Strategic Communication for Integrated Pest Management

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Abstract

Farmers and consumers in developing countries are too often faced with a serious dilemma: either sacrifice a significant share of their crops to pests or use highly toxic pesticides that can harm human health and the environment. If we can help these people out of this dilemma, we will be making a major contribution to improving food security, eradicating starvation, and alleviating poverty in resource-poor countries throughout the world. Recognizing the importance of agricultural inputs in food security and the reputation risk associated with the use of very toxic agricultural chemicals, the World Bank and other organization are supporting integrated pest management (IPM) to ensure good practice in its projects. IPM succeeded in developing environmentally sound practices but struggled to communicate the value of information on risk and benefits of IPM. The slow adoption of IPM is often attributed to the widespread gaps in farmers' knowledge and understanding of the complex and controversial issues surrounding pesticides and IPM. In this paper, we will address IPM and risk assessment not only from the economic, environmental and public health perspective, but also from a communication and consensus-building point of view. Communicating about IPM, pesticides and associated risks hinges on the ability to earn the public's confidence, raise its awareness and understanding and addressing their perceptions. Risk communication, defined as an interactive process of exchanging information and opinions among individuals, groups and institutions (NRC, 1989), is a challenging task. It provides multiple messages about the nature of risk and other messages that express concerns, opinions, or reactions to risk messages or risk management. It therefore implies a deep capacity to listen to different stakeholders in a systematic and scientific way, but also the creativity to elaborate multi-faced communications programs which can help bridging the gaps between knowledge, behaviours and practices.

Introduction

The historically, the use of pesticides has been always controversial in many societies. Whitford (2002) dates the history of public debate on pesticides back to the 1930s and 1930s, when the first commercial pesticides were used in agriculture. The banning of DDT 1971 in the USA, which was preceded and followed by several discussions, reversed the initial enthusiasm towards pesticides and further intensified debates on the issue. As a result the role of risk communication and consensus building around became more prominent. Moreover, as countries are moving towards Integrated Pest Management, the challenges of communicating pesticides to the public are becoming quite complex. This paper tries to capture some of these challenges and to identify the specific role of communication in IPM. In a first section, the paper focuses on the main topics related to IPM and its communication theory, and then deal with the complex innovation systems, comparing them to present paradigms of innovation diffusion and communication for development. The second part, examines the different axes of strategic communication for sustainable development proving their relevance regarding IPM techniques. Bearing in mind the vast dimension of IPM related concerns (which cut across geography, history, technology, policy and economy), it will also be made clear that these issues have a large impact on the use of strategic communication in development projects. Therefore, this paper should also be considered as a foster for prolific debate among practitioners, in the field of strategic communication for IPM.

1. IPM and the communication theory

In order to understand the needs for strategic communication (Santucci, 2003) the IPM techniques, and the likely impact of a communication strategy on the overall process, leading to IPM's wider diffusion, it is important (Rogers 1983, Roeling 1991) to first analyze the IPM knowledge contents and, consequently examine knowledge needs from those stakeholders, who are involved in the IPM diffusion. Only in a second moment, it will be possible to define a strategy in which the participation of the different stakeholders is favored.

Unfortunately, **IPM cannot be considered one single innovation,** because it "*ranges from chemically based systems that involve the targeted and judicious use of synthetic pesticides, to biologically intensive approaches that manage pests primarily or fully through nonchemical means*" (Sorby, Fleisher and Pehu, 2003), **hence, it does not yet have a well defined approach.** It may even comprise innovations which are absolutely conflicting, from a philosophical point of view, as are OGM and organic farming, for example. Clearly, this situation would be highly confusing for both farmers (Bradshaw, Parham and Croxford, 1996) and consumers.

In general terms, the most important concept about communication and innovations is the "distance" between what is already known and what is practiced by the target audiences. As a matter of fact, innovations are classified according to continuous, semi-continuous and discontinuous:

- **Continuous innovations** are those, which do not pose a challenge to adopters, because they show continuity with what people already know and practice; furthermore, there is no need to buy new tools or invest money. Clearly, this type of innovation is prepared and adopted more easily than other modifications.

