JOLISAA

JOint Learning about Innovation Systems in African Agriculture

Compilation of Inventory case narratives, South Africa

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Prepared on behalf of University of Pretoria

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Case 21: Production and marketing of a new cash crop (cherry peppers)

Identification:

Case 21 – South Africa
Production and marketing of a new cash crop (cherry peppers)
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The story line in a nutshell

This case involves a group of smallholder farmers who wanted to diversify their farming activities and start producing a new cash crop. Through discussions with a neighbouring commercial farmer, one of the farmers identified a market opportunity for cherry peppers. The innovation process has involved both technical innovation (the introduction of a new crop), as well as an institutional innovation (development of a new marketing relationship).

Innovation context

This innovation process took place within the context of a project supported by the PROLINNOVA network. The project is called 'Farmer Access to Innovation Resources' or FAIR, which aims at making resources available through locally managed structures to support local innovation / joint experimentation processes.

One of the areas where FAIR has been operating is Potshini. This is a rural community that lies adjacent to large-scale commercial farms. There is generally tension between these two parties as livestock owners from the rural community graze their cattle on the commercial farms without permission during periods when feed is limiting. Potshini is situated approximately 60km away from the closest town Bergville. The farmers engage in agricultural activities on a small-scale, consuming much of the produce and selling surplus. Until the current initiative, most grew common, conventional crops such as dryland maize and irrigated cabbages and sold their produce locally. As in much of the KwaZulu-Natal Province, smallholders struggle to sell their crops. This limits their scale of production further.

In addition to FAIR, the Potshini farmers, including the Walani Group, are also members of a Sivusimpilo Farmers' Forum (a mechanism to stimulate sharing between farmers from three areas in the Okhahlamba District where Farmer Support Group (FSG) is working). The farmers' forum has stimulated discussion regarding new crops, new planting practices, etc. FAIR could be considered as the context within which the innovation process has taken place, or it could be seen as the first step in the innovation process. For the purposes of this study, it has been framed as the context.

The FAIR project has been implemented through a partnership of FSG and an NGO called SaveAct, which focuses on savings and credit. FSG mainly addressed the technical farming-related aspects, while SaveAct has been focused on establishing a strong institutional environment in which local innovation processes can take place more effectively. The partnership also involves local extension officers from the provincial department of agriculture, but they have been involved as spectators rather than active partners.

The commercial farmer that became involved in this innovation process, like many other commercial farmers, also blames the neighbouring community for theft of his crops. The only interaction that the smallholder farmers had previously had with the commercial farmer was that of an 'employer-worker' nature, as they had worked as temporary labourers on the farm, harvesting his cherry peppers. One of these farmers had also grown some fruit at home from seed he had collected and showed the fruit to other farmers at a meeting of the farmers' forum.

The Walani Group (with its nine members now comprising six men and two women) was an existing structure that had been formed by the community members as an all-male group to facilitate the sharing of labour. The group saw that that it could benefit from programmes that support groups rather than individuals and decided to establish a joint farming enterprise in addition to their own individual activities. The members also made a decision to bring in female members, but the male members indicated that they did not feel that the women added value to the group's functioning.

Description

Initial practice / situation, problem or opportunity being addressed, and related triggers

Smallholder farmers in the Potshini community struggled to market their crops. In addition, their margins were very low and they sought to diversify into a cash crop for which a reliable market existed. At Forum meetings there had been discussions about the need to explore alternative crops. In 2009 members of the Forum undertook a trip to a municipal fresh produce market (FPM) in Pietermaritzburg (funded through the Prolinnova-FAIR project) and this stimulated their thinking around the issue of diversification. One of the forum members engaged in discussion with the neighbouring commercial farmer who later became involved in the innovation process described here. He mentioned that he had a factory at Winterton that was processing cherry peppers (*Capsicum* sp.), a high value crop that the smallholders had not previously grown. The commercial farmer said that he was willing to source additional fruit from the smallholders. He was also seeking to improve the relationship with his neighbours.

Thus, in short, the challenge of marketing was the main trigger that resulted in the smallholders seeking opportunities to diversify and initiating discussions with the commercial farmer when this opportunity presented itself.

Description of the innovations

This innovation process has involved technical and institutional innovation. The farmers have started growing a new crop, which involved adaptation of the commercial farmers' recommendations for production practices. It has also involved the establishment of a new relationship between the commercial farmer, the factory and the smallholder farmers.

Main stakeholders involved and their roles in the innovation process

a) Table1: stakeholders involved in the innovation process and the enabling environment

Stakeholder	Role played	Contribution(s) made	Phase in innovation process
Key stakeholders in the innovation process			
Walani Group	Smallholders looking for high value crops	Local knowledge Labour	Throughout
Commercial farmer (and one the factory owners)	Seeking additional suppliers of cherry peppers, entered into arrangement with smallholders	Knowledge (technical expertise) Access to planting material and equipment	Mostly at the start of the innovation process.
Farmer Support Group (FSG)	Facilitated the establishment of the partnership	Facilitation skills Logistics (e,g. collecting planting material and other inputs)	Throughout (Even before the innovation process they establishing and supporting the Forum).
Key stakeholders in the enabling environment			
Factory	Provided a market for the processed cherry pepper fruit	Knowledge about processing cherry peppers Market linkages	The market opportunity was the key trigger for diversification into cherry peppers.
Sivusimpilo Farmers Forum	Fosters the sharing of experiences between smallholder farmers	Provided forum for discussion Led to identification of opportunity for diversification	Initiated the innovation process Later, a platform for sharing of the outcomes, which led to uptake of the innovation by other farmer groups

The table above (Table 1) shows the key stakeholders that have allowed for the successful diversification into a new cash crop by smallholder farmers in the Okhahlamba District. The main stakeholders in the innovation process have been the smallholder farmers, the neighbouring commercial farmer and FSG, which played a key role in facilitating the establishment of the partnership.

The **neighbouring commercial farmer** provided technical support from (planting material as well as expertise) that was necessary for the smallholders to start producing the new crop. He also facilitated the delivery of the crop to the factory (which he and a number of other commercial farmers owned/ supplied).

He also supplied lugboxes (plastic containers) for collecting the fruit at harvest and provided transport from the neighbouring farm to the factory.

The **smallholder farmers** initiated the process of seeking a new crop that would be profitable and for which a market existed. They were also responsible for the daily management of the crop and activities such as topdressing with fertilizer. They contributed their local knowledge about crop production. Over time, they adapted the planting practices that had been proposed by the commercial farmer in order to overcome challenges that they encountered. They widened the inter-row spacing so as to cause less damage to the remaining fruit during the harvesting process. They were initially recipients of the new cropping practices, but later they played an active role in adapting the planting practices based on their own experiences.

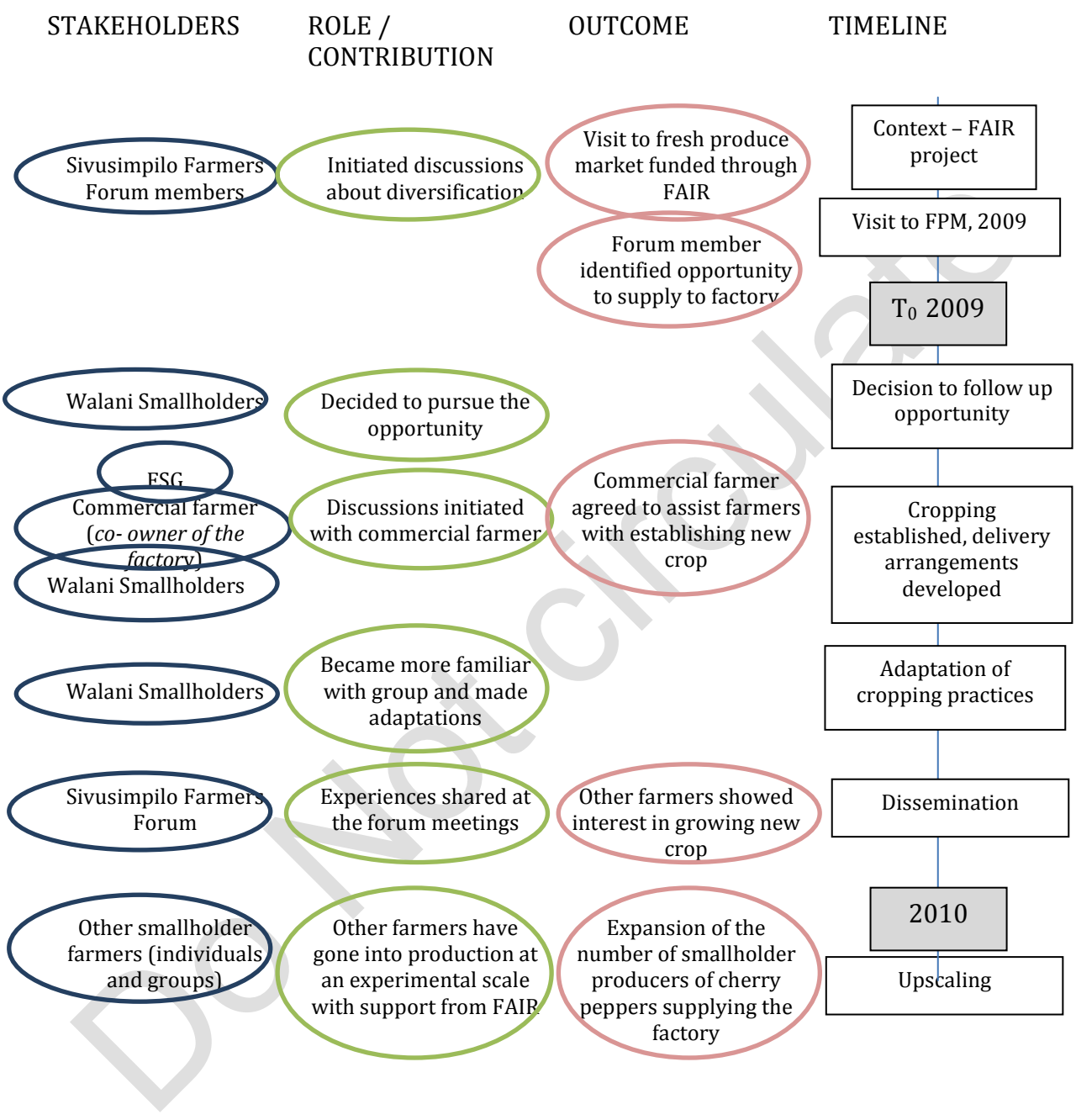
FSG field workers played a role in exploring options for the smallholders to become suppliers to the factory. They assisted the farmers with sourcing planting material and technical input from the commercial farmer. They needed to play this facilitation role because the Walani Group did not feel able to make contact with the commercial farmer themselves. Outside of the current innovation process, FSG has played a key role in creating an environment that stimulates and supports innovation processes.

The factory (processing facility) was key to the success of the innovation process, but was a market rather than an active contributor to the innovation process. At the factory, the fruit is processed into a bottled product that is exported. The factory was initially located in Bergville but later moved to Ladysmith, about 120km from Potshini.

Similarly, the **Sivusimpilo Farmers Forum** has made an essential contribution to the innovation process by stimulating discussion that led to the innovation process and later allowing for upscaling.

History / dynamics of the innovation process (1 p.)

Figure 1: Summary of the innovation process



The **context** in terms of the FAIR project is a very integral part of the innovation process as it actively supported local innovation processes and farmer experimentation.

The **trigger** was that there farmers were wanting to improve their income by diversifying into a new cash crop for which a secure market existed

The **opportunity for diversification presented itself** and the Walani group decided to act on it. This required intervention by FSG, who initiated discussions with the neighbouring commercial farmer about how to take the situation forward.

The need for intervention was identified by the farmers (not just the Walani members) at the meeting of the Farmers Forum.

Both aspects of **the innovation process** (technical and institutional) developed concurrently. FSG facilitated the establishment of the marketing and support arrangement between the smallholders and the commercial farmer. Initially FSG met with the commercial farmer. They then provided feedback at the Farmers' Forum and went on to act as an intermediary between the commercial farmer and the Walani group, which decided to give the new crop a try. The smallholders only started engaging with the commercial farmer once they started visiting his farm to collect planting material. Due to the conflictual relationship that existed between the smallholders and the commercial farmer, FSG played a key role in facilitating discussions and providing a link between the two parties.

The establishment of the new crop required technical support from the neighbouring commercial farmer. He assisted with the establishment of the trial crop, providing the smallholders with the planting material and expertise about how to grow the crop (plant spacing, fertilizer application plan, etc.).

When the crop was ready for harvest, the smallholder farmers took steps to deliver it to the neighbouring farm so that it could be transported with the farmer's own produce to the factory that was some distance from the farm. Linkages with a farm worker on the commercial farm facilitated this process.

Over time, the smallholder farmers adapted the planting practices that had been proposed by the commercial farmer in order to overcome challenges that they encountered. They widened the inter-row spacing so as to cause less damage to the remaining fruit during the harvesting process.

Spread of the innovation to other smallholders in the area took place as a result of the Walani Group (and the Phuthumani group Obonjaneni, a neighbouring community) sharing their experiences at the farmers' forum. Other groups as well as individuals decided to also produce cherry peppers to supply the factory, using the arrangement that had been put in place for the Walani and Phutumani groups. FSG has continued to play a key role in facilitating the participation of new farmers. Some of the new producers' initial crops have also been supported financially through FAIR for the purchase of inputs as they submitted applications for support to the local innovation support fund. These applications were supported because they included an additional experimental component. They compared the use of kraal manure against conventional fertilizer use for cherry pepper production. The support from the LISF only covered the cost of the seedlings. Funds provided to groups for experimentation are not repaid to the LISF as the experimentation is seen to benefit the broader community.

Results & effects of the innovation process so far (adoption)

During the first season that the Walani Farmers collectively grew cherry peppers on a limited scale (0.25ha), supplied about 2 tons of fruit (180 boxes) and made a profit of R7500 (approximately 750 Euro), which translated into a gross margin of approximately R30.000 per hectare (approximately 3000 Euro). This is substantial compared with conventional crops such as cababges, where a gross margin of approximately 1,344 Euro/ha for cabbages is likely (according to the provincial department of agriculture standard crop budgets for 2009/2010).

This led them to expand their production the following year to approximately 1 hectare using their own resources. It also led to the involvement of other groups in

cherry pepper production, with support from the FAIR project. Two of the members also produced their own seedlings from harvested seed and established small areas at their homes within their home gardens.

The successful innovation process created much positive energy within the group, which started to see the benefit of engaging collectively in agricultural activities.

There has been a positive impact on the relationship between the key commercial farmer and the smallholders, although there is still some distrust remaining with other neighbouring commercial farmers.

The process has built the capacity of the smallholders to engage in a commercial value chain. For example, they have started to understand the need to deliver a high quality product. The experience has also built the capacity of FSG staff to facilitate partnerships between different parties.

Main lessons in light of the JOLISAA goals and questions

This innovation process has led to a number of important lessons:

- Multi-stakeholder innovation processes can be successful.
- Development agents can play a key role in facilitating discussions between parties, thus enabling innovation processes.
- It has shown the importance of establishing platforms (such as the farmers' forum) that encourage innovation and facilitate sharing and discussion between smallholder farmers.
- Different sources of knowledge and skills can be combined effectively to achieve agricultural development (although this case showed a greater contribution of knowledge by the commercial farmer than that contributed by the smallholders).
- This innovation process is a relatively young case (a period less than 3 years) and not very diverse in terms of multi-stakeholder relationships.
- Innovation processes that rely heavily on one party to facilitate them raise questions of sustainability. It raises questions regarding the extent to which this marketing arrangement could continue to function effectively without intervention by FSG.
- There was very little participation of extension and no involvement of formal research in this innovation process. The involvement of extension might have facilitated the spread of the innovation more widely. It might also lead to the establishment of similar marketing arrangements with different stakeholders and different commodities.

Key references

Zanele Shezi, Nomaphelo Shezi, Maxwell Mudhara, Brigid Letty and Ann Waters-Bayer (2010).Partnerships for development: the case of the cherry peppers. *Unpublished*.

Letty, B., Shezi, Z. & Mudhara, M. 2011. Assessing the impact of grassroots innovation in agriculture. Paper submitted to Globelics Conference, Argentina, 15-17 November 2011. The study was undertaken as part of a UNU-MERIT Project on *Research and Training Support to Build African Capacity in Science, Technology, and Innovation Indicators*, funded by Canada's International Development Research Centre (IDRC) Grant 104753

Case 23: Adapting outside knowledge to increase food security in marginal areas: the case of the low cost protein supplement for chicks

Identification:

Case number: 23

Short title: Development of a low cost supplement for chickens

Authors' list and affiliation:

Brigid Letty (Institute of Natural Resources)

Ms Gugu Mbatha (Mdukutshani Rural Development Trust)

The story line in a nutshell

This is an innovation process where a group of smallholder farmers adapted an external idea to suit their context by using their own knowledge and resources. The main objective was to improve the diets of chicks during the winter, and this was achieved by taking advantage of old, unhatched eggs, mixed with cooked maize meal (Phuthu) and sunflower seed. The NGO supporting the farmers introduced them to a poultry specialist who introduced possible methods of improving their chickens' nutrition. After successful experimentation by a couple of women, the results are being shared actively among a group and in the region.

Innovation context

Msinga is one of the identified poverty nodes in KwaZulu-Natal Province and there is much focus by government and other stakeholders such as NGOs on improving household food security. One of the locally-based NGOs working in Msinga is the Mdukatshani Rural Development Trust (MRDT). MRDT has field workers who support a range of agricultural activities in the area.

Msinga is a remote rural area where households rely on a range of livelihood strategies, including subsistence agriculture (livestock and dryland cropping and irrigated vegetables within the irrigation scheme), social grants and remittances. Chickens are an important form of livestock in these households, especially for women who traditionally can own them and make decisions to sell or use them, which is not the case with other forms of livestock such as cattle. A typical household owns about 5-30 hens, but survival of chicks is very low (approximately 3 per batch of 12 eggs brooded).

MRDT has a programme whereby they have established chicken interest groups that meet regularly to vaccinate their chickens against Newcastle Disease. This is an effort to curb large-scale decimation of flocks that occurs when this disease passes through an area. Currently these smallholder farmers receive very limited support from other stakeholders.

While the contribution that chickens make to rural livelihoods is recognized in terms of protein source as well as income generation, their productivity is low, with little or no growth of flocks taking place from year to year. High chick mortalities, especially during winter when feed is very scarce, appear to be a key factor responsible for this. The remoteness of these rural households makes it impractical for them to purchase

commercial feed. In addition, most households do not have the resources to invest in their chickens so there was a need to explore alternatives.

Description

Initial practice / situation, problem or opportunity being addressed, and related triggers

Because of remoteness from shops that sell chicken feed and low household incomes, rural households are not able to purchase commercial feed for their chickens. The farmers experience extreme feed shortages, especially in winter which is the dry season. This results in high chick mortality and increased incidence of hens eating their own eggs. At meetings of the chicken interest groups, this was regularly raised as a problem and thus MRDT undertook to draw in a poultry specialist with knowledge about alternative feed sources. Following the introduction of some ideas by the expert during a farmers' day, which included feeding fresh eggs to chickens rather than allowing the hens to brood them, the farmer innovators continued to experiment with the idea. They decided to rather use old eggs as the use of fresh eggs was seen as wasteful.

Description of the innovations

This is a technical innovation and it involves boiling old, unhatched eggs and then mixing them (including their shells) with cooked maize meal (uphuthu) and sunflower seeds to develop a feed supplement for the chicks. This mixture is fed to young chicks mostly during winter, and it also fed to hens to stop them eating their own eggs. The eggs are boiled outside on an open fire because of the danger of them exploding.

Main stakeholders involved and their roles in the innovation process

a) Table1: stakeholders involved in the innovation process and the enabling environment

Stakeholder	Their role	Contribution made	Stage of contribution
Farmer Innovators	Lead experimenters	• Experience (They identified the challenge) • Ideas (They experimented with and adapted the new ideas) • Knowledge (Farmer to farmer sharing of the outcomes) • Labour (implementing the experiment)	Throughout the stages
Other members of the chicken interest groups		• Interest (participating in farmers' days and raising common problems to be addressed)	At initial stages when challenges identified during farmers days and meetings of the interest groups Later, were adopters of the outcomes of the experimentation
MRDT field worker	Advisory and coordinator	• Facilitation skills: Mobilisation of farmers into groups and allowing for sharing of outcomes • Knowledge: technical advice to the farmers • Linkages: enable farmers to access external thematic experts • Research support (including some inputs)	Throughout the process
Poultry specialist (working on behalf of MRDT)	Ad hoc support	• Knowledge (about alternative feedstuffs)	Got involved occasionally when invited by MRDT field worker

The table above (Table 1) shows the key stakeholders that have been involved in the innovation process.

The innovation process has been largely initiated and supported by the NGO MRDT. The **MRDT field staff** have facilitated the formation of chicken interest groups that have been focused on vaccinating against Newcastle Disease. The issue of high mortalities during winter emerged through interactions with the interest groups leading to theme days focused on addressing this challenge. MRDT linked the farmers up with drew in a poultry specialist with technical knowledge about feeding chickens. Later, during the experimentation phase, they provided support to the farmer innovators, providing some inputs, and tracked the innovation process.

