

In Situ Management of the Andean Tuber Biodiversity in Communities differentiated with regard to its articulation to the market

Por: **Tito Villarroel**, *PROMETAS, Bolivia*

Recently in our country, the implemented economic development model suggests that the market (free market) is the best way to achieve the social and economic development; the market is the best and most equitable distributor of resources among the different actors in the multiple economic processes, mainly in the urban-urban and urban-rural-urban relations. But will it also be in the rural-urban-rural or rural-rural processes? What consequences have or will have the gradual penetration of the market values in the local production-consumption factors and mainly in the local management of the agrobiodiversity? In what way will be affected the traditional technologies of production and conservation that have maintained entire societies Which will be the immediate effect on the prioritization of the production destination?, these are key questions that are closely related to the biodiversity management and its importance within the community reproduction, which means in Situ conservation¹. It is expected that the commercial demand gives special importance to several species and varieties at expense of others, mainly those which do not have the requirements of "commercial" though, some or many varieties would be lost or abandoned (genetic erosion). Also the traditional technologies of production and the production destination will be more specialized toward commercial values, deteriorating therefore the self-consumption, which is the fundamental factor for the conservation. The analysis of these hypotheses, in the perspective to predict if the market transforms or will transform the agriculture until now diversified, has motivated the implementation of a comparative study of two agricultural highland areas with conservationist biodiversity tradition: Candelaria (province Chapare) and Pocanchi (province Independencia), department of Cochabamba. This work was developed within the Program "Conservation and Utilization of Andean Roots and Tubers Biodiversity".

The areas of study are differentiated with regard to their access and articulation to the urban markets of Cochabamba city: very near and with very frequent access for the first and distant and with infrequent access for the second. Another important factor of differentiation constitutes the production organizational system: individual-family type for the first one and community-collective type (system of Aynoka) for the second. The variables that were analyzed are: the relation of the ecosystem to the logic organization of the production system; in this context, the local management of the cultivated biodiversity of Andean tubers, the current technologies of production and the local rationality in the determination of the destination of the production (technological, ecological, social and economic factors, added to cultural aspects), key aspects for the maintenance of the biodiversity.

It was determined that beside its differentiation about its articulation to the market, these areas are characterized by the presence of vertical ecosystems where is carried out a very diversified agriculture thanks to the environmental heterogeneity. The validity of traditional strategies of Andean tubers production with the utilization mainly of local resources (locally renewable resources) was established, which constitute an average of 85% in Candelaria (74% in potato, 88% in oca and 92% in papalisa), in contrast with 100% in Pocanchi. In this second area, the production of the tubers varieties implies the resorting to own sources of production that do

¹ The in Situ conservation is referred not only to a number of species and varieties cultivated in a given geographical space associated with a simple botanical description and its agronomic qualities, but instead it involves a totalitarian mode, integrate to do agriculture, to a lifestyle, to a way of handling the productive space and time and to the different forms of site-utilization, as basis for the family food security. It is a broad and comprehensive concept that involves biological, technological, social, economic, and cultural factors in a holistic comprehensive view of permanent interaction.

not depend on the market. In this type of low input agricultures, the management and utilization of one variety from a broad variability is emphasized: 42 varieties of potato, 27 of oca, 4 of papalisa and 4 of isaño in Candelaria, in contrast to 23 varieties of potato, 21 of oca, 6 of papalisa and 4 of isaño in Pocanchi; important concentration with regard to other Andean ecosystems constituting important genetic reservoirs that can potentially re-distribute these important resources to other areas of similar characteristics. This variability is distributed in the ecological vertical system translated into different altitudinales ranges (930 m. in Candelaria in contrast to 400 m. in Pocanchi). This permits a dynamic management in space and time (*wider* in Candelaria) through permanent local and extra local flows where varieties are exchanged, which are incorporated to their production systems, first in the community and then in the family. In the production and reproduction of this important biodiversity, the families of both areas resort mainly to traditional social practices like the Ayni and Tarpuya combined with the Company and Labor in Candelaria, and the Mink'a, Ayni and e interfamilial Company in Pocanchi, practices that instead of minimizing the need for money as a factor of production, strengthen the ties of reciprocity and solidary relationships between families and together with the heredity, the gift, the theft, etc., stimulates the flows of varieties, redistributing in the site and outside the biodiversity.

With regard to levels of productivity, in these agricultures of ecological importance, the levels of productivity range between 1.6 Kg/m² to 1.85 kg/m² in potato; 1.4 Kg/m² to 1.5 kg/m² in oca and 1.2 kg/m² to 1.3 Kg/m² in papalisa in Candelaria in contrast to 0.906 Kg/m² and 1,090 kg/m² in potato; 0.598 Kg/m² and 1.738 Kg/m² in oca and 1.385 Kg/m² and 1,500 kg/m² in papalisa in Pocanchi. In both areas the ranges are greater to the national average, which does not exceed the 0.6 kg/m² on the average of these three crops. However, with a low or null utilization of technologies considered as "state-of-the-art", the yields are relatively good.

With respect to the destination that the families gave to the production of these crops in both areas, they have the characteristic of being of multiple combination since it fulfills several complementary objectives: self consumption for the family and herd (fresh and processing traditionally), seed for the reproduction of the system and the biodiversity, barter or change for products from other ecologies and a volume is assigned for the payment or gratitude to the extra-familiar labor collaboration. A coincidental point in both areas is that the volume destined to self-consumption (8 to 10% on the average) includes more than 90% of the cultivated variability. This factor together with the ecological one is more important than the market for the conservation.

