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An Example from the Moroccan High Atlas

Like other mountainous regions in the world, the High Atlas suffers from a number of disadvantages, primarily related to its marginality, topographical fragmentation, and harsh environmental conditions. It is characterized by limited, fragile, and highly degraded natural resources, low incomes, and a high poverty level. People living in mountainous areas are among the poorest in the Near East and North Africa (IFAD 2002). The present study analyzed the importance of a cooperative—as one example of a rural institution—in facilitating smallholders' access to markets, its impact on the livelihood strategies of households, and the implications for poverty reduction. Communities in two valleys with similar bio-physical conditions in the Moroccan High Atlas, Taddarine and Anougal, were compared. Whereas Taddarine has a paved road but no marketing institution, Anougal features a dairy cooperative but does not have a paved road. Rapid rural appraisal methods and household surveys were used to gather data on livelihood assets and activities. The value chains of the main product in either valley—apples in Taddarine and milk in Anougal—were analyzed using market mapping methodology. In Anougal, with no paved road and no electricity, the milk collection center of the dairy cooperative has made dairy production the most important source of income for the farmers. In contrast, dairy production and marketing has not developed in Taddarine, which has a paved road and electricity but no dairy cooperative. The most important source of income for these farmers is fruit production, with transport being facilitated by the paved road. The study shows that although road infrastructure in remote mountain communities is a necessary condition for market access, it is not sufficient. The development of local institutions—in this case a dairy cooperative—that facilitate market access by reducing marketing costs and opening up "economies of scale," is essential.

Keywords: *Market access; mountains; institutions; cooperatives; infrastructure; North Africa; Morocco.*

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Introduction

It has been widely recognized that infrastructure, particularly transport, is crucial for producers in rural areas to have better access to markets (FAO 2003). Improved roads lead to lower transport costs, open up opportunities for new market players, and ensure greater competition among buyers (IFAD 2003). But it is also agreed that to make markets work for the poor, well designed institutions (Dorward et al 2003; Biénabe and Sautier 2005) and cooperation among producers as well as between producers and other market actors are needed (Best et al 2005).

The research presented in this article concerns the importance of institutions in providing access to markets in mountainous areas and was conducted in two valleys in the Moroccan High Atlas. Following North (1990), institutions are defined as being 'rules of the game,' such as formal rules, informal constraints (conventions, norms of behavior, and self-imposed codes of conduct), or individuals bound to a common purpose or aiming to achieve common objectives. To enable a comparison of market chains and livelihoods, this article focuses on the dairy cooperative that has been established in one of the valleys and thereby narrows the term of institution to this one example, although it has to be kept in mind that rural institutions include a wide range of constructs that can advance but also hinder development.