- **Semi continuous innovations** begin to present difficulties both at the communication and adoption level. People need to learn something, they must change some behaviors partially, a few new skills are required, some new tools may be needed, and some minor investment may also be necessary.

- **Discontinuous innovations** represent a real break with the past: they require completely new knowledge, new skills, new technology; often large investments are required and in some cases, even new markets.

At this point, a question can be raised about which one of the three categories above can be classified as an IPM technique?

IPM is a complex and difficult mix of innovations. Although IPM is largely seen as an endogenous innovation, mostly based on local knowledge, it must be clearly stated that such assumption is at the least superficial. To simplify the concept, we must imagine the two extreme situations where IPM has been (or can be) developed or applied:

- **Farming systems in developed or developing countries with over simplified production systems**, often based on one single crop (cotton, for instance) or fruit tree (apples or bananas, for example), which has been intensively used with pesticides and herbicides, for the last decades. In this case, farmers or farm workers have lost most of their local knowledge and are used to simply purchasing (or receiving) chemical products, often distributed according to a treatment calendar, without paying attention to the real "pest" presence. The relatively low cost of most chemical products has justified and keeps justifying this type of behavior;

- **Traditional farming systems in developing countries**, with limited or almost no use of chemical products, due to either the "high" costs of external inputs or to their unavailability.

These two extreme scenarios are obviously very different and represent different challenges. Yet, other aspects, such as the ones analyzed below, must also be taken into consideration

Innovations should be economically sound: it is easy to say that innovations must bring in more income to their adopters, but this apparently simple statement hides several difficulties. Within the farming world, "profit" is not the producer's only goal. In this scenario, the "average net farm income" (= return to all internal factors of production) is what is generally used as their main indicator for decision-making. Consequently, family farmers' behavior, who use their family members as labour force, is totally different from that of the landlords, who employ external labour for their farms. The key question is whether the IPM will increase the labor required at the farm or not, and who would pay for such change. Another aspect to take into consideration is that the concept of convenience is expressed by comparing the cost of IPM with the cost of chemical control: this opens a debate about the prices and taxation of pesticides, or the current existence of policies promoting or facilitating the diffusion of pesticides and herbicides (Poapongsakorn, Ruhs, Tangjitwisuth, 1998). Add that in to the second scenario described above, and this comparison is no longer possible, because what matters is the final yield in terms of self consumption, or the final economic result regarding products for the market.

Innovations should not be risky or they should bear an only very limited amount of risk. The concept of risk itself is again very relative, depending largely on the decision makers' global assets and incomes versus the dimension of the proposed change. The sociology of innovation describes innovators as risk-prone, with good or higher education, high-income and good exposure to information. Smallholders or subsistence farmers cannot risk to loose all or a share of their output. Furthermore, taking into account what was written before, producers do not like fluctuations of income and, and thus, generally adopt a strategy of risk minimization, as to stabilize the farm net income, rather than a profit maximizing strategy, which by definition also implies a maximized risk.

In both cases, in order to convince the farmers to introduce IPM techniques, several technical and economic contents must be analyzed: which pests affect the crops, their reproductive cycle, when is their presence is acceptable (very difficult economic concept), what are the consequences of such pests on yields and consequently on prices (which one moves with a reverse trend), costs and benefits of different IPM techniques (scenario analysis, again a very difficult subject). Furthermore, in most cases, the simple alternative "chemical treatments only" versus "integrated pest management" is not the most successful solution. In these cases several other modifications are required, such as new varieties, different cropping mixes, different rotations, the cultivation of insect repellent plants surrounding the fields, or between the rows of productive trees, etc.

If you add to all of the above observations the fact that **farmers are not environment friendly**: (with some very small exceptions: organic farmers, for example), you will understand why the relationship between agricultural producers and their environment is that of perennial conflict. Producers tend to dominate the ecosystem, shape the landscape, control streams, eliminate "useless" shrubs and trees and kill as many forms of competitors as they can (weeds, rats, birds, monkeys, etc.). As a matter of fact, environment is a non-value for most agricultural producers and consequently the "environment" as such cannot be used (unfortunately) as a motivation for change.

