changing and the way of approach, the hierarchy criterions of efficieny and its contents. Obtaining of the profit, being the main objective of unfolding of the activities in agriculture in conditions of competitiveness economy, in our opinion, in capacity of economic efficiency criterion will be maximisation of the profit per one unity of resources consumptions in the conditions of a high level of the quality and ensurance of production competitiveness. In the case of implementing of a new modern technologies, the criterion of efficiency will consitute the minimisation of resources consumptions per unity of final result.

INTRODUCTION

Globalisation of international economy ant technical-scientific progress offers new posibilities to rise agricultural efficiency to the level of many industrial branches. Achievement of this task can be reach through priority orientation to productin and export af agri-food products of a higher competitiveness.

Development of economical efficiency has economical and social effects both for producers – through saving production factors, reasonable utilisation, costs reduction parallel with quality grow and, consequently a better positioning in competitional environment – as well as for consumers through growing nominal and real salaries and implicit, through growing purchasing power of national currency, saving work time, recovery of free time etc.

Present paper proposes to offer a reference frame for identification, utilisation and valorification of resources and means available at enterprise, capable to asure an performant position on the market through fructification her competitive advantages [3].

MATERIAL AND METHOD

In the research, the author used dates from the Statistic Yearbook and the specialized formulary of the agricultural enterprises in the territory plan. In quality of methods of approached problems there were applied: selected, comparation and statistical grouping method.

RESULTS AND DISCUSSIONS

Economical efficiency represents a characteristic of economical activity at micro an macroeconomical level, being on every point of the frontier production posibilities when it is imposible to increase the production volume of the good, without diminishing the produced quantity from another good.

Economical efficiency of production, inclusively agricultural, depends on the goal of particular society, expressed through it rules, and it raising depends on the level of correctly cognition and application of the principles and economical international rules, correlated with specific conditions of that branch and country. Depending on the definite goal of the society, the role of the economical efficiency consists from stable and maximal satisfaction of the necessities of the people in material and spiritul goods as a result of reasonable utilisation of productive and natural available resources.

Important for every economical system is cognition of expressed forms of economical efficiency and ways of growing.

On the route of development of the human society grow the necessities in qualitative and quantitative expression. The necessity of it satisfaction conditioned new ways of choosing of production and services performing, more perfect on the basis of scientific and technical achievement, fact that generate in it turn, new social needs. Obtaining of an maximal volume of production depends not only of production forces development and of level of its utilisation, but also, by the istorical conditions of production process and of society needs.

According to appreciation modality, the effciency can be: absolute and comparative.

Absolute efficiency is define as an criterion of appreciation of production activity results at macro and micro level for a certain period of time and in dynamic through comparation of the level of efficiency on the whole enterprise, branch, district, development region and republic.

Comparative efficiency is on the basis of substantiation and selection of the most favourable decisional alternative from a lot of possible solutions. In this meaning we can mention that the goal of economical efficiency appreciation it is estimation of obtained results for strategies substantiation of economical grow at different levels: macroeconomical, microeconomical, at the level of the branch, product, etc.

The multitude forms of social efficiency productions and definitions of her esence constitutes an eloquent confess not only for multilateral character of researched category but as well as for the fact that the process of problem cognition it is constituting under the influence of the market economy in all branches of national economy of the country.

At the turn with general and particular proprieties, mentioned above, the content of economical efficiency it is influence by direct and indirect particularities of the branches of different productive activities (industrial, agricultural, transport etc.). Such influence it is characterised also for economical efficiency of agricultural activity.

In our opinion, at the appreciation of agricultural production efficiency must be taken into consideration some aspects:

Inflation level (if currency rate of exchange is instable, is distorting the indicators of economical efficiency).

Diversity forms of propriety and organisational juridical of agricultural activity.

Conditions (internal and externals) and the objectives of the activity.

Volume and the structure of production at the different agricultural units.

Social aspects etc.

Meanwhile, the concept of economical efficiency, through appreciation criterions and indicators system which characterise her must constitute a unity of appreciation not only for an economic agent but for all economic agents on the whole, to serve as a reason for agricultural production comparison in different organisational juridical forms of activity, apart on the development regions of republic, with the goal to reveal the positive and negative aspects of them. This partiality hamper scientific disclosure of each other. That is why the essence and sphere (level) of application of the category of „economical efficiency" is widing and is filling continuously.

We can assert that the essence of agricultural production efficiency consists in formation of a complex of requiments and conditions necessary for wide reproduction ensurance, in competitive conditions of economy, that will allow the branch to satisfy not only the society's needs in food products, but also harmony develop in conditions of functioning of certain economical connections, organisational, juridical, social, moral of a durable agriculture ensurance.

Raising of the useful efects must be the goal of the whole economical activity, but with condition of keeping of an ecological equilibrium. The organisation of an wide reproduction depends on the level of economical efficiency, because namely the profitability create all the premises and necessary conditions for the wide reproduction process.

As a result, we are considering, that in conditions of limited resources and unlimites needs, all the modalities through which an economic agent producer of goods can reduce the costs or grow production factors productivity used, or can improve the quality of goods through concrete ways of economical efficiency grow.

The results of economical efficiency researches of global production with utilisation of multicriterial average coefficient (on the ratio with favorable level) allowed us to estimate the place of each agricultural enterprise (number of 894 units) in competitional hierarchy, to identify grow reserves of competitiveness and economical efficiency for each group of enterprises comparison with reached levels of leader enterprises.

Generalizing obtained results we can formulate the following conclusions:

Agriculture of Republic of Moldova it is characterised through low efficiency and there are not conditions for wide reproduction.

The number of leader enterprises and with perspective constitute only 55 unities (8,6%), with average level of efficiency – 154 (20,3%) and with moderate efficiency and low efficiency together – 538 (71,4%). Created situation was possible, in the first turn, from the lack of insufficient utilisation of resource potential, of low level of competitiveness and prioritary grow of costs above agricultural selling price, insufficient subventions from the state and reduced implementation of technical progress achievement, performant technologies and fertilizers etc. This means that inside of agricultural sector take place an essential process of differentiation of enterprises concerning the level of economical efficiency production.

In reality, in our opinion, it is created four tipes of economy, little connected between them:

Progresive economy. A small number of enterprises (2,0%), activate steady and practice a wide reproduction.

Stationary economy. A small number of enterprises of about 20% have wide reproduction with low posibilities.

Low developed economy. An considerable number of enterprises (about 70%), activate profitable but achieve a simple reproduction.

Economy in stagnation. Unprofitable enterprises with low material basis, in which the debts exceed the value of assets and achieve a narrow reproduction.

CONCLUSIONS

On the basis of the researches were demonstrated the main directions of efficiency grow and competitiveness on the national plan in conditions of competitive economy, which in the author's opinion are based on:

1.Efficient utilisation of potential resources.

2.Raising products volume in agricultural units, which can be achieve on the basis of agriculture intensification, using new technics and performant technologies, progressive forms of labor, production, management organisation and other means of growing productivity at 1 ha and of the harvest.

3.Consumptions reduction of production, processing, packaging ant transportation of agricultural products. The improvement of distribution ways and implementation of benchmarking.

4.Implementation of compensation charges systems and payments exports which demonstrated their efficiency for protection of national producers in EU countries and can raise considerable potential of export from national agricultural sector for financing of each must be created a special transparent fund.

5.Stable grow of food products of high quality inclusive ecological in necessary quantities and assortments for ensurance of country food security etc.

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QUALITY IMPROVEMENT – INCREASING LEVER OF ECONOMIC EFFICIENCY AND COMPETITIVE STIMULATING OF THE ADVANTAGES OF AGRICULTURAL PRODUCTS

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Key words*: advantage, competitiveness, efficiency, quality, profitableness*

Abstract
The competitiveness of production – it is a complex notion, which reflects, on the one side, the producers interests, and on the other side – the consumers interests. In the first case it is considering competitive that product which asure the efficiency of the activity of producer. In the second case, - it is the product, which asure an maximal useful efect per unity of consumptions. Throuh these assertions result that in the assessment of the competitiveness of production it is necessary to take into consideration so much producers interestsas well as consumers.
We are considering and convincing that improvement of quality production in agricultural sector, the raising of price sale as a result of differentiation of the quality of production, as well as improvement of distributions ways constitute a totality of levers, which determine the main direction of increasing of economic efficiency of production and competitiveness of enterprises.

INTRODUCTION

On the market the competitiveness of products is appreciated through comparation of enterprise supply with requests of competitors in accordance with list of the most important needs of consumers. For the subjects of the market the products represent a totality of useful particularities, materialized in some substance, which represents a posibility of needs satisfy of consumers as well as producers. That is why, in the process of appreciation of competitiveness of products it is necessary to take into consideration both consumers' interests and producers which goals are interconnecting and, in the same time, are in contradiction.

Each consumer, choosing a product tend to reach an optimal ratio between the level of useful particularities and the expenditures aferent acquisition and utilisation. From the point of view of producer the utility of product is determined by the following factors: production consumers – the price. From a long perspective the goal of activity of each producer consists in achieving of maximal difference between sale pice of product and the expenditures aferent it production. The qualitative level of production process, which is manifesting through production and technological indexes and reflected in the quality of production, asure satisfying the needs of producer and it is considering a posibility of materializing the goal – profit obtaining.