The **poultry specialist,** working on behalf of MRDT, was able to share his technical knowledge and experiences from elsewhere with the members of the interest groups.

The **chicken interest groups** have provided a forum for chicken farmers to meet to discuss challenges concerning their chickens. This has stimulated interest in finding ways to solve them and has also facilitated sharing of outcomes.

The **farmer innovators** have been the lead experimenters. They were involved upfront in identifying the challenges they faced. They were able to adapt the ideas that were introduced by the poultry specialist so that the intervention was practical under their circumstances. Thus they contributed their own ideas. They also shared their experiences with other members of the interest group. They also contributed their effort in actually implementing the experiment – preparing the chick mash , feeding it and then observing the outcome.

History / dynamics of the innovation process

Figure 1: Summary of the innovation process

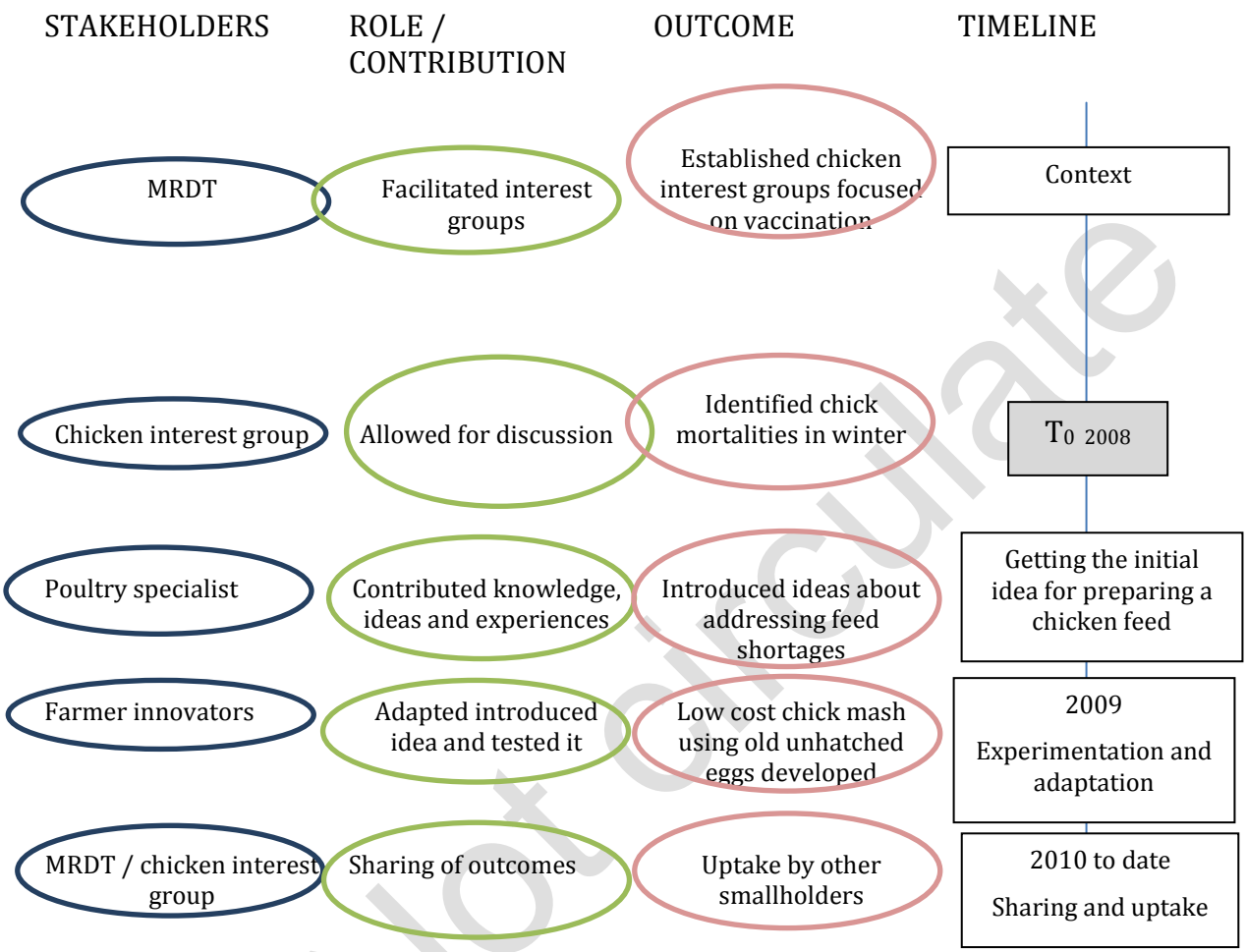


Figure 1 provides a graphical illustration of the innovation process that led to the development of a low cost chick supplement.

MRDT had already established chicken interest groups and drawn in the necessary expertise to address commonly encountered challenges. MRDT also supports farmer experimentation, which means that **the context** was conducive to a multi-stakeholder innovation process. It also ensured that there was a range of external ideas to which farmers were exposed, and which could provide a basis for innovation processes.

The chicken interest groups and the discussions that they encouraged, led to the identification of key challenges that MRDT then undertook to address in collaboration with farmer innovators. There was a move towards a focus on feeding when it was found that reduced mortalities due to vaccination were leading to greater feed limitations in winter.

MRDT has participated in the Prolinnova network, which may have also contributed to an ethos of supporting farmer experimentation and local innovation.

Getting the initial idea: The process started in 2008 when a farmers' day was held to address some of the challenges related to nutrition. The day was arranged by

MRDT field workers and they also invited an independent poultry specialist to participate and to share his ideas about possible alternative feeding interventions. The poultry specialist was introduced because he had extensive experience with household chickens and is supporting smallholder farmers elsewhere in the province. The alternative feeding options that were discussed included capturing termites and breeding fly maggots as well as using eggs. Initially the poultry specialist suggested that the farmers prevent their hens from hatching their eggs in winter and rather remove them. He suggested that one or two hens be allowed to brood eggs and that the chicks be fed on cooked eggs to ensure that they survived.

Experimentation and adaptation: The main stakeholders that contributed to the innovation process were MRDT (field workers and the poultry specialist) and the farmer innovators that adapted the introduced idea. The farmer innovators decided that they would rather eat their own eggs and feed old, unhatched eggs to the chickens. They also developed a method of preparing the chick mash, which involved adding cooked maize meal (*phuthu*) and sunflowers to the cooked eggs once they had been crushed on a grinding stone. *Phutu* scraps are regularly fed to chickens and the farmers had previously experimented with sunflower production, which is where this idea originated from.

Documentation of the innovation process and its outcomes was undertaken by the MRDT field workers. The experiment was not formally implemented and did not allow for comparison of growth rates or survival rates of chicks with or without the supplement. The measurement of the effectiveness of the process was thus limited to the farmer innovators' perceptions of the impact it was having.

Sharing and uptake: MRDT organized a sharing event once the experimentation had reached a point where the farmer innovators had some experiences to share with other members of the interest groups. During the sharing day, members of interest groups from neighbouring villages where MRDT also has vaccination programmes were invited to share and learn from this process. The farmer innovators demonstrated their method and explained how they made and used the mash, as well as its effectiveness for feeding chicks. MRDT arranges travel and lunch for the farmers that attend such farmers' days. While the other farmers were interested in the results of the experiment, some said that the mash smelt bad and found it too unpleasant to grind up the cooked eggs as some were rotten and others contained unhatched chicks.

There is no further experimentation taking place with the chick mash, but other feeding options are being explored, such as the use of green legumes grown with grey water that can supplement yellow maize and be fed to chicks confined in cages. This has been initiated because farmers perceive that there are high levels of predation of chicks by hawks.

Results & effects of the innovation process so far (adoption)

Farmers' capacity to experiment: The farmers' innovators capacity to try out new ideas was encouraged, and also the process of farmer to farmer sharing. For example, members of the interest groups are conducting a range of other experiments that include comparing layers and indigenous chickens in terms of egg production under different feeding regimes, as well as exploring options for feeding chicks that are separated from their mothers and confined in cages to prevent predation.

NGO's capacity to support farmer experimentation: The process of experimenting has strengthened MRDT's capacity to participate in joint experimentation processes.

Adoption: Because other farmers have seen the result of this initiative, some of those who have seen it are now motivated to use this technology because they see it as accessible to them. There is a move from one farming household to 20 households within the surrounding communities who are using this mixture. The practice has spread because it is resource that all households have access to, and it solves the problem that commonly occurs.

Main lessons in light of the JOLISAA goals and questions

This innovation process has led to a number of important lessons:

- Stakeholders working with smallholders need to draw in people/organisations with the necessary skills to assist with identifying possible solutions for challenges that are encountered.
- Local knowledge and experience makes a valuable contribution to innovation processes, allowing introduced ideas to be modified so that they are appropriate for the local context.
- Joint experimentation is an effective way of developing interventions and farmer-to-farmer sharing is an effective way of sharing the results of these processes.
- The establishment of interest groups have allowed the NGO to engage effectively with the farmers that they support. While the interest groups were established to address vaccination, their focus later expanded to address other challenges that the farmers were facing.
- The interest groups have created an effective vehicle for supporting farmer-to-farmer sharing.

Key references

There are no formal reports available to support this case and the information was collected through discussion with the MRDT manager, Gugu Mbatha (071 6844 516). References to the case are contained in various MRDT reports to funders.

Case 24: Developing a bulk buying system for agricultural inputs and equipment

Identification:

Case number: 24

Short title: Development of a bulk buying system

Authors' list and affiliation:

Brigid Letty (Institute of Natural Resources)

Anton Krone (SaveAct)

Zanele Shezi (Farmer Support Group, University of KwaZulu-Natal)

The story line in a nutshell

Smallholder farmers in the Okhahlamba District who have been part of the FAIR (Farmer Access to Innovation Resources) piloting of farmer-managed funds to support local innovation processes, have also been part of a Fertilizer Savings Group that has been support by SaveAct, one of the FAIR partners. Besides their other activities, they have developed a system for buying fertilizer in bulk. The process was facilitated by FAIR partners, namely an NGO that provides agricultural technical and organisational support and an NGO that supports saving and credit groups.

Innovation context

Obonjaneni and Okhombe within the Amazizi Traditional Authority – a former homeland where blacks were settled during the apartheid years – are typical rural villages with resource-poor farmers and poor infrastructure. They are typical rural communities in South Africa with low population densities, low levels of economic activity, high dependency on state welfare system, inferior provision of social and economic infrastructure, and absence of financial services. Given these difficult conditions, household agricultural production is often limited to subsistence levels. Without access to own transport, acquisition of inputs is a challenge, as it adds substantially to their cost. The lack of access to credit is another factor that compromises smallholders' ability to engage in commercial production. In fact, the only option available to most is the 'loan sharks', who charge exorbitant interest rates to the poor.

From 2007 until to date, FSG and SaveAct have worked in partnership through the FAIR programme to support farmers through a process of stimulating joint innovation processes. Farmer Support Group (FSG) provided technical support while SaveAct supported the establishment of savings and credit groups. FAIR is an initiative within the framework of Prolinnova (Promoting Local Innovation in ecologically oriented agriculture and natural resource management) that involves the piloting of local funds to support farmer-led innovation processes. It started in Okhahlamba District in 2007. It has become clear that institutional support (for example establishing and strengthening local structures) has been a key part of the process of supporting local innovation processes and improving people's livelihoods. The two entry points, of improved

farming and savings, are seen as equally important for the formation of small, robust institutions.

Through the institutional structures that were established and supported in order to manage these funds, farmers started to discuss the possibility of bulk-buying of agricultural inputs. This built on discussions that savings groups had engaged in about how they could make use of their savings to extend production. People in these villages have a history of involvement in informal savings groups. Most of these were not operating transparently; the groups were dominated by one or two people. Joining the SaveAct-promoted groups brought strong systems, group ownership and secure management of funds.

The group-managed savings groups offered alternative strategies for accessing credit and substantial annual lump sums at share-out time, whilst at the same time developing social capital to invest in innovation.

Another aspect of the support provided by SaveAct was a training programme of meetings known as *Isiqalo* (aimed at improving enterprise capacity). Monthly savings meetings and *Isiqalo* workshops provided a platform to discuss bulk buying, a concept which was introduced by farmers.

Description

Initial practice / situation, problem or opportunity being addressed, and related triggers

Farmers were battling to access inputs and saw this as key factors limiting their level of agricultural production. There is a substantial overlap of membership of savings groups and the Sivusimpilo Okhahlamba Farmers' Forum (SOFF)[1]. This enabled the escalation of discussion of bulk buying at savings group level to this forum. They saw bulk buying as a mechanism that would circumvent high transportation costs, while giving more space for negotiating discounts. Collective buying of agricultural inputs has formed part of the vision developed by the farmers through the SOFF since its inception in March 2007, although still on a fairly limited scale.

The participating members resolved to take necessary steps to achieve this goal and bulk buying became an agenda item in all monthly savings meetings and quarterly Sivusimpilo Farmer Forum meetings in Okhahlamba. In pursuit of this vision, two FLG members in 2008 started buying fertilizer from their annual savings on an individual basis.

Description of the innovations

This institutional innovation is a system of bulk buying where members of savings and credit groups[2], who are also farmer learning group members, in the Okhahlamba District, annually they use their savings to purchase inputs collectively.

[1] A forum established with support from FSG (prior to FAIR) in order to allow for sharing between farmer learning groups established in the areas where it was working with smallholder farmers. It meets monthly and is organised and run by the farmers.

[2] Savings groups range from about 10-25 members. They meet as often as they wish (weekly, two weekly, monthly), but most/all SaveAct trained groups have elected to meet monthly. They contribute to a Social Fund for emergencies, they save in shares and lend to members from their savings. Once a year they share out their capital according to the number of shares each person has purchased.

Main stakeholders involved and their roles in the innovation process

a) <u>Table1</u>: stakeholders involved in the innovation process and the enabling environment

Stakeholder	Their role	Contribution made	Stage of contribution
Smallholder farmers - members of the fertilizer savings club and farmer learning groups	Articulated the need and tested system for collective action	• Local knowledge of farming systems	Throughout the innovation process from articulating need to upscaling the system.
Farmer Support Group	• Facilitator of local institutional strengthening • Intermediary / broker in negotiations between farmers and input suppliers • Key role-player in FAIR which supported the bulk-buying initiative	• Technical farming advice • Institutional support • Knowledge of input suppliers	Establishing the context. Initiating and implementing the FAIR project. Developing and testing the bulk buying system.
SaveAct	• Facilitated the establishment of savings and credit groups and developed local capacity to manage them. • Key role-player in FAIR which supported the bulk-buying initiative	• Knowledge of financial management and savings and credit groups • Institutional support	Initiating and implementing FAIR project. Developing and testing the bulk-buying system. Monitoring the impact of the innovation process.
Sivusimpilo Farmers' Forum	Coordination and sharing	• Provided a platform for farmer-to-farmer sharing and discussion	Throughout the innovation process.

The table above (Table 1) shows the key stakeholders that have been involved in the innovation process.

Farmer Support Group is the outreach arm of the University of KwaZulu-Natal and provides support to smallholder farmers. It has also been a key partner in the FAIR project. They have also facilitated the establishment and strengthening of local institutions that support farmer sharing and learning. They have played a key role in facilitating the agreements between the farmers and the input suppliers in the current case.

SaveAct is an NGO that focuses on developing financial literacy and establishing savings and credit (S&C) clubs. As a key partner in FAIR they have supported the institutional aspects and have found ways to link S&C clubs and agricultural production by providing a source of credit.

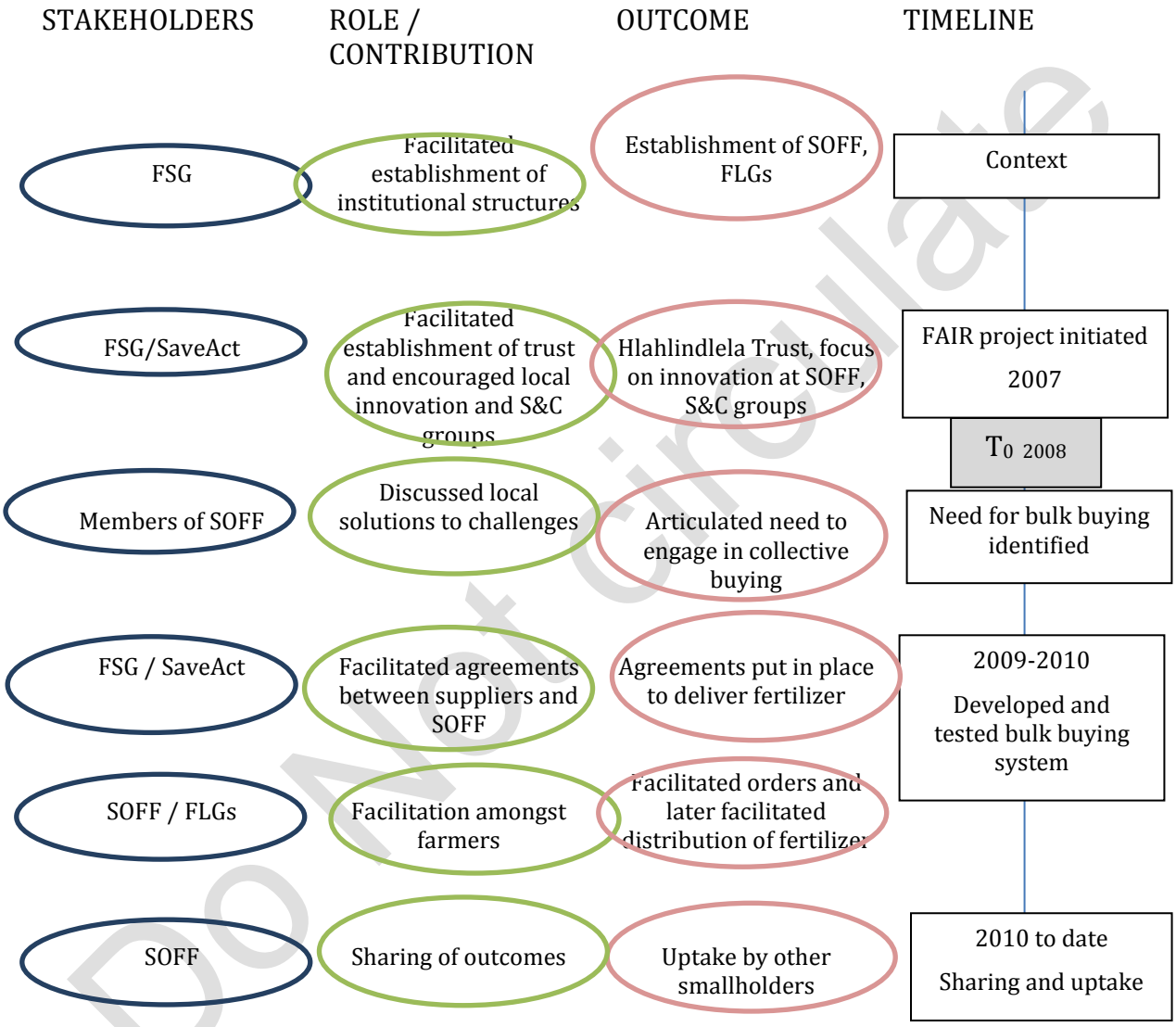
The **Sivusimpilo Okhahlamba Farmers Forum** has provided a key role of generating discussion and interest in the bulk buying initiative while also allowing for farmer-to-farmer sharing.

Smallholder farmers that are members of the fertilizer savings group, FLGs and the SOFF articulated the need to develop and test a system of bulk buying. Their knowledge of the local farming systems allowed for the development of a system that could meet their needs. They have also been active participants in the process of bulk buying.

History / dynamics of the innovation process

Figure 1 provides a graphical illustration of the innovation process that led to the development of the bulk-buying system.

Figure 1: Summary of the innovation process



Context: FSG had worked with smallholders in the Okhahlamba area and had established FLGs and the SOFF to facilitate learning, while SAveAct had established S&C groups.

The FAIR project: The establishment of the Trust that handled the innovation support funds, together with the SOFF that encouraged local innovation were effective mechanisms in allowing farmers to articulate their needs (in this case the need to improve access to inputs).

Development and testing of a bulk buying system: SaveAct and FSG's expertise, together with the existence of the SOFF and S&C groups allowed the farmers to develop and implement a system for buying inputs in bulk. The farmers saw this as a mechanism to allow them to increase their scale of production.

Through regular reflection on strategies at the meetings of the SOFF, the idea of pooling savings and collectively negotiating for lower prices of a critical input took hold, (SaveACt introduced discussions of this nature, but rural communities are familiar with the concept of bulk buying). FSG, as a key member of the local innovation support team (LIST), together with SaveAct, played a key role in facilitating negotiations with suppliers from the nearby towns of Bergville and Winterton, and worked with interested members of the farmers' forum and the savings groups to ensure that they could commit the funds and to organise the pooling of capital and purchase and delivery of inputs. FSG assisted the participating farmers to work out the type and volume of fertilizer per farmer. They also approached three suppliers for prices and delivery costs. In addition, the SOFF Meeting tasked two members in each area (Obonjaneni and Okhombe) to champion the process. This included motivating members who would not participate in the Forum Meetings.

