

# The Role of Social Capital in the Adoption and the Performance of Conservation Agriculture. The Practice of *Likoti* in Lesotho

## Executive Summary

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*Motho ke motho ka batho*. Literally translated as “a person is a person because of other people”, this Sesotho<sup>2</sup> idiom means that *people* are such only in their relationships with each other. As most African populations, in fact, the Basotho<sup>3</sup> used to rely on a complex web of livelihood strategies made primarily of family kinships and strong community networks. More recently, however, in many African countries, including Lesotho, widespread poverty, migrations, HIV/AIDS, and increasing pressure on land and other natural resources, have progressively depleted trust and caused household and community breakdowns. Fragile local institutions and weak social capital, in turn, affect growth and sustainable development.

Extensive land degradation and severe soil erosion, along with declining agriculture productivity, contribute to this vicious circle. Exacerbated by the dramatic effects of climate changes, in fact, they are at the same time an outcome and a cause of poverty and vulnerability. Challenged by so complex problems, national governments, development organizations and civil society necessitate innovative, multi-dimensional solutions in order to enhance the individual and collective capabilities needed to cut the vicious circle described above. This work focuses on two aspects which are likely – among others – to help this process. These are: the use of conservation agriculture as an innovative set of sustainable agricultural practices and the appropriate inclusion of social capital aspects in development strategies which focus on innovation generation and diffusion.

The diffusion of conservation farming practices in the African context can be considered as an innovation process with regard to many aspects. Consequently, non governmental organizations (NGOs), international development organizations and other actors promoting CA should interact with farmers and other relevant stakeholders in order to facilitate the adaptation of the technology to the characteristics of the local farming systems. As emphasized by the most recent literature on agricultural innovation, however, a more participatory approach to innovation should not regard

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<sup>2</sup> Sesotho and English are the official languages spoken in the Kingdom of Lesotho

<sup>3</sup> Basotho is the plural of Mosotho, i.e. a person from the Kingdom of Lesotho

only the phases of technology adoption and adaptation. Rather, the entire course of innovation generation and diffusion should be the result of a social learning process to which several actors – with different objectives and needs, but also with different degree of social and political power – contribute.

Three factors are especially relevant to support the *innovation process*. These are: an adequate policy support to Agricultural Innovation Systems (AIS), the establishment of ‘balanced’ research partnerships, and social capital. Especially in unfavourable environments, in fact, the equal access to the potential benefits of an innovation depends on building local institutions, networks and organizations that help farmers to mobilize their scarce resources, enhance their innovation capabilities, and link them to external networks. Nonetheless, in spite of the wide support that this new approach to agricultural innovation has received (relevant institutions include, among the others, the International Fund for Agricultural Development, the World Bank, and the International Food Policy Research Institute), it has rarely been translated into practice.

Drawing on these premises, the present study seeks two main objectives:

- to assess how social capital affects the effective and sustainable adoption of conservation farming, as an innovative set of agricultural practices capable to contribute to sustainable development in Sub-Saharan Africa (SSA)
- to derive consistent policy implications in order to maximize the benefits stemming from the adoption of innovative conservation practices in SSA, with a special focus on social capital

In this work social capital (SC) has been defined as the social relations within a group and among this and other groups, and the features and the norms that characterise these relations, which enable the individuals and/or the groups (through collective action) to reach desirable outcomes. This definition equates social capital to all types of social interactions that can be established within a group or a community (networks, formal and informal associations, kinship and friendship ties, etc.) – or bonding social capital – and among different groups or communities (such as associations among members of different ethnic or religious groups and networks of associations) – or bridging social capital. Secondly, it includes the attributes (such as behavioural norms, shared moral values, personalized and generalized trust) as well as the informal and formal agreements through which these relationships work. Institutions, such as government and governance attributes, as well as

traditional and customary rules, are not included in the definition because they can be considered at the same time a source and a manifestation – but not a component – of social capital. However, due to the critical role they play in the process of social capital (re)generation, they are closely related to the concept.

The above definition has a functional connotation. In fact, among all the social interactions and the related attributes on which a group relies, only those which foster the achievement of valuable outcomes for the group and/or the group members count as ‘capital’, no matter what the original purpose of the social interaction was. This definition implies that social capital has a multi-dimensional and dynamic nature, which takes different forms from time to time depending on the scope of the analysis and the unit of observation. Furthermore, the functional notion of social capital, conceived as an appropriable resource, is compatible with a definition of capital seen as the output of a dynamic, regenerative process. That is, social capital can well be assimilated to other forms of capital and, as such, it has the potential to foster development processes both at micro and macro level.

