



Long-term changes in business models in inland and mountainous areas for the promotion of sustainable food systems

Filippo Sgroi^{*}, Federico Modica

Department of Agricultural, Food and Forestry Sciences, University of Palermo, Palermo, 90128, Italy

A B S T R A C T

For the management of inland and mountainous areas to be economically viable, business activities in these environments must provide sufficient income for the local population without jeopardising the interests of future generations. In purely economic terms, the management of these areas requires that the production of such goods and services that constitute utility flows for an ecosystem and its local population be economically viable. This management must be able to provide an income for the local population; it cannot only support the costs inevitably incurred for the conservation and production of goods and services provided by the activities that take place in the mountain area. This study examines inland and mountain areas in Italy, areas with particular economic difficulties, that have been characterized by exodus and abandonment phenomena in recent years to verify which business models to identify to favour the permanence of agricultural activities in these environments. Business models of competitiveness were developed through the economic model of joint production analysis. The results of the study highlight that the strategies to be implemented are diversified according to the specificities of human capital and environmental resources.

1. Introduction

A major part of the Italian territory is characterized by the aggregation of citizens in smaller centres, even very small ones, often with limited access to essential services [1]. The ‘specificity’ and separateness of this way of life are captured by defining these territories as ‘internal areas’, inland concerning the (mostly flat) areas of the large and medium-sized urban centres and their connecting networks. Inland areas are areas characterized by important environmental resources (forests, protected areas, agricultural and agri-food production) and cultural resources (archaeological heritage, abbeys, small museums, craft centres) that are very diverse, the result of original natural features and long and diverse processes of humanization [2]. Inland and mountainous areas are territories that have undergone a significant process of marginalization in the years of economic development as a function of the phenomena of agricultural and rural exodus. The business models of the past, where everything was in balance with the environment, are no longer viable in these environments. There are many reasons (globalization, industrialization, international trade, etc.). However, excellent food products are still produced in the mountains today. So the model to adopt is not so much that of the past where food was produced for local areas, but a downward model between mountains and plains where mountain food products are used in urban cities. These are territories that have undergone a significant process of marginalization in the years of economic development due to the phenomena of agricultural and

rural exodus. It has manifested itself, first of all, through intense phenomena of de-anthropization. In particular, in these areas, you have a reduction below the critical threshold of ageing of the population and a reduction of employment and the degree of utilization of territorial capital. It has also manifested itself in the progressive quantitative and qualitative reduction in the local supply of public, private and collective services - of services, that is, that defines the quality of human life in every environment (hospitals, schools, bus connections, etc.). Inland areas are today that part of the national territory that is distant from the centres of agglomeration and service and with unstable development trajectories but at the same time endowed with resources that the central areas lack, ‘wrinkled’, with demographic problems but at the same time strongly polycentric and with a high potential of attraction. In Italy, the Inland areas - of which mountain areas with their 10 million hectares of forests [3] are a full-fledged part - account for about three-fifths of the territory and just under a quarter of the population. In inland areas, the prevailing farm model in the past was that of cultivated property. The small family business had its dimension according to the ecosystem. Everything had a balance: the family, farming, and work in the fields. The business model was in balance with nature. These business models determined sustainable food systems in terms of food production and consumption. In a highly articulated picture, these areas have some common features, such as their distance from centres of agglomeration and services and the presence of unstable development trajectories, with strong and growing demographic problems. Nonetheless, they are

^{*} Corresponding author.