The S&C groups had initially planned to share their savings in October, while the land was being prepared for farming activities, but since some group members were not farmers, they did not agree to this and thus the funds were shared in December as traditionally occurs with informal savings groups. The members then contributed monies to the bulk buying 'kitty' according to the number of bags of fertilizer that they wished to purchase. The payment was made to the supplier's account and farmers were provided by FSG with the necessary proof of payments. The order was delivered a week after payment, the delay being due to the shortage of stock from the supplier. Beyond this initial stage, the S&C groups have explored rescheduling their share outs of capital to September to synchronise with the planting season. The collaborative case assessment (CCA) will follow the evolution of the bulk buying system through consecutive cycles as well as the effective links between FAIR (and the LISF) and the bulk-buying initiative, though the LISF grants were not used to fund the purchase of fertilizer as part of this scheme.

Ultimately, 29 out of 34 members of S&C groups (representing two farmer learning groups (FLGs) - Elakho-Ithuba Okhombe and Sicelumusa Obonjaneni - established by FSG), managed to buy 6400 kg of fertilizer worth ZAR 24,825.34 including transport (ZAR 718.20) in 2010. Group members planned to increase their shares so that they would be able to buy more inputs for 2011/2012 season (e.g. seeds, tractor hire, labour, etc). They planned to pursue other farmer groups through the forum to be part of the process and wished to explore possibilities of approaching manufacturers of other farming inputs. The role of the farmers in brokering their own deals should be explored further during the CCA process.

Results & effects of the innovation process so far (adoption)

The effectiveness of the bulk buying system is that farmers have a means of saving and having large lumps sums available to buy agricultural inputs. The bulk buying concept adds further value to this. The savings mechanism is seen by farmers to have increased and stabilised their production. A stable investment platform has been created through participation in savings groups.

Ultimately, 29 out of 34 S&C group members (representing two farmer learning groups (FLGs3) - Elakho-Ithuba Okhombe and Sicelumusa Obonjaneni - established by FSG), managed to buy fertilizer through the bulk-buying system in 2010. The exact nature of the bulk buying system, together with changes that occurred during consecutive cycles and the apparent replicability of the system should be explored further during the CCA process.

This innovation shows great potential for scaling up and replicating of the practice as more and more people recognise the importance of saving and building up lump sums which make it possible for people to plan and schedule the purchase of expensive items that would normally be beyond their reach, such as large volumes of fertilizer.

The initiative is driven by farmers who are relying almost exclusively on their own resources and groups to take it forward. Its scaling out of the approach is not dependent on outside funds or technical expertise although the establishment of S&C groups does have a funding requirement. If developed systematically, the same mechanism for buying can also be used for selling of produce and developing marketing strategies.

Textbox 1: Farmers' views on the bulk buying initiative

Mr Dubazane remarked: "If we continue with this collaboration, we will be able to buy our own tractor through savings."

Another participant, Mr Xaba, said: "I am very sure that more farmers will be joining us next year and this initiative will grow bigger."
Source: SaveAct report

Main lessons in light of the JOLISAA goals and questions

This innovation process has led to a number of important lessons:

- It can thus been seen that the establishment of S&C groups, together with structures such as SOFF as well as FLGs have allowed farmers to come together to effectively discuss matters such as bulk buying.
- This initiative is a good example of how partnerships between different NGOs with different areas of expertise can enable activities which would not have been readily achievable by one organisation supporting farmers alone. Complementary skills and services (across agriculture and financial services) created the conditions for local initiative.
- The strong institutional environment the S&C groups (and the change in farmers financial circumstances) as well as the platform for farmer-to-farmer

[3] Farmer learning groups are groups of smallholder farmers from a particular village that meet regularly, with support from FSG to share experiences associated with experimentation, local innovation, etc. They also allow FSG to assist with addressing technical knowledge needs. The farmer learning groups are members of the SOFF, which allows for sharing and exchange between villages too. In addition, members of the FLGs have applied individually and as groups to the local innovation support fund established through FAIR.

sharing and discussion were key factors that allowed the smallholders to take an active role in the innovation process,

- The innovation process has benefited from a programme that undertook to strengthen the institutional context within which these smallholder farmers operate and work with local practices and norms when introducing a financial service model, rather than focusing only on the immediate need of input acquisition
- The technical need called for an institutional innovation (a system by which farmers organised themselves in order to be able to make collective purchases) to address it. Thus it is clear that space must be provided to explore social and institutional solutions.
- FSG played a key role in the process of facilitating a relationship between the farmers and the input suppliers but such situations cannot be sustainable unless capacity and control is transferred back to the farmers.
- The S&C groups, the SOFF and the FLGs were key in allowing the innovation process to develop and spread.
- There was limited involvement of DoA extension staff which might have allowed for increased upscaling of the innovation to other surrounding communities. The initiative was mainly supported by FSG and SaveAct which limited the uptake by other farmers.
- The innovation process was embedded within the FAIR projects that supported innovation and also drew on a context provided by previous projects implemented by the key stakeholders – especially the establishment of S&C groups supported by SaveAct.

Key references

There was face-to-face discussion with the Director of SaveAct, Anton Krone and in addition the following technical reports were made available by FSG and SaveAct:

Shezi, ZA. 2011. Bulk – Buying of farming Inputs, Elakho-Ithuba & Sicelumusa Farmer Groups.

Krone, A. 2011. Partnership and collective action creates new scope for livelihoods and innovation: Bulk buying of agricultural inputs in South Africa

SaveAct. 2011. Discussion paper: Bulk – Buying of Farming Inputs in AmaZizi Traditional Authority Areas.

Case 27: Development of a winter feed supplementation option

Identification:

Case 27 – South Africa
Development of a winter feed supplementation option
Brigid Letty[1], Hannes de Villiers[2]
[1] Institute of Natural Resources
[2] KwaZulu-Natal Department of Agriculture, Environmental Affairs and Rural Development (KZNDAEARD)

The story line in a nutshell

Researchers from the KZNDAEARD worked with a farmer in Impendle to find a way to improve the intake of chopped maize stover that he fed to his cattle in winter. This led to the development of a low-cost, locally available winter supplementation option which is currently being tested by livestock owners and the non-governmental organisation (NGO) that supports them in another rural community as a mechanism for creating agribusiness opportunities for youth as well as improving livestock productivity.

Innovation context

Impendle is a typical traditional authority area, where resource-poor households engage in a range of crop and livestock enterprises, largely for household food security / subsistence purposes. Impendle is a highland sourveld area, where the quality of the grasslands deteriorates substantially over the winter months. The area also experiences frost and snow in winter, and livestock condition is often very poor by the end of winter. Farmers generally do not buy feed for their livestock and the drop in condition in winter is accepted as the norm. Most households do not have their own vehicles and have to use public transport or hire local vehicles to travel to nearby towns to purchase inputs.

The Farming Systems Research (FSR) Section of the KZNDAEARD was established to undertake on-farm research with smallholder farmers. The main farmer innovator involved in this process had been working with FSR staff for some time around crop production matters. He had been involved in on-farm trials with FSR as well as engaging in his own independent experimentation – in particular around improving his maize production through improved soil fertility management. He had also given thought to how to improve the contribution that the maize made to his livestock. For example he had experimented with high population density in order to obtain more stover for his livestock for the winter period.

Description

Initial practice / situation, problem or opportunity being addressed, and related triggers

The main trigger was the recognition by livestock owners that cattle in Impendle lose condition during winter and need extra feed. FSR staff understood that cattle in sourveld areas such as Impendle in KwaZulu-Natal Province require protein supplementation. The farmer innovator, who had already taken the step of

chopping up his stover to improve utilisation approached FSR requesting assistance with finding a way to increase the palatability of the stover so as to reduce wastage. In view of the poor resource base of the livestock owners, appropriate methods using locally available resources needed to be sought.

Description of the innovations

The innovation, being an alternative winter supplementation option, was of a technical nature. It involved chopping up dried maize stover and then mixing it with a commercial urea-molasses product called LS33 which improved the palatability of the stover (And thus intake) and also provided a protein source that was lacking in the natural vegetation and the maize stover.

Main stakeholders involved and their roles in the innovation process

a) <u>Table1</u>: stakeholders involved in the innovation process and the enabling environment

Stakeholder	Role played	Contribution(s) made	Phase in innovation process
Key stakeholders in the innovation process			
Smallholder farmer innovator	Identification of need for supplementary feeding. Co-research	Understanding of local context and problem of weight loss in winter. Knowledge and skills in developing own way to chop and feed maize stover Provided his cattle that were used for the trial. Labour and experience in feeding the cattle daily as jointly decided with researchers	Throughout the innovation process. Identifying problem. Testing possible intervention through joint experimentation process.
FSR on-farm researchers	Co-research. Trial design. Monitoring and analysis of results of on-farm trial. Publication of findings.	Skills and resources to explore different feeding options. Knowledge of feed supplementation. Knowledge of trial design, monitoring and data analysis.	Joint experimentation
On-station researchers	Monitoring the impact of supplementation on cattle condition. Conducting on-station trials complementary to on-farm trials.	Skills and experience in condition scoring. Facilities for and knowledge of on-station trials to adapt the method of chopping the stover.	Monitoring during joint experimentation Subsequent on-station research.
Neighbouring smallholder farmers	Providing control herds for on-farm trial.	Use of their cattle to allow comparison of effect of winter feed supplementation on	Joint experimentation

		changes in animal condition.	
NGO: Mdukatshani Rural Development Programme	Introduction of the technology in another part of the province.	Provided hammer mill for chopping maize stover. Supported experimentation with drying stover at the irrigation scheme by providing materials and equipment.	Drew on the outcomes of the joint experimentation some 10 years after this had ceased.
Youth volunteers in Msinga	Co-researcher. Potential beneficiary if system offers opportunities for commercialisation.	Provided labour for fetching, drying and chopping stover.	In the second phase of experimentation at the Msinga site (10 years after the initial.

The table above (Table 1) shows the key stakeholders that have been involved in the innovation process.

Prior to the initial joint experimentation, the **farmer innovator** identified the challenges and requested assistance from the FSR researchers. The farmer innovator, besides understanding that his cattle experienced weight loss in winter had also taken a first step towards addressing this. By asking for assistance from the **FSR researchers**, he was able to draw on their scientific knowledge of supplementation. Together they were able to develop a feeding system that was practical in terms of the farmers' available resources, while also addressing the need to supplement the nutritional deficiencies. The FSR researchers then drew in their **on-station researcher colleagues** who were able to assist with monitoring the impact of the supplementation on cattle condition. Besides assisting with condition scoring, which was a way of measuring the impact of the supplementation, they also reproduced the experiment on-station. The **neighbouring smallholder farmers**, who were not supplementing their cattle, were willing to participate in the joint experimentation which allowed the team to compare the condition of supplemented cattle against that of unsupplemented cattle, which provided a control.

While a visit to the farmer innovator ten years later by the **MRDT NGO staff** showed that he had not continued to make use of the supplementation option, it did provide ideas about how to address the winter feed bottleneck in Msinga. MRDT has started supporting a process of experimenting with ways to dry the maize stover from the irrigation scheme at Msinga as this material is removed and burnt currently to make way for the next crop.

One of the **MRDT youth volunteers** is assisting MRDT to investigate different ways of drying and processing the stover before it is treated with the molasses-urea liquid.

History / dynamics of the innovation process (1 p.)

The multi-stakeholder innovation process, which could be termed joint **experimentation**, ran from 1998 to 2000, and the new technology has subsequently been applied in another part of the province since 2010. This is a case where a local innovation was improved through a joint experimentation process involving different sources of knowledge.

Context: Prior to 1998, the farmer innovator was already working with FSR Section but on crop rather than livestock joint research. Prior to 1998, the farmer innovator used an old piece of equipment that he owned to chop up maize stalks that he had removed from the field and stored at his homestead.

Articulation of problem: This farmer innovator approached FSR for assistance in developing ways to increase stover palatability and reduce wastage.

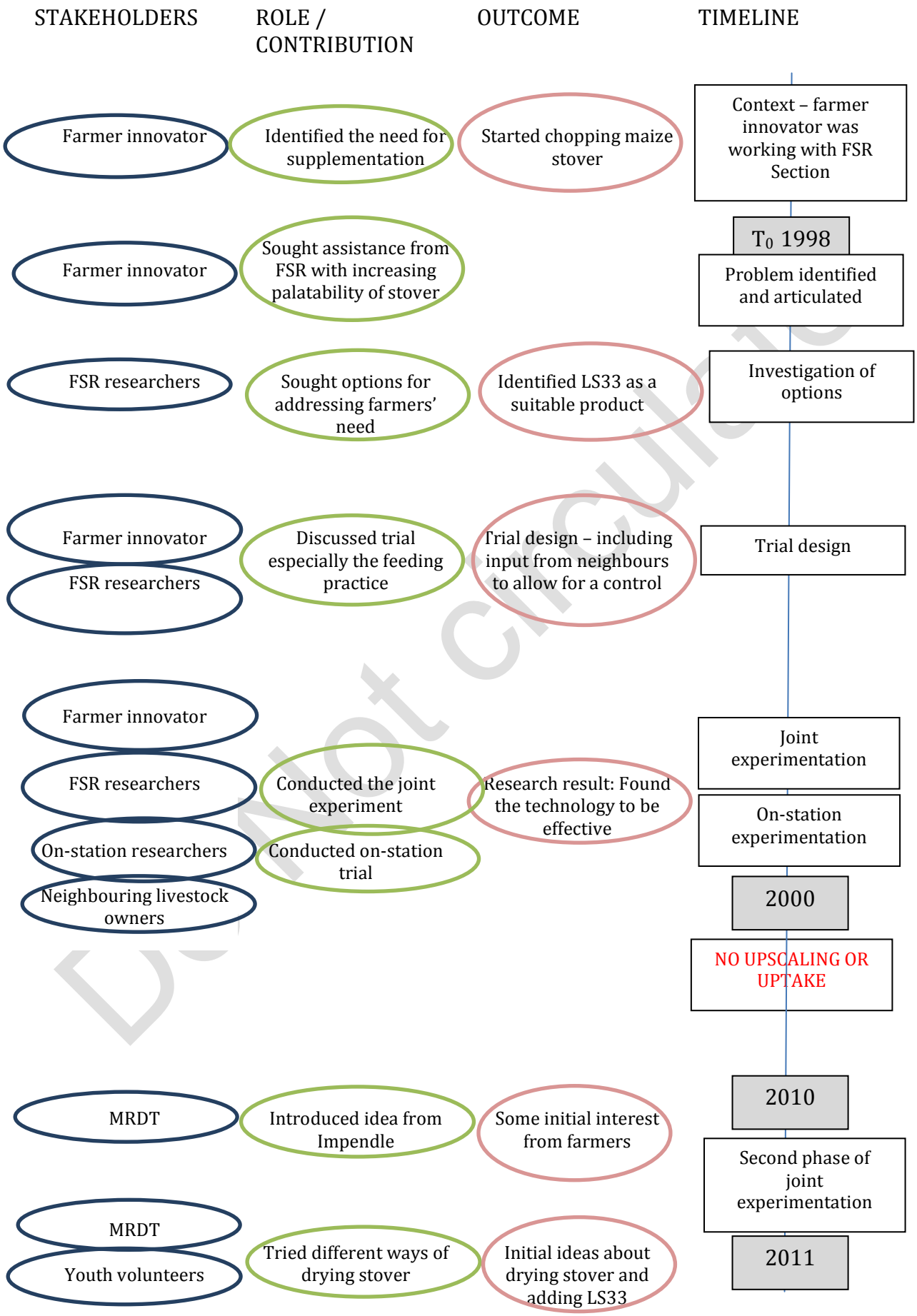
Investigation of options: The FSR staff investigated options for increasing the palatability of the stover and suggested mixing the chopped stover with a commercial liquid product called Voermol LS33, which contained molasses and urea.

Trial design: Together, the farmer and the FSR staff discussed the amount that would be fed per animal and the LS33 dilution rate. The farmer made substantial input in terms of modifying the manufacturer's recommended dosage rates, based on what he thought reasonable in terms of monthly expenditure on feed for his cattle.

Joint experimentation: The farmer, Mr Funeka, kept 12 head of cattle and felt that South African Rand (ZAR) 300/month was a reasonable amount to spend on them for supplementary feeding. At the time of the trial, a 25kg container of LS33 cost ZAR 33, so it was possible to purchase nine containers with the ZAR 300 that he said would be a realistic amount to spend per month on feed (although it was in fact provided by FSR for the purposes of the experiment) A daily allocation of 2.5kg LS33, diluted 1:2 with water, was poured over the daily ration of stover. The material was prepared daily and fed in the morning before the cattle went out to graze. Cows in milk stayed in the kraal for longer and thus received more than the other animals. The herd of cattle received approximately 16kg of the stover/ LS33 mixture per day (Mtshali et al., 2000).

The effectiveness of this mixture was tested not only for improving palatability of the feed but also for reducing loss in animal condition. This was done by comparing condition scores of cattle receiving the supplement with those of cattle in two neighbouring herds that grazed only rangeland and maize stover in the fields. A conventional condition-scoring method was used, where 0 indicates very poor condition, 1 poor condition, 2 moderate condition, 3 good condition, 4 is a fat animal and 5 is a grossly fat animal.

Figure 1: Summary of the innovation process



While the experiment was not statistically 'correct', as the farmer did not want to leave some of his cattle unfed as a control group, it did demonstrate that, by the end of the winter, feed supplementation led to substantial improvement in the condition of the farmer's cattle compared to the cattle in the other two herds. Station-based researchers from KZNDAEARD assisted with condition scoring. The joint experimentation process with the farmer in Impendle lasted only for two seasons *(1998 and 1999 winters)*.

On-station experimentation: The station-based researchers also undertook experiments on station to test the possibility of feeding less finely chopped maize stover mixed with LS33, since many farmers would not have access to the chopping equipment that the innovative farmer had and would have to use a saw.

Second phase of joint experimentation: Ten years after the initial joint experimentation, one of the researchers that had been involved visited the farmer innovator with staff from the NGO that she was working with (MRDT) to find out whether the farmer was still using the technology of mixing molasses and urea with the maize stover. He had not continued to practise the technology. This was likely due to the difficulties he encountered in obtaining the molasses/urea product, for which there was not a great demand locally and therefore not a ready supply. Some containers of Voermol molasses were seen at the farmer innovator's home during the visit. This highlighted the fact that it is difficult for illiterate people to tell the difference between products that are sold in very similarly labelled containers (As is the case with Voermol LS33 and Voermol molasses). In addition, the farmers might not have had a sufficient understanding of the difference between the two products and the added value of the urea contained in the LS33. It highlights the need to ensure that local shops stock the correct products and that farmers have the necessary knowledge to be able to purchase the correct thing. The higher cost of the LS33 might also have also discouraged farmers from buying it. It was perhaps necessary to have included molasses as one treatment in the trial to be able to show the impact on livestock condition. The relatively low demand for LS33 might also have resulted in it not being available at the local input supplier which would have made the technology difficult to apply beyond the period of the experimentation.

The new technology was, however, taken up in 2010 by MRDT, following the visit. MRDT works in Msinga, KwaZulu-Natal Province with resource-poor livestock keepers. The technology was seen to have potential not only to improve livestock productivity but also to create agribusiness opportunities for youth. There were some demonstrations done with smallholder livestock farmers and preliminary discussions about testing it under local conditions. Maize is grown on the irrigation schemes to produce 'green mealies'. Once the cobs have been harvested, the stalks are removed and burnt to make way for the next crop. MRDT is currently working with a youth volunteer to investigate different ways of drying maize stover. The youth project is seen as a way of making use of this wasted resource. Later the mixture will be used in a research project to investigate the impact of winter supplementation on goat kid survival. Opportunities to establish a business for the youth will also be pursued.

Results & effects of the innovation process so far (adoption)

The Figure below shows some of the results that were documented in a technical progress report of the Department. It includes some feedback from the farmer innovator.

Mr Funeka's comments regarding the effect of supplementation were as follows: The cattle maintained the body condition which they had the previous summer relatively well; his cows showed improved reproduction in that they had a healthy calf each year, whereas some cows skipped a year during the period prior to the trial; the calves born grew well and there were no mortalities during the period of the trial (Mtshali et al., 2000).

The innovation process did not involve sufficient exchange visits or opportunities for farmer-to-farmer sharing, which might have led to spread and uptake and possibly further adaptation of the new technology. The lack of an effective platform to allowing for spread of the new practice plus the lack of an available supply of LS33 could have been the main reasons why farmers in Impendle did not adopt the new technology for feed supplementation.

Reduced mortalities over winter and improved reproductive performance would improve the potential returns to rural households from their cattle. This would allow for income generation as well as improved food security but given the lack of application of the technology, this did not in fact emerge.

