

**SUSTAINABLE LIVESTOCK FARMING IN ARID AREAS:
THE INTEGRATED LOCAL DEVELOPMENT RESPONSE AND
MEANING FOR SMALL SCALE FARMS ENVIRONMENT****G. Lazarev****Abstract**

Livestock farming in arid situations has been founded over centuries on a variable combination of pastoral and agricultural systems. During past century, sedentarization and land use densification have contributed to the emergence of new systems, at the one end, fully intensive and productive but also, at the other end, extensive and ecologically destructive. While herds numbers have considerably increased, farmers have adapted to new situations using massively purchased feeds. Although they contribute less to the feed balance, natural pastures continue however to be an essential component of the feed balance as they provide a free, mobility based resource. As pastures are overlapped and used in an uncontrolled competitive way, long term sustainability is threatened with dramatic effects on desertification and environment. Because of the spatial importance of such natural pastures in arid areas, there is thus a direct link between livestock and overall resource base sustainable management.

Experiences in North Africa and Middle East suggest that integrated and participatory approaches may lead to more efficient resources management and to more effective poverty oriented policies. Local development is the most recent approach to face these challenges. It aims at organizing people on a decentralized basis and at promoting participatory programming which could lead to an effective responsabilization of producers/citizens. This paper offers insights of its basic principles, relationships with livestock and meaning for small scale farms development.

Introduction

Livestock farming in arid situations has been founded over centuries on a variable combination of pastoral and agricultural systems. During past century,

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sedentarization and land use densification have contributed to the emergence of new systems, at the one end, fully intensive and productive but also, at the other end, extensive and ecologically destructive. While herds numbers have considerably increased, farmers have adapted to new situations using massively purchased feeds. Although they contribute less to the feed balance, natural pastures continue however to be an essential component of the feed balance as they provide a free, mobility based resource. As pastures are overlapped and used in an uncontrolled competitive way, long term sustainability is threatened with dramatic effects on desertification and environment. Because of the spatial importance of such natural pastures in arid areas, there is thus a direct link between livestock and overall resource base sustainable management.

The ecological and socio-economic environment within which aridity based livestock farming is developing nowadays, has thus become a complex and diversified one. In order to understand its dynamic, there is a need to take into account as a whole the resource base potential, the evolution of the livestock farming systems, the diversification of farm size types strategies. But in the meantime, there is also a need to assess the interaction of exogenous factors such as the impact of urbanization, emigration and remittances revenues, access to markets, communications and transportation facilities. In addition, there is a generational issue, as, more and more, better informed young people have new aspirations and tend to disregard the harsh living conditions of pastoral and small farming activities.

Policies responses to challenge this complexity have been generally sectorial and fragmented. In addition they have been promoted from the top, putting forward first the technical solutions and leaving largely aside the social context as well as the intersectoral interactions. As a whole, livestock development policies in arid situations have not been able to set up workable models for pursuing this activity on a sustainable way, thus leaving initiative to competitive strategies which privilege the wealthiest, at the expenses of social equity and resource mining at the expenses of sound environment management.

Experiences in North Africa and Middle East, as well as in other parts of the world, suggest that integrated and participatory approaches may lead to more efficient resources management and to more effective poverty oriented policies. Local development is the most recent approach to face these challenges. It aims at organizing people on a decentralized basis and at promoting participatory programming which could lead to an effective responsabilization of the producers/citizens.

1. Evolution of Livestock Farming Systems in the Southern Mediterranean Arid/Subarid Area

1. The Ecological and Historical Importance of Pastoralism in the Southern Mediterranean Arid/Subarid Area

A larger part of Southern Mediterranean countries is arid or subarid, and historically pastoral economy and the subsequent socio-political systems have been a dominant feature of social organization and dynamic in these regions. Until the beginning of last century, sedentary agriculture was confined to either irrigated systems in the Nile, Mesopotamia and in oasis or to mountains and adequately rainfed hills. Extended plains in the Maghreb and in the Machrek which receive sufficient rainfall for a sustainable rainfed agriculture were mostly occupied by a pastoralism/agro-pastoralism based economy, as a reflection of the socio-political dominance of pastoralist tribal systems¹. In Northern Africa, it is a significant historical feature that these favourable plains were occupied at large scale by sedentary farm based agriculture only in Roman times and later during the french colonial occupation. Through the XXth century, sedentary indigenous agriculture also developed in these plains and in hills along with the regression, due to the colonial context, of the then mostly dominant pastoralist systems. Census carried out at the beginning of the XXth century in Tunisia and Morocco, indicate clearly the considerable extension of tents and precarious dwellings in presently agricultural and sedentary plains and hills. Surveys of these times also confirm the dominance of nomadic and agro-pastoralist systems and of herds mobility.

Colonial ideology in Northern Africa fueled a debate on these topics, arguing that this extension of pastoralist systems and the resulting "beduinization" of Northern Africa was a consequence of arab hilalian invasions during the XIth century. So much quoted was the famous statement by Ibn Khaldun who compared these invasions to "clouds of locusts". Isolated from its context, this statement made a lot of harm, suggesting an idealized sedentary berber society destroyed by nomadic arabs. New looks into Ibn Khaldun and ancient arab geographers writings provide a substantially different view : before the XIth century, socio-political dynamics were already (and since roman times) dominated by the continuing pressure of berber

¹ A most useful work for understanding the theoretical context of this kind of relationships is found in A. M. Khazanov; a russian anthropologist, specialist of pastoral societies, *Nomads and the outside world*, Cambridge Studies in Social and Anthropology, Cambridge University Press, 1984.

pastoral tribes and by their thrust towards better endowed and greener plains and hills, the so called Sahel in Tunisia, Tells in Algeria and Azaghar in Morocco. Hilalian invasion was so much reminded because it was sudden and disruptive of established political order. But it did not introduced beduin civilization. With time, amalgams and fusions between berber and arab tribes took place, often along with genealogic reconstructions which provided the legitimation of an arabic rooted "nasab". Northern Africa was thus reconfigured by new social systems. But, except some local regressions of agriculture, this evolution left unchanged a mostly based pastoral and nomadic/semi-nomadic economy which was, for these societies, the most efficient system for using the complementarities between arid steppes and more humid areas.