E-mail address: filippo.sgroi@unipa.it (F. Sgroi).

endowed with resources that central areas lack, including most natural resources (water, hydroelectric power, landscapes, etc.) and constitute strongly polycentric areas with interesting attraction potential. In these areas, the changes are not short-term but long-term, as their condition is the result of economic policies of several decades. The revitalization of these areas requires long-term change for realization. The inland areas are present above all in the regions of Southern Italy: a total of 1718 (67.4%) municipalities belong to them, with significant incidences in Basilicata, Sicily, Molise and Sardinia (all above 70%) [25]. The inland areas of Southern Italy account for 44.8% of the national total. In Central Italy, the relative weight of these areas is much lower, reaching 54.8% of the total with 532 municipalities. The regional distribution appears much more balanced than in the other divisions, ranging from 46.3% in Marche to 60.1% in Tuscany. The contribution of this geographical breakdown to the mapping is quite small, just under 14%. In the North-West and North-East, the share of municipalities falling within the inland Areas is further reduced, 33.7% and 41.4% respectively. and 41.4% respectively, although in absolute terms this is a good 1584 municipalities. It follows that on a national basis nationally, this type of municipality contributes an overall share of 41.3% of the total. In this paper, after reviewing the relevant economic literature, we have examined some case studies of farms in mountain areas that have been able to adapt their business strategy to the new market requirements, thus making the area resilient and competitive.

2. Agriculture for inland and mountain areas

The profound changes in the socio-economic scenario make it necessary to rethink the role of the primary sector in economies with a high per capita income, especially in inland and mountainous areas. The changes refer to innovations introduced in agriculture that result in capital-intensive products. Today, at least in western economies, having solved the problem of the availability of food at low prices, which in Europe was also one of the primary objectives of the Common Agricultural Policy (CAP), it is a question of identifying other objectives for agriculture must have in an increasingly globalised context, also bearing in mind the problems of land desertification from a socially acceptable perspective [4]. The issue is not an easy one to solve and concerns a new vision in general of the way agricultural products are produced and marketed, and also the ability to question models that worked at one time but that today no longer determine the success of the territory and the business. The business models that once worked are the family business models. It is well known that economic policy models are historically determined, they work in certain periods and according to certain variables but lose their meaning as context variables change. In fact, on the one hand, the imposition of new technologies that seem capable of so profoundly modifying agricultural activity as to make it something completely different from what we know, and on the other the growing interest in organic forms of agriculture, cause such evident contrasts in areas even territorially contiguous as to oblige us to rethink the role of agricultural activity and the instruments used to evaluate its results [14]. This process affects both lowland and hillside areas as well as mountainous areas. As is well known in these three different environments, agricultural activity has particular peculiarities. In the mountains, it is well known that agriculture has greater difficulty in finding a competitive balance in the short term than in the long term. In the mountain environment, mechanisation is difficult and the lower temperatures (temperatures can reach below zero degrees centigrade and lead to frost) do not favour the development of certain crops. One activity that develops and finds its natural habitat in mountain areas is dairy and beef cattle breeding. With this activity over time, mountains have favoured the local ecosystem, and human resilience and created the conditions for business competitiveness. However, the new models of food distribution, in force in western countries where the large-scale retail trade (GDO) model prevails, have undermined the competitiveness that once guaranteed the "viable" management of farms in