2. Strategic communication for sustainable diffusion of IPM

Most studies regarding IPM and communication have focused only on two aspects of its relationship with farmers: **1)** communication for the generation of IPM techniques and **2)** communication for speeding up the diffusion of IPM techniques amongst the highest possible number of farmers (Singh, Singh and Kanojia 2002). In this paper, we suggest at least three other areas of action, relevant to communication issues, which should be developed and taken into consideration. We believe that these topics are needed in order to ensure a more generalized diffusion of IPM techniques: **3)** communication regarding IPM in contract farming, **4)** communication for policy elaboration and **5)** communication for market development.

Furthermore, since IPM techniques are not *per se* a solution to all development problems, but only a step into the right direction (Morse and Buhler 1997), their diffusion must be analyzed within the broader context of capacity building, institutional reforms and market development, which are particularly needed (and difficult) in developing economies.

Finally, it is important to keep in mind that a substantial part of communication in IPM belongs to a wider field of risk communication defined as an interactive process of exchanging information and opinions among individuals, groups, and institutions. While discussing communication in IPM it is imperative to remember that risk communication programs *per-se* face several radical challenges. Even in the most advanced countries, for instance, IPM related stakeholders are pretty skeptical about messages on issues of environmental hazards, which are usually supported by contested scientific findings. These elements pose important obstacles to communication programs in IPM techniques, which must be taken into consideration.

2.1. Communication in IPM generation

IPM techniques cannot be proposed as a blanket recommendation (Dilts and Hate, 1996): they cannot be invented in Iowa and be sold in Argentina. IPM is based on a mix of local knowledge and modern scientific approach (Dreves 1996). This requires a location specific approach, such as the Farmer Field Schools (FFS) promoted in the last decades by FAO. Farmers are involved in data gathering, discussions, analysis, and experimentation of solution. Obviously, this approach requires that field level personnel (extension agents[1]) be properly trained in the subject matter (IPM) and in interactive communication skills (adult participatory education, group handling, etc.). The implementation of IPM techniques requires several years of experiments, trials, repetitions and validations. It is an applied research procedure, which needs time in order to be validated in a given area, for each given crop or cropping system. Sometimes, there are also high tech inputs, some of which may be relatively expensive, like the traps with hormones, and other similar devices.

This is a two-way communication situation, based on mutual respect, continuous feedback and common elaboration, where farmers, scientists and technicians share (= communicating to each other) what they think, see and imagine. It is important to understand the real goals of the farmers (higher yields? better income? soil protection? less risks?) and to develop solutions, which meet such goals (Orr and Ritchie, 2004).

Such an approach could also lead to organizational and institutional consequences, because the development of local knowledge could also mean the decentralization of some institutions and their higher level of autonomy, localy, as suggested by Dilts (1999), or might even require a more multidisciplinary approach, where the old style and mono-disciplinary structures are forced to restructure. As a matter of fact, Dabrowski (2000) individuates in the lack of cooperation between research, extension and production, which keep delaying the implementation of IPM techniques in Poland.

In China, Farmer Field Schools have been found to be a very effective approach (Mangan and Mangan, 1998) for achieving higher yields and better pest control in paddy rice, but they are not always successful, thus improvements in the methodology and in the organization are still needed (Feder, Murgai and Quizon, 2003).

2.2. Communication in IPM diffusion

Once a given IPM procedure, or a whole mix of procedures has been proven to be effective by a small group of farmers, scientists and field level agents, it then must be communicated to other farmers who live and work in similar agro-ecological situations.

In order to design the most suitable communication strategy, the five-step adoption model proposed by Rogers (1983) becomes useful:

- **Knowledge** : individuals are exposed to innovation and get a first superficial idea that something might change;

- **Persuasion**: more information and experience determine that individuals develop a positive or negative attitude about the innovation itself;

- **Decision**: when individuals decide what to do or not to do. Decision can be not to adopt, or to wait some more time, watching at results obtained by somebody else;