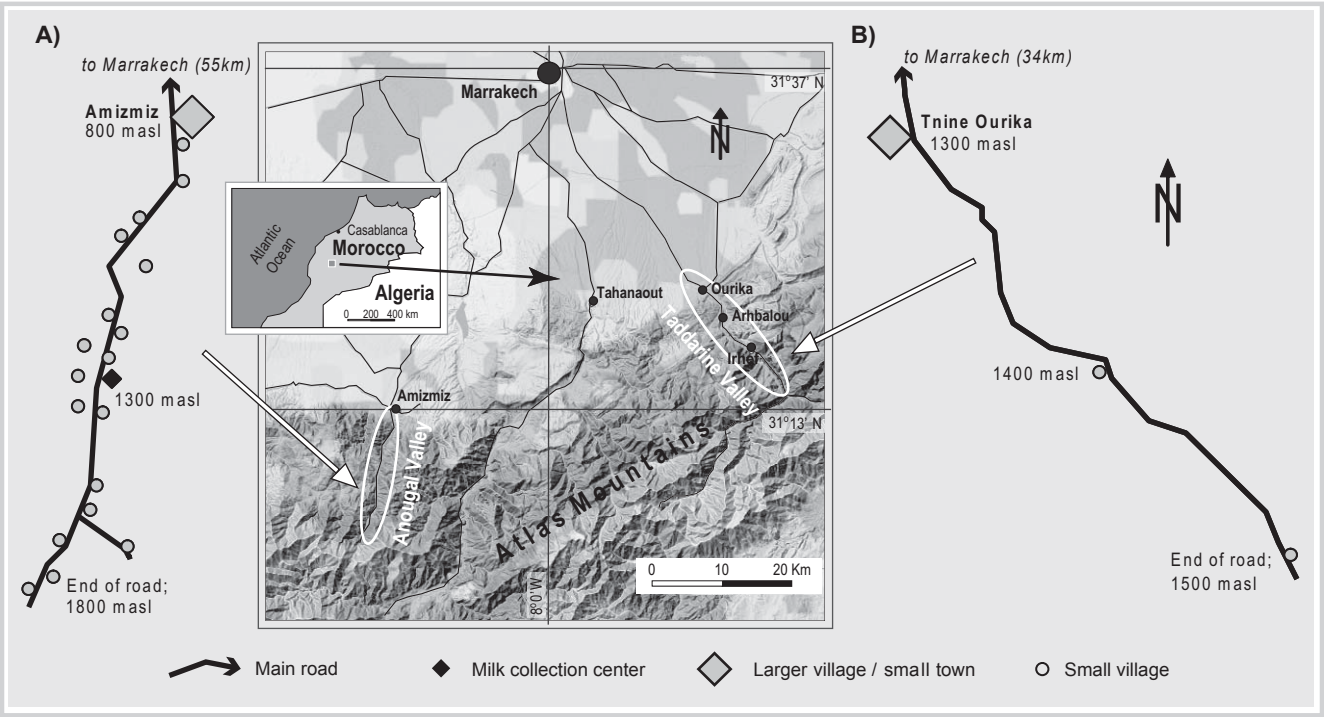
This study is part of a research and development project aiming to promote mountain agricultural production systems that alleviate poverty while preserving natural resources. The project is funded by the Swiss Agency for Development and Cooperation (SDC) and implemented by the International Center for Agricultural Research in the Dry Areas (ICARDA). This study compares the effects of different levels of infrastructure and institutional development on market access of people in the two valleys.

Methods

To ensure comparability of analysis in the two valleys, only the central part of Anougal, with a similar altitude (1200–1400 m) to Taddarine, was taken into consideration. A formal survey was conducted in the valley of Anougal to collect data on different livelihood assets and household income (INRA and ICARDA 2005). For this purpose, a random sample of 35 households was selected from the central part of Anougal. The same survey was conducted among 30 households from the whole valley of Taddarine, which were also randomly selected.

An assessment of the market chains of the most important products was carried out. This was done using a value chain analysis approach (Kaplinski and Morris 2001) and the market mapping methodology described by Albu and Griffith (2005). Focus group discussions and key informant interviews were used as tools.

FIGURES 1A AND 1B Location of the valleys of Anougal (A) and Taddarine (B). (Map by Ulla Gaemperli, based on authors' draft)



General description and comparison

The valley of Anougal is situated about 60 km south-west of Marrakech (Figure 1A), ranging in altitude between 800 and 1800 m. There are 27 villages (MADR 1996), with no paved road to the valley and no electricity network. The villages can only be reached with four-wheel-drive vehicles and are partly inaccessible during the winter. A dairy cooperative has been established in the valley, operating as a milk collection center since 1993.

The valley of Taddarine is about 50 km south of Marrakech (Figure 1B), ranging in altitude between 1300 and 1500 m and including 3 villages. There has been a paved road since 1964 and the electricity network was expanded into the valley in 2002. None of the households in this valley is a member of any farmers' organization; instead, every household markets all its products on its own.

In both valleys, limited land areas at the narrow valley bottom and some terraces on the lower slopes are irrigated. The rest of the land is fairly steep and, depending on its legal status, is used for rainfed crops, pastures, or left without cultivation as protected forest. Average annual rainfall is between 300 and 400 mm and temperatures lie between 30°C in summer (July and August) and below 0°C in winter (December to February). The farming systems are very diverse and include cereals (mainly barley), vegetables (potatoes, carrots, beans), and fruits (apples, cherries, walnuts), as well as animal production (dairy cattle, goats, and sheep). Rangeland is very scarce so planting fodder crops is essential for securing livestock feed.

Current production systems

In both valleys, water for human consumption and irrigation is provided by springs or deep wells. Transport in both valleys is assured by buses or shared taxis. While connections are frequent in Taddarine, they are limited to 2 or 3 a day in Anougal. With both valleys the nearest weekly *souk* (local market) is located at the valley entrance: in the small town of Amizmiz for Anougal and in the village of Khemis Aghbalou for Taddarine.

