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# THE CONSERVATION OF PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE: THE PERSPECTIVE OF PRODUCERS WHO ARE TRADING IN SIBIU AGRI-FOOD MARKETS

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***Abstract***

*Building resilient rural areas or communities is one of the major goals of any strategy supporting food security for the future. Under these circumstances the major stakeholders are the people working in agriculture such as producers. In Romania, Sibiu county they can be landowners, custodians or non-formal land-loaning people dedicated for practicing agriculture. The scope of this article was to survey the awareness level regarding the value of genetic resources for food and agriculture of producers that are selling their agri-food products in Sibiu city. Based on the analysis of our results most of producers are of orthodox religion and are coupling the religious fests 'calendar to agricultural practices calendar. If they are aware about the value of old animal bred, they are not aware about the value of preserving landraces for more than 100 years in the same agro-ecosystem. About 15 crops species are among the best traded on the Sibiu market, but their genetic pools is much wider reaching up to 40 species in traditional gardening. The landowners are not ye associated at the commune level and therefore it is a great need to be supported at the local and county level by officials. A recognition of the history of importing genetic resources for the region is a must due to current failures in importing crops not suitable for very peculiar local conditions. Also, we recommend the adoption of the list of crops varieties traditionally cultivated in villages. The willingness of producers to be recognized for a potential network for on farm conservation should also be part of a process to be adopted an official list for on farm conservation of genetic resources in a bottom-up approach up to the national and European levels.*

***Key words*****:** *producers, agri-food products, plant genetic resources for food and agriculture, landraces, local breeds, biodiversity conservation*

## INTRODUCTION

Local varieties or local populations of crop plants as well as old races of animals have come to the attention of researchers more than 20 years ago as they are important gene pools for breeding [15; 16; 20] and gene banks [8; 17].From political point of view they ensured their entry into the future food security agenda and influencing the general agricultural practices management as well as conservation strategies for agricultural biodiversity [5; 7]. In Italy, some 14 years ago, it was a real movement in the central region for the recognition of the value of local crops varieties or landraces that further penetrated the regional commercial markets, also in line with the European regulatory framework [13; 14]. We mention that earlier stages of this process of institutional capacity building have been achieved without specific provisions from European legislation that started after 2008. Have been published a whole series of strategies on how genetic resources can be best preserved. The best strategy should aim a dynamic balance between *in situ* and *ex situ* conservation of all genetic resources on a cost-efficient basis, according to an evaluation on a four- or five-years analysis based on specific principles published some 40 years ago [1], and followed by new approaches [9; 13; 14]. Resilience of local communities is an old and a new topic that basically integrates the principles of sustainable development [18]. The authors believe that all members of rural communities potentially can best contribute to the development of local strategies as they will ensure the successful implementation of the promoted measures. These strategies provide innovative financial

mechanisms including incentives and, moreover, the communication landscape with business that is a must [3]. The main challenges are given and supported at the policy level as well as of the effects of climate change (i.e. risks and hazards). The scope of this article is to evaluate the willingness of a certain group of producers from Sibiu county that are selling their agri-food products in Sibiu city to be part of a county network dedicated to on farm conservation. A survey based on simple questionnaire was applied in order to reveal also their knowledge for landraces cultivation and old animal breeding. These results may further substantiate local decisions-taking regarding the general agricultural management in rural areas of Sibiu county, in order to ensure food security for the future based on resilient communities for South East Transylvania [2].

## MATERIALS AND METHODS

**Producers identification.** During September (i.e. 2016, 2017 and 2018) it was possible to identify the origin of agri-food products during surveys conducted in the following agri-food markets: "Cibin", "Transilvania" and "Huet", all located in Sibiu city [19]. 114 producers from Sibiu county as farmers, small farmers and householders have been identified and answered a short questionnaire. The questionnaires were accepted by respondents and applied during Oct.-Dec. 2017 and 2018.


Fig. 1 Surveyed producers for Sibiu city are originating from the following communes: Alțâna, Bârghiș, Jina, Loamneș, Luduș Răşinari, Roșia, Sadu and Șelimbăr. Source: Modified map after https://ro.wikipedia.org/wiki/Fi%C8%99ier:Harta_jud_Sibiu.png.

**Places of investigations**. The residence place of producers located in the following communes: Alțâna, Bârghiș, Jina, Loamneș, Luduș Răşinari, Roșia, Sadu and Șelimbăr (Fig. 1). They represent only 20% of the producers identified during two years of surveying.