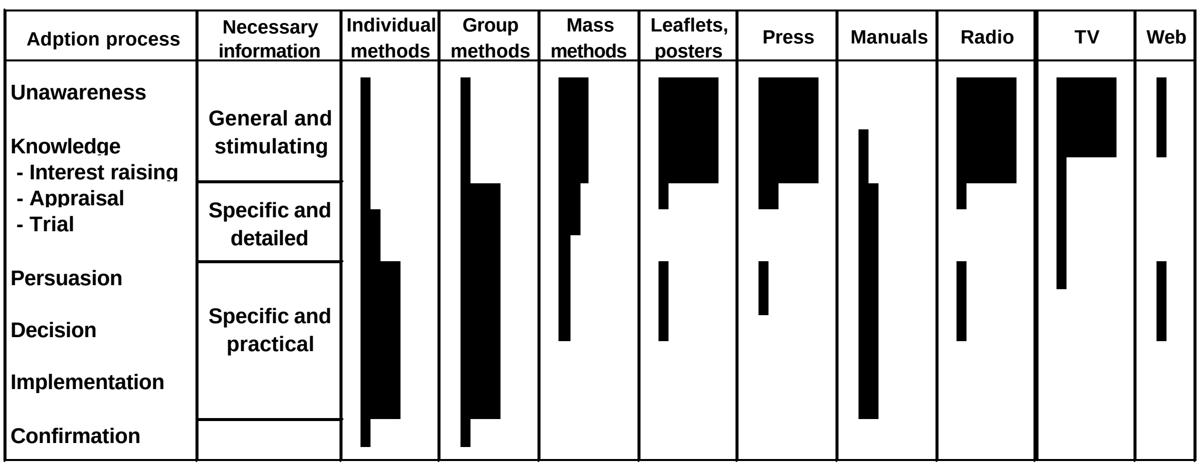
[1] In this case, the role itself of the extension agent evolves into something that could be defined as “facilitator” or “change agent”.

- **Implementation** happens when the people decide to adopt, perhaps on small scale, the innovation. Sometimes the proposed change cannot be implemented as proposed and needs refinements and modifications: it is the so called re-invention;

- **Confirmation**: if the results are positive as expected, the innovation is definitively accepted, but the contrary can also happen and the rejection may occur.

At this point, the old paradigm of communication for diffusion could be usefully applied, with all its methods and media, with mass media and mass events to be used for awareness raising, followed by more labor intensive methods (Santucci 2003). Pilot farmers, demonstration fields or whole demonstration farms, demonstration days, study tours, prizes for the best performing producers, t-shirts, caps, leaflets, handbooks, the entire wealth of communication methods and media can be used, according to the position of the stakeholders regarding the adoption process, the budget and the human resources available. In some of the situations developed, computer aided models are used, allowing farmers to simulate different technical and economic scenarios (Trumble, 1998). Since the implementation of an IPM package generally requires a relatively high level of knowledge and very sophisticated skills, it is even more difficult than the diffusion of difficult innovations, when adopters are required to simply buy a pesticide and spray it (sometimes without actually needing to do it.). This means that farmers must be trained on several subjects, with short preparation courses, or sessions, and continuous support and guidance.

Figure 1 - Suggested use of methods and media for the diffusion of IPM



Awareness raising campaigns are useful at the beginning of a project or program, in order to attract the attention of the majority of smallholders, with specific reference to the older and poorer ones, who otherwise could never be informed about the opportunities offered by IPM (Bhuyan, Bordoloi and Singha, 1995). Mass media can be very effective, as demonstrated by a study about the diffusion of IPM in rice cultivation in the Philippines, supported by 12 programs aired in January – February 1986), with no gender difference (Stuart 1988). Anyhow, mass media communication alone is generally not fully effective, i.e. it does not impact very much on the farmers' behavior, where as a more labor intensive communication strategy is normally advisable, based on a group approach (meetings, workshops, demonstrations, etc.), to convince at least the early adopters, who will be followed by the majority in due time.

Well trained agricultural extension workers, applying collaborative partnership and group approach, have been quite successful in Thailand (Elsie and Sirichoti, 2001) where the Rogers theory of diffusion[2] has been applied for introducing IPM techniques among durian fruit producers. By comparison, under-investment in applied research and inadequate extension activities are largely to be blamed for the insignificant diffusion of IMP techniques in Africa (Orr, 2003).

In Texas, a survey realized in 1995 (Thomas, Ladewig and McIntosh 1990) found that cotton producers could rely on several sources of information for different aspects of IPM and this situation favored the adoption of three IPM practices, leading to higher yields.