Indeed, beyond having an intrinsic social and cultural value, social interactions (along with their attributes) may positively contribute to the well-being of given groups and individuals also by generating one or more of the following externalities: enhanced knowledge about other agents; reduced transaction costs; risk mitigation; improved access to information and technological knowledge; and reduction of collective action dilemmas. The channels by which these externalities, and the relative outcomes, manifest themselves are mainly information sharing, group identity, and explicit coordination. Explicit coordination, or purposeful collective action, in turn requires either capable agents or clear rules on decision making, or a combination of the two, in order to become effective.

So far, empirical studies focusing on specific development issues at micro-level have been more successful than aggregate studies in explaining the relationships between social capital and development. With regard to less developed countries (LDCs), the most recurrent fields of application identified by the literature are: common pool resources, diffusion of innovation, imperfect information, markets for insurance, and effectiveness of public services. As for agricultural innovation, from the analytical review of the literature, it emerges that, until recently, social capital was not considered a determinant or even a component of the innovation process. Starting from the 1990s, the 'Social Organization of Innovation' approach has recognized a more concrete, active role of social interactions in innovation generation and diffusion. Subsequently, the

attention to social interactions and norms has further widened in order to include a number of social dimensions, many of which represent different aspects of social capital. The recognition of the relevance of social and cultural aspects has gone together with the acknowledgement that innovation might be a conflicting process, so that different actors are needed in order to ‘get the opportunities to innovate right’.

At the end of the Nineties, these ideas have led some scholars to borrow the concept of ‘national system of innovation’ from industrial economics, in order to apply it to the agricultural sector. An *agricultural innovation system* (AIS) comprises the networks of agents involved in the innovation process (organizations, enterprises, and individuals), their actions and interactions, and the formal and informal institutions that regulate this system (Ekboir and Parellada, 2002). The AIS approach focuses on the process rather than the product, and on capacity strengthening rather than technology delivery. Therefore, compared to the previous agricultural innovation practice, it attributes a higher importance to social and institutional factors both as determinants and products of the social learning process that leads to innovation. Due to the role that social capital plays in managing conflicts and promoting cooperative behaviour, it is thus recognized as a critical determinant of the innovation process. Especially in unfavourable environments, successful innovation for poverty reduction depends on building local institutions, networks and organizations that help communities mobilize their scarce resources, and link them to external networks. In particular, the presence of bridging social capital, along with institutions that facilitate the shift from bonding to bridging social capital, is important in order to allow the poorest to participate in all the phases of generation, diffusion and adaptation of innovation.

The recent spread of conservation agriculture (CA) in many African countries can be considered as an innovative approach to combat land degradation and sustain rural livelihoods. The potential benefits associated with the use of conservation practices are many. Among the most important are: long-term yield increase and output stability; reduced wind and water erosion and reduced land degradation; improvement of agro-biodiversity; and reduced contamination of soil, water sources and the atmosphere. The increase in yields is often accompanied by a decrease of the costs, leading to higher net profitability, greater social sustainability and (especially important in Sub-Saharan countries) higher food security, compared to conventional farming methods. Furthermore, conservation techniques which rationalize the use of labour are particularly helpful in those rural areas where migration and health emergencies have reduced the labour supply and led to

the further “feminization” of the agricultural sector.

Among the factors which determine the effective adoption of conservation practices and the achievement of the associated benefits, social capital has been recognized to play several important roles. It raises awareness on the impacts of soil degradation, improving skills and knowledge through better information flow. It encourages institutional agreements and cooperative behaviours (such as participation and collective action in learning, planning and implementing conservation measures), and supports the link of local groups to wider networks and other institutions. If an incentive scheme is in place, strong civic values, trust and cooperation improve fairness and transparency. However, higher levels of trust and reciprocity, as well as easier access to labour and credit (for example through labour exchanges, social networks and associations), help farmers to internalize social costs and benefits associated with the implementation of conservation measures, thus reducing the need for external incentives. Social capital facilitates extension and field activities by fostering cooperation and collective action, and it encourages adaptive research by enabling the formation of groups and networks among farmers, researchers and extensionists at different levels. As a means to support institutional agreements, avoid conflicts and foster community participation, it also helps solve the problems related to the use of common pool resources, such as land tenure and grazing rights, which seriously affect the correct adoption of CA in SSA.