**Data analysis**. Provided data during the survey have been statistically analysed.

## RESULTS AND DISCUSSIONS

**Producers and land.** Among 114 respondents 84.62% are landowners, 11.54% custodians and 3.85% work the loan land without official documents. This high percentage of landowners raise the question why they are not organized in an association for representing their rights in different fora with authorities. Such an association would further support their economic interest for producing agri-food products [22]. The distance towards the main roads varies between 2 km up to 30 km and the fertility of soil range between medium to fertile with good exhibition towards the environmental factors. As far the distance is the hardest is to sell their products. From religious point of view between 60% (Bârghiș) and 100% they are orthodox (Jina) and agricultural practices are still closely related to the religious fests' calendar for all producers. 37% were women among producers and among these 84% were householders rather than farmers. Family members varied for a family between 8 (i.e. 6 families) and 2 (12 young families) and the majority 68.2% varied between 5 and 4 members. The family members can support further the farmer occupation job for the future. The cultivated surface area varies between 400 ha (i.e. Jina) down to 0.5 ha (i.e. householders). The majority of producers are working a land surface between 15 and 20 ha (i.e. 72.5% of the respondents). 28.57% are practicing intensive agriculture on large surfaces (i.e. down to 20 ha). 57.14% are practicing organic agriculture and 14.29% are practicing classic agriculture.

**Seeds analysis**. The majority of producers, 43.48% developed mixed farms (livestock and crops) and only 13.05% are crops farms and

gardening. Among these farmers (i.e. 86.75%), over 68.42% are using certified seeds for commercial production especial for cereals, maize and potatoes. A percentage of approx. 30% of respondents said they had seeds of local varieties and this is the case of mountain areas potato from Rășinari and cucumber from Sângătin. 80% of producers for vegetables are saving seeds and 20% are buying from acquaintances or markets. This is the situation for beans, tomatoes, pepper, egg plants. Producers are not aware about the concept of native landraces [23] and this can be dramatic for loosing genetic pools for important vegetables or cereals that may be the subject of breeding programmes in our country and Europe. Almost all producers tried exchanging local seeds with other producers from other counties based on the seeds exchange network highly promoted in the country. However, the risk of entering allochthonous landraces in the region is high. Therefore, we consider that during this project it was also possible to underline the importance of local landraces originating from their own lands and gardens and inherited from their ancestors. Under these circumstances we may consider that 30.77% of the saved seeds could be considered either native (cultivated for 100 years in the same agroecosystem) such as certain landraces of beans, or creoles (cultivated for less than 50 years in the same agroecosystem) since they are older than 30 years, the remainder being local allochthone seeds with a different origin (newly introduced local seed). Respondents considered local varieties as more resistant towards dry conditions (27.78%) and at least 44.44% felt they wanted to perpetuate them in order to preserve their family traditions. 73.07% of respondents considered that they are committed to continue the preservation of local genetic resources by cultivating them on small surfaces (i.e. gardening). We mention that 12 crops species are cultivated into the field, 9 in gardens and 5 in both, by taking into considerations only the species that are part of the trading system (i.e. *Triticum aestivum, T. durum, Aegilops speltoides*, *Zea mays*, *Hordeum vulgare*, *Avena sativa*, *Medicago sativa*, *Solanum tuberosum*, *Brassica oleracea*, *Solanum melongena*, *Cucumis sativus*, *Lycopersicon lycopersicum*, *Alium cepa*, *Alium sativa*, *Capsicum annuum*). All producers are attentive for characteristics of fruits (57.14%) or seeds (42.86%) for saving seeds. Also, for hem are important the shape, size, colour, taste and the complete lack of pesticides (11.11%).

**On farm conservation willingness**. On farm conservation is one of the most efficient economic alternatives for biodiversity conservation [6] and yet it is not implemented in Romania or other European member states. Different reasons are substantiating this delay in creating a European framework for their recognition into a real network [9]. 90% of respondents are aware that it might be possible that landraces and local breeds to disappear very soon, and 81.25% of all of them want to be part of an officially recognized network for the conservation of local varieties and breeds. An association of these producers would become more effective on the way of on farm conservation network recognition. Among these producers some are farmers and some are only householders and only 55% of all respondents are practicing total mechanized harvesting. This is the case for farmers and not for householders. Under these circumstances a relevant study was published for central Italy having as a case study Brassica family for crops species [11, 14, 21].

Further data relevant to the need for recognition of on farm / on household conservation status for landraces and old animal breeds will be presented.

**In-house needs supplied by farming**. Of all respondents 93% are covering all their needs as agri-food products from their own farms for all year around (i.e. 365 days). This should be a normal situation for the sustainable agricultural practices in all agricultural ecosystems and recognized today as a real challenge [4]. Exceptions are small householders dedicated either for vegetables cultivation either for livestock breed. Only between 6% and 16.34% of the ingredients of the basic courses originate outside Sibiu County (i.e. tomatoes, pepper, egg plants, potatoes). Without awareness the households

of Sibiu County, apply the central principles of circular economy but most of them are stack in the rural areas [12]. Resources from spontaneous flora are often consumed during the season: ramsons, nettles, spruces, common bird's-foot trefoil, cress, sheep's sorrel, broad grass, plus edible mushrooms collected from natural and seminatural areas. Among the old breeds of domestic animals, we mention as frequent used: 'Țurcană'- sheep, 'Bazna'- pig, 'Mangaliţa'- pig and 'Bălţata Românească'- cattle, long-time ago recognized for their value [20].