Except when backed by a colonial power, sedentary societies in Northern Africa never had a sufficient strength to oppose these pastoral strategies and most often they had no choice but to become tributaries of dominant nomadic tribes. In this respect, there is there a basic difference with Northern Mediterranean countries. Most probably because of their more favourable ecological endowment for sedentary agriculture, those were able, in ancient times, to absorb the successive invasions of the pastoral/nomadic systems. Unlikely and probably because of the extension of areas ecologically fit only or preferably for pastoralism, Southern Mediterranean was not presented with such a choice.

The XXth century has witnessed a considerable change of land use in Southern Mediterranean countries. Wherever agriculture was possible, it has expanded, first in the more favourable areas with rainfall more than 400 mm, but also in most of drought prone areas with rainfall between 400 and 200 mm. Modern agriculture and large scale irrigated schemes also developed in many places. However, while nomadic and semi nomadic systems disappeared totally in these areas, these progress did not offset the pastoral inheritance. In spite of its modernization, a large part of rainfed agriculture, and particularly that of small farmers, failed to integrate livestock in the farming systems. To a large extent and where commonly owned pasturelands subsisted, production systems evolved as agro-pastoralist systems, livestock been still substantially dependant on natural pastures and fallows. Of course, no generalization can be made and it is true that the whole spectrum of situations is to be found, these situations being the more agro-pastoralist in the drier areas and the most endowed with rangelands, and being much less so in more humid and more densely populated areas. But it is a very fact that, in spite of a century of evolution, agro-pastoralism has remained an important feature of many production systems in the agricultural belts. In spite also of the importance of purchased feed,

integration of agriculture and livestock in the farming systems still remain an important objective of all agricultural policies.

This evolution however did not cancel a basic ecological factor of Southern Mediterranean, that of the extension of areas only fit for extensive livestock. Those comprise millions of hectares of steppes, mountains and shrub forests as well as seasonal desert rangelands. Steppes, desert and many mountains were traditionally a dominium of nomads and semi nomads. Today these systems also have disappeared, leaving place to new systems where agriculture has expanded beyond its ecological limits and where extensive livestock has developed with new combination of factors which ensure its immediate viability but which, most probably, also compromise its long term sustainability. Only in the last decades, development policies found the importance of these production systems and devoted efforts for ensuring their integration into the modernization process. In 1993, a forum was convened to discuss these issues in the Middle East countries². Among its conclusions, which were confirmed by several FAO technical meetings, was the need for research to first understand the evolution process. Studies carried out in Morocco and in Tunisia³ came to similar conclusions. These similarities were found sufficiently convincing for providing a description of this process on the basis of a case study illustration from one of these countries.

2. A Case Study Illustration: Evolution of Livestock Farming Systems in the South East of Tunisia

This illustration regards the Governorate of Tataouine, in the South East of Tunisia⁴. The area is mostly arid and subsaharian. It comprises a low chain of mountain with good summer pastures and vast pastoral steppes extending over

² Colloque "Devenir des steppes d'Arabie et du Bilad ash Sham", Institut du Monde Arabe, avril 1991. Published in " Steppes d'Arabies", Presse Universitaires de France Paris - Cahiers de l'IUED, Geneve, 1993.

³ Particularly the studies carried out within the context of two IF AD financed livestock development projects, the *Projet de Developpement des Parcours et de l'Elevage dans l'Oriental*, in Western Morocco, and the *Projet de Developpement Integre du Sud Est Pastoral*, in South East Tunisia.

⁴ This study was carried out within the context of a methodological experiment realized during the preparation, in 2001, of a development project to be submitted to the financial institution IF AD. This experimental work was conducted by a team coordinated by INRAT, the agronomical research institute of Tunisia, within the framework of an agreement between IF AD and ICARD A.

more than two millions hectares. Very ancient villages and granaries are scattered in the mountain where traditional techniques for water harvesting allowed over centuries to produce olives, figs and cereals. This area economy however was mainly based on nomadic pastoral livestock. Strategies to adjust to erratic climate conditions were based upon an extremely good knowledge of the natural pasture potential. Rules for managing herds watering facilities and for exchanging and sharing grazing rights according to the year rainfall were regulated by an effective tribal system. A similar picture was also found in the extended steppe areas of Algeria and Morocco, as well as in most steppe areas in the Machrek/Middle East.

Surveyed in 2001, this area offered a totally different picture. The whole population is now settled in lowlands large villages and in a populated headtown. Ancient mountain villages are abandoned and visited only by tourists. No more families move seasonally with their tents and nomadic life is a past image. Only shepherds are on the move but with light equipment and in permanent contact with herd owners vehicles. Only part of the livestock moves away with shepherds. The other part almost never overnights far from villages. Ancient agricultural lands and traditional plantations are privately owned while rainfed cereals lands are a common property of extended families. Range lands are for a part, common properties of tribes and for another part, intertribal common properties. These rights are still very well known. A major change occurred with the Government common lands privatization policy. Encouraged by subsidies for tree planting, substantial tracks of common rangelands were converted into mostly marginal tree plantations - a move in contradiction with the law for common lands privatization which provided a common ownership status for all ecologically defined rangelands. This policy has resulted in many disruptions of existing grazing systems and in an abandonment of mountain ancient plantations. Common rangelands, however - and in spite of privatization -, constitute the very large majority of the total Governorate area. This is not the situation of the nearby Governorate of Medenine where the privatization policy has led to a dramatic reduction of pastures which were replaced by marginal olive tree plantations. Villages urbanization is an ongoing trend with its impact on local economy. Most families have non agricultural activities, in trading, housing, services or civil service and the dividing line between rural and urban population is highly unprecise. This trend is accentuated by a strong emigration, which affects temporarily or definitively important numbers of men.

The farm typology which was set up by the study⁵ clearly describes the complexity and diversification of the farming systems. In total there are 5350 farms which own 465000⁶ heads of small ruminants and some 22000 camels. This total however is broken down in very different categories of farms. All of them have grazing rights over the same pastoral area but these rights are used very unevenly according to farmers categories. The following categories were found:

- *Entrepreneurial livestock herders*. They total 275 and own 137500 heads of small ruminants with average herds of about 500. A third of them also raise camels. Herds are tended by professional shepherds. These herds are extremely mobile to take advantage of the common pasture potential. Vehicles are essential to supply feed and to facilitate watering

- *Medium agro-pastoralists*. They account 495 and own 88500 small ruminants (average herds, 190 heads). They have agricultural activities and to tend the herds, they use either family labor or wage shepherds. Some of them own camels which are entrusted to associated herds tended by a professional herder.

