Assessing the Market Potential of Local Agrobiodiversity Products in the Tajik Pamirs

Giuliani, Alessandra\textsuperscript{a}, Frederik Van Oudenhoven\textsuperscript{b}

\textsuperscript{a}Swiss College of Agriculture, Laenggasse 85, CH-3052 Zollikofen, Switzerland
\textsuperscript{b}Bioversity International, Via dei Tre Denari 472/a 00057, Maccarese (Rome), Italy

Introduction

The Pamir Mountain area is a very harsh environment and food scarcity has been an element of everyday life ever since agriculturalists settled in the area thousands of years ago. This scarcity, aggravated not infrequently by wars, revolutions, and natural disasters, is likely to intensify as climatic changes destabilise harvests and as the cultural and economic forces inherent in globalization begin to change food preferences and displace local crop varieties. Addressing food security in this complex social-ecological context requires looking not just at increasing food production and supporting local subsistence agriculture, but also at conserving the diversity of fruit crops and grains that are adapted to local conditions and are central to the resilience of the local food system. Pamir agriculture is characterised by a tremendous diversity of unique fruit varieties, at the basis of local food culture and food security. Fruit trees usually grow along the roads and in margin lands near water sources and irrigation canals. Orchards abound and in-season variety of fruit is overwhelming. Apples and apricots are believed to have originated in the Pamirs and the large number of un-hybridised local species would support such a claim. There are literary dozen of types of local apples, apricots and mulberry. Recent studies show a range of diversity of 33 apple varieties, 40 apple varieties and 37 mulberry ones (\textit{Bioversity}, 2010). Fruit trees such as mulberry, apricot, and apple are particularly important since they can be cultivated on sloping surfaces where grains do not grow. Particular traits such as early ripening, and resistance to cold, drought, and ultra-violet radiation give local varieties advantages over introduced varieties that often do not cope well with local conditions. Also, as any Pamiri will tell you, they are much tastier. The collapse of Soviet Union brought independence to Tajikistan as well as a transition from a planned to a market economy, which has led to profound changes in Tajikistan (\textit{Breu and Hurni}, 2003). Soviet agricultural reform and recent efforts by development organisations to stimulate markets through the introduction of easily marketable exotic varieties have had profound effects on agrobiodiversity, increasing its loss and, in some cases, the vulnerability of households to food scarcity. There are real barriers to incorporating agrobiodiversity in markets and in development activities in general, but a strong willingness exists among farmers, local scientists, development workers and other stakeholders to collaborate on overcoming these barriers (\textit{Van Oudenhoven et al.}, 2008).

Material and Methods

A pilot study was carried out in 2009 to investigate the market potential of local products derived from apple, apricot, and mulberry and how these could be better used to benefit community livelihoods and the conservation of agrobiodiversity. This study was part of the activity on

\textsuperscript{1} Corresponding author: E-mail: alessandra.giuliani@bfh.ch
Reviving Biocultural Heritage: Strengthening the Socio-Economic and Cultural Basis of Agrobiodiversity Management for Development in Tajikistan and Kyrgyzstan. Conducted by Bioversity International, aiming to support the custodians of pockets of fruit tree and horticultural biodiversity by strengthening the ethnobiological, economic, and socio-cultural foundations of agrobiodiversity management (BIOVERSITY, 2010).

The study focused on local varieties of mulberry, apple and apricot and included a household-level survey of 78 families using semi-structured questionnaires and with individual interviews to farmers in 3 valleys of the Tajik Pamirs: Shugnan (6 villages), Rushan (11 villages) and Vanch (19 villages). The survey was addressed to households producing both local and introduced varieties of the target fruit crops. The survey household interviews were carried out by trained local farmers under the supervision of the Pamir Biological Institute. Additional key informant interviews addressed to national researchers and market chain actors were also conducted.