**On farm conservation perspectives**. The European legislation defines *in situ* conservation as the place where local varieties have naturalized and is assimilated to the farm term for cultivated plants. No indications are given as to how recognition of holdings / owners of local varieties can be organized. Sibiu has the chance to develop for the first time officially in Romania this concept to ensure the implementation capacity of the European regulations on the conservation of local varieties.

At the local level, with the support of local councils it can be developed official lists of species and varieties traditionally cultivated in their communes. In this regard a network of producers may further organize meeting with officials for defining their own genetic resources. It is based on principles already substantiating generally bottom - up approaches strategic development. The purpose of this official list is to raise awareness at local level of the significance of long-term food security for maintaining *on farm* or *on household* of landraces and old breeds considered valuable resources worldwide for their genetic basis in research, breeding and food security. In this regard, the tax conscription of Transylvania published in 1750, reveals official lists comprising the main species of crop plants found in villages [10]. Many of these (the potato) were still gardening crops and in less than 100 years they have conquered cultivation in the field [2]. The process was slow, associated with local understanding of their usefulness as food and feed. This process was lost during time and it is valuable in terms of adaptation of genetic resources to new environment. Testing first in small plots ]n case of framers is lost in Romania. However, the national network of seed testing may provide a free access to new genetic resources, but however, local climate may be different compared to testing centres and the dramatic loss of production cannot be estimated for all types of climate in the country [1]. It is relevant that each owner of arable land (householder and farmer) should be aware of the inestimable value of local native varieties grown in their own household or of old farmed breeds for more than 100 years. Also, each landowner (householder and farmer) understands the unwanted effect of introducing into the culture of alien, exotic varieties if they are not accepted by the community. The community of arable landowners represented by the City Hall has the right to decide on the acceptance or rejection of the cultivation of alien varieties and hybrids on the basis of the assessment of the genetic contamination risks of the local genetic resources pool, and further for ensuring food security for long term.

Producers know the intrinsic value of these valuable genetic resources through instrumental values (i.e. take-over and perpetuation from generation to generation) as well as their unicity as food resources. Their value can be defined collectively also as instrumental values. Those values are attributed to any resources that can be integrated into economic needs at the social level. As a result, local native and creole varieties can be well defined and understood not only by conservationists but especially by the society in which they carry out their activity or by the stakeholders to promote them.

In case of local authorities, through the Local Councils, they need further to support the coherent and consistent integration of conservation measures applied in agricultural policies for supporting food security under the impact of climate change from the village level, on a case by case basis and therefore there is an urgent need for the adoption of official decisions regarding the following:

(1) the Official List of species and varieties / hybrids of plants and animal breeds

historically existing in the localities. This measure is important in order to avoid the cultivation of plants that cannot be adapted to local pedo-climatic conditions in our country. Here we present the example of Paulovnia's unsuccessful cultivation in Brad commune, Sibiu county. On the other hand, the loss of certain crops (e.g. millet) may be again of interest today due to demand in the food market. For the future, the revitalization of neighbourhoods would support integrated agricultural management for rural communities by compacting crops plots in the same area and reducing costs.

(2) the Official List of species and varieties / hybrids of crops and animal breeds existing on the farm at Sibiu County and the distribution map thereof. The measure will support future strategies for ensuring food security in Sibiu County under conditions of climate change. They will also be benchmarks for harmonizing environmental policies with regional agricultural and economic policies;

(3)Council Decision on the procedure for approving the long-term integration of new genetic resources (plant varieties and hybrids of plants and animal breeds). Such a measure will especially support communication to rural communities about the latest news, vulnerabilities and risks. The measure should be accompanied by recommendations for rural communities;

(4) Council Decision on the list of landowners applying traditional agricultural measures, use local varieties and breeds of Romanian animals in the household. The measure is important for knowing at county level the situation of cultivation and preservation on the farm of the old cultivar varieties, their production and the potential of marketing traditional products to the agri-food markets or stakeholders such as the hospitality industry interested in culinary tourism. The magnitude of the presence of these resources may determine cooperation with the Sibiu varieties testing centre to initiate the recognition of local varieties for Sibiu County. Sibiu gastronomic region can bring for the first time the official recognition of the presence of local varieties and old races of Romanian animals in the households of people. The measure is justified by the results of the interview for the producers.

## CONCLUSIONS

Based on the analysis of these results it can be considered that generally producers from Sibiu county are dedicated for continuing agriculture activities. However, they are not aware yet about the value of plant genetic resources as landraces even they are aware about the old animal bred. Even the most of producers are landowners they are not associated to develop common practices for the support of resilient villages or communes facing climate change risks and hazards. Local and County Councils are not yet involved in the real support of the conservation and sustainable use of rural resources such as genetic resources for food and agriculture. They need to address and substantiate their future decisions on the agricultural history of the place and to support the cooperation between all producers in a village or commune.

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