The testing of the system in Msinga could also allow for youth that are involved to generate income from the sale of the feed, while livestock owners would benefit from the direct impacts on their livestock performance.

One of the key impacts of the study was an increased capacity amongst the researchers to be able to engage in joint experimentation processes. They saw the benefit of basing interventions on farmers' own motivations as well as their local circumstances. For the on-station researchers that had previously had little experience working with smallholder farmers, this initiative gave them insights into the types of challenges that they face.

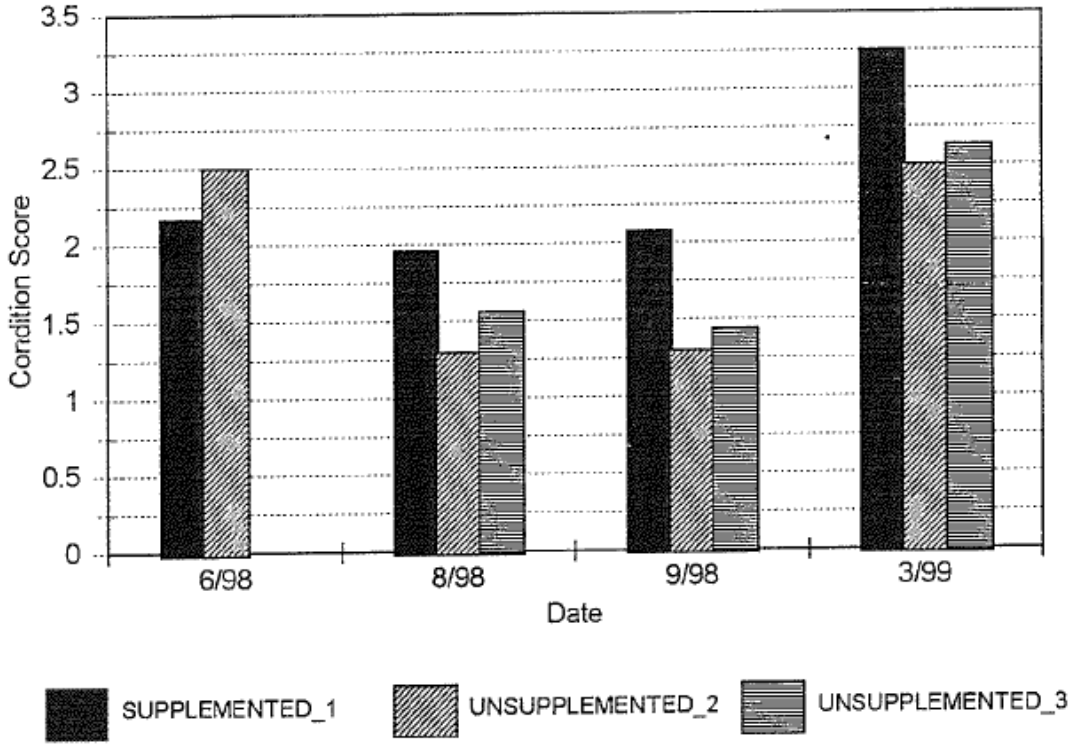


Figure 1: Changes in average body condition of supplemented and non-supplemented herds. *Note: June is the beginning of winter, August is late winter, September is spring and March is early autumn.*

Main lessons in light of the JOLISAA goals and questions

The current case should be viewed as a case of joint experimentation that did not ultimately lead to the application a new technology for a number of reasons. Given that the process has been restarted at a different location and with different players, it may yet develop into a true innovation. In the case of Msinga, it may lead to an innovation bundle that has both social and technical elements.

While it has not been a good example of a successful multi-stakeholder innovation process, this case has nonetheless produced a number of useful lessons, for example:

- An on-farm experiment that produces good technical results may not result in adoption of the introduced technology if certain requirements are not met. For example, in this case, farmers had to be able to access the urea / molasses product and had to have the resources available to purchase it. This had not been given sufficient consideration by the researchers and farmer involved in the initial on-farm trials.
- The innovation process allowed for different types of knowledge to be combined fairly effectively but there was insufficient involvement of the broader community which might have improved the applicability of the technology.
- The joint experimentation process was focused on the technical aspects of the technology because this was the area of expertise of the researchers. They should have given more attention to ensuring that the environment supported the intervention. The context should have been addressed by the research team - in particular, input markets.

- The existing relationship between the farmer innovator and the FSR Section allowed for the innovation process to take place.
- The FSR Section played a key role in linking smallholder farmers and on-station researchers, which facilitated joining of knowledge.
- The involvement of more local smallholders during the planning phase could have increased the applicability of the technology to their situations.
- The joint investigation process needed to be combined with efforts to build capacity of smallholder farmers.
- Further follow-up as well as increased farmer-to-farmer sharing could also have improved uptake of the technology developed.
- The technologies developed through such process need to be properly documented so that the information is available later to other interested parties in a format that allows them to try it out themselves and, if necessary, modify it. This is the responsibility of the researchers involved in the process.

Key references

Mtshali DD, Letty BA & de Villier, JF. 2000. Increasing the utilization of maize stover by cattle in communal grazing areas. Farming Systems Research Section, Technology Development and Training, KZNDAEARD.

Letty BA, de Villiers JF, Mtshali DD, Stewart I & Madiba S. 1999/2000. Final report: Investigation into a practical method for small-scale farmers in sourveld areas to improve the utilization of crop residues (AOP 4.4.15). KZN Department of Agriculture and Environmental Affairs. Directorate: Technology Development and Training.

Case 32: Mainstreaming of traditional healers' indigenous knowledge through manufacturing, processing and patenting a mosquito repellent from the *Lippia javanica* shrub

Identification:

Case number: 32

Short title: Mainstreaming indigenous knowledge

Hlami Ngwenya[1], Vinesh Maharaj[2]

[1] University of Pretoria

[2] CSIR, Enterprise Creation for Development

The story line in a nutshell

The traditional healers in the Giyani area have always used some indigenous plants for different purposes. Through a self-organized traditional healers' committee, they formed a partnership with researchers from CSIR to experiment, develop and commercialise a mosquito repellent from an indigenous plant that has properties similar to citronella. This initiated was funded by the Department of Science and Technology (DST), and has yielded positive results.

Innovation context

Traditional healers play a key role in South Africa. They provide alternative medicine to people, mainly through their informal sector. The majority of the African people (more so in the rural areas) strongly believe in traditional healers, and often consult them for different reasons. Despite their influence in the society, the traditional healers are frequently not recognized by the formal healthcare system that often holds negative perceptions about this practice and the efficacy of their products / mixtures. One of the major arguments is that their products are not scientifically proven, therefore cannot be trusted. In an effort to grow the sector and increase the recognition and income generating potential of traditional healers, the traditional healers established a committee. The aim was to lobby with various government departments, and also form partnerships with research institutions to validate their knowledge and exploit opportunities within the formal sector.

In an attempt to preserve the South Africa culture and its traditions, the government of South Africa has established departments that deal specifically with issues of traditional affairs through different programmes. Research institutions such as CSIR have also shown interest in working with traditional healers through research. The existence of a (self-organized) committee representing traditional healers, the existence of enabling policies and programmes and the willingness of CSIR to work with the traditional played a key role in ensuring that there was support available for this initiative.

Description

Initial practice / situation, problem or opportunity being addressed, and related triggers

Unemployment rates are high in South Africa and opportunities for income generation and enterprise development are sought by government departments such as DST. Rural areas have resources such as indigenous plants and efforts are being made to exploit such opportunities – but also to ensure that these opportunities benefit the people who hold the indigenous knowledge.

The traditional healers in the Giyani area use their local knowledge as well as resources for different purposes. For example, they have always used the Lippia Javanica plant as a mosquito repellent, and believed it to be highly effective. The committee approached the CSIR to explore possibilities to assist them to develop a mosquito repellent product which could be recognized and marketed. This was the beginning of this joint research venture.

In terms of triggers for the joint innovation process, a number of different factors were involved. Firstly, the high prevalence of malaria provided a market opportunity as well as the knowledge of *Lippia javanica* by the traditional healers. Other factors included the opportunity to introduce a new technology for processing the Lippia into a product that could be marketed, as well as existing policies that sought to support this type of activity.

Description of the innovations

This represents an innovation bundle comprising a mixture of technical, organizational and institutional innovations. (1) The Technical innovation involved the domestication of the Lippia crop through establishment of nursery, processing of Lippia oil and development of technology for cultivation and processing of the plants. (2) The organizational innovation involved an organized partnership between healers, CSIR and DST - all contributing their knowledge, with the interest of the traditional healers as core; improved local organizational capacity of the community for the production as well as marketing through an established candle factory. (3) Institutional innovation, which involved the traditional healers and CSIR establishing a Memorandum of Understanding (MOU) that protects the rights to share, as well as benefit sharing agreement. DST, as the funding institution for this project, entrusted CSIR to manage the funds through a formal agreement. A production unit was established for the production of the Lippia-based mosquito repellent in the form of candles.

Main stakeholders involved and their roles in the innovation process

a) **<u>Table1</u>: stakeholders involved in the innovation process and the enabling environment**

Stakeholders	Their role(s)	Contribution(s) made	Stage of contribution
Key stakeholders in the innovation process			
The traditional healers committee	Participants in the innovation process.	• Indigenous knowledge • Participated in on-farm trials • Coordination with support programmes	Since 1999 throughout the innovation process
Traditional healers and the community	Production	• Production of Lippia-based mosquito repellent candles • Management of the factory	
CSIR researchers	Research and patent registration	• Scientific knowledge and research on natural products • Expertise on bio-prospecting • Facilitating linkages with relevant actors	Since 1999
SANPARKS (Kruger National Park)	Conservation input	• Expertise regarding sustainable harvesting within and outside park boundaries • Possible outlet for the candles	
Key stakeholders in the enabling environment			
The Mabunda Tribal Authority	Mediators	• Conflict management and mitigation expertise among the different local actors • Allocation of land for experimentation	Since 1999
DST researchers (Government)	Technical and advisory role	• Allocation of funds to build a factory for the local community • Provide enabling	After the product was registered

		environment for job creation	
Fever Tree (Private sector)	Marketing expertise	• Marketing and distribution of the end product • Buying the product from the farmers	After the product was developed
Gerda Foschee (Consultant)	Patenting expertise	• Involved in providing information and building capacity with regard to the issues of registration and patenting of the product	

The stakeholders that have been involved in the innovation process are shown in the table above.

The Traditional healers were the holders of the indigenous knowledge. Through the **traditional healers committee** they were able to establish a partnership with the **CSIR**. The CSIR, besides having technical research skills, also had a knowledge of bio-prospecting. The **DST** funded the process of testing and commercialising the Lippia-based product.

Kruger National Park (SANPARKS) supported the initiative with knowledge about how to harvest the Lippia sustainably and also provided an outlet for the candles as a measure to prevent malaria infection.

The **Mabunda Traditional Authority** made land available for the harvesting and cultivation of the Lippia and also played a role in managing conflict among the different local actors.

Private sector players, Fever Tree and consultant Gerder Foschee addressed marketing and patent registration aspects respectively.

History / dynamics of the innovation process

As a result of limited success with obtaining information about this case, the sequencing of events is not conclusive, but as far as possible the history of the innovation process is provided below.

CONTEXT

- The traditional healers have used the *Lippia javanica* as an insect repellent for many years.
- The traditional healers established a committee for advocacy and to act as their mouth piece

THE INNOVATION PROCESS

- **Collaboration between the Traditional healers and CSIR**

Signing of a memorandum of understanding to protect the traditional healers against commercial exploitation, as well as benefit sharing agreement.

- **Testing and processing of the plant (Initiated in 1994)**

A full research process took place jointly between the farmers and the researchers. The researchers relied on the traditional healers to identify the correct plant. There are seven identical looking varieties. The traditional healers used their knowledge to identify the correct plants, through its appearance as well as the texture of the leaves and smell. CSIR developed technologies for the cultivation (on farm) and processing (initially on station) of the plant. Exchange visits between the farmers and researches were part and parcel of this process.

- **Launching of the 'Hi Hanyile' factory in Giyani**

This is a community based production unit for the candles. It had the capacity to manufacture 400, 000 candles per year, employing 35 people.

- **Establishment of a nursery**

There was also a 20 hectare nursery established for the propagation of seeds. They also cultivated 10 hectares of geranium and lemon grass to provide the fragrance for the candles.

- **Registration and patenting of the Product (In 2005)**

This was done in collaboration with DST and CSIR. A consultant (Gerda Foschee) who has expertise in the matter was pulled in to assist.

- **Marketing**

A private sector company (Fever Tree) bought the product from the factory and helped to market it. There is no sufficient information about this arrangement and the outcome thereof. The product is also sold locally and the Kruger National Park was an outlet for the product.

0. Results & effects of the innovation process so far (adoption)

This innovation process has benefits of some kind for most of the stakeholders involved in the process. Direct benefits accrue to those people that have obtained jobs or income generation through the initiative. Other stakeholders have less tangible benefits. Some of these benefits / impacts are listed below:

Technology

- The Lippia based candles has been proven to have higher repellent effect than other existing products.
- The candles were official registered as mosquito repellent under the Act 36 of the Department of Agriculture, and the product was patented (Patent No 95/9583)
- New technologies for cultivation and processing of plants were developed
- Dissemination of technology through training and skills development

Marketing

- A factory was built for processing Lippia, which can provide income generating opportunities in future (For example, by 2005 the factory produced about 400,000 candles per year)
- A company called Ulwazi Botanicals was registered for marketing and selling of the mosquito repellent candles
- The product has reached large scale marketing in Limpopo, Eastern Cape and Western Cape Province.

Bridging the gap between indigenous and formal knowledge

- The biggest outcome of this process is that of bridging the gap between the indigenous knowledge and formal research, where both traditional healers and research work jointly towards achieving a common goal.
- The local knowledge was validated and mainstreamed into formal research

Changing perceptions

- This initiative helped to change current perceptions - the healers are recognized as the source of this knowledge and have a formally registered patent

Job creating and income generation of the local community

- The commercial production created jobs for 34 people (as recorded in 2005)

Main lessons in light of the JOLISAA goals and questions

Some of the lessons drawn from the case are summarised here:

- This case shows the possibility of bridging the fusion of indigenous knowledge and modern scientific, leading to a viable business opportunity that benefits the local people.
- Through necessary support, local knowledge has the potential to be used to create business opportunity.
- An institutional arrangement that protects the rights of the local people and clarifies benefits for all is important if such partnerships are to be successful.
- It highlights the need to involve a range of different stakeholders in order to be able to address technical, institutional and marketing aspects.
- If investigated further, it will be possible to assess the long-term sustainability of such an initiative and the steps that must be taken to ensure that such projects achieve the expected results.

Key references

The case has been documented but full publications are not readily available. However, there are some links that give a snapshot of case, for example:

- A report on the process is available at the SANPARKS library: Home-Grown Mosquito Repellent Candle Due Out Soon. The Kruger park Times. http://www.krugerpark.co.za/krugerpark-times-3-3-mosquito-repellent-22030.html (Downloaded 21/09/2011)
- Agro-processing opportunities identified through a novel mosquito repellent from a medicinal plant. VJ MAHARAJ, G FOUCHE, J SENABE, RNTHAMBELENI AND F KOTZE.

http://researchspace.csir.co.za/dspace/bitstream/10204/2744/1/Maharaj_P_2008.pdf (Downloaded 21/09/2011)

- http://www.thefreelibrary.com/Candle+lights+of+health+and+fortune.-a0157839976">Candle lights of health and fortune.

Case 36: Collaboration of research, extensionist and farmers in developing bio-pesticides to control vegetable pests

Identification:

Case number: 36

Short Title: Developing bio-pesticides to control vegetable pests

Authors' list and affiliation:

Rebina Sasa[1], Hlami Ngwenya[2]

[1]Agricultural Researcher, Limpopo Department of Agriculture-Natal

[2] University of Pretoria

The story line in a nutshell

The local extension officer, in collaboration with the researchers, built on farmers' indigenous knowledge on the use of bio-pesticides. The aim was to establish a systematic joint learning process through trials and experiments to test the performance of these bio-pesticides on different crops and to commercialise the pesticide.

Innovation context

This case is from Diphagane village, which is under Makhuduthamaga Municipality of Sekhukhune District. The Diphaghane project consists of a group of women that were supported by the Department to establish a vegetable project growing common vegetables such as spinach, cabbage and onions. They received infrastructure (fence, tanks, building and pump, etc) from various sources including the Municipality and the LDA. The project is located within a densely populated rural area (former homeland). The farmers produce vegetables, which they sell locally and use for home consumption.

The farmers in this area did not have any contact with researchers before this initiative. Their only link to the external world was through the extension officers. For a long time, farmers' indigenous knowledge was not recognized either by the extension officers or researcher as valuable knowledge to learn from. The extension officer and did not have any working relation with the researchers.

Both the local extension officer and one of the researchers had been part of the BASED training program that took place in the province. One of the aspects of BASED (Broadening Agricultural Service through Delivery), was to promote a participatory approach to extension with emphasis on recognition of farmers as sources of knowledge, something not commonly achieved before then.

Description

Initial practice / situation, problem or opportunity being addressed, and related triggers

The farmers experienced problems of pest damage to their crops. As they could not afford the expensive chemicals, they started experimenting and developed their own with recipe using a mixture of six different indigenous plants. They added different ingredients over a period of time to develop the recipe, drawing on their local knowledge. They still had questions about the strength that it required (and

opportunities for dilution) as well as its shelf-life (which would have assisted them to be able to market the product effectively). Basically, the farmers were looking for a cheaper product than those commercially available

When the local extension officer realized this, she collaborated with the IKS and Innovation Division of LDA Research Directorate to find ways of supporting the farmers to expand their knowledge by establishing more formal learning from these innovations.

Description of the innovations

This case involved two aspects of innovation – a technical and an organizational innovation.

The technical innovation was the biopesticide that the farmers had developed, with assistance from other stakeholders. The product is developed by grinding up these different plants, mixing them with water and then applying it to plants using a knapsack sprayer.

The process of collectively testing the biopesticide at different dilution rates through an experimentation process can be seen as an organizational innovation as it was a first time that the IKS and Innovation researchers had worked with farmers in this manner.

The farmers in joint venture with the extensionists and researchers established some trials to test the performance of the bio-pesticide on different crops. Two experiments were conducted: One with 100% percent of farmers' original mixture, the other one with 50% farmers' original mixture and 50% water. Then there was a control plot without any pesticide.

Main stakeholders involved and their roles in the innovation process

a) Table1: stakeholders involved in the innovation process and the enabling environment

Stakeholder	Their role	Contribution made	Stage of contribution
Key stakeholders in the innovation process			
Diphaghane project members	The lead experimenters	• Indigenous knowledge on plants • Land for the experiments • Labour to establish and monitor the experiments • Time – to organize sharing days, where they share their knowledge with others • Skills - to make demonstrations and train others	Throughout the process
Extension officer	Coordinator, advisor and technical support for farmers	• Time and skills - coordinating between the farmers, research and other stakeholders • Knowledge - advice and technical support • Mobilization of farmers	Throughout the process
LDA Researchers from IKS and Innovation Division	Research expertise	• Skills - Advice on how to conduct experiments • Technical expertise • Scientific knowledge about bio-pesticides • Getting this innovation	Throughout the process

		registered as a formal research	
University of Limpopo	Formal documentation of the innovation process	• Skills in using video documentation	During experimentation process
Other community members	(Potential) customers	• Recipient of knowledge from the experimenting farmers • Purchase the pesticides	Participation during the sharing days; Ongoing purchase of pesticide
Key stakeholders in the enabling environment			
Prolinnova	Supported the innovation process	• Financial support • Training of extension officer on ARD process	

The table above (Table 1) shows the key stakeholders that have been involved in the innovation process.

The **smallholder farmers** were the key experimenters who started by developing a recipe for a biopesticide using their local knowledge. They have contributed their labour to managing pesticide trials and their skills to implementing subsequent experimentation. They actively shared their knowledge with other farmers through sharing days.

The local **extension officer** became involved in the process having participated in the BASED programme. Her main role was to provide advice and technical support to the farmers but she played a role in linking the farmers with researchers and also played a role of mobilising the farmers.

The **researchers from LDA** contributed their skills about conducting experiments as well as their scientific knowledge about biopesticides to the process of developing and testing the biopesticide. They also played an active role in registering the farmers' intellectual property to prevent bio-piracy.

Other **community members**, as well as farmers from neighbouring communities have not contributed skills to the innovation process but are customers that provide a local market for the biopesticide. In addition they have attended farmers day at the Diphaghane Project.

Prolinnova, as a network, has been key in creating an enabling environment for the innovation process, having made funds available to support the innovation process through the purchase of inputs and materials as well as support provided to farmers' days.

History / dynamics of the innovation process

The Diphaghane members had (on their own) been engaging in **farmer experimentation** to develop a bio-pesticide. This had been a process where the farmers had added consecutive ingredients until the achieved what they perceived to be an effective product.