- *Small agro-pastoralists*. They account 1100 and own 115000 small ruminants (average herd 105 heads). They raise themselves part of the herds but also entrust animals to associated herds tended by a shepherd. They also have agriculture (olive trees and some cereals). Farms revenues are supplemented by temporary wage labor in other sectors.

- *Small Agriculturalists*. They account 2005 and own 80000 heads (average herd, 40 heads). Animals are kept around the farm and partly entrusted to associated herds. External wage labor is particularly important.

- *Large plantations farms*. They total 825. They have minor interests in livestock (17000 heads of small ruminants, average, 40 heads). They are usually merchants, civil servants or emigrated families who invested in tree planting.

- *Small irrigated farms*. Their number is increasing rapidly. They now account 610. They own sedentary herds of small ruminants (totalling 18500 heads, average, 30)

- *Associated small ruminants herds*. They number 165 totalling 18500 heads, mostly belonging to the small agro-pastoralists and to the small agriculturalists.

⁵ This typology has been established by A. Bourbouze, IAM Montpellier, in cooperation with P. Martini, IF AD consultant, within the context of the IF AD project preparation (nov. 2001).

⁶ Livestock numbers refer to year 2001, which happened to be a fourth successive drought year. They mostly indicate the relative distribution of livestock between farm types and not to the importance of stock in normal years.

- Associated camel herds. There are some 55 herds
- *Professional shepherds*. Those account 700 to 800.

This description shows the importance of large and medium livestock farms which account for less than 15 % of farm number but which detain half of the small ruminants and almost all camels. Small farms constitute the bulk of the farm number. It plays a role in economy since it detains about half of the small ruminants. It is obvious however that policies to develop these small farms have to be conceived differently than the one for the larger livestock farmers. Among the latter, strategies must be further differentiated to take into account the large herders production systems and the one of the medium agropastoralists.

A common feature of the livestock production systems - although with differentiated applications according to farm types - regard the dependancy upon purchased feed for animals. Over years this strategy has appeared the most adapted for compensating climatic irregularities as well as permanent feed shortages in the rangelands. A very careful analysis of the production potential of the thirteen types of pastures associations in the area⁷ led to a good estimate of the rangelands feed production in good, medium and bad year. Rangelands supply varies from 1 in dry years to 2 in an average year and to 3.8 in a good year. Livestock demand also varies according to years, from 1 in dry years to 1.8 in good years. Non pastoral feed supply, from local residues but mostly from on market purchased feed, account for 65 % of animal demand in bad years, 48 % in an average year and 18 % in a good year.

As a whole, livestock production systems seem adapted to the harsh local conditions and farmers strategies appear efficient for coping with erratic climate conditions. This adaptation maintains the area as major meat supplier in Tunisia. The negative aspects regard the high costs during bad years that can be afforded by small farmers only with government subsidies. Given the recurrence of droughts, this system seems hardly sustainable in the long run. Another negative factor regard the uneven distribution of the stock on the natural pastures. While those are overgrazed in many places, they are underutilized in other places. There is in addition a complete lack of overall pastures management. No system has yet replaced the traditional authority which played a regulatory role in nomadic times.

⁷ This evaluation was carried out by Tahar Tellahigue, pastoralist and IFAD consultant.

3. Trends and Generalization in the Southern Mediterranean Arid/Subarid Area

Lessons that can be drawn from this farming systems evolution have a general meaning as they could be applied to most of arid and subarid areas in Southern Mediterranean countries. They indicate clearly the interdependency of all factors simultaneously. Rangelands are an abundant resource in these areas as they are in the case study area. They cannot however support a productive livestock without supplementation. In the meantime, there is no clear responsabilization for pastures management and interindividual competition leads to uncontrolled overgrazing and finally to environment degradation and desertification. Improvement of traditional agriculture which was adapted to local constraints has been neglected while mechanized farming and often modern tree plantations have expanded beyond their ecological limits. Research has furthermore encouraged this trend when finding solutions for cultivation in these extreme conditions, with no regard to their impact on existing production systems and on the overall ecological sustainability⁸. Irrigation, although punctual and very expensive proves to play an important regulatory role, in spite of its size and the reduced number of beneficiaries. It does not prove however to be a viable solution for producing massively the required additional feed. Urbanization, dependency on external resources and emigration are seen everywhere.

Farming systems differentiation has become a major feature in this context. Nomadic life has disappeared, except a few relics, and long range mobility no longer concern families as a whole but only selected family members and wage shepherds. Large entrepreneurial herders tend to dominate the livestock activity. Their production systems take the best of the common rangelands free resources, with no responsibility for these pastures management. They can afford climate irregularities and compensate rangelands supply shortages thanks to capital resources to purchase feed. They also can hire herders manpower. In addition, their efficiency has improved as a result of increased mobility and better transportation facilities. As summarized by the suggestive title of a book on pastoral system evolution in the Middle East, they have gone "*from camel to wheel*".

Medium and small farmers have followed a different path. They are all settled in villages and have generally shortened their radius of rangelands

⁸ A criticism of this research approach is given for example in several papers in "*Steppes d'Arabies*", see footnote 2.

dependency, thus exerting an increased pressure on the nearby resources. Only when entrusting their livestock to associate herds led by wage shepherds can they afford long distance rangelands grazing. In addition, a progressive transformation of land tenure rights has resulted in many private pastures on the nearby once common lands. Cereal cultivation is quite irregular but plays an essential interannual regulatory role. These farmers also have become dependant on purchased feed but have to obtain external monetary resources to afford them.

Another major feature is the relationship with emigration. This is a generalized trend but experience shows that emigration does not mean a definitive break with the departure areas. Sending remittances, investing in local activity and in housing, returning regularly and detaining livestock entrusted to family members are seen everywhere. Emigration has had two disruptive impacts. The first on women who have taken many tasks left by departed men. Their private life also has been affected as marriage has become more difficult and they have to wait for long. The second concerns the young male teenagers who wait for emigration opportunities and show little interest for agriculture and livestock. This results, in particular, in a loss of local knowledge on pastoral and environment matters.

A last important common feature regard the land tenure issue. Rangelands which occupy such extended areas in all these countries have been largely kept away from privatization. A number of countries have provided for a state ownership of these lands but nowhere traditional tribal ownership rights have disappeared. In spite of the dissolution of tribal systems along with the raising of the administrative and formal political life, old tribal inheritances regarding in particular solidarity, identity and common lands rights have remained. But, except in some recent experiences, these social inheritances have been negated by development policies. It is true that the challenge is particularly ambiguous: how to mobilize the strength of traditional customs and solidarity to fuel modern development organizations and not to revive obsolete sociopolitical structures?