One of the most important advantages of conservation practices is that they can be suited and adapted to all kinds of farming systems, including small-scale subsistence agriculture, and to most agro-ecological conditions. But, just because of its adaptive and dynamic nature, successful application greatly relies upon the skills of the practitioners to combine tillage methods, input and equipment, according to their own needs and conditions. This is why, in the promotion of conservation farming, it is especially important to strengthen the capacity to innovate rather than just introducing and diffusing the practices. As stressed by the AIS approach, several social capital aspects are extremely relevant to enable farmers’ innovation capabilities. Last but not least, social capital fosters a good attitude towards the cultural and institutional changes that – along with conflicts – often accompany technological transformations, and which can be especially problematic in the transition from conventional to conservation tillage methods.

The discussion summarized above has been supported by a case study which empirically analyses the relationships between social capital and the adoption of a particular conservation farm-

ing practice – a planting basin system locally called *likoti* – in Lesotho. Primary data were collected through a household survey conducted by the author from January to August 2006 under the FAO project OSRO/LES/503/UK – *Support to vulnerable rural households in Lesotho*. Two sub-sample populations of farmers (117 innovator farmers who introduced CA and 112 conventional farmers) were interviewed and compared in terms of socio-economic and selected agronomic aspects. The sub-samples represent a cross section of farmers which were selected randomly amongst those who participated in training or other CA related initiatives promoted by two Christian organisations: Africa Inland Mission (through its *Growing Nations* project) and Rehoboth Christian Church. Beyond the data collected through the questionnaires (which were then entered in a dataset comprising about 300 variables), further information was gathered through interviews and workshops held with local stakeholders such as CA trainers, government extension officers and other relevant informants.

Drawing on the findings of the survey, the case study has provided wide evidence of the scope for adopting conservation farming in Lesotho. Part of the analysis sought to assess the socio-economic and the environmental sustainability of the techniques employed. The most significant advantages associated with the use of *likoti*, compared to conventional tillage practices, can be summarized as: (i) greater environmental sustainability due to improved soil structure and enhanced fertility; (ii) higher agricultural productivity, due to improved efficiency in the use of inputs and other resources; (iii) higher social sustainability, due to the accessibility to the technology by all social categories, including the most vulnerable ones.

The possible dependencies among socio-economic, farming related and social capital variables have been tested through the ‘structural learning’ of Bayesian networks<sup>4</sup>. Overall, the qualitative information provided by relevant local stakeholders, the analysis of the data collected during the household survey and the interpretation of the Bayesian networks built for selected groups of variables led to results which are highly consistent with those from the literature review, and which have been briefly discussed earlier. The factors that so far have mostly determined the adoption of CA in Lesotho are:

- Literacy (found to be especially relevant to resource poor female headed households)
- Suitability of the technology to different farming systems (including poor resource and subsistence farmers)

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<sup>4</sup> Bayesian networks are graphical models built as directed acyclic graphs (DAG) made of nodes and arcs (edges): the nodes represent random variables, each variable assuming certain values or states; the arcs express the likelihood that two variables are (conditionally) dependent. In this work, the structure of the Bayesian networks was built directly from the data collected during the household survey through an inferential process. This method is called structural learning and works by testing the conditional (in)dependence among one variable and all the other variables through an iterative process: for each couple of variables, the (in)dependence is tested conditionally to the subset of all the other variables.

- Social capital
- Capable agency of CA trainers and promoters

With regard to social capital, CA farmers were found to be more endowed with social assets than conventional farmers, but further differences are location specific. In particular, a “network dimension” characterizes CA farmers in the lowlands, while a “trust dimension” is stronger among respondents in the mountains. The different dimensions of social capital characterizing the lowlands and the mountains – a “network dimension” and a “trust dimension”, respectively – somehow reflect the different impacts of the rapid economic and social transformations that the Basotho have experienced in the last years, and which are affecting their ability to cope with shocks and vulnerability. In particular, these trends have narrowed the range of their livelihood strategies, including relying on social assets and, subsequently, farming. As a result, in the lowlands – where external and internal migrations exacerbate the negative effects of these socio-economic changes – 'choice-based' networks based on balanced reciprocity, are substituting community based groups that used to rely on generalized reciprocity. Even though these networks represent an important asset for their members, vulnerable groups are more likely to be marginalized compared to the past. In the mountains sites, instead, the “trust dimension” seems to be closely related to the persistence of traditional institutions, including community support mechanisms. However, the Bayesian networks learnt from the social capital variables show that both the dimensions of social capital – network and trust – are interrelated, and that both are linked to the variable *Adopter*. These findings are consistent with the most recent literature on agricultural innovation, and in particular with the AIS approach.