The competitiveness it is determined by the totality of qualitatives and values particularities of product, which are taking into consideration by consumer, resulting from the importance of needs satisfying [2].

MATERIAL AND METHOD

In the research, the author used dates from the Statistic Yearbook and the specialized formulary of the agricultural enterprises in the territory plan. In quality of methods of approached problems there were applied: selected, comparation and monographic method.

RESULTS AND DISCUSSIONS

As we mentioned before, the competitiveness of production it is influence, in the first way, by two factors – quality and price. But in conditions of products promotion to consumer, the sales and post-sales services, the publicity, the image of producer, the market situation, demand fluctuation influence on the level of products competitiveness.

Nowadays, the main lever of price increase of agricultural products remain qualitative factor, which has a priority semnification in price forming.

The necessity of high quality products it is a prerogative nowadays. This is the main condition of economical and social efficiency increase.

The level of production quality it is an important criterion of each contry development in the frame of global community and a „visit book" for promotion of products on the global market in conditions of strong competition, widing export posibilities on the global market goods.

Raising content of useful efects (useful substances) in agricultural products (fats, albumines, sugar, starch etc.) lead not only to increase of food industry goods consumption production volume but in the same time at decreasing of production expenditures simultaneous with reduction of sowing surfaces and number of animals.

In the food industry the effciency of production (e.g. sugar, oil, starch production) it is direct influenced by the sugar content in sugar beet, the content of fats in seeds of sun flower and milk, starch in potatoes and corn, so – by the content useful effect in each production unity.

From theose established we conclude that the quality of agricultural productions it is determined by its utility.

In the author's opinion, the quality of agricultural production consists from the totalities of biological, foods and technological particularities, which determine the utility level of each kind of product in people nourishment, food industry ant other industries where agricultural production it is used in quality of raw materials.

From economical the point of view, the quality of a product it is conditioning by the expenditures aferent satisfying consumers needs of quantitative side, level of utility of consumption value, which in the case of agricultural productions is characterised through increasing of quantity consumption of this product. In the same time, we mention, that price grow must not take place in the same time with the index of rise quality, from the point of view that additional useful effect, obtained from the salling production of high quality, must be distributed between producer and consumer.

Groups of enterprises according sale price of of 1 q winter wheat beans, lei		Number of enterprises	Sale price of 1 q winter wheat beans, lei	Unitary cost of finished selling production, lei	Profit, lei calculated to:		The level of profitableness, %
					1 q finished selling production	1 ha from which was sale production	
I.	Până la 60	9	55,96	51,48	4,48	119,5	8,7
II.	60,01-80,0	72	74,78	64,63	10,15	259,0	15,7
III.	80,01-100,0	310	92,49	80,60	11,89	303,0	14,7
IV.	100,01-120,0	343	108,76	89,83	18,92	512,4	21,0
V.	120,01-140,0	116	126,69	102,22	24,46	691,0	23,9
VI.	More than 140	36	159,78	109,70	50,0	1376,0	45,6
Total, on average		886	104,73	87,32	17,4	463,0	19,9

Table 1. The influence of sale price of 1 q beans of winter wheat on it profitableness in corporative agricultural enterprises from Republic of Moldova, on the average of the years 2004-2006
Source: The author calculation in accordance with the specialized formulary of the agricultural enterprises, years 2004-2006

obtained from oil, sugar, fibres, fats etc. The economcal aspect of quality as a category reflects the necessity of consumptions evidence both in the production process, and consumption sphere (processing, exploitation).

Starting from the above mentioned, result that an agricultural product it is characterising through some biological, technical and economical particularities, which constitute and determine the qualitative level of this product. This product owing to it utility it is sale on the market at certain price.

Rising the production quality in agricultural sector involves a varied system of economical, administratives and organisational means and methods of influence above economical activity, aimed at creation, providing and keeping the qualitative level of agricultural production. This system must include all the spheres from agro-industrial complex, as well as planing process, scientific researches, technical agricultural production, agricultural production process, sales, consumtion (exploitation and processing). A great importance in production quality increasing occur to authentification (elaborating of qualitative standards).

Raising the production quality is not reasonable to be examined separately by the following economical categories, as: labor productivity, unitary cost, sale price, profit, profitableness etc. A tight and direct connection exists between quality of agricultural production and sale price.

The price is an important lever in stimulation of production quality in accordance to it utility, physical, chemical, biological particularities, what characterise the satisfying level of consumption needs. That is why, price forming must be calculated per unity of useful effect and not per physical unity. Establishment of similar price to the products of different quality come in a contradiction whith the rule of labor productivity upward, the principle of price forming on the basis of necessary work consumption. Price must be in accordance with the obtaining effect of consumer through

The most spread method of sale price forming at agricultural production in Republic of Moldova it is the method of price forming in accordance of production costs in conditions of demand and supply created in that moment. It is fairly method of sale price estimation, from the point of view that price it is a value currency expression of product, value which is give by circumstantial expenditure of directly production of this agricultural product. We are referring to all the elements of cost structure of finished sale production: materiales, fuel, energy, water, payment, expenditures aferent distributions and sales. At these total costs are adding a profit margin. Profit represents an essential condition of wide reproduction in agriculture. That is why, this method it is considering the most suitable by the local agricultural producers.

Both quality and sale price, obtained as a result of differentiation, influence on the results of economical activity of agricultural units. The dimension of the influence depends both by the level of the sale price and by variety of distribution ways of different kind of agricultural products. In this way, the producers of winter wheat have diffrent posibilities (distributions ways) for selling beans. Respectively, and sale price differ in a large measure (table 1).

Dates from table 1 demonstrate that once with sale price rising of 1 q winter wheat beans, the profitableness of product rises. In the VI th group of enterprises the sale price of 1 q, as well as unitary cost was superior than in Ist group, respectively by 2,8 and 2,1 times. This shows that increase in costs conditioned rise of quality of winter wheat, and in accordance lead to obtain higher sale price and the profit of 1 q wheat and at 1 ha sowing increase about 11 times, the level of profitableness being higher with 36,9 p.p.

Such evolution of sale price influence on the profitableness it is observed and at the production of grapes in both the Center and South regions of Republic of Moldova.

Obviously, that grapes of higher quality are sell through

different ways of distribution as on the market, individual store etc. at a high price. Higher unitaries costs are justified by the quality and sale price, that lead to higher profit and profitableness at 1 q and 1 ha obtaining.
This situation allow to the enterprises from the last groups to display an wide reproduction activity, that can not atributed to the enterprises from the groups with lower financial results.
A different situation of above presented materials it can observe at sugar beets
For sugar beets, for which ways of distribution are limited exists the monopol of gathering and processing enterprises and organisation of about 95% from selling sugar beets. Price difference is small and depends totaly on the quality of product. Having unitaries costs of 1 q at the same level, the profitableness is higher where the selling price is higher, too.

CONCLUSIONS

1. In conclusion we can assert that the main factor in ensurance of the competitiveness of agricultural production is the quality, which is manifesting through price differentiation and variety ways of distribution. This stimulates producers to place on the market production of high quality.
2. On the basis of obtained results where determined the reserves of profitableness level of the main products dependence on level of selling price for 1 q of product.
3.We can affirm that the reserves of profitableness grow in corporative agricultural enterprises from Republic of Moldova are superior in the far-off groups than where the price of 1 q it is maximal.
4. For consumer, the quality it is a compulsory particularity for product, but it is not enough for it buying. In connection with consumers sensitiveness above price level, this remain an important instrument in struggle competition. Together, price and quality of agri-food productions determine nowadays the level of competitiveness of agricultural products on the domestic market.
5. Distribution of agricultural and food products includes all the activities through which are achieve the process of passing of these categories of goods from producers economical agents to final consumers or users.
6. Development of agriculure and production efficieny economy increase can not be understand without an modern and efficient distribution system. Contrary, all the efforts of vegetable and animal agricultural production grow will fail.

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INCREASING FACTORS OF COMPETITIVENESS OF PRODUCTION IN AGRICULTURAL UNITIES

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Key words*: advantage, competitiveness, competition, factors, quallity*

Abstract
In nowadays conditions the competitiveness represents a complex, integral indicator which is setting up under the influence of lots of factors.
For estimating of conditions and factors of the economic competitiveness of economical agents from agricultural sector it is reasonable to take into consideration the competitive advantage theory and comparative advantage theory, as well as factors of external influence.
The economic competitiveness factors of agricultural enterprises are divided into two big groups: internals and externals. For achievement of the objectives vising the efficiency and profitableness it is necessary that all these factors of competitiveness of agricultural enterprises to be acquainted by its managers. Although each factor occupies an important place in the frame of strategic vision of the enterprise, in the last years, it was observed a series of transformations in the way of its approach.