//. Policies Responses to the Sustainable Development Challenge in the Southern Mediterranean Arid/Subarid Areas

Most agricultural development policies in Southern Mediterranean countries during the past decades have given priority to large scale irrigation schemes and to intensification of modern agriculture. Productivity programmes however also tended to address small scale farms, concentrating on credit

schemes and input distribution. These programs however were severely affected by the subsidies compression which went together with the structural adjustments. Extensive livestock was neglected during a long time and only recently they were taken seriously into consideration by development policies and research. Overall results however are uneven and no global response has yet be given to this challenge.

1. A Major Concern: Response to Drought and Climate Irregularities

The only ancient policy which has systematically addressed extensive livestock has concerned the response to drought effects. Climate irregularities are a structural fact which, however, seems to have worsened during recent decades. Reponse to herds mortality has generally been motivated by political reasons. In most countries, governments promulgated urgency measures after drought to compensate herds losses. These policies were generally known as programmes for herds reconstitution. They consisted in subsidies and low rate credit for buying replacement animals. They were proportional to losses, thus going massively to larger herds. After a few years, herds were reconstituted, pursuing their historical incremental trend. It was found however that, after each drought, a large number of small herders had gone out of job, thus favouring herd concentration. This policy has been often criticized as it usually neglected the relationship to resource potential. Instead of leaving the drought affected pastures to reconstitute, it favoured overgrazing resilience, thus encouraging a negative trend.

Another response has consisted in improving watering facilities. All countries have devoted substantial investments to drill deep boreholes for preventing water drought shortages and to reduce livestock pressure around existing water facilities. This policy was a typical example of governments fragmentary understanding of pastoralism. In the past, watering facilities were owned and managed by tribes which had strong customary rules for using these facilities according to grazing rights and grazing arrangements with other tribes. Government watering facilities were public and open to all users, and as a result they largely contributed to an open access of rangelands, with no longer respect to traditional grazing rights and regulation. In some countries, this trend was accelerated by laws which provided for public ownership of rangelands, thus contributing largely to overgrazing. There were only exceptional cases where the location of boreholes was discussed with users during project preparation.

The third response, and the most recent one, has consisted in providing feed to herders for supplementing livestock in times of drought shortages. This response has come along with the ongoing trend for supplementing pastoral herds - as seen above in the case study illustration. Such policies were particularly enforced during the past decade droughts in Morocco and Tunisia. This response has proven to be efficient to save livestock but it has also proven to be a fragmentary measure which was not conceived in relation to the differentiated needs of the production systems. It also contributed to make the smaller herders more dependant on feed that they could not afford under normal conditions, thus increasing their economical stress.

2. Increasing Livestock and Natural Pastures Productivity

Another set of responses has concerned the improvement of livestock and pastures productivity. To a large extent, this response has been strongly linked to research. Improving livestock productivity through genetic programmes, disease control, feeding systems was not intended specifically for extensive livestock but primarily for intensive farm based livestock. Results of research, however, proved to provide also responses adapted for extensive animal production. Disease control and mass vaccinations have, beyond any doubt, contributed substantially to the reduction of mortality in extensive livestock areas. Herders response proved generally rapid and positive. However consequences of these improvements upon the overall pastoral production systems and particularly upon the ranges carrying capacity were rarely analyzed. Veterinary programmes seem to have always gone their own and independant way.

Genetic improvement were also introduced into extensive livestock systems although generally as a side effect of programmes for intensive areas. Selected breeding animals were distributed by government animal production services among herders but these services were never able to follow up the chain of improvements and evaluate the results of improved breeding. Those came at random. More efficient results were obtained with programmes such as the one introduced in the western steppes of Morocco and which consisted in contractual arrangements with professional organizations. The National Sheep Producers Organization of Morocco (ANO) proved thus able to distribute improved livestock to known good herders and somehow to follow up the chain of genetic improvements. This programme however generally ignored the smaller herders. Research which played a major role in improving the breeding stock was generally absent in the implementation evaluation

process, thus illustrating once more the existing gap between upstream research and research application.

Another field of improvements which was a long time a relatively hidden one regarded pastures improvement. Research in this field carried out a considerable amount of trials and identified many indigenous and exogenous varieties likely to improve pastures. The difficulty however always came in finding efficient solutions to disseminate these results as, generally, research trials had little in common with real range situations. In Northern Africa, as also in Syria, governments sought to plant or seed improved varieties in selected protected and government managed areas. Good results were often obtained but the introduction of users in these selected pastures has remained a critical and mostly unsolved issue. Those new resources were exogenous to users production systems and they were seen mainly as a supplementary feed offered from time to time by the government. Results, although sometimes technically impressive, never induced herders to repeat the operation and to apply for credit to such an end. With time however, lessons were learnt and simpler plantations systems, particularly for forage shrubs and cactus, were established on the basis of users demand. In all cases however, plantations were realized by government services or upon governments contractual arrangements with private sector. Cactus dissemination in Tunisia illustrate one of the few cases of adoption of pasture improvements on private lands.

3. Improving Services and Cooperative arrangements

Improving services to farmers was another way experienced for improving livestock efficiency. The start took place in intensive agricultural areas, generally as a component of multipurpose services cooperatives. In the eighties, experiments were conducted for introducing these systems among extensive pastoral herders. The most ambitious formula, such as the one experimented in Syria or in Algeria, aimed at organizing herders into production cooperatives, those occupying a given government delimited territory and managing it according to rotational pasture management rules. Services for access to inputs and for marketing were also organized. Conceived from the top, these systems obtained results in proportion to the efficiency of government support. But as they were superimposed upon existing production systems, they most often created more conflicts than solutions. They were never considered by herders as a model to be adopted for their own production systems. Simpler systems of services cooperatives, mostly for improving

access to inputs, were also introduced. Similarly, those proved dependant upon government support and upon strong subsidies incentives.