mountain areas [5]. Today, it is no coincidence that the vitality of mountain areas in these areas is being questioned and that this process of questioning the objectives of agriculture is particularly lively. Indeed, in recent times, the agricultural sector in these areas has struggled more than elsewhere to fulfil its role as an indispensable building block for the harmonious social and economic growth of the community. This is in the presence, at least within the European Union, of communities living in mountainous areas that are not always in favour of considering the areas they inhabit as an area with the sole or predominant function of the water reservoir, transit area, or recreation area for the benefit of urbanised plain dwellers. Having said this, one certainly does not wish to argue that mountain areas are, from the point of view of agricultural activity and, more generally, from the socio-economic point of view, a homogeneous area. It is well known that there is an ever-increasing tendency to intensify activities in the most favourable areas with strong competition for the use of resources and, in particular, of the soil, while in other areas there is a progressive abandonment. However, despite or perhaps precisely because of these obvious differentiations between territorial contiguous areas, it is precisely in mountain areas that the limits of the development model that has been pursued in recent decades in terms of productivity and profitability, including but not only in the agricultural sector, are most evident. However, we must say that in certain respects, the very idea of limits represents the essence of life in the mountains. Mountains are characterized by the limits imposed by nature, which the plains do not have. In the valleys, agriculture has fewer problems from a technical point of view (ease of mechanisation, irrigation, more efficient transport); however, it is also true that there are altitudinal limits for the various crops, and there is a physical limit to the possibility of exchanges even between areas that are extremely close as the crow flies. Well, from the point of view of business competitiveness, it can be argued that when limits have been transformed into opportunities, there has been real development, while when they have been transformed, either for cultural or political reasons or for technical reasons, into absolute constraints, there has been stagnation [6]. For example, have been able to exploit orographic and climatic constraints by creating a development model based on small peasant properties on the valley floor and large properties at altitude (hills and mountains), which led to a phase of expansion of the hill and mountain economy that bore fruit in terms of human and landscape resilience. Moreover, if we think of the related activities, linked to the cold and snowy winters, that can be carried out in mountain areas such as winter sports, all this has led to the development of tourism in many mountain areas [15]. But also not to be underestimated is the use of mountain areas in summer to escape from the heat of the cities. When, on the other hand, the orographic and social climatic limitations, the latter connected with the existence of small though cohesive communities, did not constitute the starting point for an innovative path, but turned into a constraint felt as unchangeable, the mountain's economic and demographic decline arrived punctually.

3. Mountains as a tool for new business models

In the post-modern economy, when we talk about mountains, we are reminded of a world of the past, of a way of life considered on a human scale. Or one remembers it for the walks taken in winter or summer to spend one's free time. The desire to preserve this landscape, therefore, prevails in mankind, even if, many times, the strategies necessary to do so are not clear. In other words, there is a widespread feeling among people that mountain communities used to have their virtuous circle in terms of economic activity, and that today, also as a function of the economic models in place, this can no longer be had, or at most can only be had for recreational activities that bring people from the valleys to the mountains to practise sport or relax [16]. If this way of understanding the mountains is accepted, and mountain agriculture, which in a certain respect, constitutes the heart of the mountains, it would be superseded as a consequence of the worldview it invites us to adopt

before the economic, demographic and social profile. And if we accept this way of thinking, the mountain would be nothing more than a remembrance of values that are now meaningless and with no possibility of constructing models of growth and economic development. If we accept this idea of the mountain then we understand that there is no possibility of creating new development opportunities and therefore a model of “hill” agriculture and a model of “plain” agriculture should only prevail in the economic system. From an economic point of view, we ask ourselves: with the level of economic development achieved today in developed economies, can we afford to abandon the mountains? In other words, if development and economic growth have led to the depopulation of the mountains, we ask, should this situation continue? Experience teaches us that where man has abandoned the mountains in the medium to long term, there have been natural disasters in the valley that have also led to deaths through floods that cause rivers of mud to flow down from mountain to valley [7]. On closer inspection, the limitations of the mountains, or rather the major risks, appear more and more frequently when it comes to outlining possible future scenarios. This idea stems from the observation that, in any case, the earth is a finite system, that man’s capacities are finite, that many choices are irreversible and therefore, despite everything, the likelihood of encountering impassable limits in predefined periods increases day by day. In one respect, the translation into a modern language of this idea of the need to come to terms with the limit or limits can be found in the term ‘sustainability’. That is, sustainability is nothing other than being able to be competitive within the given resources, and therefore limits, that you have available [17]. Sustainable development means a type of development that meets the needs of present generations without compromising the needs of future generations. But this type of development must come to terms, with an ethic based on shared values, with limits in at least three completely different fields. One speaks, about sustainability, of economic, social and environmental aspects [18]. These three fields cannot be considered in isolation, but all possible interactions must also be taken into account. The point then becomes not to consider social and economic environmental limits as something absolute, defined once and for all. When speaking of sustainability, it would be a mistake to consider a particular aspect as decisive in itself. No one component, however important, is an absolute constraint. It is in the combination of the various environmental, social and economic components that the real limit to continued economic growth without insuperable obstacles is to be found. Therefore, considering the three components of sustainability, what is a limit becomes a resource for the mountains and any territory. In this logic, the old worldview of the mountains once again becomes as relevant as ever. It is once again a question of considering these constraints as opportunities that can facilitate the search for efficient solutions [19]. If this is the case, then there can be no doubt that it is precisely in areas where the economic, social and environmental constraints of the various activities are most evident, i.e. in mountainous areas, that solutions can be developed sooner than elsewhere to ensure sustainability, i.e. an equitable and lasting type of development [8]. This is particularly true for activities such as farming where multifunctionality, i.e. the ability to perform several functions simultaneously, is particularly evident. Indeed, agricultural activity is a multifunctional activity par excellence [20]. Indeed, it is well known that in addition to producing food, agriculture produces ecosystem services that are of extreme importance to the community. It is therefore interesting to rethink the role and functions of agriculture in mountain areas from this perspective. Traditionally, the mountain environment was considered hostile to human settlement; a human settlement in mountain environments has always led to adaptations and compromises. Depending on this specificity, the legislator also provides special forms (exemptions and/or concessions) for the payment of taxes.