INTRODUCTION

Competition represents an important phenomenon both for economical and social life because constitutes the motor factor which motivates so long the business as people existence, as a result competition it is a dynamic factor for progress and efficiency, which contribute to the increase of the welfare of the society. Is or not for society useful, the competition exists, on the whole economy, in the extent where it is registering an significant grow from one period to another and at the microeconomical level it is observing the wining of a competitive place better than previous period.

Once reaching a leader position on a certain market, the economical agent must be concious that the competition fight was not finished. He must continue to adapt to competition environment, to be flexible at the new transformations in the medium where he was relating, to find new competitive strategies, so he must be permanently „in alert", to find new solutions, even to renew, as to keep the gained place. The market will be dominated by theose producers who will better know to use more efficient the resources and who will have de capacities to adopt advantageous competitive strategies. [2]

MATERIAL AND METHOD

In the research, the authors used dates from the Statistic Yearbook and the specialized formulary of the agricultural enterprises in the territory plan. In quality of methods of approached problems there were applied: selected, comparation and monographic method.

RESULTS AND DISCUSSIONS

On the basis of investigation of essence and particularities of competition in agriculture sector it can emphasize that, competition as an instrument of technical-scientific progress it is one of the most important element of competition of economy, and in such conditions, competition must generate competitiveness which is manifesting though approriation of agricultural enterprises to compete with other economical agents within the framework of a certain market for obtaining a maximum profit.

Created situation both on internal and international market of agri-food products generate an theoretical and practical interest above the essence, factors and selection of estimation methods of cometitiveness level. In spite of significance of this economical category the analysis of scientific of literature shows that does not exist an conceptual approach of competitiveness unanimous accepted. In general signification, competitiveness means the capacity to compete and competitive advantages make up the benefits which offer posibilities to compete.

Within the framework of competition advantages analysis must be done a connection between internal and external factors analysis of an enterprise. In this meaning, lastly it is applying the notion of „benchmarking", what means „sistemical and continue comparation of the capacities of the own enterprise with capacity of the most strong competitor from the branch" or so called „best in class" (the enterprise which ranked first place in a certain domain).

The benchmarking can be appreciated as a method of competition supervision on the basis of perfomance indicators. The most important role of this method consists from researche of processes, concepts, methods, strategies and ideas of top enterprise and in transposing of the most favorable characteristics resulted from this analysis in the on enterprise. The benchmarking it is a concept that shows positive and negative deviation of the own enterprise above competition with the goal to improve the activity results permanently as well as an atention mean concerning erodation of competition positions.

The factors of economical competition of agricultural enterprise can be devided into two big groups: internals and externals.

The first group of factors which determine the comparative advantages of an enterprise determine the fruitfulness, which is the first particularity of the soil.

Besides land resources, the comparative advantages of an enterprise can be determined by the basis of technical-material situation, by existence of the currency means, investments as well as by the existence and utilisatin of human resources.

The second group of factors, which influence the level of agricultural enterprise competition and determine the competition advantages, depend by the factors of productivity, which ensure the advantage of agricultural unit achieved through strategical programming, staff traning, stimulation of the innovations, market investigation, costs reduction, application of the new technologies etc.

To the organisational-managerial factors refer: juridical organisational form of enterprises; utility level of production capacities; existence of comercial brands; the producer reputation; production and technological potential; work motivation system; the level of information accesibility; the progressive level of technologies; marketing service organisation; products standardisation and certification; management factors inclusively the structure of enterprises owners and the participation level of them in the management process; ecological process; progressive management process; system of the management quality; effective management; marketing administration and control etc.

To the economical factors which determine the level of comparative advantege of agricultural units we can mention:

- financial stability;
- payment capacity;
- investment attractiveness etc.

Marketing factors comprise: the level of competitiveness fabricated products, which are constitute from the quality of the products, the level of production consumption, sales management, the way of payment; programming of goods and sales flow; the investigation of buyers' behavior on the market; marketing researches; sales stimulation etc.

A special signification occurs to staff competitiveness. Internal conditions are manifesting through the level of competitiveness of the environment where staff work. Internal conditions must be inherited or obtained. It is keeping the opinion, that staff competitiveness is determined by internal and external conditions.

In composition of external factors of economical competitiveness of agricultural enterprises comprises: natural-climacterically conditions, which essential influence above production specialization, technical-material basis etc.

Natural fruitfulness of the land (first differential rent), level of which is conditioned by the physical – mechanical, biological particularities which have a decesive signification for plant cultivation branch; emplacement above commercial and processing centers of agricultural production.

State adjustment. The state involving or uninvolving in domain of competition must intensificate or essential diminish the comparative and competition advantages of agricultural units, namely influence on its competitiveness.

Almost in all international countries are in force juridical adjustments concerning rules of competition display principal part of which consists from interests protection of local agricultural producers.

Development of technical-scientific progress in agricultural sector. The level of technical-scientific progress in agriculture represents a process of continue improvement in technical, technological, selection domains; organisational improvement of agricultural production on the basis of scientific achievement; new technical and technological implementation with the goal to raise significant the efficiency of agricultural production and it processing for a stable ensurance of country with agricultural products of high quality and necessary range of goods.

The technical-scientific progress is based, in the first turn, on the innovations in the domain of agricultural production and the result of investments application in new technologies is manifesting through the raising of economical efficiency of agricultural production.

The practical life demonstrated that frequently utilisation of the new strategical actions with a view to obtain competitive advantages. If, at the first stage competition through price constituted a strategical alternative frequently used by the economical agents from the agricultural sector, nowadays it is developing new actions with a view of quality improvement, display of a new promotional efficiency actions, speeding up of approaching of consumers' needs etc.

Reorientation toward another factors of competitiveness demonstrate dynamic character of competition, as well as the fact that competitive phenomenon acquaint new valences due to the business environment being in permanently movement and transformation.

CONCLUSIONS

Finally, following analysis and systematization of competitiveness factors, examined by many investigators, we can conclude the following:

1.The competitiveness of a certain enterprise it is examining, as a relative category, namely each enterprise is comparing with competitive enterprise according with certain particularities.

2. The competitiveness of enterprise it is a category which is changing permanently, conditioned by the modification of internal and external environment factors of enterprise.

3. The main accent putting on comparation of indicators between competitors, in the same time with quickly adjustment to all the modification conditions of external environment.

4. Accordingly with management competitiveness the factors of competitiveness can be divided into internal and external. In their turn, the factors which inflence the external competitiveness inflence above internal factors.

5. Human resources can be considered as one of the main factors, which influence above more efficient utilisation of the whole production potential of the enterprise, as well as on enterprise competitiveness improvement.

Business environment modification in which activate nowadays the economical agents determine the dynamic character of the categories which make up the competitive advantages of economical agents. That is why, the enterprises must develop strategical potential permanently, sugesting the most competitive products on the market, and according with formed juncture of the market, of the competitive own state and advantages to realize and achieve a flexible competitive strategy.

All above mentioned allow us to consider that at the basis of competitive advantages of agricultural units are putting the connections and analysis of internal and external factors of the market which are permanently in transformation.

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THE IMPORTANCE OF NEGOTIATION AND COMMUNICATION IN RURAL DEVELOPMENT

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Keywords: *communication, negotiation, rural development*

Abstract
This paper presents several remarks about some negotiation techniques and communication issues in attracting or facilitating European Structural Funds in Rural Development process. Negotiation is a form through which two partners implied in that process obtain a reciprocal advantageous agreement.

INTRODUCTION

The purpose of this paper is to provide an overview of the role of communication in rural development. The paper is primarily intended as orientation and briefing for those responsible for identifying and formulating agricultural and rural development projects and programmes. The main body of this paper covers the conceptual aspects of development communication, the problems that can be alleviated by a well-conceived and executed communication programme, and a check list concerning communication for those formulating rural development projects.

MATERIAL AND METHOD

Strategies that include communication for rural development as a significant aspect of agricultural and rural development are sorely needed. Efforts in this direction are being made, but governments have yet to recognize fully the potential of this factor in promoting public awareness and information on agricultural innovations, as well as on the planning and development of small business, not to mention employment opportunities and basic news about health, education and other factors of concern to rural populations, particularly those seeking to improve their livelihoods and thereby enhance the quality of their lives.

Rural development is often discussed together with agricultural development and agricultural extension. In fact "agricultural extension" is often termed "rural extension" in the literature. In contrast, rural development includes but nonetheless expands beyond the confines of agriculture, and furthermore requires and also involves developments other than agriculture. Accordingly, government should consider the establishment of a communication policy that while supporting agricultural extension for rural development also assumes the role of a "rural extension" service aimed as well at diffusing non-agricultural information and advice to people in rural areas.

By its very nature as mass media, communication for rural development can provide information useful to all segments of rural populations. However, it would serve as a first effort toward advancement of "rural extension" services and activities aimed at rural development concerns beyond those of agriculture. Thus, extension and communication activities would be expected to work in tandem, allied in the common cause of supporting income-generating activities, both agricultural and non-agricultural.

Development communication rests on the premise that successful rural development calls for the conscious and active participation of the intended beneficiaries at every stage of the development process; for in the final analysis, rural development can not take place without changes in attitudes and behaviour among the people concerned.