In addition, a participatory multi-stakeholder workshop attended by market chain actors, researchers and development workers working with these fruit species was organised by Bioversity International in collaboration with the Pamir Biological Institute (PBI) and Mountain Societies Development Support Programme (MSDSP) from Aga Khan Foundation. To organise the workshop elements of the Participatory Market Chain Approach have been applied. This recently developed participatory research and development method looks at the involvement of the different actors of market chains, it seeks to generate group innovations based on a well-led and structured participatory process that gradually stimulates interest, trust and collaboration among market chain actors (BERNET et al., 2006). The workshop was designed to unite people potentially or currently involved in the production and marketing of the target local fruit crops (apple, apricot and mulberry) in the Pamir so that they could share their interests, problems and ideas for improving the commercialisation of these products for the benefit of all actors. The meeting also aimed at fostering dialogue and trust among market chain actors so that they could develop a more profitable marketing of fruits through enhanced cooperation. An additional objective was to raise the awareness of development organisations, government and the private sector with regard to the importance of local agrobiodiversity, the market potential of its derived products and the interventions needed to achieve this potential. A number of opportunities and bottlenecks in the market chains of these crops were identified and discussed in a participatory manner.

Results and Discussion

Farmers cultivating apple, apricot and mulberry own very small patches of land (0.3 ha in average). Among the households surveyed, mulberry is cultivated as a main crop (37.2% of the interviewed farmers), followed by apple (33.3%) and apricot (29.5%). Other crop cultivated by these farmers are cherry, pear, plump, peach, walnut, potato, vegetable, wheat, beans. Together with grains, the target fruits represent the main staple crops grown by farmers in the Pamirs and are used both for food and income generation. Farmers generally use their own apple, apricot and mulberry seedlings or get them from relatives living in the same village.

Of the large diversity still cultivated by the farmers that were interviewed in the three valleys (17 varieties of apple, 14 apricot and 8 mulberry varieties), most are local. A number of introduced apple varieties are cultivated mainly because of their market appeal, while the local varieties are maintained mainly for different reasons. The most frequent reasons for the local varieties to be cultivated by the households interviewed are: 1) household preference (good taste and high sugar content); 2) early ripening; 3) their sweet taste; 4) they are easy to process; 5) they maintain high quality while being stored; 6) farmers can use the seeds; 7) they are easy to transport; 8) they give high yield; 9) they request low input; 10) their cultivation contributes to the conservation of local biodiversity.
The three fruit crops are processed in various products using suitable varieties. The processing is done at the households. Apple is mainly consumed fresh (90.5%) and only partially dried or transformed in juice and in jam (the remaining 9.5%). Apricots are also mainly consumed fresh (58%), the rest is dried (33.3%) and processed in jam (8.7%). The following products are derived by local varieties of mulberry: dried fruit (tuth, 50%), grinded dried mulberry (pikth, 34%), paste similar to honey (bekmez) and jam (3.5%), while 12.5% of the fruit is consumed fresh. To process the fruits simple tools are used: examples are sun drying, preserves, and the crushing of mulberries with a big stone to make flour. Sometimes water or electric mills are used to produce larger quantities, but the quality is lower. Water mills can be used only in winter when temperatures are cold enough to prevent the fruits from sticking to the millstone.

Approximately 40% of apple yields is used for household consumption and 60% for income generation; for apricot and mulberry only 20% of production is sold. The income generated by marketing these crops and the derived products generate in average 63.5% of the household’s average yearly income. More than half of the interviewed farmers sell their produce to local middlemen for the Khorog (main town of the Tajik Pamirs) market and the district centre market. Some farmers sell products to traders, who transport them to the Tajik capital Dushanbe. A small number of farmers sell their produce directly to consumers in the markets of Khorog and Dushanbe or (as is the case in particular with mulberry) along the road. Some other farmers sell their products to relatives, who transport them to markets in Khorog and Dushanbe. In some valleys, the traders and middlemen know the farmers and buy the products on the farm. They then bring the products to the market and sell them directly to consumers or, more often, to retailers. Traders and local middlemen travelling from the Pamirs to Dushanbe and Khorog markets possess market information, as well as information on the sellers in the market. Farmers and millers lack this information, which weakens their bargaining position vis-à-vis traders and middlemen.