4. Economy of inland areas

In inland areas, especially in the past, agriculture and forests played

a prevalent, if not exclusive, role in the economy of the territory according to the habits and lifestyles of the local inhabitants [21]. However, the progressive abandonment of marginal and/or mountainous rural areas has led to a radical change in agroforestry activity. All this, when combined with the phenomena of farm pulverisation and fragmentation that have always characterized agricultural activity, has led to an impoverishment of the territory in general [22]. It is in this scenario that the problem of how the agro-forestry activity present in the inland areas can contribute to creating paths of economic growth and therefore development must be analysed, in an economic system with a mixed economy such as the Italian one in which, as is well known, private and public enterprises are the driving force behind the economic development of the territories. The inland areas have a population structure that is large of advanced age and therefore very often not inclined to implement innovations. This aspect appears to be of particular importance since possible development strategies depend on the ability to implement business models where the entrepreneur can innovate [23]. The propensity to innovate processes - the intelligent use of the system of competencies, skills, intellectual property, human capital and economic and financial assets - is the key factor in improving the competitive capacity of the enterprise. The strategy to contain the depopulation of marginal areas is to promote ‘endogenous and integrated development’ based on the valorisation of human, environmental and productive resources present locally. What are the possible solutions in terms of growth and development? In municipalities where there is the possibility of implementing an agricultural and/or zootechnical activity, it is necessary to favour processes of land purchase and sale, also through the intervention of the public operator, aimed at creating ‘viable’ productive structures. In this case, the start-up premium for young entrepreneurs could also be envisaged (start-up premium) provided for in the Rural Development Plans. In municipalities where there is a highly significant wooded area on the total municipal land surface, and there is also an ageing population, encourage the increase of the wooded area with native forest plants to prevent hydrogeological instability [24]. In municipalities where there are both agricultural and livestock activities and wooded areas, encourage the tourist-recreational sector, also strengthening the area’s receptive capacity. In addition, the creation of forms of cooperatives between landowners and young people should be encouraged; in this case, productive structures would be created where there is an interchange between the factors of production (landowners bring land and agricultural capital, while young people bring labour). In other words, the first strategy proposed in the point helps to create farms that have a minimum ‘viable’ size that justifies the investments to be made. As for the second point, this strategy is aimed at preventing hydrogeological disruption and encouraging the production of wood for firewood. The strategy indicated in point three is aimed at creating a tourist flow to enjoy the beautiful landscapes and monuments in the area. Lastly, the strategy indicated in point four is intended to contribute to a process of bringing together entrepreneurs, often the elderly, who hold the capital, and young people who bring ideas and manpower. It should be emphasised that the strategy indicated in point two, if properly implemented by entrepreneurs, could create the conditions, in the medium/long term, for the production even of a supply chain at the service of industrial companies producing wood goods.