Development Communication is the planned and systematic use of communication, through inter-personal channels, audio-visuals and mass media:

- to collect and exchange information among all those concerned in the planning a development initiative, with the aim of reaching a consensus on the development problems being faced and the options for their solution.
- to mobilize people for development action, and to assist in solving problems and misunderstandings that may arise during development plan implementation.
- to enhance the pedagogical and communication skills of development agents (at all levels) so that they may dialogue more effectively with their audience.
- and last, but by no means least, to apply communication technology to training and extension programmes, particularly at the grassroots level, in order to improve their quality and impact.

Development communication can help to ensure that the design and action plan of a development project take into account the attitudes, perceived needs and capacities of the people which the project is trying to help. Many projects have failed in the past because assumptions were made about the willingness and capacity of rural people to absorb new technology and development infrastructures into their

way of living and working. Abandoned irrigation schemes and settlement programs, broken down equipment, and the slow adoption of improved crop varieties, are example that bear witness to this failure to bring about attitudinal and behavioural change.

If a rural development project has been planned with its beneficiaries, their participation and mobilization are almost certain to follow quite naturally. However, in any event, communication support during project implementation keeps people informed, helps to mobilize them, and to stimulate the more conservative to action. This is especially so when communication, (in the form of audio-visual presentations for example) is used to spread knowledge of successful development action taken by some communities and individuals in other communities and individuals that have not yet mobilized.

Furthermore, even the best project, designed with its beneficiaries, cannot be cast in concrete; as it progresses, there will be an inevitable need to fine-tune its activities and introduce changes of emphasis. A good communication system can keep a dialogue open between all those involved in a development project, thereby nipping problems in the bud as they arise. Such an ongoing information flow can also help to ensure co-ordination and proper orchestration of inputs and services to a development initiative.

RESULTS AND DISCUSSIONS

Training at the grassroots level had become a major priority in recent years. At the same time, communication technology has been improving and becoming even cheaper and easier to use in rural areas. Audio-visual media make It possible to:

- help overcome the barriers of illiteracy and incomprehension (by conveying ideas and practices in an audio and visual form);
- illustrate new ideas and techniques more effectively than by word-of-mouth alone, and this improve the impact of extension and training;
- compress time (a whole crop cycle can be shown in a short presentation);
- compress space (events and practices in distant locations can be transferred to other places where they can be useful testimonials);
- standardize technical information (by creating audio-visual materials that illustrate the best available advice to farmers and having these materials used throughout the extension and farmer training chain, thereby ensuring that the technical information will not become distorted during its passage from its source to the smallest and most remote farmer).

Any development initiative which, if it is to be successful, depends on rural people modifying their attitudes and behaviour, and working with new knowledge and skills, will normally benefit from communication support. So also will projects that have a multi-disciplinary nature, that is to say those which involve a number of subject-matter ministries and authorities, and which are therefore inherently difficult to manage. Communication can provide the linkages that will ensure co-ordinated management.

Communication planning is a specialised field and calls for people who, in addition to a knowledge of communication processes and technology, also have an understanding of development issues and a familiarity with conditions in developing countries.

CONCLUSIONS

Development communication planners cam often be made available by international development agencies, either from among their own staff or by calling in consultants. Communication planners may also be found locally in developing countries. There are increasing numbers of universities and institutions that are becoming involved in development communication and can provide expertise. Many NGOs in developing countries also have communication expertise that can be called upon. Audience segmentation is very important for the communication strategy as a whole. Relevant actors, beneficiaries and intermediaries are clustered into groups according to socio-economic and other characteristics they have in common. In later stages, communication objectives, message appeals or participation options are analyzed and designed per group. In audience segmentation, gender and age awareness plays a crucial role. Instruments and techniques useful to identify actors and relate them to each other are, among others, direct observation, interviews, focus group discussions, sociograms and resource users analysis

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STUDY REGARDING THE IDENTIFICATION OF PRESENT AND FUTURE OCCUPATIONS FROM SOUTH OF ROMANIA

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Key words: *occupations, labor market, structural unemployment, continuing adult training, etc*

Abstract

The aim of the study is to highlight trends in the evolution of the current and future occupations for the south area of the country. The study presenting has left from many aspects which characterize the labor market: the existence of structural unemployment which is mainly due to the economic system marked by certain imbalances and which leaded to a atypical development between branches; responsive attitude of the educational system in the way that he has to adapt the educational offer when market demands for certain specializations and skills is obviously; poor knowledge of the trends in the labor market. Using the questionnaire as a specific research instrument it was able to outline the profile of current and future occupations and correlation of new occupations with the need of following of a course of continuing training.

INTRODUCTION:

Necessity of this study it's gived by the following realities which are characterizing the labor market in southern Romania:

Economic disparities: According to the "National Strategy Plan for Regional Development 2007-2013" the specific of the south area is the disparity between the nodes of concentration of industrial activities (Arges, Dambovita, Prahova, Dolj) and tertiary (trade, services, tourism), with specific tourism areas (Constanta, Tulcea) and large areas with crops (Braila, Calarasi, Giurgiu, Ialomita, Teleorman, Olt, Mehedinti), etc.

Causes: The severe impact of transition to a market economy - industrial restructuring: dismissed in the steel industry from MITTAL GROUP (Braila, Galati), the decline of industrial units (Prahova), closing the majority of representative industrial units (artificial industry developed in the '70 years - Calarasi, Giurgiu, Ialomita, Teleorman).

Effects: the lack of jobs, unattractive salaries, inadequate level of qualifications had leaded to the departure of employments to areas with economic growth; the increase of housing cost maintenance had also leaded to the migration of unemployed population to rural areas where are practice an ineffective agriculture.

The existence of unemployment: In 2008 Braila district had a unemployment rate of 3.8% (national average was 5.6%); in Arges 4.3%, Calarasi 4.6%, Dambovita 5.2% Giurgiu 4.4%, Ialomita 5.6%, Prahova 3.4%, Teleorman 7.3%, Dolj 6.1%, Gorj 5.9%, Mehedinți 8.6%, Olt 4.4% and Valcea 4 %, etc.

Intense activity of construction of private housing has taken over a part of the fired labor force and in this way the social shock dismissed was tempered. There was a process of stabilization of newly created enterprises (eg textile enterprises operating at Braila). Market demand for other specializations and skills became apparent.

MATERIAL AND RESEARCH METHODS

In April 2008 was realized a sociological study (Project 91-057 Program 4 "Partnerships") which had as main objective the identification of present and future jobs from rural areas (for agriculture and non-agriculture activities) and identification and evaluation of continuous professional training needs for agricultures and other categories which are rolling on the activity in the rural areas. The opinion poll was applied in 11 counties in order to assure the distributives margin for sampling, by the implication of the National Agency for Agriculture Consulting agents (catalogue with the Counties Offices of Agriculture Consulting which are cover the southern area of the country). The study realization had been used a specific research instrument, Questionnaire, and was established the target group (local actors: mayor, professional training suppliers etc.; Local Beneficiaries: local agricultural producers, family farms, students, workers, craftsman, agro-tourism, others beneficiaries) on which was applied the opinion poll.

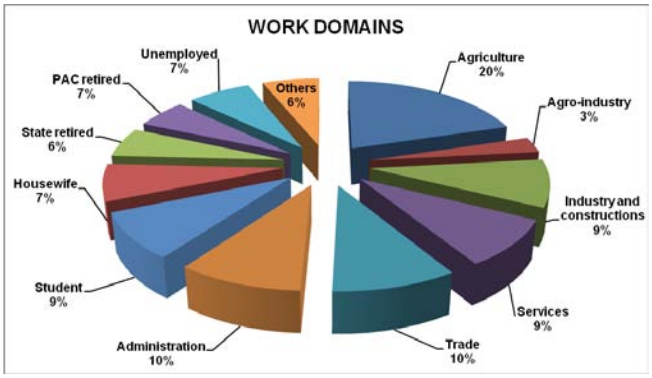
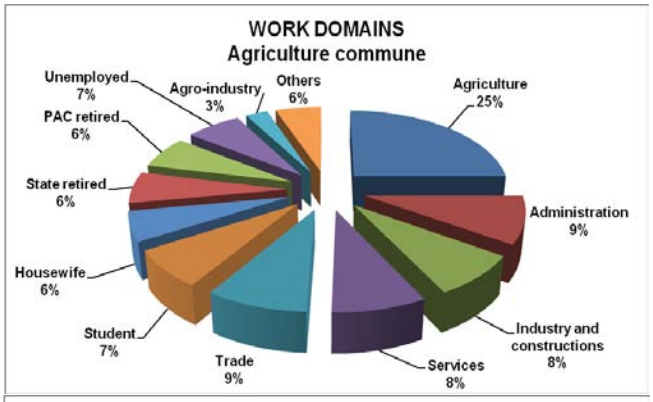
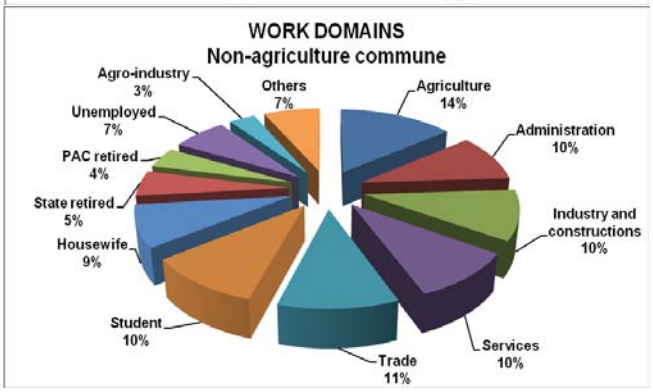


Fig. 1 Work domains





RESULTS AND DISCUSSIONS

Present occupations

Questioned population (fig.1) works in agriculture (20.3%), trade (9.5%), administration (9.5%), industry and constructions (9%) and services (8%).