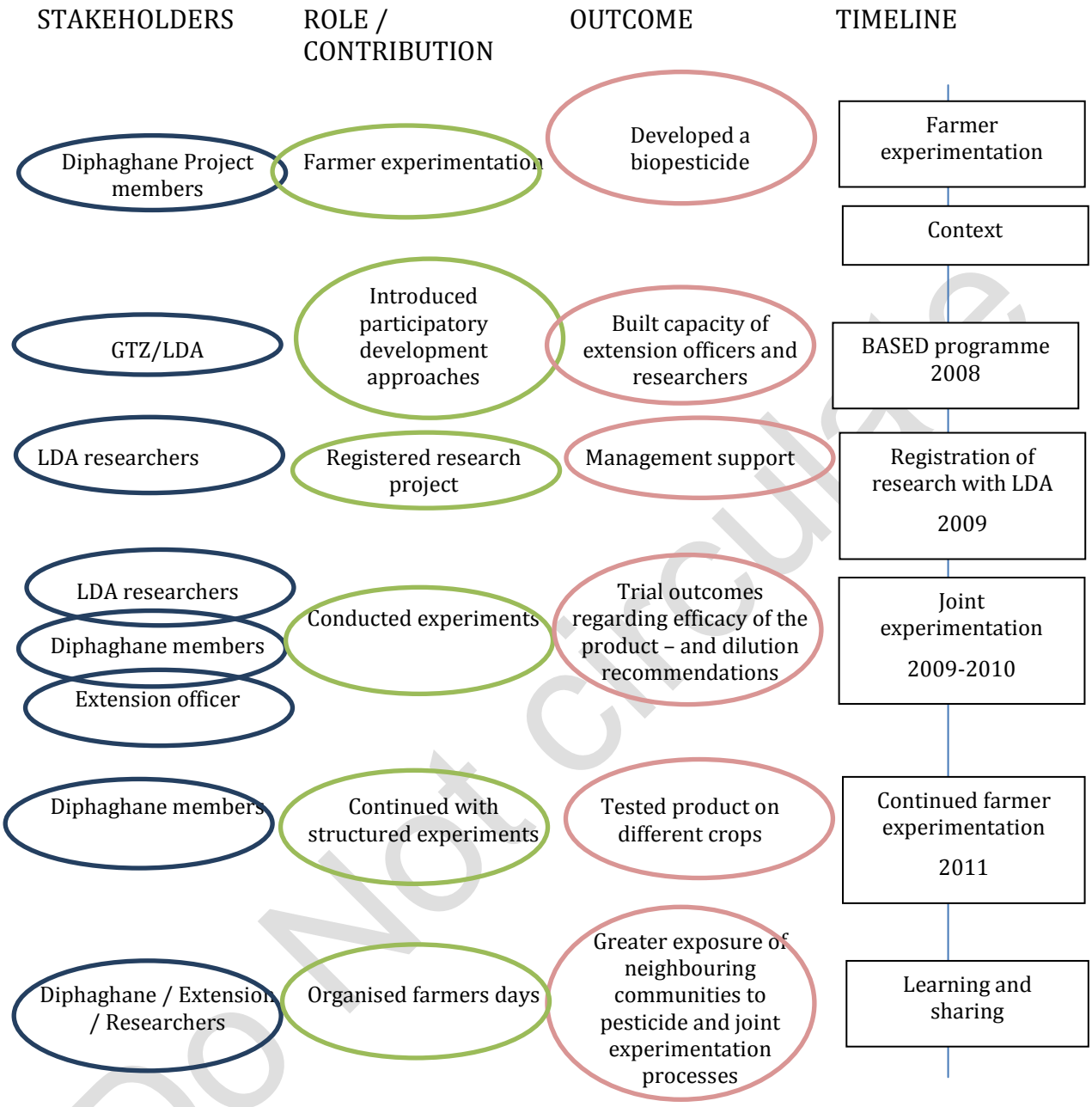
The **context** that gave rise to the innovation process was the BASED Programme that introduced participatory development approaches. This gave rise to a process that built on the farmers' own experimentation.

This led to a process of **joint experimentation**, where the farmers in joint venture with the extensionists and researchers established some trials to test the performance of the biopesticide on different crops. The treatments in the experiments were different dilutions of the biopesticide, which were compared against a control (application of water only). During the experimentation process, the researcher demonstrated how to establish an experiment and the farmers carried on the rest of the work and took the responsibility of looking after the experiment. Initially the innovation process was bottom-up, as farmers were solving their own challenge, but later it developed into an organized partnership between the three key stakeholder groups.

After the formal experiment, the farmers carried on their own **farmer experimentation** to test the biopesticide on other crops and took full responsibility for monitoring of the experiments.

The extension officer, together with the researchers, organised meetings with farmer experimenters and other farmers for **learning and sharing purposes**. She also helped to link the farmers with other relevant stakeholders.

Figure 1: Summary of the innovation process



Results & effects of the innovation process so far (adoption)

This process has resulted to different outcomes and impact areas:

- Technical and economic aspects
    - The biopesticide seems to have been effective in reducing pest damage to the crops.
    - The product is marketed locally and the farmers generated income out of it (figures not available currently).
    - The farmers should be able to reduce their production cost, because of the reduced damage to their produce and reduced input costs.
    - There is appreciation and use of underutilized local plant resources that can be used as a biopesticide, which should lead to exploration about possible use of other local resources.
- Capacity strengthening aspects
    - The farmers have gained technical knowledge on how to conduct and monitor experiments and have broadened their knowledge on the performance of bio-pesticides on different crops, and in different contexts.
    - The farmers are able to make conduct and monitor experiments and to train others.
- Institutional aspect
    - This innovation was registered as a formal research with LDA, which means that such processes are supported by the Research Directorate.
    - This process has contributed to changing the power relations between the researchers, extensionists and the farmers, creating more equal relationships.
    - The recognition of farmers as sources of knowledge by the extensionists and the researchers has enhanced farmers' self-esteem.
    - The research and extension officials involved in the process have become responsive and support farmers' expressed needs.
- Creating strong external linkages
    - Linkages have been established between the farmers and external actors such as Prolinnova, University of Limpopo and other neighbouring communities, which enhances information flow.
- Questions of IP
    - In terms of dissemination, the innovation itself has not spread because the farmers are protecting their recipe until the experimentation process is complete. This is because their ultimate goal is to manufacture and sell the biopesticide. They have made the finished product available and they have also shared widely the experimentation process that has been followed and the value of farmer innovation. In future, LDA will need to make decisions about using public funds to support experimentation where the knowledge generation is held by the experimenters and not made public.

Main lessons in light of the JOLISAA goals and questions

This innovation process has led to a number of important lessons:

- The major lesson from the case is the recognition and the farmers as important sources of knowledge in the innovation system.
- Research and extension services can play a key role of mobilizing and supporting (And building on) farmer experimentation to effectively contribute to the overall knowledge generation and innovation.
- Local knowledge is a useful entry point for joint experimentation supported by government research institutes.

Key references

There are technical reports from Limpopo Department of Agriculture that accompanied this process.

A video was also produced on this process (available from Koki Mphahlele at Centre for Rural Community empowerment, University of Limpopo Email. koketsom@ul.ac.za).

There are no formal publications documenting the process.

Further information could also be obtained from Rebina Sasa (email. SasaR@agric.limpopo.gov.za)

Case 38: Development and adaptation of in-field rainwater-harvesting techniques

Identification:

Case number: 38

Short title: Development and adaptation of in-field rainwater-harvesting techniques

Authors' list and affiliation:

Brigid Letty (Institute of Natural Resources)

Cobus Botha (Agricultural Research Council)

The story line in a nutshell

This initiative, funded by the Water Research Commission (WRC), and implemented by the Agricultural Research Council (ARC) and the Free State Department of Agriculture, aimed to develop and disseminate in-field rainwater harvesting (IFRWH) techniques. Ultimately, smallholder farmers became active partners in the innovation process rather than being merely recipients of the introduced techniques. They adapted the techniques for use with vegetables instead of just field crops, and adapted the specific technologies used to gather and store water. The researchers and extensionists thus recognized that the farmers were important contributors to the development of new and appropriate technologies.

Innovation context

Food insecurity, poverty and unemployment are serious problems associated with resource-poor rural households that are found within the rural areas of Thaba Nchu in the Free State, the location of this case. This is exacerbated in areas where water is the scarcest natural resource that limits crop production, which is one of the key activities of these smallholder farmers.

Farmers are heavily constrained by erratic rainfall, lack of resources (production inputs), low returns from production, and high risk of crop failure) associated with rainfed production practices. Not only is rainfall marginal for cropping (approximately 435mm/annum), it also falls mainly in thunderstorms. Water harvesting was seen by researchers as a mechanism to overcome these challenges and increase yields. Farmers and researchers together identified a need for developing alternative technologies for rainfed production.

Description

Initial practice / situation, problem or opportunity being addressed, and related triggers

The environmental stress experienced by smallholders triggered researchers to develop a new technology, and the introduction of this new technology to the farmers triggered the joint innovation process.

Description of the innovations

This technical innovation is mainly in the field of agricultural production, although it is also closely related to natural resource management. Given the characteristic

conditions of the Thaba Nchu Region, the introduced technique combines the advantage of no till, basin tillage and mulching (what mulching was initially introduced and how was it adapted?) on high drought risk clay soils and duplex soils. These methods reduce the total run-off to zero and reduce evaporation from the surface considerably. It involves the use of water harvesting bowls constructed between rows within the field to capture any rainfall that occurs. The farmers who were exposed to the techniques that had been developed on-station initially by researchers then adapted them to their local conditions by introducing material for mulching and by adapting the dimensions of the ponds. The interest of farmers in using these methods within vegetable production also led to changes in the design of the ponds to accommodate the inter-row spacings.

Figure 1: In-field rainwater-harvesting techniques[4].

[4] **Source:** Heidi Phahlane (undated). Powerpoint presentation. MARKET CONSTRAINTS AND OPPORTUNITIES FOR THE SUSTAINABLE ADOPTION OF INFIELD RAINWATER HARVESTING IN THABA NCHU: A PRINCIPAL COMPONENT ANALYSIS (PCA) APPROACH. http://www.findavenue.co.za/AEASA/Presentations/Market%20Constraints%20and%20Opportunities.pdf (Downloaded 20/09/2011)

Main stakeholders involved and their roles in the innovation process

a) <u>Table1</u>: stakeholders involved in the innovation process and the enabling environment

Stakeholders	Their role(s)	Contribution(s) made	Stage of contribution
ARC Institute of Soil, Water and Climate research team	• The researchers developed the initial techniques on-station • Supported the information sharing processes (through technical assistants)	• Technical expertise (subject matter specialists: agronomists, soil scientists, sociologists and agricultural economists)	Throughout
Participating smallholder farmers (local farmer groups)	To test new techniques (as recipients of new knowledge)	• Labour to manage the demonstration plots	Throughout
Innovative smallholder farmers	Tested and adapted IFRWH techniques to suit local conditions	• Local knowledge and experience • Ideas about how to adapt the techniques	Throughout
Free State Department of Agriculture (Extension officers)	• Identified suitable sites for the project • Supported farmers when implementi ng the techniques • Partial funding	• Knowledge of the area • Links with the local community • Partial funding	Throughout
Municipal-based water harvesting	• Community mobilisatio n and	• Knowledge of the area (for selection of villages)	Throughout

interest groups)	information dissemination	• Linkages (for transfer of IFRWH technique amongst community members)	
University of the Free State researchers	Research input	• Scientific knowledge about water-harvesting • Knowledge about research methods	Throughout
Stakeholders involved in the enabling environment			
Water Research Commission	Funder	• Supported the research programme financially	Throughout
Starke Ayres (Private Sector)	Contributed to adapting the vegetable planting practices	• Technical expertise related to vegetable production	At the stage where farmers wanted to use the IFRWH techniques for vegetables

The innovation process can be characterised as an organised partnership, with a number of different stakeholders / knowledge holders coming together through a structured research project. The table above (Table 1) shows the key stakeholders that have been involved in the innovation process:

The ARC research team led the project within which the innovation process was initiated. They had also led the on-station component prior to commencement of the project that involved on-farm testing and adaptation of the IFRWH technologies. The RAC researchers supported the process of information sharing which allowed for upscaling of the techniques (this was achieved mainly with the input of technical assistants employed by ARC).

The smallholder farmers at the study sites that participated in the process managed the demonstration and training plots. They also implemented the IFRWH technologies within their own fields and gardens.

With the smallholders, certain **innovative farmers** provided their own ideas about how to adopt the demonstrated technologies to make them more suited to local conditions.

The extension officers from the **Free State Department of Agriculture** played a key role in identifying suitable sites for the project. Later they also played a key role supporting the farmers during the implementation and adaptation of the techniques. Their knowledge of the area and their links with the community were key in facilitating implementation of the project.

The **Municipal based water harvesting interest groups** were established through the project to support exchange and learning between local farmer groups. They provided linkages which were key to the sharing and upscaling process.

University of the Free State researchers have also provided research input to the WRC project as team members.

In terms of the enabling environment, the **WRC** has been a key player, funding the initial on-station research project as well as the on-farm component that gave rise to the joint innovation process.

The **private sector** was also involved in the process, with technical advisors from **Stark Ayres** providing input regarding the adaptation of planting practices to accommodate the water harvesting basins.

History / dynamics of the innovation process (1 p.)

Figure 1: Summary of the innovation process

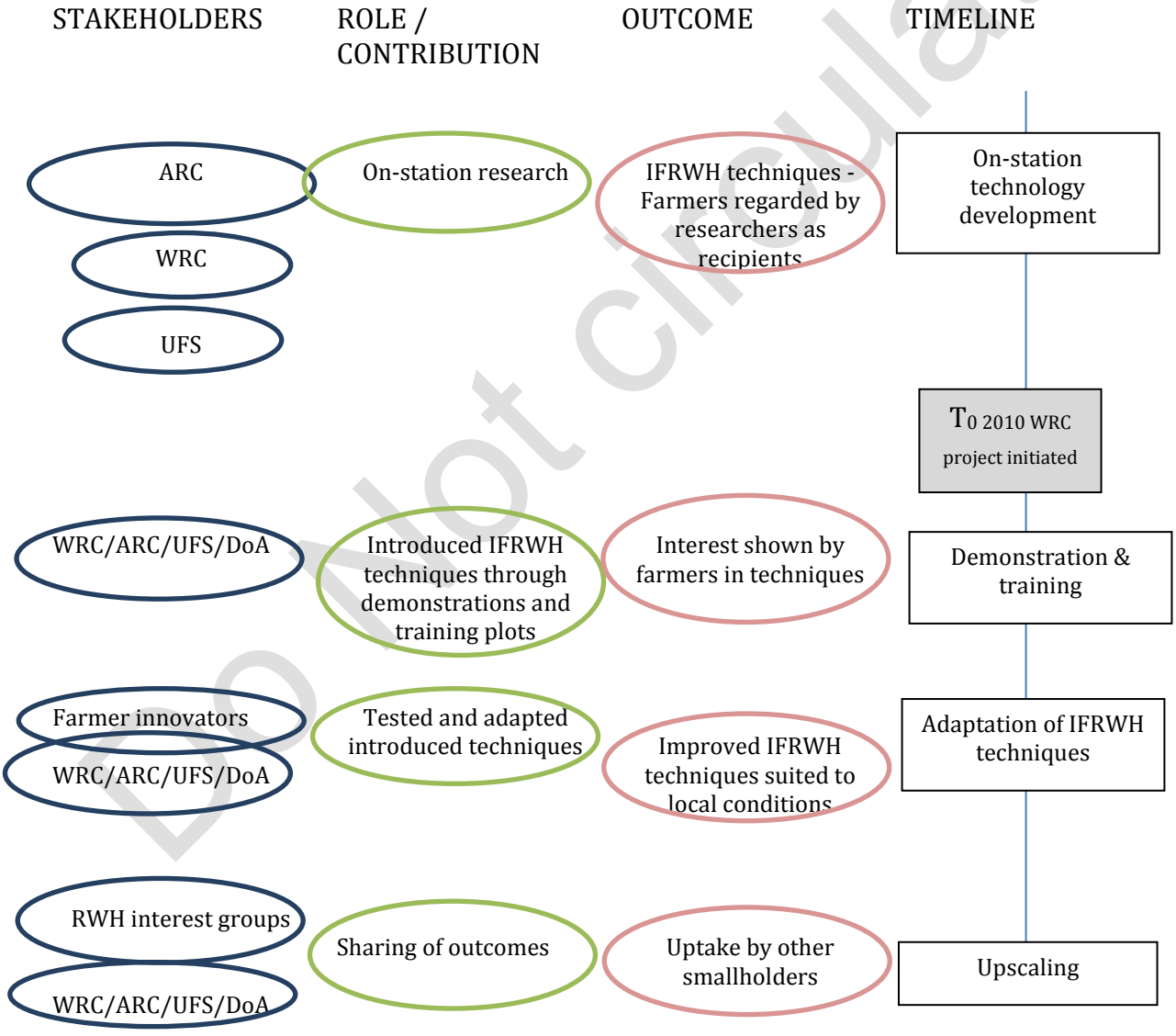


Figure 1 provides a graphical illustration of the innovation process.

Initiation of the innovation process: If T0 is seen as the start of the WRC-funded project that involved on-farm testing and adaptation of IFRWH techniques.

Prior to this, The ARC Institute for Soil, Climate and Water at Glen in the Free State Province developed the IFRWH techniques on-station through a project funded by the WRC in collaboration with the Free State Department of Agriculture, ARC and WRC. The trials had focused on field/agronomic crops such as maize and sunflower.

The on-farm demonstration and adaptation of IFRWH techniques: The WRC went on to fund a project in 2010, which was intended to involve transferring these technologies to six rural communities in the Thaba Nchu and Botshabelo areas in two provinces of South Africa. It was within this project that the joint innovation process described in this case was initiated. The case being followed up through the Jolisaa initiative focuses on the innovation process at Thaba Nchu. The innovation process is still ongoing, though it has mainly reached a stage of wider dissemination at the project sites.

Smallholder farmers were involved right from the initial phase (on-station research), attending farmers days held at the on-station demonstration plots, but initially they were seen as recipients rather than active contributors to the innovation process.

The WRC project was embedded in the Farming Systems Research and Extension (FSRE) Approach. With this approach, researchers first seek to understand the farming systems within which the envisioned beneficiaries of the research and extension efforts operate. This took place during the initial interactions with farmers. The approach used in the introduction of IFRWH techniques recognised the central role of farmers in any technology development initiatives, in that it stressed the testing and assessment of new technologies on farmers' fields under their conditions and involved local farmer groups in the adaptation and dissemination of the technologies.

Since it was seen as important to adapt the new technology to local conditions and practice, the demonstration and training plots were seen as a mechanism to allow for the initial introduction of the techniques but the practices were later adapted at these sites as well as at farmers' own fields to make them more suited to local conditions.

The innovation process started with the introduction of technologies that had been developed by the ARC researchers for in-field rainwater harvesting (IFRWH) associated with field crops. Effective interactions took place between farmers and researchers before the start of the project and during the process of technical change. They were facilitated by the research team, with support from the Department of Agriculture officials.

Demonstration plots were initially established by the research teams with the involvement of the farmers after having engaged the local headman and obtained access to the communities.

The researcher team then established training plots which were ultimately managed by the community members and built their capacity to use these technologies. In recognition of the large labour outlay needed to implement the IFRWH techniques, participating farmers organised themselves into groups that managed demonstration and training plots and also helped to manage members receive similar training about IFRWH techniques.

Smallholder farmers and the local communities have participated in various activities associated with the innovation process, including short courses, farmers' days, information days, in-field training sessions, IFRWH festivals etc. These

activities have built capacity, created interest and allowed for wider dissemination of the techniques.

Adaptation of the original IFRWH technologies: The scientists (researchers) originally envisaged that the IFRWH techniques would be used for field crops such as maize and sunflower. Later, the smallholder farmers identified the need to expand the application of the techniques to include vegetable production. They articulated this during discussions with the researchers. This called for adaptation of the techniques as well as adaptation of the planting practices to accommodate the water-harvesting basins. The research team worked with agronomists from Starke Ayres and the UFS and the farmers to adapt the technologies. Farmers also developed their own adaptations to the introduced concepts, adding stone and grass mulches to further reduce evaporative losses.

Through the same WRC project, the IFWH techniques were also introduced by the ARC research team into another province that is characterized by steeper gradients. In these contexts, farmers realized that they needed to reduce the dimensions of the basins in order to prevent them from breaking when full of water.

This can be seen as a mature innovation as the introduced techniques have been applied and adapted to different local conditions and are now in the process of being more widely disseminated.

Results & effects of the innovation process so far (adoption)

The results and effects of the innovation process are summarised below:

Scale of uptake: The IFRWH techniques have been implemented in 1000 households in 42 rural villages around Thaba Nchu in the Free State.

Improved agricultural production: Research results from the on-farm work over the years have shown that the IFRWH technique is sustainable in terms of increased agronomic productivity, reduction of risk, conservation of the natural resources base, social acceptability and economic feasibility.