On the other hand, some of the factors which have been commonly identified by the literature as determinant for the adoption of CA are lacking or absent in Lesotho. One of the most important absent aspects has been public policy support. In spite of Government’s acknowledgement of the benefits associated with minimum tillage techniques, the concrete involvement of the Ministry of Agriculture and Food Security (MOAFS) in the diffusion of CA has been limited. The low commitment of the MOAFS is reflected also in the lack of support from the extension services, as admitted also by the local extension officers interviewed during the field survey. At policy level, neither the creation of a national Conservation Farming Network Group (CFNG), which also involved Government officials, nor the support that FAO and WFP gave to the organizations that first promoted *likoti*, translated in a functioning multiple stakeholder partnership. Lack of interaction among farmers and other actors, including extension services, in turn affected the degree of farmer participation in the diffusion and, most importantly, in the adaptation of the

technology to the local conditions.

The low interaction of formal research and farmers' indigenous knowledge has been another important missing aspect. In particular, institutional issues related to land tenure, such as the use of stubble as fuel or fodder by the villagers, and the integration of the livestock and the farming systems, have received inadequate attention by promoters of *likoti*. With regard to the adaptation of CA principles, some trainers in Qacha's Nek, one of the surveyed district, have started to collect examples of successful experiments made by individual farmers in order to further improve the technology and widen the range of opportunities stemming from its adoption. However, interacting with innovating farmers is not part of the promotion strategy of either the NGOs and the international organizations involved or the MOAFS.

Using the AIS lexicon, in Lesotho the promotion of innovative conservation practices has not been based on "a dynamic process of interacting embedded in specific institutional and policies contexts" (Hall, 2006). Limited stakeholder interaction and inadequate policy support may not only limit the potential benefits associated with the use of the technique, but they also hamper the internalization of social costs and benefits, discourage the social acceptance of the innovative practices, and ultimately affect the rate of adoption.

Drawing on the discussion above, the following paragraphs outline the most important policy implications for the successful adoption of innovative conservation practices in SSA.

**Sustainable incentives schemes** would help poor and vulnerable households to adopt conservation farming practices which have been proved to be particularly suitable to their needs and conditions. Furthermore, beyond having positive impacts on agricultural yields and food security, CA has also a critical role in the conservation of the environment and the natural resources. The environmental impacts can be considered as positive externalities from which the whole society benefits, but that are not perceived by individuals, especially when adequate policy support is lacking. Therefore, public support to the spread of conservation practices, including more effective advisory services, should be considered also in the perspective of maximizing social benefits that would not occur otherwise.

More **information and advocacy** about the concept of conservation agriculture and its potential advantages should circulate in order to reduce scepticism and achieve a wider acceptance

of CA also amongst the non-adopters and to raise awareness about the long-term environmental and social benefits. The 'supply' of information should be accompanied by an adequate investment in farmers' receptive capacities, i.e., in rural people's **education** and access to extension services. Special training and information sessions have to be conceived and organized for researchers, officials of the Ministry of Agriculture and extension staff in order to provide farmers with both training and technical assistance. A deeper involvement of the extension staff in training and field activities would also foster a wider acceptance of the conservation practices.

**Participation** at community level of all members, and especially of the local leadership, allows a better understanding and a wider acceptance of new ideas and practices. In the case of *likoti*, a number of issues would need to be discussed and solved at community level through a more participatory approach. For instance, access by herders and other villagers into CA fields after the harvest is one of the most important deterrents to the correct application of CA principles. In order to overcome it, community members should not just discuss the issue of herding livestock out of the fields, but they should also find feasible solutions for livestock owners and alternative fodder and fuel sources.

The extent of farmers' participation is also important with regard to **training**. The effectiveness of conservation practices largely depends on the timely and appropriate management of all the farming activities. Therefore, the enhancement of technical knowledge and precision skills through adequate training is critical. However, equally important is the approach used by the trainers. It has been demonstrated, in fact, that the promotion of participatory field activities and a close interaction between farmers and trainers lead to the better assimilation of CA principles and, in turn, to a more appropriate application of the techniques.

**Participatory adaptive research** based on constant interaction among formal researchers, technology promoters and local farmers is especially important in the diffusion of conservation practices, just because of their flexible nature. In order to fully exploit the benefits of a technology that can be suited to different environment conditions, in fact, farmers need to enhance their innovation capabilities, which are not only of a technical nature. Participatory research activities are critical also in order to include aspects of indigenous knowledge and traditional institutions, and ultimately facilitate the tremendous mind shift that has to take place in the transition from conventional to conservation practices and which is one of the biggest challenges to their adoption. A critical component of a working participatory and adaptive research system should be the presence of multiple stakeholder partnerships.