The "ranching" option which was experimented first in Eastern Africa and later in Western Africa, had apparently no impact in the Southern Mediterranean countries, although some similarities with the Syrian experience are found. These ranches were government owned and they aimed at developing local herds entrusted to them by local herders. Their efficiency proved to depend upon government authority and, over time, almost all of them disappeared as a result of administration mismanagement and laxism. The famous King ranch in Morocco (a private initiative) is a rare example of technically successful ranching in the Mediterranean area. It must be noted however that its implantation disrupted considerably the traditional pastoral organization of the tribes who owned the land and that they were forced to lease to the ranch.

4. Experimenting Participatory Natural Pastures Management

Considering all the shortcomings of government managed initiatives for improving natural pastures and extensive livestock, Morocco took the risk, at the end of the eighties, of engaging itself into a radically new approach, that of experimenting a participatory natural pastures management system. This experience was carried out at a large scale within the context of an IF AD project for extensive livestock and natural pastures improvement in the country eastern steppes (the so called Oriental). Its basic assumption was to recognize the existing customary rights on common pasturelands and to address to traditional communities which owned these lands. The cooperative formula was retained as no other legal framework existed for organizing herders. These however were based on traditional community informal organizations, giving so far a membership right to all community members.

Departing from this base, the project was able to identify, with the community members, pastures areas which could be rehabilitated after a few years rest, to delimitate these areas, to set up the rules for protecting them during the rest period and for using the improved pastures according to optimal grazing time and to these pastures carrying capacity. The richer and most degraded pastures, those of *artemisia herba alba*, were selected. Thanks to the community cooperation, grazing was efficiently prevented during the rest period. Thanks also to good rainfalls, after the first two years, the first pastures under rest resulted completely rehabilitated and were opened to grazing along the rules set with the communities. A major change, which had considerable

implications with respect to the grazing lands free access customary rights, was the acceptance of an animal head grazing tax for pasture improvements maintenance. Within a few years, some four millions were rehabilitated and about thirty community based cooperatives were established. There is no comparable results in other Southern Mediterranean countries⁹. These results owe a lot to the good cooperation which developed between scholars and particularly sociologists from the Moroccan Agronomical Institute and the administration. IF AD also played an important supervisory role.

With time, cooperatives have consolidated their basis and have engaged in efficient services and transportation facilities. The dark side has been the trusting of cooperative management to the wealthiest herders and the resulting marginalization of a majority of small herders who had almost no voice in decision making. Latest evaluations recommend a differentiation of the cooperative system in order to adjust support and participation to the differentiated needs of each livestock farm type. Another weakness lies with the financing system which depends upon government budgetary resources, this resulting into a cooperative dependency upon government decision making. As a result, there is still a considerable need for enlarging the participatory system and for a financial responsabilization of existing cooperatives.

A new IF AD project in Tunisia, the Southern Integrated Development Project (which covers the Governorate of Tataouine and some other range areas), has attempted to take these lessons into account, particularly those regarding local organizations responsabilization. Its scope however would be larger since participatory range management, although important, would be part of a more ambitious "local development" project, the kind of which is justified and discussed in the sections below. This IF AD project is now at the Government-EFAD negotiation stage.

5. The Global Response Failure

This brief account of policies which engaged into support and improvements of extensive and pastoral livestock system, shows that a vast array of approaches was experienced and implemented. However, although they have had many positive effects, these approaches did not produce models

⁹ Recently, a move was made in Syria to readjust cooperatives limits along customary grazing limits, thus recognizing traditional communities as development partners (oral communication by Tahar Tellahigue, IF AD pastoralist consultant).

responding to the constraints complexity and to the farming systems diversity. There are many reasons for these shortcomings. A first and major reason has been the belief that sound technical solutions would solve the problem. It took a long time before research and technical administration realized that technologies had to be introduced into differentiated production systems. It took another time to recognize the importance of local knowledge. But it took still a longer time to come along with the ideas of producers participation, responsabilization and partnership.

Since some time, development policies are on the turn and are more and more conceived with respect to these lessons. But this is far from being sufficient. The case of the Oriental project in Morocco, which is considered a success story, demonstrates that a lot of major problems have been left unsolved and that producers responsabilization and administration disengagement are far from effective. Top down approaches are negated in official statements and policies but they are still ubiquitous in civil servants mentalities. The case study on the farming systems evolution in Tunisia also indicates a need for a new approach. Problems to be solved are, in fact, so much intricated that they cannot be tackled successfully if not considering their interactions. Fragmentary approaches, which have been the rule, have to leave space to global and integrated responses.

///. Paradigms for Sustainable Development, Environment Holistic Management, Participation and Integration

1. Natural Resources Holistic Management

Rural and agricultural policies in past decades were mainly founded upon two ideas, that of growth as the only development finality and that of the State as a central actor for policy implementation. The concept of "sustainability" has introduced two new paradigms in this vision: first, development must be based upon a rational management of the Earth resources, thus setting constraints to growth, second, people participation is a necessary requirement, thus pledging for another role of the State.

Degradation of natural resources, human pressures, climate changes and desertification processes justify the first paradigm which puts forward the interactions of all development actions upon the ecosystems and recommends a holistic management of resources. In the field of rural development, this would mean an integration of sectoral policies, a care for consistency of the many actors decisions, a global vision of resource synergies and complementarities.

There is, in addition, an indispensable spatial dimension: because of the number and diversity of actors who take decisions on the use of rural space, there is a need for master plans and overall programming in order to define the rules and limits of resources exploitation. Such plans and programmes have, in particular, to identify the parameters which should be considered while implementing development actions for succeeding in halting the degradation processes and for initiating a long term and sustainable management of natural resources. No meaningful results however, would be expected along such a way unless the actors are fully associated to this planning and agree with the disciplines and rules that they would imply. Because actors operating in the rural sector have neither the same objectives nor the same temporalities, it is clear that such an approach is not likely to be implemented unless reconciliations and compromises could be negotiated within operational, political and institutional frameworks which are mostly lacking at present.

2. Participatory process

The second paradigm regards the responsible participation to development of all concerned actors. Participation has become, in recent years, an overused concept and its meaning has somehow become confusing. Initially, this concept was put forward as a way for implementing bottom up approaches, in reaction to the top down approaches which, for many decades, dominated development policies. Associated with this idea was the one of action at "grassroot" level. In developing the concept in practice, there has been a multitude of experiments at village and community scale which have produced new methodologies for understanding development constraints, for formulating diagnosis, for identifying priorities and for elaborating actions programme.