Because of existing inequalities that are manifested in the labor market (a decline of industry, the majority of industrial closures representative, etc.), unemployment has a significant share (7%), in both, agricultural and non-agricultural communes. Also, it can be remarked the high share of female population 6% in agricultural communes and 9% in non-agricultural communes, which have the status of housewives.

The main occupations of agricultural domain (Fig.2) are those related to agriculture and animal husbandry (30%), fishing (11%), mechanization (7%), viticulture (7%). According to the study, from the 10 agricultural communes, major share of active population (by approx. 90%) which is working in agriculture it's held by Purani commune (Teleorman County), Dala commune (Giurgiu county) and Lucieni commune (Dambovita County).

A specific feature of employment in rural areas is the involvement of the majority of the population employed in agricultural activities related, first of all, to land processing and livestock farming. Poll results indicate that most of the people (28.9%) had owned a land area of 1-2 ha, 5% had land areas of 5-10 ha, 0.7% of respondents over 50 ha, 39 % have animal shelters and 10.3% have tractors and agricultural machinery.

At question „How would you assess the current income of your household", 34.4% of respondents consider that the income assure the necessary strict, for 30.5% the income does not provide what is necessary and only 1.8% succeed to have all whar they want.

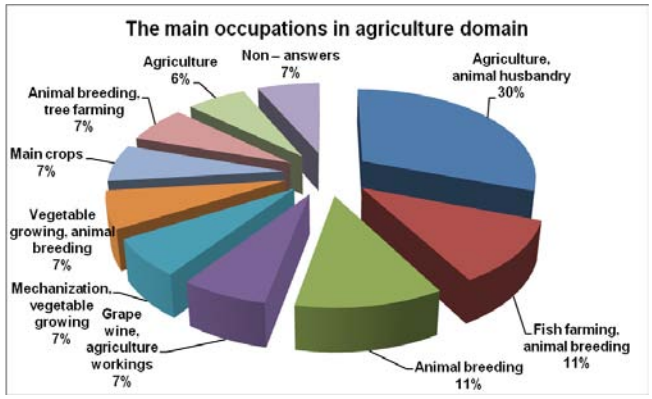


Fig. 2. The main occupations in agriculture

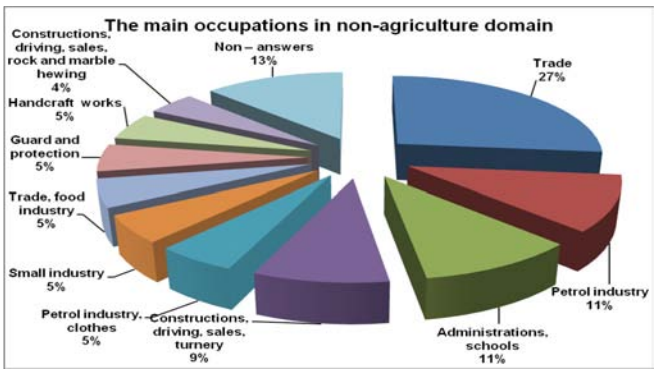


Fig. 3. The main occupations in non-agriculture

Fig. 4 Traditional occupations

Key types of rural-nonagricultural employment (fig. 3) are traders (27%), those working in the public sector (administration, schools - 11%), oil industry (11%), construction workers (9%), etc. The active population for the dominant non-agricultural activities is held by Budeasa commune (Arges County) - 98%, and Blejoi commune (Prahova county) - 83%.

From traditional occupations (fig. 4) which mark the rural life find only a few who became real jobs and complete the agriculture generally available to the majority of municipalities such as those related to art and craft workshops.

We observe that for the traditional occupations exists interest from respondents. Their development could be one of the most effective forms for new jobs creation. Existence of these occupations shows that there are craftsmen who practice them even against the backdrop of restricting activity in these areas (other domains such textile, clothing and construction are still more attractive), restriction reasons

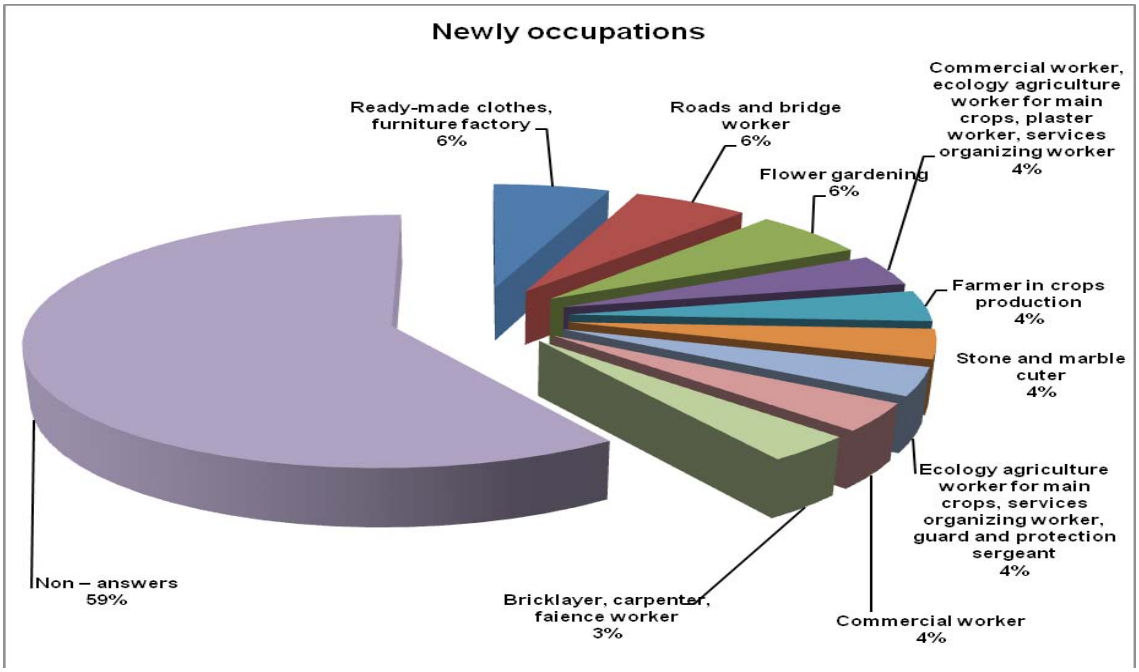


Fig. 5 Newly occupations

being determined by the low earnings in these domains.

Taking in to consideration the fact that most of the rural population is involved in agriculture, there are opportunities for business development and other fields, which would allow the first diversification of activities (fig.5) in rural areas and business improvement in social services (organizer service, security and order sergeant, trade worker, bricklayer, carpenter, marble and stone cutter, roads and bridges worker, clothes, furniture factory, floriculture).

Specializations and competence for newly occupations

Another issue facing rural areas is the lack of complementary services for agriculture support (creation of center purchase of agricultural production, creation of collection centers for milk, veterinary assistance, assistance in agriculture, etc.). The development of these services could lead to some difficulties, because not all rural areas have the necessary manpower, trained as professional who could work within these services. Even if mentioned occupations are practiced in communes took in study, they are practiced by people who

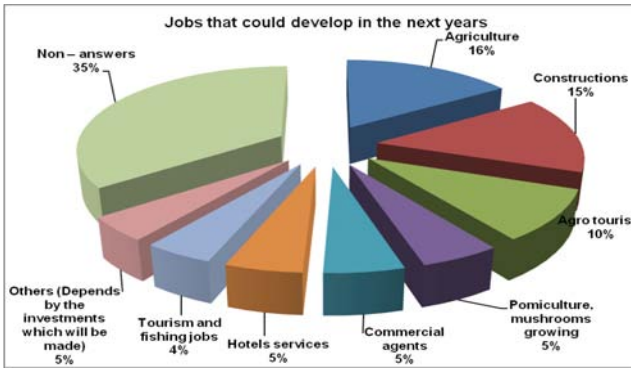


Fig. 6 Perspective jobs

have no special training.

At question **"Would you consider necessary the continuous professional training to face the professional changes?"** 70.60% of the respondents considered necessary training, 13.80% responding negatively to this question.

To find a job 54.8% of respondents considered it necessary a professional training course and only 31.5% believe that it is absolutely necessary such a course.