Improved livelihoods: The levels of food security have increased (by how much?) by means of maize and vegetable production in homestead backyard gardens through the technology and practice of IFRWH and conservation technology.

Improved capabilities: This innovation process has built the capacities of researchers (And students) to work in partnership with smallholder farmers to develop technologies. It has built the capabilities of farmers to explore and evaluate new techniques.

Institutional strengthening: The establishment of interest groups at local and municipal level has provided vehicles for sharing and exchange.

Improved relationships: There are improved relationships between ARC, DoA and farmers.

Main lessons in light of the JOLISAA goals and questions

This innovation process has led to a number of important lessons:

- It clearly demonstrates the benefits of bringing different stakeholders together to develop solutions to problems that smallholder farmers face. It also highlights that their involvement early on in the process is essential

although some having some level of demonstration does perhaps provide farmers with a starting point from which to develop their ideas.

- It has demonstrated that different stakeholders, with their different types of knowledge can effectively combine their knowledge to develop improved systems. The farmers had knowledge of their farming systems and how the techniques could potentially be applied to other components of the system. They also had ideas about how to adapt the technologies to suit their local conditions. The possibility of initial workshops allowing for integration of ideas prior to establishment of demonstration plots might have fast-tracked the joint innovation process.
- It is shown the need to address both technical and institutional aspects during the implementation of such initiatives. For example, the establishment of farmer groups at local and municipal levels allowed for facilitation of farmers around managing plots as well as supporting the process of sharing and exchange.
- Another lesson is that on-station researchers need to proactively involve smallholder farmers in the development and evaluation of technologies and also to monitor the extent to which the technologies are being applied even while still at an on-station stage.
- The need to monitor the farmer adaptation process (and the reasons for farmer's changes) as part of the project, rather than as an outcome, is also clear.

Key references

This summary drew on telephonic discussions with the ARC researcher, Cobus Botha (051 8611172).

In addition, he suggested that the following report would provide additional information:

Volume 1 of 2: MAIN REPORT
On-Farm Application of In-Field Rainwater Harvesting Techniques on Small Plots in the Central Region of South Africa. (2007). JJ Botha, JJ Anderson, DC Groenewald, N Mdibe, MN Baiphethi, NN Nhlabatsi, & TB Zere. WRC Report No. TT 313/07.

Case 39: Developing and testing an irrigation management tool

Identification:

Case 39 – South Africa
Developing and testing an irrigation management tool
Brigid Letty[1], Joe Stevens[2]
[1] Institute of Natural Resources
[2] University of Pretoria

The story line in a nutshell

Researchers at the University of Pretoria and CSIRO, drawing on knowledge gained through other irrigation-related programmes involving collaboration with farmers, developed a simple irrigation scheduling tool. They then fine-tuned the tool (and the method of utilisation) through interactions with commercial and small-scale farmers based on the testing of a prototype prior to upscaling and commercialisation.

Innovation context

The Water Research Commission (WRC) is a national research organisation that funds research related to water utilisation. Researchers at University of Pretoria (UP) had previously undertaken research funded by the WRC and had collaborated with researchers from the CSIRO.

Through their research initiatives, they had identified the need to develop a simple water scheduling tool that would be accessible to smallholder farmers in particular.

The small-scale farmers (areas less than 0.5ha/farmer) for which the tool was originally developed are small-scale irrigators having small food plots where they grow vegetables or other crops such as wheat for sale to local or regional markets for the market. They make use of basic irrigation methods (short furrow, flood and sprinkler irrigation) to apply irrigation. In general they lack the necessary scientific knowledge about when or how to apply water or how much to apply – and through intuition many are aware that nutrients can be lost from the soil due to over-application of water. They generally, however, apply too little rather than too much water due to the cost of running pumps and need for labour to move the sprinklers manually. The smallholder farmers have very limited resources to invest in irrigation infrastructure or in agricultural inputs.

Commercial farmers (table grape, citrus, subtropical fruit, maize and wheat) that were also involved with testing of the tool had had previous experience with irrigations scheduling tools such as tensiometers and had high-tech irrigation systems, but they also recognised the need to improve their efficiency of water use.

Description

Initial practice / situation, problem or opportunity being addressed, and related triggers

The main trigger for development of this innovation was a realization amongst researchers that very few irrigation farmers in South Africa are monitoring the soil water status and therefore is characterised by inefficient irrigation practices – even more so for smallholder farmers. Given the large amounts of this scarce resource used for irrigation, researchers believed they needed to develop a tool to assist

farmers with knowing how much and how often to apply water. Through previous research programmes, ideas for developing such a tool had emerged and the researchers then decided to source funding to develop a prototype. Thus the key triggers for this innovation process were a combination of environmental stress and the introduction of a new technology..

Description of the innovations

The tool is known as a Wetting Front Detector (WFD) and is a special funnel-shaped instrument, a filter, and a float plus indicator instrument that is buried in the soil. As the water infiltrates into the soil during irrigation, the funnel collects some water and uses this water to activate an indicator float, which is visible above ground. The WFD gives a signal to the irrigator when water, percolating through the soil, moves past it. The Wetting Front Detector is completely mechanical and requires no batteries, wires or loggers.

Figure 1: Wetting Front Detector.

The design of the Wetting Front Detector is such that it also stores a sample of soil water at the base of the funnel each time the wetting front moves past. This sample can be used for the monitoring of nitrate movement and salt accumulation or leaching using simple filed tests. For this, a sample is extracted by syringe and a drop placed on a colour test strip for measuring soil nitrates or the electrical conductivity of the soil water can be measured (Stirzaker et al., 2008).

Figure 2: Taking soil water samples from WFD.

Main stakeholders involved and their roles in the innovation process

a) Table1: stakeholders involved in the innovation process and the enabling environment

Stakeholder	Role played	Contribution(s) made	Phase in innovation process
Key stakeholders in the innovation process			
Researchers (UP and CSIRO)	Research and development	Scientific knowledge: development of the protoptype Linkages with commercial farmers for testing the prototype	Throughout the process
Various small-scale and commercial farmers	Tested and adapted the tool to their conditions	Local ideas about applying the tool	Involved once the initial prototype had been developed
Key stakeholders in the enabling environment			
Water Research Commission (WRC)	Funded the initiative	Supported the research and testing process	Involved once the initial prototype had been developed
Agriplas (Private sector)	Manufacturing and marketing	Manufacturing skills: manufactured the tool for initial testing	Once the prototype had been tested and adjusted.

The innovation process could be described as an organised partnership that took place at a national level in South Africa and Australia, but which has had impact at an international scale, with the tools being exported to Brazil, India, Latin America, Asia and other African countries including Malawi, Ethiopia and Eritrea.

The table above (Table 1) shows the key stakeholders.

Researchers from UP and the CSIRO identified the need for a simple water scheduling tool and had ideas about how it could be manufactured. They were involved in the developing and testing of the prototype.. They had links with commercial farmers which also facilitated the process of testing and fine tuning of the prototype.

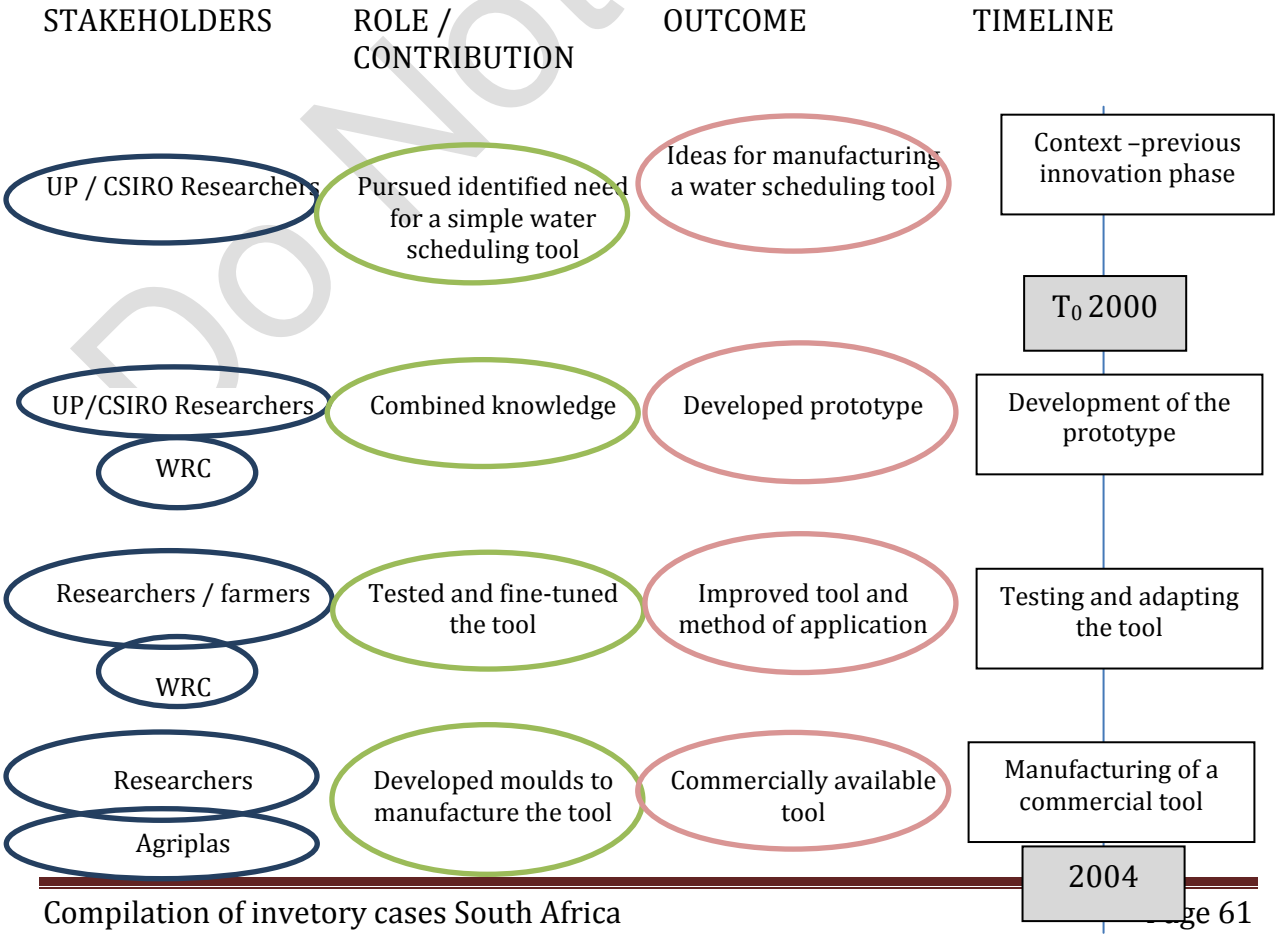
Commercial and smallholder farmers that were involved in other initiatives of the UP and CSIRO researchers became involved in testing the tool and in adapting the way in which they had been instructed to use it. They were also involved in an impact study that sought to understand how useful it was found to be by farmers.

The **Water Research Commission**, while not directly involved in the innovation process, played a key role in making funds available to support the development of the tool.

A **private company** called Agriplas (the private sector) manufactured the tool once it had been tested as they had the facilities to fabricate the moulds to make the plastic parts of the WFDs.

History / dynamics of the innovation process

Figure 1: Summary of the innovation process



This innovation process involved the development of a technical innovation mainly related to agricultural production. It does have implications for improving the management of natural resources (soil and ground water) and the process of developing it was itself innovative because it involved a number of different stakeholders including farmers and the private sector. The innovation process started with research knowledge, and then farmers (with their local knowledge) were involved with the fine-tuning and application of the technology. Later on, the private sector was involved in the manufacturing of the technology in SA.

The multi-stakeholder process of developing a prototype and then fine-tuning it with input from farmers was largely a planned process that took place between 2000 and 2004. It was led by researchers, but involved mixed sources of knowledge (farmers' local knowledge as well as scientific knowledge) and individual farmers were seen as co-leaders in the process together with formal research. Community based farmers' organisations, extension staff and the private sector were also active participants. It can be seen as a mature innovation, having now reached the stage of commercialisation.

One can describe the innovation process as follows:

Context: The researchers from CSIRO and UP had previously been involved in the development and understanding of irrigation scheduling. Through their prior activities and programmes they identified the need to develop an appropriate irrigation scheduling tool that met the requirement of ensuring more efficient use of water while not being overly complex.

Development of the prototype: The researchers used scientific knowledge, their own skills and available materials to develop a prototype to test during the exploratory phase.

Testing and adapting the tool: According to the developers, through the process of testing the prototype with various farmers (selected farmers were provided with the tool and a set of instructions), the instructions were altered, particularly with respect to optimum placement depth under sprinkler, short furrow and centre pivot irrigation. In addition, a new design was evaluated for furrow irrigation. The developers also recognised the value of local knowledge saying, "Scientists, in their haste to provide the solution, often fail to identify and build on the tacit knowledge of practitioners and, therefore, fail to expend the effort to harness this knowledge. Ideally [as was the case in this situation] there needs to be a bidirectional flow of knowledge, with all parties learning from each other (Stirzaker et al., 2010)".

Manufacturing of the tool: Once the prototype had been developed and tested, the researchers approached a private company with the necessary facilities (moulds) to allow it to produce the various parts of the tool. This allowed for manufacture of the wetting front detector that could be tested at a wider scale. Once the design had been finalised, the company proceeded to manufacture and export the tool. The uptake of the tool has been by commercial rather than smallholder farmers despite the latter being the original target of the researchers.

Results & effects of the innovation process so far (adoption)

The tool developed through this innovation process is seen mainly as successful. According to a book written by one of the researchers, Richard Stirzaker (2010a), the researchers had originally aimed to reach small-scale farmers with their technology but, it was the large-scale end of the market that actually picked up the new device (they saw the benefits of using water more efficiently as they recognised that their previous practices were potentially wasteful and saw this as a way of reducing their operating costs), though a limited number of smallholder farmers have also made use of it. This limited uptake might reflect the lack of resources available to smallholder farmers to invest in such equipment, or could be because there is insufficient recognition of the need to irrigate more efficiently because many do not have to pay for water based on actual volumes used.

When the tool was being tested with farmers and its application was being fine-tuned, the following feedback was obtained from farmers through an impact and adoption study. While most participants saw no risk of adapting their scheduling according to the feedback from the tool, 15% saw this as risky. The commercial farmers perceived the main risk being their cutting back on irrigation when the WFD suggested they applied too much water. Conversely, small-scale farmers perceived a greater risk would result if they had to apply more water (According to feedback from the tool), particularly those facing high pumping costs.

For the farmers that have integrated the tool into their management programmes, there has been more efficient use of irrigation water and reduced loss of soil nutrients through:

- Ability of the WFD to provide a soil solution sample is being used increasingly for salt and nitrate monitoring. The use of electrical conductivity of the WFD sample helped to adjust the crop factor used in the management program.
- One of the unexpected consequences of using a WFD is that it encourages an evaluation of system performance. Irrigators puzzled by the non-response of the detector have subsequently found out that drippers were blocked, or pressures were lower than expected, or sprinklers were far from uniform
- WFDs have repeatedly warned irrigators about their tendency to over-irrigate during the early part of the season and under-irrigate during the exponential growth phase

The economic impact has not been measured although it is an obvious benefit of the using the tool. The innovation process also had a positive impact on the way that researchers perceive farmers as partners in the research process rather than simply as recipients of technology.

The results from the phase of testing the prototype with various farmers contributed towards the commercialisation of the WFD by a South African company (Agriplas). In the first year after commercial release, over 4500 units were sold within South Africa. The WFD is made in SA and exported to different countries worldwide. In 2003 already 10 000 units had been sold since the launching of the project, of which 90% were sold in South Africa.

An interactive website with Frequent Questions to be answered as well as a step by step guide on CD how to assemble and use the WFD was developed. The interactive CD was effectively used in the training and apprehending of certain concepts amongst small scale irrigation farmers, where illiteracy and language barriers often

impact on training. The interactive website was mainly used by commercial farmers and advisors from the irrigation industry.

Main lessons in light of the JOLISAA goals and questions

This innovation process has led to a number of important lessons:

- Multi-stakeholder processes that allow key stakeholders, in this case farmers and researchers to combine their knowledge and experience are more effective mechanisms for developing technologies.
- The involvement of the private sector allows for commercialisation of research outputs. In this case the private sector brought their specific skills and expertise to the innovation process.
- The innovation process gave smallholder farmers space to have effective input in the fine tuning of the tool.

Figure 3: Small scale irrigation farmers attending training session.

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Case 46: Maize seed production innovation system in the Vhembe district (Limpopo Province)

Identification:

Case number: 46

Short Title: Maize seed production innovation system

Authors' list and affiliation: Ms Hlamalani Ngwenya[1]

[1] She was part of the implementation team in terms of concept development, Facilitation/training and backstopping support. Moreover, she followed this case with a scientific research towards her PhD.

The story line in a nutshell

This is a complex dynamic process of developing a maize seed production system involving more than 10 different categories of stakeholders, with the smallholder farmers at the centre. The main aim was to build the capacity of farmers to self-organize for experimentation, social learning, increasing their bargaining power, creating strong linkages and access to formal markets. It also involved including as many farmers as possible in the process.

Innovation context

This innovation process took place in the context of a bilateral program of the Limpopo province Department of Agriculture (LDA) in South Africa and GTZ. The program called BASED (Broadening Agricultural Service and Extension Delivery) was set up as a change process and used a participatory extension approach (PEA) to reform the extension service delivery system. Among other focal areas of BASED was the development of innovation system. The seed system was one of the four major innovation systems that were developed in the province.

Before this innovation process, the farmers used the local maize variety which was, according to them, giving them low yields. Only the small number of farmer who belonged to projects received extension support from the local extension officers, leaving the majority of farmers marginalized. Some of farmers in the projects had access to improved varieties through their extension officers.

The general relationship between the extension officers and the farmers in the project was hierarchical, with not recognition of farmers' own knowledge in farming activities. The officers always recommended monocropping and the use of fertilizers to the farmers, strongly discouraging the use of manure and intercropping practices.

The extension officers in the different villages did not work together at all and they regarded each other as competitors. The farmers in the villages had no other formal contact with other stakeholders, including researchers.

Description

Initial practice / situation, problem or opportunity being addressed, and related triggers

This innovation process was implemented in response to the farmers' expressed challenge of low maize yield. With the PEA principles of self-reliance of farmers, and learning through experimentation; instead of making recommendations to farmers, they were engaged in the process of trying out different options. The success of the

trials triggered the need to get the seed certified, and then market opportunities emerged too.

This was a well thought through, complex process. It was planned and managed in an action-learning mode to allow for continuous monitoring, flexibility and adaptation; and further development of the approach.

Description of the innovations

This case reflects a mix of innovations that were implemented as separate but interwoven processes. These are 1) Technology innovation: farmer-implemented and farmer-managed trails for testing of open pollinated varieties of maize and seed multiplication while supported by extensionists, researchers and other stakeholders; 2) Organizational innovation: Self-organizational capacities of farmers to gain the critical mass and increase their bargaining power; 3) Market innovation: organized farmers breaking the market barriers through producing high volumes and good quality certified seeds; 4) Institutional innovation: Creating an innovation platform that brings together the various service providers to work together, harmonized their approaches and created institutional arrangement that support the farmers in this process; 5) Social innovation: enhancing knowledge sharing and social learning at all levels.

Main stakeholders involved and their roles in the innovation process

a) **Table1: stakeholders involved in the innovation process and the enabling environment**

Stakeholders	Their Role	Contribution made	Stage of contribution
Key stakeholders in the innovation process			
The BASED team	Overall coordinators	• Training expertise • Facilitation skills • Coordination knowledge and skills • Financial contribution	Throughout the process in 1998
Local extension officers	Training of farmers	• Skills in farmer experimentation • Facilitation	Throughout the process in 1998
Farmers	Key experimenters	• Knowledge and labour • Mobilizing resources (including financial)	Throughout the process in 1998
SADC-SSSP	Training of extension officers in participatory seed systems development	• Technical Training • Technical backstopping and M&E expertise	Got involved in 2001
National, and international research institutions (ARC, CIMMYT and ICRISAT)	Researchers	• Research expertise and training	These research institutions got involved in the second season (2002).
Key stakeholders in the enabling environment			
Provincial and National Departments of Agriculture	Provider of enabling environment	• *Policy knowledge*: Provided an institutional framework that supported the process through creating an enabling environment	
Institutions of higher learning-	Hosting the trials	• Labour, resources, skills - Through the support of CIMMYT,	In 2002

Local colleges and universities		ICRISAT and ARC, they established and monitored the Mother trials	
South African national Seed Organization (SANSOR)	Certification of maize seed varieties	• Assisted with the certification of the seed	In 2002
National Farmer organization	Participated in the innovation platform	• Knowledge and experience	In 2002
Private sector			
NGO			

The BASED team provided training of extension officers on participatory extension approach and facilitated the establishment of an innovation platform. They also coordinated various stakeholders in the platform, and providing follow-up and overall monitoring and evaluation of the process.