Attendance of schools for higher education (7th grade and higher) is very low as these schools are located outside the valleys. Few traditional or newly formed local organizations exist. Besides the dairy cooperative in Anougal, there are no other rural service institutions for the poor households of these two valleys. Average farm size is 0.20 ha in Anougal and 0.24 ha in Taddarine. Households in both valleys own only very few animals such as sheep, goats, and cows. Most of the agricultural work is still done manually; households in both valleys do not own a lot of equipment. In both valleys, households use the available cash either for household consumption or to purchase production inputs, with little chance for savings. Households are not creditworthy at the agricultural bank. Credit is provided by

TABLE 1 Percentages of households belonging to the different poverty groups and their respective income per household member and day (Dh = Moroccan Dirham; 1 US$ = 8.4 Dh).

Poverty group	Extremely poor	Poor	Less poor
Income per household member and day (Dh)	< 5.15	5.15–8.4	> 8.4
In Anougal	26%	31%	43%
In Taddarine	47%	23%	30%

TABLE 2 Revenue per household and year by sources in the valleys of Anougal and Taddarine (in Moroccan Dirham and as percentages of total revenue; Dh = Moroccan Dirham; 1 US$ = 8.4 Dh).

Village	Crops	Animals	Trees	Non-agricultural	Migration	Total	Total per person
Anougal	3867 (18%)	8235[a)] (38%)	3948 (18%)	4317 (20%)	1294 (6%)	21,662 (100%)	3864[b)]
Taddarine	2557 (14%)	2295[a)] (12%)	6018 (32%)	5710 (31%)	2137 (11%)	18,718 (100%)	2641[b)]

[a)]significant with t-test at 5%
[b)]significant with t-test at 10%

relatives or middlemen, who note down in a small booklet any items that are not paid for immediately.

Revenue and poverty levels

To get an overview of households' financial situation, three poverty groups were defined: the extreme poor, the poor, and the less poor. The figures from the "Poverty Update" report prepared by the World Bank (MNSHD 2001) based on data from 1998 and 1999, were used for allocation to these three groups. The food poverty line was calculated based on the cost of the basket of food items chosen according to the food spending patterns of the second poorest quintile of the population, which was found to yield almost exactly the mean food energy requirements. People not even earning enough to meet their basic food needs were defined as the extreme poor. The national poverty line was calculated based on the food poverty line, adding an amount for non-food items—based on spending on those items—found amongst those with an income reaching the food poverty line. In Table 1, 'poor' households are those with an income between the food poverty line and the national poverty line, while 'less poor' households are those with an income reaching the national poverty line.

Table 1 shows that 57% of households in Anougal and 70% of households in Taddarine fall into the "poor" or "extremely poor" poverty groups. These figures are very high as, on a national level, only 19% of rural households fall below the national poverty line (MNSHD 2001); this confirms that mountain people belong to the poorest in Morocco. Table 1 also shows that households in Taddarine, which has better infrastructure, are generally not better off than households in Anougal.