A significant proportion of people who considered that a training course is a little necessary or unnecessary to find a job category is comprised of age over 55 years which probably consider that at this age matters less training programs earlier found that hardly any jobs. The proportion of non-responses is 3.50%.

Favored factors for sight of new occupations in rural area are related to: interest of area tourism (6.30%), European financial support (6.30%), infrastructure investments (6.30%), tourism development (6.10 %), and non-responses (79%).

CONCLUSIONS:

1.Current occupations: considering agricultural and non-agricultural communes – rural area, can be distinguished several types of employment:

- Predominantly agricultural (25%) with stable people in the community
- Predominantly in agriculture and animal husbandry (30%), with non-agricultural population engaged in other sectors (administration, construction, services, trade)
- Mainly non-agricultural (trade 27 %), oil industry, administration, schools, construction, etc..),
- Local-mixed in the agricultural and non-agricultural sectors (traditional occupations - farming and breeding, viticulture, gardening, crafts, etc.).

2.Future occupations: In southern Romania, take place now and in the future an accentuation of disproportions in occupational structures. The existence of large gaps between the level of economic development of the counties studied

turn up in intensity and scale of the crisis of the use of labor.

3.Changes occur in employment in the counties studied must have as an active measurement (with the greatest impact in increasing employment opportunities) professional training, with the key role in regulating supply and demand in the labor market.

4.Basic types institutions which could contribute to employment increasing in rural non-agricultural are local services, non-agricultural independent establishments leaded by entrepreneurs and small and medium enterprises (SMEs).

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THE ANALYZE OF THE MUTATIONS WHICH WILL INTERFERE IN THE OCCUPATIONS FROM RURAL AREA IN THE NEXT 3 YEARS FROM EU INTEGRATION

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Key words*: mutations, occupations, population, education and professional training etc*

Abstract: *The objective of the study is to underline the tendencies in the dynamic of economics sectors from rural area. The new occupational structures, thru the capacity system of professional training must take into accounts the Romanian rural economy needs, as well as the future of the most important European economies. The mutations analyze which will interfere in rural area occupations have been realized with the help of some specific indicators, as: structure of occupied population in rural, by age, sex, environment and occupations; occupied population rate between 15-64 years old, by education levels, residence environments and sex; population categories in the 2 th quarter of 2008; population occupied by economic domains etc.*

INTRODUCTION:

Due to financial crisis, the worst affected areas are the pillars of the industry - metallurgy, textiles, auto components, chemicals and vehicles. This is reflected by the unemployment rate which has started to rise.

Labor market in Romania has undergone profound changes resulting from economic reforms, being induced directly influences to the quality of the human factor.

Social conditions have resulted in reducing the natural population growth and increased definitive migration, which in turn caused the steady decrease the population and consequently of the population actively involved in the economy.

There are areas such as construction, real estate transactions, rental activities and services provided by business, health and social assistance, public administration and defense, trade, hotels and restaurants, financial intermediation, where the occupied population has growth, areas which are considered with potential for development in the next period.

Restructuring and privatization have resulted in a migration of population from urban dismissed to the rural area. Agriculture has become the employer of last resort, which resulted in a rate of employment in rural bigger than the urban area.

In the next period, is estimated an orientation of active population from rural areas to the service sector of agriculture, as a result of development of a competitive agriculture focused on medium-sized farms.

To strengthen the new trend will be addressed segment of the population employed in subsistence agriculture, to attract it to the non-agricultural services sector. The process will be widened due to increasing economic performance in the manufacturing and services, as well as the opportunities offered by diversifying the instruments of intervention in support competitiveness of these areas.

RESEARCH METHOD

Statistical analysis - identifying prevailing economic areas, of active population 15 and over 65 years, by level of education; identify occupations of rural areas by age group to surprise changes that will take place in occupations of rural areas in the coming years;

	2002	2003	2004	2005	2006	2007
Total (thousand people)	8329	8306	8238	8390	8469	8726
Agriculture, hunting and fishing and forestry	3011	2884	2634	2674	2514	2462
Fishing and fish breeding	4	4	4	4	4	3
Industry	2122	2059	2052	1973	1969	1958
Extractive industry	133	125	117	106	90	85
Worked industry	1835	1797	1800	1732	1749	1744
Electric and thermic energy, gases and water	154	137	135	135	130	129
Constructions	366	396	419	463	513	594
Trade	855	906	938	1038	1118	1200
Hotels and restaurants	95	105	133	133	134	156
Transport, storage and communications	401	402	404	418	453	478
Financial intermediary	69	72	82	90	95	109
Real estate transactions and other services	316	355	383	386	440	486
Public administration and defense	148	155	159	173	183	209
Education	415	420	430	430	426	429
Health and social assistance	358	359	367	370	389	394
Other activities of national economy	169	189	233	238	231	248

Table 1: Civil occupied population by activities of national economy
Source: NSI Romanian Statistic Annual 2007

Module approach - addressing the data and the use of objective indicators, statistics: Romania's Statistical Annuals, Eurostat data or data available from the studies of literature,

Year	Residence environment	Total		University	After high school	High school	Professional	Gymnasium	Primary and no graduated school
2000	Total	9700580	63,9	84,8	70,5	65,9	71,4	50,8	57,3
	Urban	4986345	56,3	84,6	68,1	60,5	64,4	34,6	32,1
	Rural	4714235	74,5	86,2	86,2	78,2	81,8	69,2	70,0
	Masculine	5265540	70,2	86,4	73,3	72,3	76,7	56,5	61,1
	Feminine	4435039	57,7	82,8	66,9	61,0	61,0	46,3	54,7
2001	Total	9622672	63,5	82,4	71,0	65,2	72,4	49,6	55,4
	Urban	4652154	55,9	82,0	68,6	60,2	64,0	23,3	21,5
	Rural	4817931	74,2	86,1	85,8	77,2	84,4	68,1	67,7
	Masculine	5209042	69,7	85,0	73,2	71,4	77,6	54,1	60,4
	Feminine	4727541	58,2	80,2	69,6	63,0	59,5	46,6	51,8
2002	Total	8670889	59,0	81,7	69,1	63,0	67,5	43,6	44,6
	Urban	4583695	54,3	81,3	67,8	59,1	61,6	22,0	16,5
	Rural	4087194	65,3	84,4	76,8	71,7	75,3	57,9	65,3
	Masculine	4764386	65,6	84,3	67,2	69,6	73,4	48,3	50,6
	Feminine	3906503	52,5	77,8	68,5	57,8	56,5	39,9	38,7
2003	Total	8669384	59,0	82,2	69,1	63,6	68,7	43,6	40,6
	Urban	4634419	54,8	81,9	68,8	60,0	63,0	21,0	15,7
	Rural	4034965	64,7	84,7	70,9	72,0	76,2	57,8	50,7
	Masculine	4785233	66,0	84,6	68,2	70,3	74,8	49,5	29,8
	Feminine	3884151	52,2	79,7	70,3	58,2	57,7	38,9	36,5
2004	Total	8689371	59,0	85,1	70,5	64,3	68,1	40,9	38,8
	Urban	4877909	56,8	85,2	70,3	62,0	64,3	23,1	16,9
	Rural	3811462	62,1	83,7	71,8	69,8	72,9	53,7	48,4
	Masculine	4759218	65,4	87,2	68,5	70,3	73,2	46,8	44,4
	Feminine	3930153	52,7	82,8	72,9	60,3	57,3	36,4	34,7
2005	Total	8683252	59,3	85,3	70,9	63,3	68,8	41,3	38,5
	Urban	4863193	56,2	85,1	70,4	60,3	63,5	21,9	14,8
	Rural	3820059	63,9	86,4	73,7	70,9	75,3	55,3	49,4
	Masculine	4791834	66,5	86,7	70,2	70,4	75,1	47,9	44,6
	Feminine	3891418	52,4	83,7	71,8	57,8	57,8	36,1	34,0
2006 (trim. IV)	Total	8651410	57,4	84,6	71,3	60,0	65,0	39,6	36,8
	Urban	4926890	55,5	84,6	71,2	57,8	60,5	21,4	16,7
	Rural	3724520	60,3	84,4	72,1	65,3	70,3	51,8	46,0
	Masculine	4798546	63,9	85,7	71,4	65,9	70,1	46,7	44,9
	Feminine	3852864	51,0	83,4	71,2	55,2	56,1	33,9	30,7
2007 (trim. IV)	Total	8708430	57,9	86,6	70,2	59,9	64,8	39,6	36,0
	Urban	4984794	56,3	86,9	69,0	58,0	59,6	20,7	18,1
	Rural	3723633	60,1	83,5	77,0	64,7	70,8	51,3	44,5
	Masculine	4809463	64,1	87,3	70,8	66,1	69,7	46,0	43,5
	Feminine	3898966	51,7	85,9	69,7	54,8	56,4	34,6	30,4

Table 5: Occupation rate of population between 15-65 years old by education levels, residence environment and sex, in period 2000-2007(%)
Source: Education and Research ministry, Report on national education condition, 2008

European documents for continuing training, the analysis period 2000-2008.