The sale is another factor used for the acquisition of money, which will be invested in the purchase of products and food are not produced at the local level, however, the volume of sale includes not more than 7 varieties on the average in potato, against 6 in oca and 2 varieties in papalisa in both areas, that is that the market demands few varieties and marginalizes the great majority (is the market a factor of erosion?). In Candelaria the potato and other tubers are sold by 43% of the same producers of the intermediate fair of Colomi; against 30% that sell them directly in the city markets and finally, the 11.5% on the farm, on the other hand in Pocanchi, due to the distance toward the markets, they are marketed especially on the farms (nearly 90%), where the intermediary has more possibilities to impose the price that believes advisable

In these types of agriculture, considered sometimes "backwards and inefficient" mainly the aynoka system, most of the production factors for the Andean tubers can be reproduce regardless to the market. Moreover, the need for ensuring the production destined to self consumption and sale makes necessary the conservation of a broad range of varieties and species cultivated simultaneously in the local ecosystems heterogeneity, which walk, where are produced and reproduce dynamically in time and space in a familiar or communal way².

² The "legal" delimitation of the geographical space (socioeconomic space) as protected areas, without considering local factors for the management of its resources is a risk for the biodiversity conservation since it will stop the natural flows of the seeds of many varieties and species with negative consequences for the family food security.

The local management of the biodiversity becomes then a fundamental conditioning factor in order to insure the production and the food security on a priority basis and has a high agro-ecological importance since it is part of a comprehensive and total management of the agroecosystems where everything is interrelated, skill that in addition guarantees the millenary right of the families on these resources without restriction. The millenary respect toward each specie and variety, has generated a wealth culture that is express in rites and customs that are the fundamental basis of the tangible (the varieties itself) and intangible (the knowledge of its use) effect of each variety and specie, aspect that neither deny nor prevent its access to the market with part of this wealth as complementary economic strategy.

Then, it can be stated that aside the commercial articulation are the local factors like the self consumption (more than 50% of the native varieties of potato are consumed in more than 5 different cooking preparations and are also used in the processing of chuño), the heterogeneous characteristics of the ecosystems that permit multi varietal crops, agriculture of low inputs and more labor, practiced in both areas, the social relations of production that gave dynamism to the flows of traditional Andean varieties which determine the in Situ conservation. So, the local management of the agricultural variability cannot be conceived from a simplistic vision that only gives special importance to the biological, technical or profitable value of the biodiversity, but its cultural, social and economic importance, as a part of the total management of the natural resources and the territory have much to do with its implementation. The biodiversity plays a leading role in the reproduction of the productive system and the socioeconomic and cultural spaces at family and communal level, which means that the support for its strengthening taking into account these factors is a fundamental and immediate task.

In this context some operational actions should involve the organization of biodiversity fairs, conceived as the promotion of social spaces for the exchange (directed and spontaneous) of varieties and knowledge between families of different ecologies (communities), between curators of different generations (intergenerational transmission with regard to the biodiversity), the revaluation of traditional processing with "little known" or simply "unknown" varieties and their later local, national, and regional dissemination.

The initiative to processes of thoughtful and sensitization with legislative and political local authorities on the importance of this way of conceiving the biodiversity and its relation with the agroecosystems performance and the education incorporating the subject matter by the teachers at the communal schools, respecting and vitalizing the respect to the nature (biodiversity), are actions that can contribute, in a participatory manner, to the strengthening of the processes.

Finally, this empirical evidence that relate the in situ management of the biodiversity with the market, reflect that before conserving (as another scientific occurrence) is to learn to live with the biodiversity with the totality as these communities do without denying its access to the market as a part of a coexistence that can even be strengthened if adequate strategies of marketing for the biodiversity that do not involve their conservation neither its role in the local self consumption nor the conservation of the agroecosystems are developed, that is a complementary relation In Situ – Ex Situ - In Situ (Community–Market–Community) (Rea, 1995) in response to the global development models that prioritize the relation Ex Situ – In Situ – Ex Situ (Market–Community–Market) at the expense of the rural development of the Andean people.

BIBLIOGRAPHIC REFERENCES

DELGADO, R.; VILLARROEL, T. ESPINOZA, J. 1995. La biodiversidad de los tuberculos andinos: entre las exigencias del mercado y la racionalidad campesina. In: BUSQUEDA. IESE. P75-102.

Proyecto Integral Candelaria (PIC).1999. La conservacion, produccion y utilizacion de los tuberculos andinos en Candelaria. Technical report. Without publishing.

VILLARROEL, T. 1997. Ecosistema, dispersion y flujos: Bases para la conservacion In Situ de la biodiversidad de los tuberculos andinos. In: Memorias de la IX Reunion Internacional de Cultivos Andinos. Cusco-Peru.

VILLARROEL, T.; SALAZAR D. 2001 la biodiversidad de los tuberculos andinos: importancia en la vida de las familias de una comunidad altoandina de Cochabamba. Presentation presented to the Latin American Congress of Biodiversity. COMPASS-AGRUCO.

VILLARROEL T. 2001. Conservacion, produccion y utilizacion de la biodiversidad de los tuberculos andinos en comunidades diferenciadas en cuanto a su articulacion al mercado. without publishing