Looking backward to all these experiments, some lessons have become more and more obvious. The positive response of populations, when it was responsabilized, was a first lesson. It was also found that populations had a capacity for understanding their own problems that was greatly ignored by governments development officers. Another lesson has been the trickle down effect of participatory actions on the developers behavior. Those, who were so certain of their "I know best" approaches, have begun to respect people and to better evaluate their capabilities. As a whole, however, and in spite of the many meaningful results, participatory experiences have been short of expectations. A main reason for this has been the insufficient concern paid to these experiences political context. In the absence of an enabling political environment, all participatory experiences are not sustainable, except when

artificially maintained by some devoted NGOs. Participation at grassroots level has certainly proven useful to train people in democratic practices but it cannot be a substitute for democracy, the latter being only a result of a more general evolution in a country. Such a finding is essential: it does not put a halt to participatory projects as they exist now but it clearly indicates that there is no sustainable process of participation in the absence of a more global and progressive democratic context. Such a process also cannot develop in the absence of a real government commitment to support decentralization.

Another reason for participation shortcomings has been the oversimplified understanding of the "top-down" and bottom up" approaches opposition. Experience shows that decisions which can be made at a community or village level are limited. Many development actions depend upon decisions or resource mobilization which can be decided only at government level. Presently, there is a kind of dividing line between participatory small scale actions which result from bottom up dynamics and, on the other side, larger scale development actions which continue to be managed by governments. This is a fact: there is a simultaneous need for the two approaches. What has to be improved however would be the relationships between the two approaches because a dividing line is highly counterproductive. There is, in fact, a need for synergies and interactions between top and bottom levels. There is also a need for interfaces where participatory organizations could meet government decentralized institutions, where priorities from the top and from the bottom could be reconciled, where resources allocation could be discussed, etc. Only a long term evolution would facilitate such a functioning of the participation and decentralization process. Local development, as presented below, could be a first step to face this challenge.

3. Integration

Integration is another of these overused concept. During a time, it was at the root of an entire generation of so called "integrated development projects". These projects however were, at this time, associated to centralized management and integration was mainly taken as an approach for coordinating different ministries within specific regional projects. This concept has been revived in a new generation of development project as a way to foster intersectoral synergies. In the local development approach, it also means setting interactive programmes to take into account the multiple aspects of individual livelihood. This would mean, in particular, that in rural areas, all needs would have to be taken into account and that programmes would not

have to be designed, as usual, according to the institutional dividing lines of each department in development administration but along identified local priorities. So far, development programmes should no longer appear as a binded set of administrative departments budgetary programmes. Along the new approach, needs for government action would be, for a part, defined and budgetized on the basis of local development programmes. Such an evolution is most important challenge for a sustainable decentralization process.

IV. Local Development, a New Concept for Sustainable Development

1. Discovering the Concept

Local development also is one of these ambiguous concepts of the development terminology. Most of development programmes have local impacts and the concept has been used to refer to these impacts. The concept of "local" also is associated by many to grassroot programmes, the village or the community levels being meant as the "local level". During the past decade however there has been a tendency to apply this concept to a well identified level of action within a decentralization process. This level is approximately the one of a "small region", this one being large enough to have an economic personality and for being provided with basic administration and services and, on the other side, small enough for being accessible to villages and other grassroot and local organizations. Such a small region would have a headtown polarizing local activities plus a variable number of smaller urban centers, often designated as "bourgs ruraux". Ideally or later in the process, they may also have a local government at this level.

This kind of "small region" exists traditionnally in some old decentralized countries. In Spain, for instance, it is called the "comarca" and a form of local government is found hereby. In France, thinking and experiences are on the move with the progress of decentralization but there are conflicting views to define rightly this level of decentralization. Some see it in the so called "pays", others in a "syndicate of communes", others in ad hoc territorial project looking for their development within the framework of a "contrat de territoire". In developping countries, this concept is quite new but it is being more and more considered. It is for instance put forward as an essential level of "territorialization" in the *Strategy 2020 for Rural Development* which has been elaborated in Morocco. In some East Africa countries, such a decentralization level is found with the Districts Local Governments. In the form of *Local Area Development Programmes (LADP)*, it is recommended by the Convention to

Combat Desertification as a basic development tool for implementing this Convention.

This context being set, local development could be understood as a decentralized development process, operated at a given territorial basis and likely to associate its population to the process, either through their local organizations or through representative institutions or local governments corresponding to this territory. The local development concept may thus be defined with three sets of features, its territorial features, its institutional and organizational features, its programming methodology and process features.

2. Territorial features

There is no fixed methodology for defining the "small region" level. A main reason for this is the basic assumption that populations would be motivated for a common development project at local level only if they are allowed to agree on the small region definition and limits. Decentralization processes and demographic progress are in general far from sufficient for allowing such a territorial self determination. The "contrat de territoire" approach which is implemented in France is based on such a self determination of the communes interested in joining a common territorial project. In practice however, tendency consists in adhering to the most convenient administrative level. In the developing countries, this is only an approximate solution which does not offset many improper colonial inheritances. In Western Africa, for instance, this level is found under various denominations, departement, canton, cercle, district, etc. Most often, however this level, which is the lowest in the administrative organization, is not fully recognized by the decentralization policies which consider a higher regional level or a smaller political organization, that equivalent to the "commune".

These territories, however they are defined, are composed of basic territorial units corresponding to villages or to community territories. Because administrative villages and community territories not always coincide in developing countries, because also, some particular territorial systems, such as the community pastoral areas, have to be taken into account, there is a tendency to designate the basic units corresponding to a sociological community and its territory by the neutral wording of "socio-territorial units". In the development project of South Eastern Tunisia, some 30 socio-territorial units, corresponding each to a pastoral territory, were identified. In the developers vocabulary, the community territories are called "terroir". This level is an essential one as it forms the true basis for the participatory process.

Most of participatory experiments have been developed at this level and it is there that most of methodological progress has been made. However, in contradiction with their sociological dynamism and with their place in the participatory development projects, these socio-territorial units, in most of developing countries, have no legal status and they are generally ignored by the decentralization policies.

In the meantime, however, decentralization policies have promoted in many countries an intermediate political level, that of the "commune", "rural commune" or equivalent. These are represented by an elected body, they have a budget and they are expected to constitute the structural basis of a future modern territorial organization. Such communes are found, for instance and with very similar features, in Morocco and in Senegal. As they have a legal status, communes are burdened with local projects, although they are not equipped for that. An evaluation of their performances seems to indicate that they are both too big and too small for, presently, being an efficient development instrument. They are too big because they leave no place to basic community units and villages where are the real actors and decision makers for most of grassroot development activities. They are too small because they do not constitute a platform for overall territorial planning and because they cannot afford having the required technical staff for supporting project conception and implementation.