RESULTS AND DISCUSSIONS

1.Statistics analyze by economics domains

Changes in the structure of employment by sector reveal a process deindustrialization and loss through migration of active population. It notes the significant increase of the population employed in trade, construction, hotels and public administration. We have more foundry workers (manufacturing), welders, and workers in steel construction, commercial agents and intermediary business, security and order personal, but also a legislative body, executive and administration leaders, more representative in the labor market. Changes reflect the way that different occupations have reacted to economic changes in analyzed period.

Occupied population	2002	2003	2004	2005	2006	2007
Total - thousands persons	9234	9223	9158	9147	9313	9353
Agriculture (%)	36.2	34.7	32.0	31.9	29.7	28.2
Industry (%)	25.2	24.8	24.9	23.5	23.2	22.5
Construction (%)	4.4	4.8	5.1	5.5	6.1	6.8
Services (%)	33.9	35.7	38.0	39.1	41.0	42.5

Table 2: Occupied population structure by activities sector, sex and environments
Source: NSI Romanian Statistic Annual 2007

	U.E. - 25	Romania
% occupation in agriculture	4,0	28,2
% occupation in industry	24,6	22,5
% occupation in services	71,4	42,5

Table 3: Occupied rate by economic domains (2007)
Source: Eurostat, 2007

Comparison with the EU, in the economic differentiation is unfavorable for Romania.

Compared with the EU, share of the population employed in agriculture is 24,2% higher than the EU average, with 2,1% less in industry and 28,9% less in services.

2. Employment rate of the population in rural areas

According to the NIS, in the II quarter of 2008 the active population in rural areas was 45.4%. The employment rate of the population working age is at a distance of 10.3 percentage points by the target of 70% established for 2010 by the Lisbon Strategy.

3. Education and professional training on labor market

In 2007 the rate of employment of the population aged 15-64 years increased by 0.5 percentage points over 2006,

Occupation groups	Total occupied population/year	Age categories					
		15-24	25-34	35-44	45-54	55-64	65 and over
Total	100% 2007	10,3	23,4	23,0	18,2	14,0	11,1
	100% (2000)	13,7	20,9	23,6	23,7	28,3	13,7
Members of the legislative body, its executive, senior government leaders, officials and heads of units economic social and political	100% 2007	1,7	20,1	35,6	29,7	12,3	0,6
	100% (2000)	1,7	19,1	52,6	25,8	0,8	1,7
Specialists with intellectual and scientific occupations	100% 2007	3,3	34,1	19,2	26,1	15,7	1,6
	100% (2000)	8,2	28,9	37,4	25,2	0,3	8,2
Technicians, craftsmen and assimilated	100% 2007	8,5	29,4	28,1	24,2	9,5	0,3
	100% (2000)	10,7	31,9	40,4	16,8	0,2	10,7
Workers in the operational services, trade and assimilated	100% 2007	13,3	33,7	34,0	14,4	3,8	0,8
	100% (2000)	20,4	40,0	31,3	7,8	0,5	20,4
Administrative officers	100% 2007	7,3	29,0	34,3	23,5	5,5	0,4
	100% (2000)	-	-	-	-	-	-
Farmers and skilled workers in agriculture, forestry and fishing	100% 2007	9,3	18,3	17,2	16,6	19,7	18,9
	100% (2000)	12,7	16,0	17,7	28,9	24,7	12,7
Craftsmen and skilled workers in trades type item, adjustment and maintenance of machines and installations	100% 2007	11,5	30,4	31,4	21,2	5,2	0,3
	100% (2000)	15,3	39,9	35,7	8,7	0,4	15,3
Other categories of occupations	100% 2007	12,4	26,9	27,8	19,0	9,0	4,9
	100% (2000)	20,7	33,0	32,3	12,8	1,2	20,7
Untrained workers	100% 2007	13,8	24,2	23,5	19,3	11,6	7,6
	100% (2000)	19,1	29,7	32,6	16,2	2,4	19,1

Table 6: Occupied population structure in rural area, by age, sex, environment and occupation groups in 2007 compared with 2000 (%)
Source: NIS: Romanian Statistics Annuals 2002 - 2008

reaching at 57.9%.

Can be observed significant differences on residence environments for each education level. Continue, employment rates of people with low or average training are higher in rural areas.

This situation is explained primarily by the fact that rural areas offer the opportunity of employment activities (paid or unpaid) deployed in agriculture for people with a lower level of qualification.

AMIGO results of the survey conducted by the National Institute of Statistics indicates that in 2007, only 4% of the people who have some form of training in the national education participated in training courses/retraining through public agencies or private employment. Participation in such programs training is decreasing compared to previous year (same period), when it recorded 4.8%.

4. Statistical analyze of occupations in rural area

- for group of occupations "Members of the legislative body, executive, senior government leaders, officials and heads of units and the economic and social policy" - the highest rate of employment is one segment aged 25-34 years (from 19,1% in 2000 to 20,1% in 2007) and 45-54 years (from 25,8% to 29,7%) and a reduction to share aged 35-44 years of 17% (from 52,6% in 2000 to 35,6% in 2007);
- for group "**Specialists with intellectual and scientific occupations**" - the highest rate of employment is the segment aged 25 and 34 years, it had a 5,2% increase (from 28,9% in 2000 to 34,1% in 2007);
- for group "**Technicians, craftsmen and assimilated**" - a significant share of employment rate is the segment aged between 45 and 54 years with a significant increase of 7,4% (from 16,8% in 2000 to 24,2% in 2007);
- the group "**Operational workers in services, trade and assimilated**" is represented by the segment aged between 45 and 54 years, registering an increase of 6,6% (from 7,8 in 2000 to 14,4% in 2007);
- in 2006 was recorded group of "**Administrative officials**" who is represented by segmental aged between 25 and 34 years in the percentage of 34,7%;
- group of "**Farmers and skilled workers in agriculture, forestry and fisheries"** follows an upward trend for the segments aged between 25 and 34 years (from

	Script I pessimist	Script II moderate
Total (thousand people)	-26,1	-1,8
Agriculture, hunting and fishing and forestry	-1,8	-13,4
Fishing and fish breeding	-162,1	-2,7
Industry	-76,2	6,5
Extractive industry	-1,1	-8,6
Worked industry	-54,6	11,3
Electric and thermic energy, gases and water	21,5	9,6
Constructions	-60,9	9,7
Trade	-78,6	6,3
Hotels and restaurants	0,6	3,7
Transport, storage and communications	-149,4	1
Financial intermediary	5,6	-14,5
Real estate transactions and other services	-3,9	-10,2
Public administration and defense	3,5	2,3

Table 7: Forecasted dynamic of labor force demand in period 2005-2013
Source: INCSMPS, Economic development and occupation, implications on education offer and professional training, 2005

16% in 2000 to 18,3% in 2007) and the share of 65 years and older (from 12,7% in 2000 to 18,9% in 2007);

- Group of "**Craftsmen and skilled workers in trades type item, adjustment and maintenance of machines and installations"** is the segment 45-54 years, registering an increase of 12,5% (from 8,7 to 21,2%);
- "**Other categories of occupations**"is occupied by the segment between 45-54 years, registering an increase of 6,2% (from 12,8% in 2000 to 19% in 2007);
- for the group 'Untrained workers" an ascending trend is recorded in segment aged between 45-54 years (from 16,2% in 2000 to 19,3% in 2007);

Scenarios regarding the dynamics of employment, outlined under the PHARE program by specialists from the National Institute for Research on Labor and Social Protection, for developing strategies for training, showing a decrease of demand for employment by 1,8% per entire population until 2013, in the moderate statistical modeling.

Pessimistic scenario could be an indicator of employment trends, in which the development strategy and wage increases are not changing compared with the levels registered in foreign the countries.

CONCLUSIONS

1.Evolution of economic sectors, are demonstrating that agriculture, although recording a tendency of decrease, has a high share compared with average from EU-25, while the share of industry shows little variation on total light industry and increases in manufacturing which means more employment for welders, construction workers in steel, mounted and repairers of appliances and electronic and electrical equipment, etc. On the other hand, notes that the services sector continues to grow. There are significant growths of the population employed in trade, construction, hotels and public administration;

2. Changes reflect the way that different occupations have reacted to economic changes in analyzed period.

3. Based on statistical data from 2007 compared with 2000, regarding the employed population structure, broken down by age groups and groups of occupations, it may find that: the highest rate of participation in the occupied population structure it's represented by people aged 25 - 34 years (5,2%) and by people aged 55 - 64 years (15,4%) for the group of occupations "Specialists with intellectual and scientific occupations" and (11,5%) for the group of occupations "Members of the legislative body, its executive, senior government leaders, officials and heads of units and the economic and social policy", followed by the segment aged 35 - 44 years (34,3% in 2007) for the group of occupations "Administrative officials";

In Romania will widen existing disparities in terms of occupational structures of labor force. Restructuring activities sometimes over dimensioned, abolition of some posts of technical and administrative staff, as well as migration of administrative personnel from posts paid from the public budget to other paid with higher salaries (even if sometimes with the occupation which are requiring smaller competences or in the underground economy) explains a good part of these evolutions.