5. Materials and methods

Our analysis was located in the mountainous area of Palermo that lies in the Sicilian watershed of the Vallo di Mazara, a mountain ridge that separates the Tyrrhenian slope to the north from that of the Sicilian Sea to the south. Starting from the watershed of the Alto Belice Corleonese, dominated by Mount Pizzuta, 1333 m above sea level, the mountain range extends in different directions: a chain of mountains at its southern limit stretches for about 19 km from the Eleuterio gorges, near Marineo in the east, to the towns of San Cipirello and San Giuseppe Jato, located at the foot of the western end. It practically closes the base

of the horseshoe, encompassing a vast plateau in the interior of which the waters of the Belice Destro basin are collected, forming the artificial lake of Piana Degli Albanesi. To the east, the massif reaches as far as the nearby course of the Eleuterio, while to the northeast it overlooks the Conca d'Oro of Palermo, reaching as far east as the coast of the Tyrrhenian Sea. Very important in terms of extension is the extension to the west, which begins at Portella della Paglia and rises in the relief between the upper Oreto and upper Jato, which in the west continues as far as the plains of Partinico [26]. To the north, the chain bends to give rise to the Monreale Mountains, which extend northwards into the Billiemi Mountains, which reach as far as the sea between Sferracavallo and Isola Delle Femmine and extend north-west into the Carini Mountains, which reach as far as Punta Raisi, and the Terrasini Mountains, which end at Capo Rama, near the Gulf of Castellammare. The Monti di Billiemi with the Monti di Monreale delimits the Conca d'Oro to the west, in which, to the north, there are two mountains completely isolated between the sea and the plain: Monte Pellegrino and Monte Gallo. In these mountainous areas in the past, zootechnical activity was widespread and in particular, the breeding of the 'cinisara' cattle breed, with its dual attitude, which is very well adapted to these mountainous environments and climatic specificities. In these mountains, apart from the area where the Ficuzza (Corleone) forest is developed, we find zootechnical activities, farms that cultivate cereals and/or fodder and, where possible, something like olive growing and viticulture (where the environments permit). To overcome the limitations of the mountains, a new business development model must be created that meets the objectives of profitability, solvency and competitiveness. In this context, in the mountains, we are very often in the presence of food products that come from the same production process (joint). This rethinking can only start from the identification of the relevant variables in the current context. These variables, which are partially different from those relevant in even the recent past, therefore require a redefinition of both the objectives and the instruments used to achieve them. Specifically, the assertion that in mountain areas agricultural production on the one hand and the natural and socio-cultural environment on the other are necessarily joint products of the same production process must first be examined in its implications and consequences. It is important to note, in this regard, that to speak of joint production implicitly means abandoning, or at least limiting, the search for those economies of scale that, in some ways, are at the basis of all contemporary socio-economic development and of large companies. The idea of joint production, on the other hand, recalls economies of flexibility and, consequently, the adoption of economic policy recipes different from the standard ones normally recommended and/or employed in lowland or hillside farming. In any case, the awareness of having to deal with joint production must, in our opinion, be read from a perspective of sustainability. This should also be done by taking into account the fact that at the same time as the demographic decline, the rural mountain world has experienced a socio-cultural impoverishment that has accentuated its subordination to the dominant urban model. Today, few people live in the mountains, and they also have difficulties with the services they can provide. The disappearance of traditional craft activities linked to agriculture, the distance from decision-making centres, the difficulty of access to information, and the lack of services all contribute to the marginalization of mountain areas and beyond. If we add to this the exploitation of non-agricultural resources (think of energy or tourism resources) frequently occurs based on programmes and capital extraneous to local communities. As a consequence, the mountainous rural world loses the capacity to find within itself the strength for autonomous development, while unfavourable environmental conditions make it more difficult to preserve the delicate balance imposed by human presence. We can therefore say that the presence of extra-mountain activities in the mountain environment has undoubtedly changed its development model, which no longer finds its basis in a possible endogenous development as it was in the past. Today, a new balance, requiring a high degree of integration and synergy between the various human activities, can only be based on