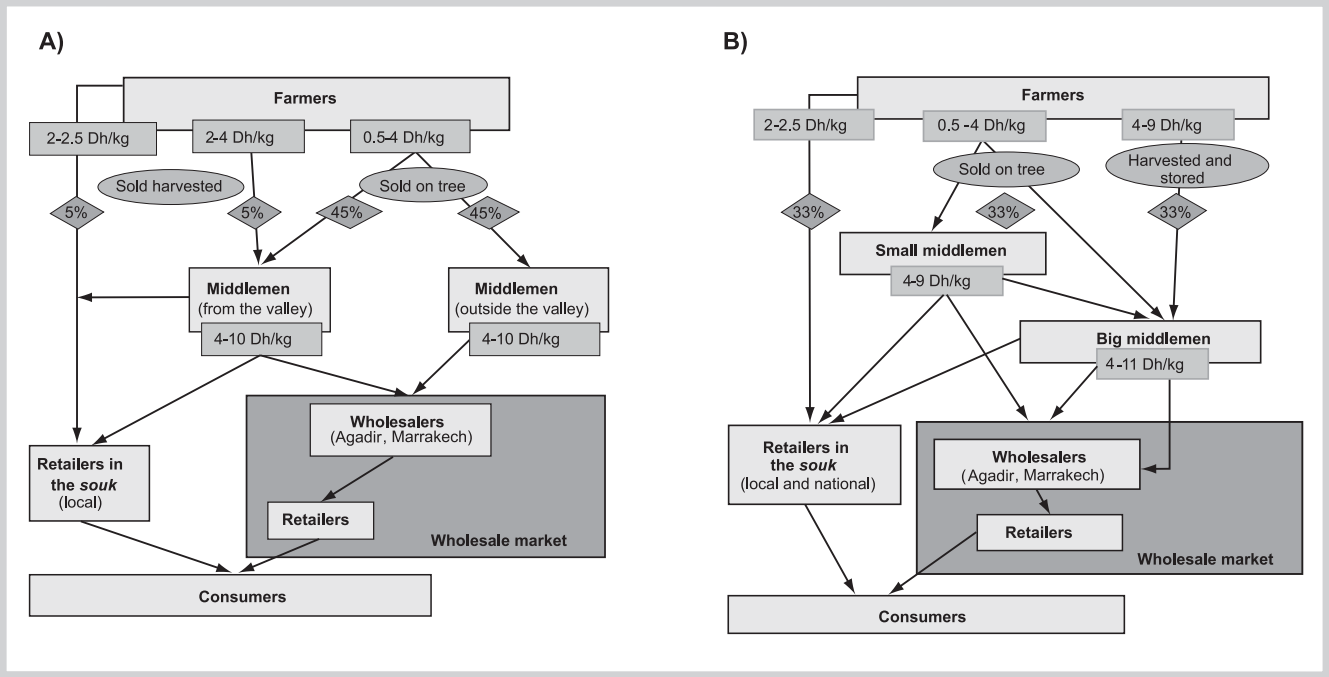
Table 2 presents the yearly revenue of households in the two valleys. In this study, revenue is calculated by multiplying total production—including household consumption—with the relevant market prices. "Non-agricultural" revenue is revenue coming from non-agricultural activities such as from a small shop or off-farm work in the valley. "Migration" indicates the income remitted by family members who migrated temporarily or permanently to places outside the valley. The most important differences in revenue between the two valleys are found in animal production and income from fruit trees. While households in Taddarine earn considerably more from fruit trees, households in Anougal generate significantly higher income from animal production.

As this study covers only the year 2004, its results have to be interpreted with caution. Revenues can fluctuate considerably and the year 2004 is regarded by most of the households interviewed as a bad year, so the percentages of "poor" and "extreme poor" households are most probably slightly too high. Nevertheless, a comparison of the two valleys in terms of revenues is still possible as the data on income were collected in the same year.

Current marketing systems

For households both in the highlands and in the lowlands, access to markets is essential for generating income. As there are important differences in transport infrastructure and institutional development between the two valleys, it is possible to examine the effects of institutions and infrastructure on market access of households in mountain areas. In Taddarine, the paved road allows traders with trucks to buy the products

FIGURES 2A AND 2B Value chain of apples in the valleys of Anougal (A) and Taddarine (B).



directly from the farmers. In Anougal, the low-quality roads do not allow bigger trucks to reach the valley, obliging the farmers to sell their produce to middlemen or directly to consumers at the *souk*. Poor households in Anougal are much more dependent on middlemen than those in Taddarine as the middlemen with their small trucks have a near monopoly in Anougal. But unlike in Taddarine where no farmers' organization exists, a dairy cooperative was created in Anougal in 1993. This cooperative operates a milk collection center to which farmers from the valley deliver their milk. In the collection center, the milk is cooled in a cooling tank using a diesel engine with generator and is then sold to the regional collection center in Amizmiz, run by a big national milk factory.

Market chain analysis

To compare transport infrastructure to marketing institutions in mountain areas with regard to their effects on market access, the market chains of the two key products—apples in Taddarine and milk in Anougal—were analyzed. Table 2 shows that better transport infrastructure seems to be particularly beneficial for the production and marketing of tree products and for the generation of income from non-agricultural sources and from migration. Compared to other fruits grown in this mountain area, apples have been produced for a long time, so that the market chains for apples are well established in both valleys and can be analyzed to determine the impact of a paved road.