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THE NEED TO SET UP GOAT FARMS FOR THE PRODUCTION OF MILK, IN A PERMANENT STABULATION SYSTEM IN THE BRAN REGION

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Abstract
It is very well known that the Bran Region is famous for traditional sheep husbandry, and because this occupation is an inherent part of the way in which tourism is performed in the region, given the sale of traditional sheep milk products to domestic or foreign tourists, we identify the need to set up dairy goat farms, so that, by combining goat's milk with sheep's milk the quality of the types of cheese obtained will increase, but most importantly, the effectiveness of turning milk into cheese will be improved.

INTRODUCTION

To have the desired impact, any attempt to change the mentality of livestock farmers in the tradition of our country is met first by the lack of cooperation from local authorities, which should be between a connection between investor and the community, but the „unfortunately" not all investments are going to increase the revenue of those who understand to manage in their own interest.

Trying to convince producers sheep in the Bran area of the need to establish dairy goat firms, is supported by arguments of our personal training expertise in cheesemaking in southern Spain, where the combination of ewe's and goat's milk leads to streamlining activity of cheese factories. Also, the morpho – productive characteristic, recommended the establishment of farms raising dairy goats. On the other hand there is also a need to establish a modern factory for processing milk into cheese, because without cuch an investment the sale of traditional dairy products will be faced with the prohibitions, obligations and restrictions imposed by the agricultural policies of the European Union.

MATERIAL AND METHOD

The material utilised in carrying out this study consisted in the research, analysis and interpretation of the specialited documentation. An important part presented through the adequate methodology, was to know the national and international experience, referring in particular to the operation goat milk in the south of Spain and efficient ways of making cheese.

RESULTS AND DISCUSSIONS

Although in Bran area there is no tradition of raising goats, this is due to an erroneous impression formed in time about these animals, namely are said to be destructive of the various forms of vegetation, and in particular, the trees are in early stage of development.

Since the increase in sheep in the area traditionally, which has more restricted area, if we relate to Europe, specifying that a shepherd is more practical only in Eastern Europe, respect nature, I brought the possibility of exploitation argument dairy goats permanent stabulation system which would allow both to protect nature but, in particular, better streamlining of the activities undertaken in such a farm.

If we relate to the experience of Spain, we can say that the south of the country has a dry climate and the types of vegetation in this area requires the operation of goats, which adapts best to these conditions, being the only animals capable of consuming wood vegetation . But here and meet the sheep breeds adapted to arid climate by improving the breeds of sheep in Israel, but cows and farms operated by this time in the permanent stabulation system, and because the cow's milk may be combined with good results at goat. It stresses these aspects because, after discussions with various breeders in the Bran area, they brought the proposal, the possibility of collecting large quantities of sheep's milk, over 3000 l / day, and a quantity of whole milk , where the loose and need to establish a modern factory for processing milk and cheese processing in respecting all European quality standards, this issue competing and packaging and labeling to the cheeses requirement for recovery, even if the area has been extended until the end of right to exploit such as traditional cheeses.

In establishing such factories should be taken into account and adapt the technology flow in order to obtain particular traditional products, which can be labeled as organic and can be exported. The establishment of cheese factory, however, is necessary to find a major investor in the area, which will involve financial, following as part of the costs to be recovered by accessing the European funds.

To highlight the tradition sheep husbandry Bran area, this statistic may be the farmers here as follows:
• 2,000 households have a 6000 head sheep, with a number ranging from 1-5 sheep heads, these households may not be considered as having influence on the production of sheep's milk cheese and,in the area;
• 150 large slave holding a total of 15,000 head of sheep, but with a large variation in the number of heads held as some farms have on average 250 - 300 heads, 46 farms have on average 100 head and 4 farms have a number of heads between 1000-2000.
Given that Bran is an area with specific tourist destination, be considered a recovery than traditional products in the region and especially cheese.

Cheeses produced from goat milk or in combination with milk from other species are mainly consumed by foreign tourists, where there is a habit in this regard and this can be changed through skills Romanian tourist products to consume „healthy" even if there is a tradition in the consumption of such products.
Increasingly important contribution of agrotourism in the tourism, will increase the living standards of families who have space for accommodation, the development area in

which tourism is practiced, and on improving infrastructure, with an economic impact by increasing the recovery of resources , especially those less known, to reduce pressure on the most intensively exploited.

It also recommends designing new products to support the ability to support environmental conservation and the environment.

You can use the combination of making cheese, the milk of the three species, namely goats, cows, sheep to varying degrees, depending on the type of cheese you want to develop.

The advantages of these species combined milk cheeses are in preparation:

• goat milk combined with sheep's milk, as positive results: increased efficiency of production given that increases the amount of milk used in the design, since the production of milk obtained from sheep is low; lender of taste characteristic taste and goat milk with the desired impact in terms of feed consumed, giving the characteristics of good organoleptic milk, along with bodily hygiene, increase firmness by homogenization of cheese fat content of milk and can change the color of cheese, giving it a shade more open, but depending on the percentage of used goat milk, cheese can (when it is high in%) and white color that falls open to the appearance of the product, obtaining a product with high nutritional content, because goat's milk rich in vitamins and minerals and is metabolized by the body very well, having similar composition to that of human milk.

• goat milk combined with cow's milk: increased efficiency of production as a result of increasing the percentage of casein converted into cheese, which is induced by high casein content of goat milk; lender of taste and taste characteristic of goat milk with the desired effect depending on the feed consumed, giving the characteristics of good organoleptic milk, along with bodily hygiene, obtaining a product with high nutritional content, because goat milk is rich in vitamins and minerals and is metabolized by the body very well, having similar composition to that human milk.

• goat milk combined with the sheep and beef in some percentage contribution brings the two met in combination outlined above.

When the herd of goats in lactation is high, may be obtained from the cheese milk of this species with the major advantage that in making cheese may be used raw milk nepasteurizat due to low incidence of tuberculosis (only 1 ‰), being known that the pasteurization, the calcium becomes indigested the body (as some researchers even lose a portion of calcium), no longer necessary to add additives such as calcium chloride in making cheese.

CONCLUSIONS

1. Shows the contribution made by goat milk by combining milk with sheep and cows, with a direct impact both qualitatively and quantitatively the cheeses;

2. Given the main landing area should be included in the tourist circuit and a cheese factory, which will provide tourists the traditional preparation, with tastings and sales of products;

3. Have highlighted how the feeding goat milk with the recommendation to obtain a feed „unique" that do not require periodic changes of the ration and to maintain the yield of milk processing;

4. For this project will be implemented, it is necessary and the involvement of the National Agency Growth goats in Romania,"CAPRIROM" will be to facilitate the purchase of goats Alpina French race, which will then be subject to improvements, for a better adaptation and domestication in the area, and it is necessary to work with resorts and research profile;

5. Also National Growth goats in Romania, will intermediate exchange of experience between the Romanian and french producers, with the role of better awareness of the benefits resulting from the exploitation of dairy goats.

6. Need to find outlets in production of cheese, both internally and externally, because the street trade of traditional products will disappear;which is necessary and required to be able to access European funds;

7. Creating a cooperative system with the specific tradition of the European Union, which would allow a direct involvement with, the manufacture of cheese and milk producers in the area and manner of payment of milk to determine the contract, which will provide opportunities livestock farmers to know in advance the price at which they will capitalize on milk production and the price vary depending on the percentage of fat and protein, which vary by species and season, but the price different and depending on the number of cells somatic and the number of bacteria / milliliter of milk, but milk from goats, the increase in permanent stabulation rise and homogenization of production throughout the year. To combat the shortcomings of the parameters of hygiene in milk production, it is necessary for farms to have a certain number of animals from which to obtain a production important to justify the investment in equipment for milking and cooling tanks;

8. It is recommended that further improvements to make the selection of goats milk to each producer in part, by body weight, physical appearance and constitution, so as to obtain a homogenization of milk production obtained from each animal taken individually homogenization on-line quantitative and qualitative, and the young male breeders to select with high genetic potential;

9. Young male and female, for recovery for meat production, to undergo the process of fattening and gathering of youth and the goat from the sheep for meat production, to make export conditions in Arab countries with tradition in the consumption of meat of sheep and goats;

10.Growth and technology înţărcării kids to take account of the place and birth, which will also depend on the distribution of milk production throughout the year, knowing that each animal passes through a part of the lactation curve, with major influence on milk production obtained at certain time intervals;

11.Differentiated by fiscal policies (taxes and duties), the state can encourage animal breeders who have a certain number of heads, and small producers will quit in time to this type of activity, or will reorganize to become effective;

12.Packaging and labeling cheeses will remove from the market to producers for the production of milk used does not justify the quantity of processed cheese, and outlining the exact composition of the products to be certified by laboratory tests;

13. Monitoring the health status of animals, which will become mandatory, and will increase the quality of products obtained from them, but this measure should be consistent with operation in the hygienic conditions of the animals.

14. Is expected that the project, once it is implemented, will constitute an example for other areas of Romania with traditional breeding and agrotouristic potentially.

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