The farmers in Tajik Pamir valleys face a number of problems that hinder the market potential of their products. The major problems reported by the farmers are i) the lack of storage facility which prevents the possibility to keep the fresh and dried fruits from July to October/November and to be able to sell them later on the market at a higher price; ii) lack of packaging to conserve the product better and attract more consumers; iii) transport and sell the products on the markets; iv) the fruit tree pest management.

Looking at the market chains of local varieties of apple, apricot and mulberry and their derived products, the farmers together with the other market chain actors identified common problems that hinder the market potential.

At production level: i) presence of pests; ii) lack of pesticides and inefficient pest management; iii) good yields, but lack of technology and mechanization in cultivating and harvesting spring frost and adverse weather conditions occurring more often in recent years.

At processing level: i) lack of suitable machinery, technology and know-how for quality processing (large quantities of fruits are left to waste each year because of a lack of processing capacity); ii) lack of storage facilities for better conservation of fruits and products.

At marketing level: i) substantial obstacles to transport to main markets in Dushanbe and Khorog (long distances with difficult roads; prohibitively high transportation costs); ii) lack of producers’ organisations for transportation and marketing of products; iii) lack of awareness among middlemen, traders and consumers about qualities of local fruits, as a consequence low willingness to buy these fruits at an acceptable price; iv) lack of proper packaging for better conserving, transporting and presentation of the products; v) lack of labelling and minimal presence in markets of local varieties of these fruit crops and their derived products (as compared to imported products).
local fruit trees (apple, apricot and mulberry) in the Tajik Pamirs confirms that the level of unique agrobiodiversity in fruit trees in the Pamirs is very high thanks to selection, improvement and maintenance by its farmers. The consequence of this process is the multiple crop varieties growing only in this region and well adapted to very harsh conditions. Producing a choice of diverse fruit crop varieties, farmers guarantee a yearly harvest, both for household consumption as well as for an income. As a result, these local farming systems have a higher resilience and adaptation than those systems with only one crop variety or introduced varieties (often not able to resist to extreme local conditions). Farmers are aware of the importance of maintaining this crop diversity, but since the market economy is gradually rising, they start being concerned of the market opportunities and the market attractiveness of their fruit crops that can provide an income. Currently, the introduced fruit varieties are often more attractive than local varieties on the market and this represents a risk for the maintenance of local diversity.

The farmers in Tajik Pamir valleys face a number of problems that hinder the market potential of their local varieties and derived products of apple, apricot and mulberry. The major problems reported by the farmers are lack of fruit pest management, lack of storage facility, lack of packaging to conserve the product and attract consumers; transport and marketing constraints. A number of opportunities and possible solutions have been identified together with the farmers and the other market actors. Yields of local varieties are generally steadier than those of exotic once. These varieties are the basis of food security in the Pamirs. Development and research efforts should focus on improving the marketability of local varieties, so families would be able to achieve income and food security at the same time. Farmers should be trained on integrated pest management to enhance the yield and quality of fruits. The particular varieties of apple, apricot and mulberry that are best adapted to the manufacturing of specific products have been identified. Further studies should be carried out to better determine the biochemical/nutritional composition of different varieties, which can help to enhance the quality of products. Simple technology for the processing and packaging of fruits can be improved and disseminated, along with training on their use. Micro-credit will facilitate this process. The creation of cooperatives on the basis of existing village organisations should be fostered to: achieve access to suitable technology and know-how for processing and packaging; organise transport to main markets (local and national); reduce dependence on intermediaries or influence intermediaries by convincing them of the value of traditional fruit varieties. Public awareness of the nutritional and health qualities of local fruit varieties is to be raised among producers and consumers. Local fruit variety packages aimed at local and national consumers as well as tourists, could include different local fruit varieties with a label describing the origin of the fruits and their nutritional contents.

References