development models that are at least partially original. In this logic, it becomes necessary to question the possibilities and limits of technological innovation in mountain areas. In this regard, it is well known that the spread of technical progress on the one hand "causes cyclical growth of a heterogeneous nature in which disequilibrium is the rule and equilibrium the exception" [9], on the other hand, it is not without undesirable side effects. More specifically, since technical progress is seldom neutral, the relative importance of production factors is modified, making certain capital goods, labour capacities, natural resources, and organisational models obsolete, thus changing the very worldview prevailing in a given society and age. One problem that arises when dealing with joint productions is the determination of the 'true' cost of the individual products/services. In particular, the problems that arise can be traced back to the fact that: 1) a single product/service unit is only one of the possible 'objects' of cost calculation; other possible objects are operational centres and stages of a production process or particular economic combinations; 2) there is no single 'true' cost but several cost configurations, each with its own of validity about the purposes for which the cost is determined (preventive or final) or rather "constructed". Through empirical observation in the mountain areas of Sicily, we have gathered data on the business models to be adopted for the development of marginal territories. Data were collected through questionnaires administered to five case studies. To choose the case studies, based on the objectives, a priori requirements were set: the units to be studied had to be located in marginal production contexts (in terms of distance from the urban centre of at least 30 km); the business activities had to be run by entrepreneurs with their families; joint production was applied in the enterprise, and it had to be located in a mountainous altitude zone. The questionnaire used was semi-structured. In particular, there were multiple-choice questions and a section of open-ended questions. The data requested concerning information on business strategy and how the entrepreneurs tried to turn the limitations of the mountains into opportunities to compete. The questionnaire was administered directly in the company through an interview with the entrepreneur or family member. After the data was collected, a company file summarising the data collected was created and sent by email to the company for review and integration.

6. Results and discussions

The five case studies examined allow us to outline some of the characteristics of inland areas in Italy and the changing farm structures. The units examined are located in the inland area of the Palermo mountainous region. In these farms, zootechnical activity is practised with milk and cheese production. Management is at the family level. In addition, fodder for animals, cereals and vegetables is cultivated. In recent years, they have also undertaken agrotourism activities and, to be competitive, they have also set up agri-Voltaics for the production of energy, part of which is used for farm activities and part of which is sold. From what they have found, it is clear that from the limitations of mountainous areas these enterprises have created opportunities for development and resilience for the territory. What they complain about is the difficulty of accessing roads and services that the public operator should take care of. As we have seen, inland and mountain areas are today characterized by abandonment phenomena. To promote the new vision of 'viable' farms, models must be developed where innovations can present competitive business models. With mechanisation-related innovations, there has been a relative loss of importance of the mountain primary sector compared to that of other areas. With the latest generation of technological innovations in agriculture, i.e. biological-informational innovations, the assessment of impacts on the mountain economy becomes even more complex. First of all, in the current state of knowledge, the effects of new biotechnologies are not easily predictable a priori due to a lack of sufficient knowledge. While positive environmental effects can be expected in the sense that the adoption of cultivars resistant to pathogens may lead to a reduction in the undesirable effects