3. Institutionnal features

There have been extended discussions for identifying the most relevant institution for local development. Some, and the most numerous promote the village associations, others the communes or equivalent, others civil society organizations and others a territorial administrative or governmental level. In fact, such a choice has not to be made as in a real local development approach, all organizations have to be considered and all have a role to play. The institutionnal set up has to be multidimensional. The main problem however is in defining the roles and competences of each organizational set up.

Main actors in local development could be identified as the following. First the actors with a territorial competence. They include the administration operating at the small region level, local government when existing, the commune or equivalent, villages (or socio-territorial unit) although generally not recognized by law. A second group, fully open, comprise village based common interest groups, transversal economic organizations, such as

cooperatives and producers associations, professional organizations, local NGOs and other civil society organizations.

As far as the first group is concerned, a basic rule for defining competences is put forward by local development approach promoters, the rule of "subsidiarity". This rule provides that decision is made at a higher level when the action concerned is not feasible at the immediately lower level. This means that communes, for instance, should have no voice in decisions which regard only a village community, but conversely, that a decision regarding the communal territorial level, for instance a market place, should be taken at this level, provided it is approved by the elected population representatives. The same should apply to administration at the small region level. Determining precisely this distribution of competences and the resulting chain of "subsidiarity", should be the very first step in a local development process.

A particular issue regards the respective role of Government and of local organizations in this competence allocation. Because of the budgetary constraints a precise dividing line has to be defined. When preparing the local development project of South East Tunisia, such a task repartition had to be recognized and proposals were made for allocating project resources between administration and local organizations. It was then found that the latter was not possible without a kind of masterplan including all local communities, according to their resources and population. Administration, so far, is requested to operate in two ways in this project, directly from its own budgetary resources, on a contractual basis with communities when asked to implement a local programming action.

The second group of actors may intervene in the development process in many ways, contracts with village organizations, with communes, with administration, or autonomously, on a credit or a grant basis, etc.

4. Programming process

Preparing and implementing development programmes constitute the true finality of a local development approach. A number of experiences has led to the elaboration of a number of appropriate methodologies and tools. But, because of the newness of the approach in projects and development process, there is still a considerable need for elaborating more methodologies and tools through practical experience and testing in real life. This is surely a field where research could bring a lot, as pinpointed in this paper conclusion.

To date, major progress have been made for programming local development at the level of basic communities or socio-territorial units. There

exist, in this respect, many methodological approaches. However, assessing their process and results, it was found that they were mostly "communicational" and that they usually failed to create data bases and references likely to help inserting these programmes into larger planning instruments. They were also insufficient for facilitating programmes monitoring and evaluation. To help correcting these weaknesses, a team of developers-researchers initiated, during the nineties, a research development process with the aim of systematizing the methodological sequence and creating new tools. This research has now reached its primary objectives and its findings, as of year 2001, have been published for informational and pedagogical purposes¹⁰. This research continues and, for instance, it had been experimented in 2002 for setting the tests which were carried out during the preparation of the Tunisia South East Development Project. This experience was enriched with the methodological assets of the INRAT/ICARDA team.

The methodological approach for programming at community level, elaborated during this research development process, follows basically a now well accepted sequence. However, it proposes to implement it with different timing, with some sequence variations and with the use of new tools. A first stage consists in acquiring and sharing with the community a good knowledge of its terroir and of its socio-economic structure. It includes an innovative terroir mapping instrument and a family survey, the results of which are stored in research designed maps and data banks. In Tunisia, in particular, the mapping tools had, for the first time, to be systematically used in a pastoral context. The content of this knowledge stage is then "restituted" to the community population as a basis for carrying a diagnosis of the community and its terroir strengths and constraints. This diagnosis is made separately with men, women and young people before synthesis. Then, there is a sequence which, step by step, leads to an identification of possible solutions, to a strategical vision of a long term possible objective, to an identification of priorities, and finally to a proposal for a two-three years action programme. A tool has been developed for monitoring the contractual arrangements according to which the programme would be implemented.

The end of the programming sequence at community level is precisely where yet relatively unsolved methodological interrogations begin. Should the community be alone in a programme, then the above describe approach would suffice for decision and resource allocation. However in larger scale development programmes which comprise a number of other communities, this

¹⁰G. Lazarev et M. Arab, *Developpement local et communautisrurales*, Q1/2QQ2, Kathala, Paris

approach is not feasible. It is found that there is a definitive need for a tool showing the overall development picture. Such a tool would aim at allowing an equitable resource allocation between communities, setting up the priorities, identifying other tasks to be operated at other levels in accordance and deciding about the application of the subsidiarity rule.

An amount of thinking has been made on these matters but nothing will replace experiments and testing. This is precisely where the above referred research development process stands with the Tunisian case. It is now hoped that with the contribution of the INRAT/ICARDA team, more responses would be given soon on these matters. In any case, keeping track of other experiences in other parts of the world will be pursued. It is thus hoped that a continuing methodological capitalization would be possible.

V. *Meaning for Livestock Small Farming*

1. *A Strategy based on Farm Types Differentiation*

A local development approach, although based on integration and interaction, does not offset the need for specific policies within this context. There is such a need for strategical policies addressing to farming systems. Lessons drawn from several experiences indicate clearly that such strategies must be differentiated according to farm types. Such a conclusion was reached, for instance, by the performances evaluation mission of the pastoral project in the Moroccan Oriental. Considering the same resource base but taking into account the differentiated situations, this evaluation recommended a specific strategy for the livestock entrepreneurs who play a major role as an engine of the regional livestock economy but who should not be allowed to concentrate freely the use of the pastoral common resources. Pastures leasing systems were suggested to correct this social inequity. Medium size livestock farmers must be assisted strongly as they could become more viable thanks to a better organization. Their specific needs however are presently poorly considered within large herders dominated cooperatives to which they belong. Splitting the cooperatives with sub groups was suggested. The numerous small farmers raised another problem. Their small agro-pastoral farms are marginal and there is no chance to make most of them viable. These small farmers however succeed in managing a complex survival strategy which combine a mix of agricultural and livestock activities, small works in local and larger urban areas, investments in child schooling, etc. These farmers, who manage efficiently to keep a rural based job, are particularly vulnerable at drought times. They must be protected in priority. The project evaluation team recommended a social approach for this vulnerable category. A

local development approach which may take into account employment diversification, is likely to offer a better and more sustainable response.