2.3. Communication about IPM in contract farming

In some cases[3], the implementation of IPM is not fully left in the hands of the individual farmers, but it remains totally or partially in the hands of specialized field personnel (employed by the Government, or by a cooperative, or by the trader who will purchase the output), who have a good level of education in IPM, dispose of several "stations" scattered all over their area, with traps and meteorological devices.

Once these personnel (or their back-up services) establish that it is time to implement a given measure, such as to liberate an insect predator, or to hang traps with hormones, they spread the message, as fast as possible, to all interested producers who belong to their network. Clearly, such situation is again within the old communication paradigm, a behavior that is diffused with a very top – down approach. Telephones, farm visits, radios and email are used, for communicating as fast as possible what to do, to all interested farmers. There are even cases with field personnel acting on behalf of the farmers (hanging traps, counting pests, or spraying the suggested product in very controlled quantity).

[2] The innovation diffusion model divides individuals into four categories, with respect to the moment they decide to adapt an innovation: the **innovators** include a very tiny minority of people (about 2-3% of the population), who by education, economic situation and personal psychological attitude are risk prone. They like to try new things and do not have fear of failure or their economic situation is such that they can even risk a partial loss of income. The innovators normally are even more advanced than the average local advisors or change agents. They introduce innovations into their farms, households, life styles, even before the institutions begin to consider such changes. The communication behavior of the innovators is quite open: they travel extensively, have direct relationships with other innovators, read foreign journals, participate to fairs and exhibits. Because of their status and of their behavior, they are a bit insulated from the local community, tend to have few social relationships and most other people think that they are at least extravagant; The **early adopters** have more or less the same characteristics: good education, good economic status, but fear the risk of failure a bit more than the innovators. They represent about 10-15% of the considered population and look at the innovators, but also want to have the support of some local advisors. They think twice before experimenting an innovation, but are open to change. They have good relationship with most of the other people living in the area, or working in the same sector. To some extent, they could be considered informal leaders, because they enjoy the respect of their peers and their behavior is taken as example by the majority. The **majority**, by definition, includes almost all people concerned by the proposed change, almost two thirds of the population, and by comparison are even less risk prone than the precursors. The people belonging to the majority have a lower level of education, they read less than the previous categories or participate less in meetings, they wait to see the results achieved by the precursors, wait to be assured that almost no risk is linked with the proposed change, and slowly adopt the new behavior. The **laggards** are again a small minority of individuals, generally with limited or no formal education, small income and few resources, sometimes old, scarcely informed or totally uninformed, economically extra-marginal. They fear the change and have almost given up any hope in the future. This group of people has contacts almost only with people of the same group and they even refuse to expose themselves to new ideas.

[3] Like in many cases of contract farming.

This does not mean that producers are left in the total ignorance[4] of what IPM means, or of what the IPM personnel is doing: also in this case, most communication activities are aimed at explaining the biological and economic rationale behind the IPM strategy.

2.4. Communication for policy elaboration and implementation

In order to have a real diffusion of IPM techniques, not limited to single projects or to the willingness of few motivated farmers and scientists, the most important area of action for communication for development is very likely at national or sub-national political level, for elaborating a coherent legislation, with measures favoring IPM and without measures supporting in the same time hard conventional agriculture (Larguier 1997, Nicholls and Altieri 1997, Williamson 2003).

"*Establishing a policy provides a focus for agreeing social goals, or agreeing suitable compensation for groups with alternative goals to those of the dominant group*" (Ramirez and Mumford 1995, page 565).

Political support is needed for several purposes: to have budget for applied research on IPM techniques, for subject matter specialists and field level advisors, for the farmers willing to try, or simply to have the normative framework that will allow the producers to get a premium price in the market (certification).

Political support could also be needed to introduce measures limiting the use of pesticides and herbicides or to make them less attractive (taxes, time limitations, licenses, etc.).

In this case, a proper communication audit (Calabrese, Grenna and Santucci, 2003) should be developed, as to define all stakeholders (pro and against the diffusion of IPM), within the public sector, the private sector and the civil society, and the best way to achieve a political agreement about the necessary legislation. Consequently, there will be all the likely communication activities needed to achieve the production of the legislative framework: study groups, workshops, seminars, consultations, study tour within the country and abroad, articles in the press and interviews with radios and TV, etc.