In the valley of Taddarine, planting of apple trees started in the 1970s, six years after completion of the paved road. In the valley of Anougal, planting of apple trees started about 15 years later. The low-quality road prevented both traders with bigger trucks and extension workers from proposing apple production as an option to farmers in Anougal. Only in the course of development projects were apple trees finally introduced in Anougal, but again the absence of a paved road was an important constraint to rapid dissemination of such trees. In 2004 total apple production was estimated to be 150 tons in Anougal, whereas 1200 tons were produced in Taddarine.

Figure 2A shows that in Anougal 90% of the apples are sold while still on the tree. Harvesting is done by the middlemen. In Taddarine (Figure 2B), only about one third of the apples is harvested by the middlemen and another third is stored for one or two months by the farmers before being sold. This storage is important as it allows the apples to ripen and farmers to obtain better prices when selling directly to wholesale middlemen. Only higher-quality produce can be marketed through this channel as the lower-quality apples cannot be stored and have to be sold directly to retailers in the local and national markets. This separation of qualities is crucial for the apple market as prices in the consumer market for low quality lie between 2 and 2.5 Dirham (US$ 0.24–0.30) per kilogram but can reach four to five times as much for the highest quality. It is mainly the paved road that enables farmers to sell the lower-quality apples them-

selves in the local *souk* and that makes this quality differentiation possible.

As most of the farmers in Anougal sell their apples before harvesting, they are not able to target different market channels for different qualities and thus to obtain a better price. It happens that farmers who sell their apples already four or five months before harvest get underpaid by the middleman as it is very difficult to estimate the quantity harvested. Selling apples while still on the tree can be a great advantage when farmers urgently need cash for other business activities or for private reasons, such as medical treatment. An option would be to provide these poor households with credit to enable them to buy the goods needed and then repay the credit with earnings from the sold harvest. Experiences from other Arab countries have shown that the provision of micro-credits through innovative schemes can be of great benefit for the rural poor (cf the example from Syria in Bürli 2004).

Providing micro-credits is one institutional approach to improve market access for poor rural producers in mountainous areas. In this article, however, we focus on analyzing the effects of a farmers' organization—the dairy cooperative in one of the valleys studied. Table 2 shows that households in Anougal generate significantly higher income from animal products. Since its creation in 1993, the cooperative has increased membership to 120 and increased the quantity of milk collected from 1800 to 30,000 liters in 2004. The cooperative also provides its members with inputs such as sunflower oilcake or pulp of sugar beets. In the early years, only the better-off farmers engaged in dairy cattle breeding. As milk production has proved to be profitable, poorer households have also started to invest in dairy cattle, as a result of which fodder crops—such as barley, alfalfa, or Berseem clover (*Trifolium alexandrinum* L.)—have grown in importance as well.

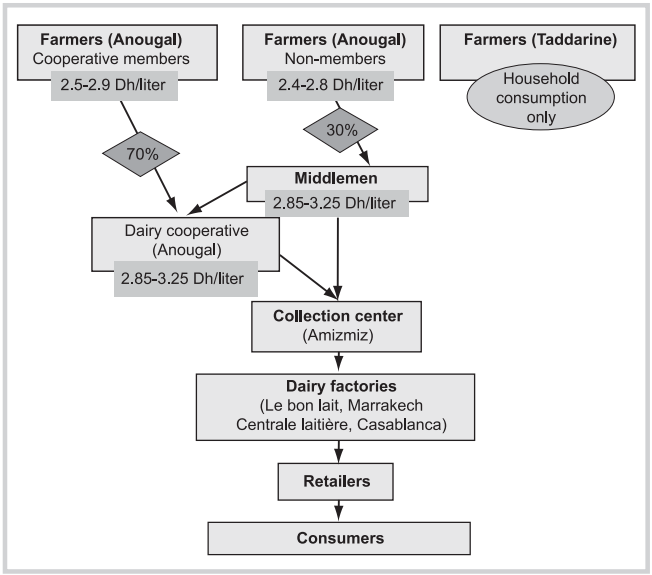
Interestingly, despite the absence of a paved road to Anougal and with no electricity available to cool the milk on the spot, milk is only marketed in this valley (Figure 3). In Taddarine, on the other hand, where the infrastructure is in place, there is no collection center for the marketing of milk. The Setti Fedma dairy cooperative operates in the village of Khamis Aghbalou close to the Taddarine valley entrance. This collection center was established in 2001; it pays the same price to the producers as the dairy cooperative pays to its members in Anougal. However, Khamis Aghbalou is too far away from the farmers of Taddarine, who continue to produce milk essentially for home consumption.