The local extension officers provided training to farmers on how to establish farmer-implemented, farmer managed (FIFM) experiments, and how to monitor and evaluate them, and later supported the farmers to conduct the satellite trials. They also served as an interface between the different service providers and the farmers.

In the first season, t**he smallholder farmers** conducted the FIFM trials to test different varieties of maize. The following season, they continued to conduct, monitor and evaluate the trials (the baby trials) to test more varieties of maize. They also played a key role in the selection of the best cultivar and in the process of getting it certified. They engaged in seed multiplication and also became organized to establish the seed unit.

The **small-scale seed production for self-help project** (SADC-SSSP) provided the initial technical training of extension officers in small-scale seed production and FIFM trails, during the first season (2001). They also provided technical backstopping of the extension officers and continuous monitoring and evaluation of the process

National and international research institutions (ARC, CIMMYT and ICRISAT) provided a strong basis for the innovation process having introduced concepts such as Mother and baby trials, to allow further testing of additional varieties. They provided training to the local extension officers and were also involved in conducting research to test the nutritive value of the best varieties that were selected by the farmers. They worked with institutions of higher learning (local colleges of agriculture as well as universities) that hosted the Mother trials.

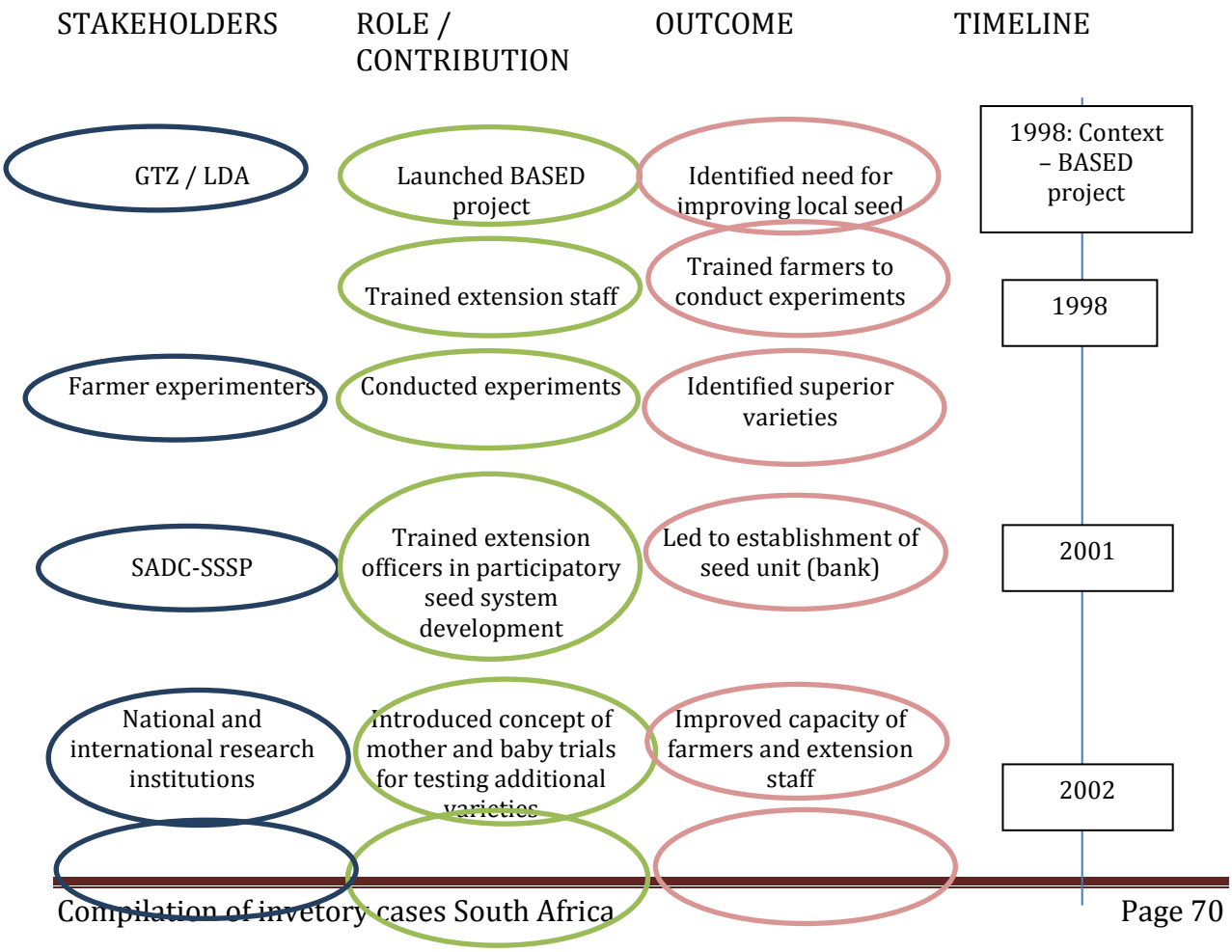
An innovation platform was established that allowed for sharing of knowledge and experiences. The national farmer organisation, private sector players and NGOs were represented on the platform.

History / dynamics of the innovation process

A number of key activities were conducted simultaneously at different levels involving different actors:

- At extension level: As a starting point, the local extension officers underwent an intensive competence development process that addressed both social and technical capacities required to support the farmers in the seed development process. The officers also serviced as an interface between the different services providers and the farmers.
- At farmer level: The farmers in the different villages engaged in FIFM experimentation as a process of testing different OPV of maize. With support from the local extension officers, the farmers designed experiments, monitored them and were directly involved in the evaluation of the crops. Experimenting farmers sharing their findings with the rest of the farming community. The community jointly selected the best performing varieties based on their own criteria. Farmers got organized to establish a seed grower association and a seed unit, which was a seed bank for quality control, seed certification and marketing
- At service delivery level: An innovation platform was established that brought together the different stakeholders to support this process through different expertise.
- At all levels: Systematic knowledge management, M & E and social learning events.

Figure 1: Summary of the innovation process



SANSOR	Assisted with certification	Seed certified

Results & effects of the innovation process so far (adoption)

The innovation was considered as a success, with tangible impact at various levels:

- At farmer level
    - Enhanced the local organizational capacity of the farmers both at community level (formation of interest groups) and across the communities through seed growers' associations)
    - Enhanced the experimentation capacity of farmers and entrepreneurial spirit
    - Led to the certification of the seed, increased production of maize and income generation by farmers
    - Farmers established the seed unit, which is regulated nationally.
    - Farmers breaking the market barrier through producing good quality certified seed, and through bulking
    - The inclusiveness of the process, with no exclusion based on gender or socio-economic status
    - Leadership development, and enhanced conflict management and negotiation skills of the farmers. For example in the open irrigation schemes, the seed growers had to negotiate about the planting time with the non-seed growers in order to avoid cross pollination.
    - Women leaders emerged. For example, the chairperson of the seed growers association was a woman, and she received awards for her management skills.
    - Recognition of farmers in the SADC region, and receiving awards for best organized and effective small-scale seed production system in the region.
    - Putting the participating villages on the map, as different people from South Africa and abroad could come and learn from these experiences. Some farmers calling their village a university.
    - Farmer to farmer sharing and dissemination mechanism
    - Strong linkages of farmers with different service providers
- Personal development and capacity building of local extension officers
    - Personal development of extension officers to move from top-down approaches to community-based, farmer-first approaches of working with farmers
    - Extension officers gained technical skills in seed production
    - Extension officers gained facilitation skill to mobilize farmers for self-organization
    - The officers from different villages began to work together rather than as competitors
    - Five officers in the province were trained as qualified seed inspectors
- Institutional change

- A coordinated service delivery mechanism that is responsive to farmers need
- Harmonization of approaches by international and national research institutions
- The LDA created an institutional arrangement that support the process - taking over to fund part of the competence development of the extension officers in order to support the farmers in many villages.
- Scaling up of the process.

Main lessons in light of the JOLISAA goals and questions

Some of the lessons that emerged from this case are summarised below:

- Projects have the potential to initiate innovation processes that can solve smallholder's challenges.
- Innovation systems often require the involvement of a range of different stakeholders that each contributes complementary skills and knowledge.
- Technical innovations are often associated with social / organisational innovation processes that allow for the technical aspects to be more effective. The different types of innovations often do not occur simultaneously but build on each other.
- Building farmers' capacity to conduct sound experiments is a sustainable approach to overcoming smallholders' challenges.
- Formal research can play a key role in multi-stakeholder innovation processes if they have the necessary skills – in particular the ability to make use of truly participatory approaches that recognise farmers' own knowledge.

Key references

The lessons from this process have been thoroughly documented and also published in different forms:

- Scientific papers and publications
- Formal scientific publications
- A PhD thesis on this learning process (this case included) is underway (By Ms Ngwenya)
- Papers presented at international conferences.

Most of the publications about the BASED program and this case embedded in it readily accessible from www.Picoteam.org. Documents can be readily accessible.

Case 47: From unemployment to a viable Egg-layer production cooperative in Mahonisi Village - Limpopo Province

Identification:

Case number: 47

Short-title: The evolution of a viable egg-layer production cooperative

Mr Khosa[1], Ms Betty Marhanele[2], Hlamalani Ngwenya[3]

[1] The managing director of SASEKISA Cooperative

[2] Limpopo Department of Agriculture (the then local extension officer in the village)

[3] University of Pretoria

The story line in a nutshell

This case documents a self-initiated innovation process that turned a group of 12 unemployed youth into a viable cooperative. With an attempt to deal with their unemployment status, the group linked up with the local extension officer for support. They started as a small egg production project, supplying local markets; and evolved into a viable multi-enterprise cooperative supplying four big supermarkets in a radius of 80km.

Innovation context

Mahonisi is one of the villages in Thulamela District in Limpopo Province. The village is in a remote area with poor infrastructure and degraded natural resources. Although farming is an important activity in the village, the people only produce at subsistence level. They have limited if any access to either input or output markets. The only external contact they had was the local extension officer, who only worked with a small number of farmers in what was called an extension project. Thus, leaving the majority of people marginalized. The majority of the people in the village were generally not interested in farming as they regarded it as an activity to keep the elderly people busy, with no opportunity for generating income.

The local extension officer, Betty Marhanele, had been part of the BASED (Broadening Agricultural Service through Delivery) training programme that was initiated in 1998. One of the aspects of BASED was to train extension officers in participatory approaches to extension and facilitation skills, while simultaneously building local organizational capacities of farmers to deal effectively with challenges they face.

The Government of South Africa through the Department of Trade and Industry promotes cooperatives as a way of creating jobs for the local people. The approach is to encourage people to establish cooperatives, and then give then give them the necessary technical and financial support. In 2004 the Department of Agriculture initiated a Food Security Programme with an aim of combating poverty. The approach of the department was to give the community food parcels, as well as batches of live chickens, to a small group of people in the communities. The group took advantage of this enabling environment, and ventured into an egg-layer production project.

Description

Initial practice / situation, problem or opportunity being addressed, and related triggers

The people of Mahonisi saw government programmes supporting cooperatives as an opportunity to form a cooperative for broiler production. Realizing their technical gap in agricultural related issues, Group A, a group of 12 youths (aged 18 to 32), approached the local extension officer for assistance.

There are a number of triggers that can be traced: firstly, the Government's pro-poor policy and social responsibility initiatives to address the high levels of poverty. Secondly, the local extension officer created an opportunity through training and linkages. Thirdly, seeing an opportunity to address the high levels of unemployment also became a trigger. Lastly, there was a market opportunity for eggs and chicken, for the local market and large retailers.

Description of the innovations

The innovation process includes organizational, institutional, technical and marketing aspects. This was a self-initiated process (by the youth) and later supported by the extension officer. It was initially planned to be a small egg-layer project. However, the process unfolded as need and opportunities emerged and it evolved into unplanned multiple enterprise business. In every phase of the innovation, there were different stakeholders involved who contributed their skills and knowledge, while some provided an enabling environment that helped towards the success of this initiative. Overall, the innovation process is seen as an effective business model and has reached a mature stage as a functioning cooperative, with full time employees and supplies products to both formal and informal markets.

Main stakeholders involved and their roles in the innovation process

a) Table1: stakeholders involved in the innovation process and the enabling environment

Stakeholder	Role played	Contribution(s) made	Phase in innovation process
Key stakeholders in the innovation process			
Cooperative members	Initiating and managing the cooperative	• Ideas and skills • Land • Labour	From 2003 to date
Local extension officer (Betty Marhanele)	Technical expertise, facilitation and community mobilization	• Knowledge of local organization aspects and facilitation skills • Technical skills • Knowledge of and linkages with different service providers	From 2004 to date
Key stakeholders in the enabling environment			
Local extension officer (Frederick Mukatshela)	Technical support	• Technical advice	From 2008 to date
Other technicians within the Department of Agriculture	Animal production and animal health expertise	• Technical expertise and support to the project	From 2004 to date
The local chief	Local authority	• Allocation of land for the cooperative (20 ha) • Dispute resolution within the cooperative	Throughout the project
Private sector	Input suppliers	• Market - Branco has a contract to supply the cooperative with chicken feeds	After production
	Pick 'n Pay - Thohoyandou	• Market - Special contractual agreement, where the cooperative give credit to the Supermarkets	From 2008 to date
	Pick 'n Pay - Malamulele		From 2010 to date

	Pick 'n Pay - Giyani	over a 7 day period	From 2011 to date
	Friendly Supermarket- Giyani		From 2011 to date
Local colleges of agricultures	Technical support	• Technical training about agricultural related issues	From 2005
Local community structures	Provision of basic services	• Provided information about security, and also provide security itself • Provide information about how the youth could get access to electricity	From 2006 Throughout the project
Department of Agriculture	Creating an enabling environment for business through provision of relevant resources (Financial, knowledge, technical etc)	• Provided the initial stock, feed and equipment	Each actor came at a different stage of the innovation process, Either as a response to specific needs or creating an opportunity for the youth
LIBSA (Limpopo Business Support Agency)		• Knowledge and training in cooperative development • Business support to product competitive products • Financial input for building poultry houses	
Department of Labour		• Provided training in computer literacy	

The table above (Table 1) provides a summary of the stakeholders that were both involved directly in the innovation process and which played a part in creating an enabling environment.

The **members of the cooperative** initiated the process and had the ideas and skills to self-organize and register a cooperative. They also secured land for the production of initial stock production and have provided labour and skills for the production aspects and for constructing buildings and infrastructure. They were active in resource mobilization, negotiation, market analysis and product marketing. The members were also responsible for doing the enterprise management and book-keeping.

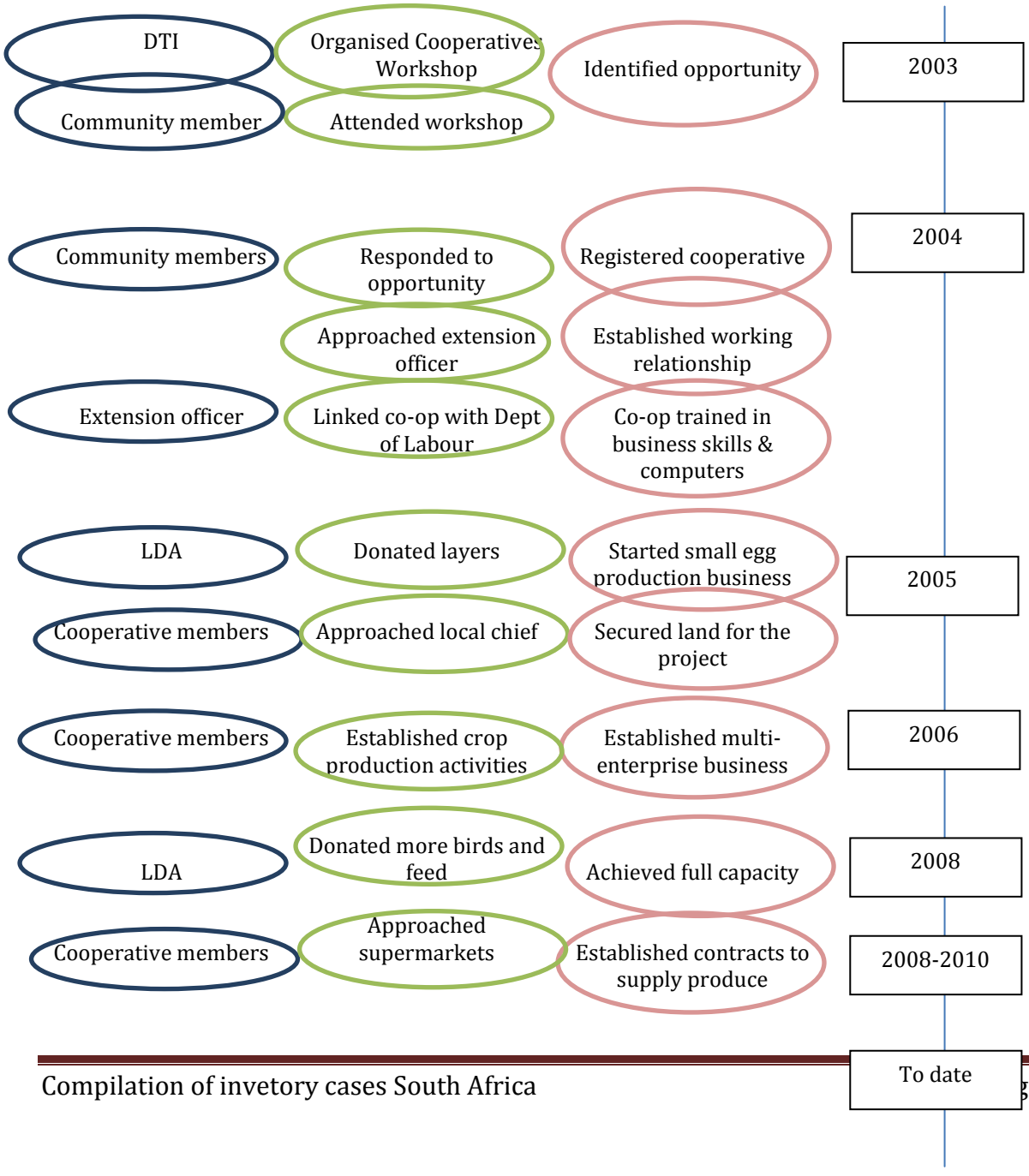
The other key person in this innovation process was the **local extension officer**. Her knowledge and skills related to understanding the local institutional environment, understanding what support different service providers could provide, her technical

skills related to agricultural production and her facilitation skills that enabled her to make linkages with other stakeholders all contributed effectively to the innovation process. She was also key in resource mobilization.

The **other technicians from the Department of Agriculture as well as staff from the colleges of agriculture**, with their technical support, together with **the local authority** and the **private sector players**, who provided a market for the cooperative's produce all created an environment that allowed the business to grow and flourish. The **local community structures** such as the community policing forum and the electricity and water committees all ensured access to basic services needed by the business.

History / dynamics of the innovation process (1 p.)

Figure 1: Summary of the innovation process



The start of the innovation process was in 2003 when there was a **workshop on cooperatives** organized and conducted by the Department of Trade and Industry in Malamulele (a township about 30 KM away from Mahonisi village). Mr Khosa, a cooperative member, attended the workshop. With the information gained, he organized his friends to form a group for broiler production. At first there were 12 members (aged 18 to 34), but later only 9 remained. They **registered as a cooperative** in 2004.

Realizing their lack of knowledge on chicken production and other agricultural related issues, the group **approached the local extension officer** for assistance. She trained them on local organization issues, and linked them with the Department of Agriculture's Food security program. She also linked them with other service providers for technical skills development.

While the group was still waiting to receive the first batch of chicks (from the Department of Agriculture), the officer linked them with the Department of Labour for **training in computer literacy and some basic business skills**.

In 2005, the group received a **donation of 16 layers**, 20 bags of chicken and dripping material from the Department of agriculture (as coordinated by the local extension officer). One of the cooperative members provided space in his house and back yard, which they used for the production. The extension officer brought in the animal production and animal health technicians to help train the group on-site and to support them with vaccinations and other animal health-related issues. The technicians got involved throughout the process as the need arose. Furthermore the extension officer sent some group members to the local college of agriculture to take advantage of the short courses that were conducted there.

By end of 2005, the group with the support of the extension officer **approached the local chief** to present what they were doing, and negotiate for a piece of land. Three mains things are said to have prompted the Chief to give the group a piece of land: 1) they were a registered cooperative with a certificate; 2) they were producing and supplying to the local market, as well as neighbouring villages and 3) they were working with the Department of Agriculture.

By 2006, after 12 months of egg production, the group **started selling the spent hens locally**, and used the money to buy another batch.

In terms of accessing inputs, the cooperative **established a contract with BRAMCO** for feed supply. The group negotiated for reduced price as they bought in bulk. The service has continued since then until today.

Mr Khosa (with the support of the extension officer), **approached LIBSA for funding**. They received funds, which they used to erect the fencing of the 20ha, construction of the poultry houses and a storage house, equipment, borehole, 2 water tanks and a power supply.

Alongside the egg layer production, the group **initiated crop production activities**. They started experimenting with different cash crops such as tomatoes, chinese spinach and onions. The initial idea to diversify came from the local extension officers, however the group decided which crops to try out, as informed by the local market. The cash crop production was linked to the egg-layer innovation process in the sense that they used the chicken manure to grow the cash crops.