2. A Strategy taking into account Small Farmers Pluriactivity

Taking into account the need for job diversification outside the agricultural sector would probably be the newest dimension of local development approaches and the one likely to have the most significant impact for small farmers, who survive only from their ability to have multiple activities. In this respect; local development offers a broader framework than rural development programmes. It takes the urban dimension into account as well as the rural-urban interactions. It may consider non agricultural activities as a priority by itself and not an appendix, as generally in rural development projects.

3. An Experimentation in Progress: the IF AD Project in South East Tunisia

This project has already been referred to. Should it be successful, it would illustrate the potential of the local development approach for meeting the challenge for sustainable development in a harsh arid context and in a mainly livestock based economy. This project was initially intended for bringing a support for natural pasture improvement, environment restauration and for combatting desertification. A participatory management of the natural resources constituted its basic assumption. As there was, in such pastoral areas, no experience to refer to, the decision was made to carry out a participatory experience in a test community; the objective being to design an appropriate methodology and to raise the issues to be discussed before project negotiation. This was a very innovative approach in project preparation but both the Government and the financial institution took this risk in view of all the probleme encountered with unsolved issues at the start of previous participatory projects.

This experience was carried out by an INRAT/ICARDA team assisted by IF AD methodological consultants¹¹. The first question to be solved was to identify the proper kind of communities. The team was not especially surprised to find that the communities corresponding to pastoral territories and to homogeneous "terroirs", were found in the ancient social tribal organization

¹¹ This experience which took place between july 2001 and march 2002, has been fully reported in documents to be found with ICARDA Tunisia.

that had not been offset by an administrative organization operating within very different limits. A map of these communities territories was established and further to Government acceptance to pursue the experience, a test community was selected for carrying out a participatory diagnosis and a participatory development programming. New investigation tools were tested and the whole process was conducted over some four months.

Throughout this process a continuous revision of project assumptions had to be made. First, it was found that a participatory project could not be conceived around a single environmental and resource management objective. Second, the diagnosis made clear a priority for job diversification outside agriculture, especially for the young and women. Third, there appeared a need to clarify the respective role in investment and decision making of local organizations and of administration. Fourth, there appeared a need for a kind of regional master plan which could ensure an equitable distribution of project investments between communities and for assessing better the choices between priorities. It was thus found that a grassroot participatory programming process could not avoid being inserted into a larger development framework. Government and project designers drew the lessons of this experience lessons, this project building process resulting finally in a "local development project". More will be learnt when the project starts being implemented next year.

VI. *Conclusion: Role of Research*

This paper addresses to highly specialized professional and scientists. It opens gates on development generalities which are far from laboratories and field trials. But, although general, it deals with development complexity and as such it regards a major concern of contemporary science, that of managing and understanding complexity and, therefore, uncertainties.

Challenging approaches for sustainable development is not realistic if not taking its uncertainties into account. Most of them are found not in techniques but in social and political behavior. Would specialized researchers also contribute to this common quest for sustainability, then they would have to be also concerned by a number of global problems, often far from their immediate fields of work. Would they proceed along such a path, then a first step would be to have a common understanding of the concepts which describe these development processes. This would concern, for instance, the wording used in this paper, such as sustainability, local development, terroir, socio-territorial units, participation, resources holistic management, participatory programming, small region, etc. At present, no definitions are yet given for final. But we will

not be able to proceed more ahead, if we do not decide on their meaning and if we do not work for such a common understanding.

Another concern regards the need for research to replace its works into their global context. This means taking strongly into consideration at least three factors which are a condition for sustainable development. These factors regard the long term management of environment, the fight against poverty which is largely responsible for the first, and finally the need for a more regulated and democratic environment. In this century, we have no choice but being concerned by these priorities. Should we fail, then little else would be important

Local development as a possible framework for sustainable development still requires a lot of practice and experiments. Progress would be made only if ongoing experiences are monitored and evaluated scientifically and if scientists contribute to the elaboration of more advanced methodologies and tools. Research has to consider seriously its possible implications in such a process. In this respect, it should be reminded that this a possible field work for everybody. The team leader who led the methodological work in the quoted Tunisia South East project, is a world specialist of cactus and of feed bricks. He accepted nevertheless to learn from sociologists and development consultants. Its scientific training helped him to transfer its rationality to these new fields. This is an example of how research could contribute to the process.

ODRŽIV UZGOJ STOKE U SUŠNIM PODRUČJIMA: ODGOVOR NA INTEGRIRAN LOKALNI RAZVOJ I VAŽNOST ZA MALE FARMERNE

Sažetak

Uzgoj stoke u sušnim uvjetima temeljio se stoljećima na promjenljivom povezivanju seoskih i poljoprivrednih sustava. U prošlom stoljeću sjedilački način života i gustoća iskorištavanja zemlje pridonijeli su pojavi novih sustava, s jedne strane vrlo intenzivnih i produktivnih ali ekstenzivnih i ekološki štetnih s druge strane. Dok se broj stada znatno povećao farmeri su se prilagodili novim prilikama upotrebljavajući masovno kupovanu hranu. Iako manje pridonose ravnoteži hrane, prirodni pašnjaci, međutim, i dalje su bitna komponenta ravnoteže hrane jer pružaju slobodan pokretan izvor. Budući da se pašnjaci previše iskorištavaju i upotrebljavaju na nekontroliran konkurentski način ugrožena je dugoročna održivost s dramatičnim posljedicama opustošenja okoliša.

Zbog prostorne važnosti takvih prirodnih pašnjaka u sušnim područjima postoji izravna veza između stoke i održivog upravljanja sveukupnim izvorom hrane.

Iskustva u Sjevernoj Africi i Srednjem Istoku nameću zaključak da partnerski i integrirani pristupi mogu voditi do djelotvornijeg upravljanja izvorima hrane i djelotvornije politike orijentirane prema siromaštvu. Lokalni razvoj najnoviji je pristup ovim izazovima. Cilj je organizirati ljude na decentralističkoj osnovi i promovirati partnerske programe, što bi moglo voditi do djelotvorne odgovornosti proizvođača/stanovništva. Ovaj rad daje uvid u temeljne principe, odnose prema stoci i važnost za razvoj malih farma.

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