Institutions for accessing markets

This study shows that institutions, particularly cooperation among producers and between producers and other market chain actors, are an important factor in improving market access for poor households in mountainous areas. Access to markets is a crucial element for the development of mountain communities in Morocco. Farms are small and producers are poor, which calls for horizontal cooperation to sustain market access pathways for smallholder producers. Larger investments and increased bargaining power for producers can only be realized through cooperation among producers.

Interviews and group discussions revealed that, in both valleys, there is a lack of trust among producers and between the different market chain actors. This results in individualism and makes it difficult to enhance horizontal and vertical cooperation. Many market chain actors refuse to cooperate with others as they have had bad experiences in the past. In general, many efforts made to bring farmers together in the past have been corrupted or thwarted by selfish or inefficient managers. Therefore it is important from the outset to establish a proper constitution governing the activities of the group, based on democratic lines. The adoption of democratic decision-making systems to organize collective marketing can strengthen communities considerably and at the same time increase their social coherence and the level of trust within the group (Robbins et al 2005). There is considerable mistrust among market chain actors at the same level or at different levels, or towards managers of a cooperative, and this mistrust has to be overcome first. For this purpose, Bernet et al (2006) propose the Participatory Market Chain Approach (PMCA), that involves all the actors of a market chain. It seeks to generate group innovations by

FIGURE 3 Value chain of milk in the valleys of Anougal and Taddarine.



gradually stimulating interest, trust, and collaboration among the different members of the market chain. An interesting development of the present research would be to apply PMCA in Morocco, with local NGOs and/or local government representatives acting as facilitators.

The lack of trust among members and other internal factors—such as poor education, training, and information—are some of the reasons for cooperative failures. External factors—such as uncertain property rights or inadequate communication infrastructure—have also contributed and need to be addressed by policy makers (Ortmann and King 2007). Poulton et al (2006) go even further and argue that the state's role does not have to be limited to the provision of public services (infrastructure, agricultural research, contact enforcement, etc). They recommend that, in collaboration with a wide range of other stakeholders such as the private sector, farmers' organizations, and NGOs, the state ought to play a more pro-active role in overcoming market constraints to achieve pro-poor agricultural growth.

Conclusions

Infrastructures such as electricity, paved roads, and regular public transport services alone are not enough to improve market access for poor people in remote mountainous areas. Good roads encourage poor farmers to sell some of their products directly in the local market. This may enable quality differentiation in that mainly lower-quality products are sold locally and higher-quality products are sold to traders for up to five times the price. Better road infrastructure also encourages farmers to sell more of their products after harvesting and increases the number of traders coming to the valley, thereby reducing the dependency particularly of the poorest households on middlemen, who nearly have a monopoly in areas with poor transport connections. Despite all these positive aspects of infrastructure, this study shows that households in the valley with a lower level of infrastructure have generated higher incomes because of their better organization.

Institutions, in particular cooperation among producers and between producers and other market chain actors, play a crucial role. The establishment of a dairy cooperative that is operating a milk collection center in a valley with neither electricity nor a paved road has made milk production the most important source of income for households in this valley. An important conclusion is thus that institutional innovation has fostered farmers' competitiveness as they were able to link up with a market chain that requires opening up "economies of scale." As it has been stated by Holloway et al (2000), milk groups are a simple example of an agroindustrialization innovation, but they appear to be a necessary first step in the process of developing more sophisticated cooperative organizations. It is widely recognized that rural agroindustrial development has a very high potential to help reduce rural poverty levels (Dorward et al 1998; Delgado 1999). The income generated from milk production in the valley that has no paved road but features a dairy cooperative seems to have more than compensated for the infrastructural disadvantage as poverty is more widespread in the valley with better transport infrastructure. This demonstrates that appropriate rural institutions can facilitate market access for income-generating activities, even with inadequate infrastructure, and can improve rural livelihoods. Considering the low level of infrastructure that mountain communities generally have to deal with, the development of appropriate rural institutions to access markets is of utmost importance for poverty alleviation in mountainous regions.

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