In 2008 **LDA made yet another donation** to the cooperative. This time it was a bigger quantity of chicks and feed. Until this time, the group had not managed to fill the poultry houses. This donation helped to boost the momentum of the cooperative, and they began to produce in bulk.

The cooperative **established a contract with Pick 'n Pay** (the Thohoyandou branch), which is about 75km North of the village.

In order to stay informed about the latest developments in poultry production, the cooperative has **become part of the Local Poultry Association** and they meet occasionally with other commercial farmers to share knowledge.

The local extension officer (Betty Marhanela) got a promotion and she was replaced by Mr Frederick Mukhatshela. He continued to support the cooperative.

In 2009, the cooperative **signed a contract with Friendly Supermarket** in Giyani. The Cooperative also established a contract with **Pick 'n Pay – Giyani branch** (about 75km South of village).

By 2006, the cooperative achieved a **fully-fledged crop production business**. They started producing good quality and bulk, and they supply the formal market (Pick 'n Pay).

In 2011, the cooperative **signed a contract with Pick 'n Pay - Malamulele**: (about 25km north of the village).

To date, the Cooperative has reached a mature stage, and operates as a viable business. It employs 23 permanent staff members who receive monthly salaries.

Results & effects of the innovation process so far (adoption)

Some of the outcomes of the innovation process include:

- Capacity development in agriculture: In the beginning, the group did not have any interest in agriculture, but now they have developed the skills and also generate income for themselves. The youth have changed their perception about business opportunities in agriculture.
- Establishment of the cooperative: The youth have managed to establish a cooperative, which is registered according to the SA Cooperative Act, and they have established structure, including two poultry house that each hold 12,000 chickens, and a storage place for keeping inputs.
- Creation of employment and income generation: The cooperative employs 23 people from the community who receive monthly salaries, thus generating income. This is in addition to the 9 members.
- Formal Market access: Through their local organizational capacity and producing in bulk and good quality, the Cooperative was able to establish formal market arrangements (Supplying an average of 300 fresh eggs every week; sale of eggs and chicken in informal markets such as local and neighbouring villages; Sale of produce at different events that they target).
- Coordinated service provision: The different actors were coordinated by the extension officer to provide their services in support of the cooperative. This was achieved by identifying the gaps in the innovation process, and then bringing in relevant service providers that could fill the gap.

- Sharing knowledge: The Cooperative members share their knowledge through the poultry association. Moreover, many people come to the cooperative for learning purposes.
- Recognition as commercial farmers: This helped put the village on the map.
- The benefits and impacts of the innovation process have been mainly related to the initial innovators (the youth and the extension officer), although other stakeholders have also seen some less tangible benefits (including the local community, since they have gained employment opportunities). The other stakeholders, especially the government departments involved, have learnt from the process about how to establish successful enterprises.

Main lessons in light of the JOLISAA goals and questions

Some of the lessons that emerge from this case are summarised below:

- The role of coordination played by the extension officer appears to be important, bringing the different actors at the necessary point in the innovation process.
- Establishment of a cooperative of this nature requires different technical capacities, which are often not possessed by one person or found from one institution. For example, it is clear that the extension officer alone could not have managed to support the group in all the technical skills required, hence she brought in different actors to fill the gap. The ability to identify actors who have relevant capacities is important. However, the ability to coordinate their service provision (bringing in the right people at the right time) and ensure their delivery is even more crucial.
- Development of cooperatives requires a strong level of socio-organizational capacity. The group had an idea to self-organize and register as cooperative. However, this alone is not enough to make a group functional. The training of the local extension in facilitation skills, participatory approaches and local organizational capacity added value in strengthening the local organizational capacity of the group.
- Linked to the socio-organizational aspect, it the ability of the cooperative to produce large volumes of good quality produce in order to satisfy the rules of the formal market game.

Key references

- This case has not been documented, but the local extension officer is interested to share information. She is readily available. (Contact number Betty Marhanele, +27 833384655 or Hlekulani@gmail.com)
- The initial local extension officer (Betty Marhanele) intends to do scientific research on this case (as part of furthering her studies towards her Masters). This is in line with the current movement of LDA to encourage its employees to obtain qualifications.
- The Cooperative members are also willing to share their experience. Contact SASEKISANI Cooperative Mr Joseph Khosa (Manager) 0836821461.

Case 48: Enhancing farmers' organizational capacities and experimentation for managing soil fertility

Identification:

Case 48 – South Africa
Soil fertility experimentation in Limpopo
Hlamalani Ngwenya[1], Mr Michael Netshivhodza[2]

[1] University of Pretoria and member of PICOTEAM

[2] Madzivhandila college of Agriculture

The story line in a nutshell

This innovation is about a process of increasing farmers' adaptive capacity to manage natural resource by combining local and external knowledge in soil fertility management. While simultaneously strengthening their organizational capacity to increases their bargaining power and bulking buying of input, thus benefiting from the economy of scale. This is involved different stakeholders contributing their knowledge while the smallholder farmers remained at the center. The case also highlights the catalytic role of facilitation in mobilizing farmers as well as managing the participation of the different stakeholders in the different stages of the innovation process.

N.B. *This case is one of the three that are selected for the in-depth analysis during the CCA. There more gaps that arise in this short case will be filled in the process. This is to give an overview of the case, and also raise questions for further analysis.*

Innovation context

There is enough evidence that points Limpopo Province is stricken by high level of degradation of natural resources and decline in soil fertility. The extension officer worked with a small group of farmers in the projects, leaving the majority of farmers marginalized. In the projects, the officer always recommended the use of fertilizers as a way of addressing the problem of declining soil fertility. Due the high cost of fertilizers, only a few farmers could afford, and that became a source of exclusion for the resource poor farmers. Moreover, the extension officer prohibited the farmers in the project from the use of manure and other indigenous methods, as that was labeled as primitive. In the projects, the extension officer often made demonstrations, and farmer were expected to follow instructions precisely, with no room for them to contribute their own knowledge. The dominant crops produced by the farmers were maize and groundnuts. There was also a clear divide between the farmers in the projects and the others, and no farmer sharing took place. The youth were not interested in farming activities as they regarded it as a means of keeping the elderly busy, with no potential for economic gain.

In 1998 the Limpopo Department of Agriculture in partnership with GTZ established the BASED program (Broadening Agricultural Service and Extension Delivery) with an aim of reforming the extension service delivery in the province BASED adopted a Participatory Extension Approach (PEA) that was initially developed with success in Zimbabwe, and adapted to suit the South African context. PEA is an action learning approach that emphasizes (among other things) of developing facilitation capacities of extension officers to manage systemic change, while they simultaneously develop a community based approach that is more inclusive; strengthening the local

organizational capacities of farmers, promoting farmer experimentation and conservation of natural resources.

Among other focal areas of BASED was the development of innovation system. The soil fertility management (SFM) was one of the four major innovation systems that were developed on large scale in the province. The PEA process with SFM embedded in it started small in 1998 with 6 pilot villages in two districts of the Vhembe and Capricorn (1st generation). In 2001 the implementation went on a larger scale involving more extension officers and more villages in the initial districts (2nd generation). In 2003 more extension officers and villages got involved (3rd generation) covering all the districts in the province.

While the initial facilitation input/ process of the SFM was similar to all the villages, it was not implemented as blue print but gave room for adaptation as informed by the dynamics and the needs of the different villages. As a result, the outcomes of this process is different from one village to another, with some villages leaning more to enhancing their experimenting capacities while others explore more the bulk access to inputs.

This case documents the overall SFM process as it started at provincial level, but also uses two villages (of the 2nd generation) in the Vhembe district to showcase the dynamics on this innovation at village level. Experience from other 1st generation is well documented, and it will used when necessary.

Description

Initial practice / situation, problem or opportunity being addressed, and related triggers

Like in many other villages in the Limpopo province, Mphaila village expressed the challenge low maize yield, and they attributed that to lack of fertilizers. With a facilitated process of analyzing the problem of low maize yield, a number of other technical issues (such as Soil fertility Management) emerged to be of equal importance.

The biggest trigger here was the training of Extension officer in participatory approaches and facilitation skill. With his skills gained, he move away from prescribing solutions to the farmers, and also challenged the farmers to go beyond their usual needs of 'more fertilizers'. Through the use of the 'problem tree tool', followed by asking questions and probing the farmers were able to link their problem of low maize yield to the decline of the soil fertility. This created an opportunity for the farmers to self-organize, mobilize their own resources and together with the extension officers engage in a joint learning to try alternative ways of managing soil fertility and increase their capacity to manage natural resources. This in turn became a trigger for the farmers to diversify their crop production, and entice the youth's interest into agriculture.

Description of the innovations

This case reflects a mix innovations that were implement as separated but interwoven processes. These are 1) Technology innovation (farmer experimenting with different soil fertility management techniques; while supported by extensionists, researchers and other stakeholders). 2) Organizational innovation (Self-organizational capacities of farmers to mobilize own resources, and gain the critical mass to bargain for services). 3) Market innovation (organized farmers create access to input and output markets and benefit from the economy of scale)

Social innovation (enhancing knowledge sharing and social learning at all levels). All these innovations did not happen spontaneously, but were well thought through facilitated action learning process.

Main stakeholders involved and their roles in the innovation process

a) **Table1: stakeholders involved in the innovation process and the enabling environment**

Stakeholders	Their Role	Contribution made	Stage of contribution
Key stakeholders in the innovation process			
The BASED team	Overall trainers	• Training expertise in participatory approaches and facilitation skills • Technical training in SFM • Design of SFM training tools suitable for smallholder farmers • Mentoring and coaching	Since 1998 and through out the process
	Coordinators	• Coordination of activities and project management • Facilitate Monitoring & Evaluation • Contribute financial input (for training of extension officers)	
Extension officers (1st and 2nd generations)	Training of farmers and coordinators	• Facilitation skills Mobilize farmers to self organize into SFM interest group • Technical expertise and training in soil fertility issues and experimentation • Provide backstopping	Since 2001, and throughout the process

Stakeholders	Their Role	Contribution made	Stage of contribution
		support to farmers • Link farmers with the different service providers	
Farmers experimenters	Key implementers	• Financial resources for inputs for experimentation • Land and human resources for experimentation • Organized mid-season evaluation to share their observation with the community • Skills - taught other farmers on how to experiment	At the beginning of the experimentation process
Farmers (SFM interest group), including youth farmers	Adoption of SFM technologies from experimenters	• Experience: Modified the experiments, and tried out different combination Self organize	
Key stakeholders in the enabling environment			
SFM farmers in other villages	Exchange of information and bulk buying	• They joined hands with them to increase their bargaining power for bulk buying of input	
Livestock farmers within and other neighbouring villages	Supplier of manure	• Manure (chicken and kraal) at negotiated cost (financially or exchange of crops)	
Umbrella Organization (Some members of the SFM	Coordinator of activities in the community	• Linkages - the SFM group and other interest groups • Facilitation - Organize sharing	

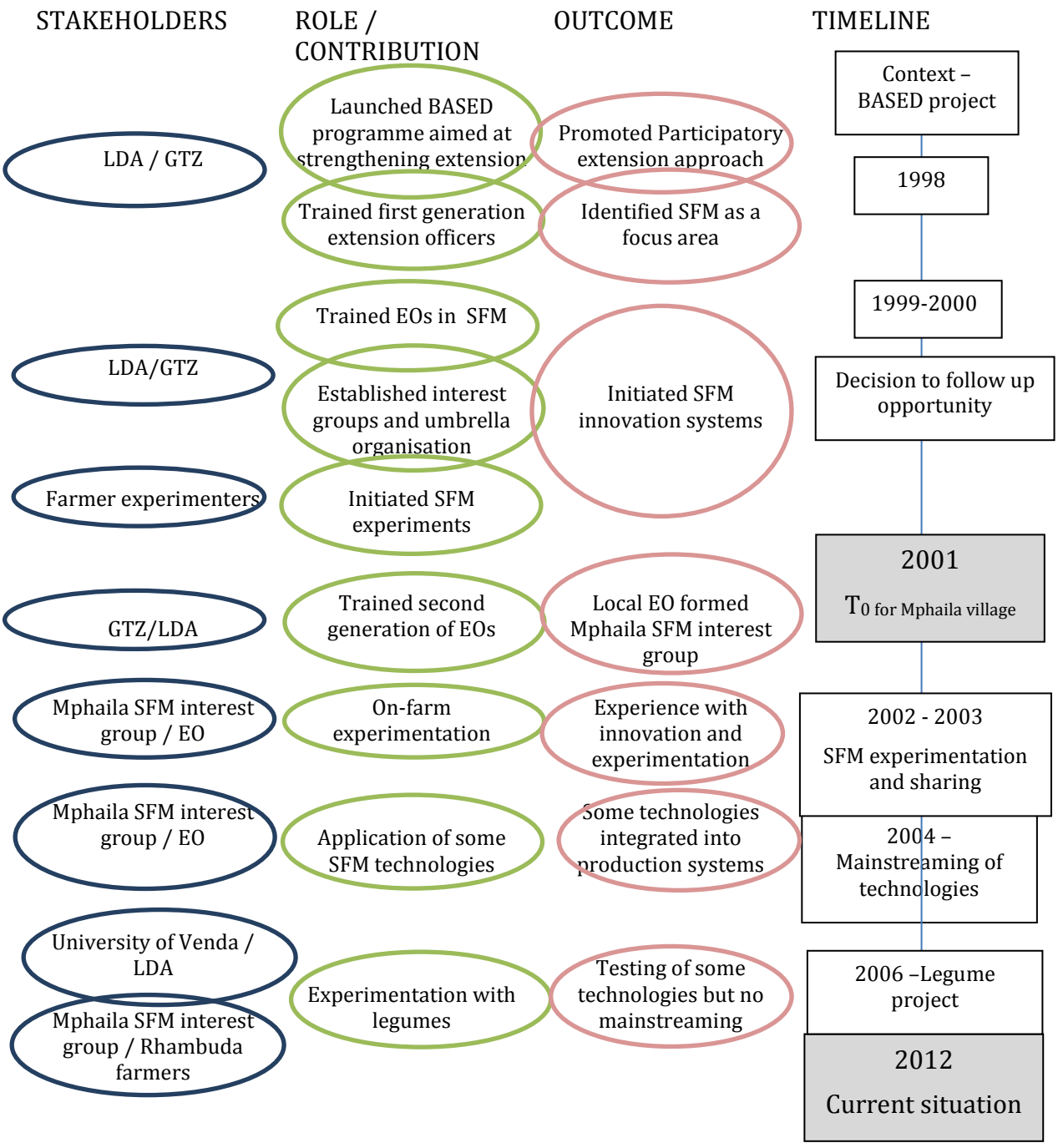
Stakeholders	Their Role	Contribution made	Stage of contribution
interest group are part of the UO)		activities across the interest group • Negotiation skills - for better prices with the different service providers • Conflict resolution	
Local college of agriculture	Training	• SFM expertise	
Local university	Technical expertise	• Soil science technical expertise	At various stages of the innovation process
Agricultural Research Institute	Testing of soil sample	• Providing information about the status of the soil in the village	When establishing experiments and monitoring them
Private sector	Fertilizer companies (NTK)	• Provide different inputs to farmers	At the beginning of the innovation process, and through out
	Access lime (Roedtan)	• Provide lime in bulk	

The table above (Table 1) shows the key stakeholders involved in the SFM case in Limpopo. The BASED team became the driver of this process. This team was multi-stakeholder and multi-disciplinary in nature. This team comprised of independent consultants with different backgrounds (Soil scientist, extensionists, and hydrologist), GTZ technical advisor, Limpopo department of agriculture management and some extension officers. While the BASED drivers, the different actors within the team contributed differently towards the overall coordination.

The innovation process itself evolved in different stages and different actors were the sources of knowledge. When describing the natures of stakeholders above, their roles are also indicated, which denotes their knowledge contribution into the entire innovation process.

History / dynamics of the innovation process (1 p.)

Figure 1: Summary of the innovation process



THE CONTEXT - PHASE I: 1998

The launch of the BASED program: The BASED program was launched. The BASED team comprised of the GTZ advisor, some independent PEA consultants and the some representatives of LDA.

Training of the 1st generation extension officers: Training of Extension officers in PEA and facilitation skills. The training was conducted by the PEA consultant, with the BASED program contributing financial input.

In 1999 to 2000

Formation of SFM interest groups and the Umbrella Organization: As part of the training the 1st generation Extension officers mobilized farmers, identified and analysed their needs and based on that formed interest groups, one of them being the Soil Fertility Management (SFM). The members from the different interest groups come together and formed an Umbrella organization that coordinates activities across the groups.

Training Extension officers in soil fertility management: Having identified the needs of farmers, the some of the extension officers were then trained in the SFM technical areas complementing their socio-organizational skills. The BASED PEA consultant did the training, which was combined with the officers implementing in the community.

Farmer SFM experimentation: The SFM interest group takes soil samples for testing and contributes own money for that. Some farmers within the group volunteers to make experiments

PHASE II: 2001 (*T0 for the Mphaila case*)

Training of 2nd generation extension officers: The extension officers in the 2nd generation were trained by the 1st generation extension officers, while the BASED team offers backstopping support.

Technical training of Extension officers: The BASED team continued to provide technical training of extension officers. The local university (University of Venda) was also pulled in to give technical advice.

Formation of SFM interest group: Facilitated by Mr Tshithivhe, and his peer learning team (other extension officers from neighbouring villages) with Mr Netshivhodza offering technical backstopping.

In 2002

SFM interest group: Composed on both men and women, and youth farmers. Mobilized own money to take some soil samples. Some volunteers made the initial experiments in the own land. Decided on what combination to try out, designed the experiments, monitored and kept the records. At this stage, the experiments were tested on maize.

Organized access to inputs: through the UO, the farmers organized access to inputs. Created linkages with different input suppliers (for fertilizers and lime), negotiated for the better prices and conditions for delivery. SFM interest group purchase manure locally from the Livestock interest groups.

In 2003

Sharing day: the UO organized a sharing day where farmer experimenters shared their experience with the community, neighbouring communities and other actors. This day was also meant to share experiences in other technical areas that were running parallel to SFM.

In 2004

Mainstreaming of SFM technologies and diversification:

- Since 2004 more farmer experimenters emerged trying out new options. They started diversify and try the combination of inputs of onions, cabbages and other crops that were not in the mainstream. More youth farmers got involved
- SFM interest group joined hands with other SFM interest groups from other villages, for bulk buying of fertilizers and access to lime and chicken manure

In 2006

This was the start of the legume project for SFM in Mphaila and Rambunda villages. This is an on-farm and on-station research project initiated by Initiated by Dr Odhiambo of the University of Venda. University contributed legume seeds, and the technical expertise as well as laboratory data capturing and analysis.

- Michael Netshivhodza (The 1st generation extension officer), provide technical expertise and overall coordination.
- Mr Tshithivhe 2nd EO (Mphaila village) and Mr Mukhano 2nd generation EO (Rambuda village) support farmers in laying out experiments and the day to day supervision.
- Farmers - experimenters as well as record keeping.

Currently

- There are some activities going on in the villages, and we will find out more during our Nxtra workshop, and that CCA.

Results & effects of the innovation process so far (adoption)

The innovation was considered as a success, with tangible impact at various levels.

- At farmer level
    - Move from project approach to a community based approach
    - Increase experimenting capacities of farmers (farmer led experiments) and management of soil fertility
    - Youth engagement in farming activities
    - Farmer diversification: Moving away from the maize production, but experiment with new crops such as onions, cabbages etc, as well as increased production
    - Farmers created strong linkages with different service providers
    - Farmers benefiting from the economy of scale (bulk buying of input)
    - Farmers gaining access to markets (informal and formal markets)
- Social learning
    - Systematized farmer to farmer sharing
    - Farmer trainers emerged
- Integration of research and extension

- The overall change of relationship between the extension officer – farmers-researchers.

Main lessons in light of the JOLISAA goals and questions

- One of the major lessons here is the soft skill (facilitation skills, participatory processes and socio-organizational aspects) are very important to provide leverage for the technical innovation. Looking at the PEA training itself, that starting point was to impart soft skill, and the technical areas could only be identified during the process

N.B. As this case has been selected for CCA, more lessons will be drawn in the process.

Key references

Most of the scientific publications are on the phase I of the SFM. Two such publications are:

Ramaru J, Mamabolo Z and Lekgoro J (2000). Improving soil fertility management in South Africa: Learning through participatory extension approaches. Managing Africa's Soils No. 19. Rusell Press, Nottingham.

Ramaru, J. M., J. Hagmann, Z. M. Mamabolo and M. H. Netshivhodza (2009) "Innovation through action – An action research journey with smallholder farmers in Limpopo Province, South Africa: experiences of soil fertility management", in Almekinders, C., L. Beukema and C. Tromp (eds.) Research in Action – Theories and practices for innovation and social change, Wageningen Academic Publishers, ISBN 978-90-8686- 087-6, The Netherlands, 45-66