Further broader, cross-cutting policy implication is the need to **consider social capital aspects more effectively** in development oriented strategies. According to the review of the recent literature on CA and agricultural innovation, several social capital dimensions play a critical role in the adoption and the diffusion of CA practices, above all by enabling the conditions for the creation of new knowledge through participatory, adaptive research. The empirical analysis has largely confirmed these results, even though in Lesotho aspects of participation and interaction among farmers and promoters are still lacking. Inquiring into the possibility of ‘investing in social capital’ as part of innovation promotion strategies, is the natural next step.

On the one hand, careful assessment of the institutional and the social capital related features may facilitate the identification of suitable technologies thanks to a deeper understanding of the farmers’ perception of land degradation problems and possible related solutions. On the other hand, fostering selected social capital aspects (such as the presence of associations, the occurrence of community interaction or the degree of reciprocity) could help speed up the rate of adoption, improve the performance as well as enhance the social acceptability of the technology. The feasibility of describing the social capital belonging to a certain group or community largely depends on the willingness of policy makers to consider social capital in the feasibility assessment of development projects and programmes.

The actual possibility of influencing the existing forms of social capital is a much trickier and more debated issue. While it is unlikely that externally driven ‘social experiments’ to purposely ‘enhance’ social capital could lead to meaningful outcomes, preliminary assessment of the social capital that characterizes a given group or community may substantially affect the sustainability of development processes. Consequently, in the promotion of agricultural innovation, the choice of the most appropriate technology, along with the form of diffusing it, should depend on the dimensions of social capital which have been identified. In addition, the empirical literature has recognized the relevance of a number of social capital ‘enabling factors’ (such as education, capable agency of committed leaders, and the presence of meso-institutions), which can be included in consistent policy interventions. As a result, the issue of ‘investing in social capital’ may be better reformulated as ‘how to take social capital into account effectively, and how to identify and deal with its enabling factors’.

From the discussion above, it can be seen that beyond technical and organizational aspects, the feasibility of the identified issues depends critically on wider transformations in the approach to agricultural innovation – and more generally to rural development. In fact, in spite of many

declarations about the relevance of concepts such as participation, partnerships and AIS, agricultural research and innovation policies mostly follow conventional schemes in which the ‘tangible’ aspects of development are still more important than the ‘intangible’ ones, such as human and social capital. The possible explanations are manifold. One reason is probably that a concrete mindset shift has not yet followed the theoretical changes. Further reasons might be of a political nature. On the one hand, as already mentioned, existing institutions may be reluctant to support any transformation in the current approach to agricultural innovation, which may ultimately change the decision making rules. On the other hand, development policies, including the promotion of pro-poor agricultural innovation, are often influenced by a donor-driven approach which favours ‘tangible’ aspects. In this sense, the reasons why social capital is rarely taken into account are similar to those which explain why most agricultural innovation strategies still focus on the transfer of technology rather than the improvement of farmers’ innovation capabilities.

To sum up, CA practices have shown a meaningful potential for reducing poverty and combating land degradation in SSA. In spite of the major role played by social capital in the effective adoption of CA, this aspect is rarely taken adequately into account by agricultural innovation policies. Therefore, stronger policy support to wider transformations in the approach to agricultural innovation is needed in order to fully achieve the potential benefits associated with the use of CA by small-scale farmers in Africa.

The work wishes to offer an original contribution to both the literature on social capital and agricultural innovation. Many international development agencies and non governmental organizations have recently acknowledged the respective relevance of social capital, innovation and sustainable agriculture to combat poverty and vulnerability. Nonetheless, relatively few studies have so far attempted to analyse empirically the multiple interactions existing among these three dimensions in a specific field context, and the impacts they have on sustainable development. The need to further explore these subjects is particularly urgent in Africa, where people's livelihoods are increasingly jeopardized by rapid social changes and ecological emergencies. By providing evidence of the role that social capital aspects may play in the effective adoption of agricultural innovation, the work also advocates the need for introducing innovative policies and practices for innovation generation and diffusion and, more broadly, for rural development.

The methodology employed in the empirical analysis is an additional original aspect. The

use of Bayesian networks, in fact, responds to the need of testing analytical instruments for assessing and measuring the impacts of social capital, alternative to those which have been conventionally used so far and which have shown several limitations. In particular, the empirical literature on social capital – both at micro and macro level – mostly relies on econometric tools which do not take into account the multi-dimensional nature of social and institutional phenomena as well as the complex linkages existing among social capital and other socio-economic variables. At the opposite, Bayesian networks make it possible to express interdependency relationships more complex than mere causality directions.