of agricultural practices, the consequences of the loss of biodiversity - already compromised by the increase in bio-uniformity [10] due to mechanical and chemical-biological innovations - or on the balance of the ecosystem are still poorly known and, in any case, potentially disruptive [11]. As far as the new information technologies are concerned, it is now evident how they have entered overbearingly into all production activities, extending from company management to the control of the production of goods and services. In the agricultural field, it is well established that computerised production control is more suited to standardised and large-scale production in the plains than to differentiated and quality production located in the mountains. For the mountains as a whole, therefore, biological-computerised innovation can bring benefits even if the risk of marginalization remains and is linked to the more general process of generating innovations. Some of the innovations available for peripheral mountain areas are not the result of stimuli deriving from real local needs, partly because the absorption market for 'dedicated innovations' is not able to repay the huge investments in research required [12]. The search for a specific role for mountain regions in the society of the future therefore also depends on their ability to influence the direction of technological change. However, it should be noted immediately that it is not so much the innovation itself that is relevant, but rather the availability of the set of complementary assets and capabilities that can enable its successful adoption. At the enterprise level, these complementary resources require business capabilities, production skills, financial advantages and other resources that constitute missing links of which enterprises are not always aware. Indeed, an enterprise system requires the circularity of all factors of production. Since this set of complementary resources is, in principle, independent of innovations, which are often unforeseen, it is only by chance that the combining firm possesses the ideal combination [13]. This hypothesis may explain why many innovative firms disappear from the market after experiencing initial success because they do not build long-term competitive models. Furthermore, the assertion that society seems to have great difficulty in finding the optimal combination between the new potential provided by technological and financial innovation, and the necessary complementary changes in political and institutional organisation, still seems relevant. In other words, it can be argued that technological progress increasingly depends on a broad availability of technological and professional capacities and contextual structural and institutional changes. This is particularly true when one considers the problems of the entire economy rather than those relating only to the most advanced sectors. One may ask, then, what kind of technical progress should be pursued in inland and mountainous areas? Beyond the issues connected with the 'values' that one intends to favour, from an economic point of view, all innovations capable of mobilising local resources are useful for mountain areas. In other words, the technical progress worthy of dissemination is capable of enhancing local resources as much as possible by giving them a fundamental role in the production process. Thus the development model lies in the internal resources of the system of internal and mountainous areas. This is undoubtedly true for natural resources, but it is even more true for human resources. On the other hand, this seems to be the only way to prevent technological innovation for these regions from turning into a condition of dependence on those who are the driving force behind these processes (metropolitan areas, large companies, etc.). This would result in local resources being mobilised in a discriminatory manner and according to forces and interests outside the region.

7. Conclusions

This work has attempted to identify which concrete economic policy measures can be used to allow the permanence of viable agriculture in inland and mountainous areas. And on this aspect, there is a latent demand in the consumer which, if brought to light, would lead to a great deal of supply. Certainly, the strategy is not common to all areas, but one thing that all inland and mountain areas have in common is the

progressive ageing of the population and the risks associated with hydrogeological disruption. In the current context of the principles of sustainable development and the multifunctional role of agriculture, possible intervention strategies must be identified to limit the phenomena of the exodus as much as possible and intervene where possible with strategies to repopulate these areas. All this is necessary with a view to long-term environmental sustainability that must be combined with economic and social sustainability. In the specific case of inland and mountainous areas, their landscapes involve the link between local populations, the forest and agricultural activity, among other things, which is a process of continuous transformation. This process is not only the result of physical interventions but also of the socio-cultural background of the local populations, who, through their interpretation and appropriation of the traditions and customs handed down from generation to generation, have shaped the agro-forestry landscape, making it unique and unrepeatable. This connection between local people, the landscape and the forest environment is very important for local communities. The conservation and management of the upland landscape in a given community is often an expression of the connection between that community and its environment. In multifunctional management, forest management takes into account multiple potential products and their sources of income. Indeed, one of the most important functions of appropriate forest management in the mountains, in addition to obtaining raw materials, is the conservation of the landscape and natural resources as a backdrop for recreational activities and the preservation of local social networks. Forest management in the mountains must be multifunctional, take into account the state of the forest as a public good and be able to provide the local population with sufficient products and services to make them feel that the forest is a source of income. In light of the above, the appropriate instruments to promote such management involve a mix of self-government of public goods and the introduction of payment mechanisms. Ultimately, there is certainly a need to rethink mountain business models. To have long-term development, we need to rethink mountain development. A development that underpins the economic policies of rural and urban territories.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The authors are unable or have chosen not to specify which data has been used.

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