Clearly, since the introduction of IPM techniques very often collides with the supporters of hard technologies, and there will be lobbies resisting this change, there will be debates and opposing information that must be foreseen and neutralized with data about the positive environmental and socio-economic impact of IPM techniques.

2.5. Communication for market development of IPM products

This is probably the most important area of action, at least in the Countries with higher purchasing power. Since the best motivation for producers remains the market[5], one more area for strategic

[4] Many believers in the full autonomy of farmers will surely criticize such situation, but it is due to the recognition that there are tasks which are quite difficult and that sometimes it is better to rely on experts and to call them in. After all, we all use computers, but if something does not work, we all call the IT personnel without feeling offended or deprived. The same happens in many situations, where the implementation of some IPM techniques or technologies is not (yet) transferred into the hands of the producers.

[5] Although a limited number of farmers could be motivated by philosophical, religious, ethical, environmental and health related motivations, the most important driving force remains the perspective of economic benefits (Vartdal and Loes, 1994).

communication is to convince the consumers, or at least a portion of them, that the products coming from IPM processes are good, and even better than those from conventional farming, and that such products deserve a premium price.

On one side, this means information and education for doctors and opinion leaders, for traders and journalists, with all usual communication methods (meetings, conferences, seminars, etc..) and media (printed, electronic, etc.) as to stimulate the domestic consumers demand for such products, although the main obstacle remains in the scarce clarity of what "IPM" really means (Anderson *et al.,* 1996). Another major obstacle is the resistance of the agricultural establishment (policy makers, unions, scientists, food companies, food distributors) to a market differentiation that implicitly assumes that all other products, the ones non IPM labeled, could have residues, or could have been harmful to nature, or that they could be dangerous for human health.

On the other side, it means helping the producers to organize themselves for a better marketing of their output, even in foreign markets (Hillocks 2002) with proper packaging, labeling and with appropriate marketing channels, etc. This is the communication component of a marketing strategy, but it is again a communication for development situation, where the action for empowering the producers is very much labour intensive, based on a group approach, where people have to elaborate their own strategy to achieve the best results.

3. Conclusions

The diffusion of IPM techniques, either within the paradigm of conventional agriculture, or within that of organic farming, requires a holistic approach, which should consider not only the technical and ecological aspects, but also the much broader socio-economic ones. IPM techniques might have very difficult and complex contents and they might require new knowledge and new skills.

As a matter of fact, a wide spread adoption of IPM relies on several institutional, technical, economic and socio-psychological factors, such as: favorable policy frame, awareness building with mass media, situation analysis, confidence building, common perception of problems by researchers and farmers, interactive extension, group approach, motivation for both farmers and field advisors, practical education of advisors (Schmidt, Stiefel, Huerlimann. 1977).

Consequently, a strategic communication approach, that includes all five areas, as described in this paper and shortly summarized in Table 1, could greatly enhance the likelihood of faster elaboration of new IPM methodologies and their sustainable, market oriented diffusion, in the developed and developing countries alike.

Table 1 - Synoptic view of various aspects of strategic communication for and about IPM

Where the action begins	Source of information	Contents	Stakeholders	Methods or media
1. IPM Generation				
Scientists, progressive farmers, development agency	All three categories	Biology, agronomy, entomology, farm management	Scientists, advisors and selected farmers	Very intensive and participatory approach, based on group methods: meetings, workshops, study tours, demonstrations, etc.
2. IPM Diffusion to other farmers				
It could be the MoA, or a development agency, or a CSO, or a trader	IPM research	as above	Advisors and all farmers	Both participatory and top-down approaches, using all methods and media, according to difficulty of technical contents, media availability, number and typology of stakeholders, budget availlable.
3. Communication about IPM in contract farming				
The buyer of output	IPM research	as above, with lower intensity	Advisors and farmers with production contract	Generally a top down approach, with meetings for general introduction to basic knowledge about IPM
4. Communication for policy elaboration				
The interested party: it could be the MoA, or the MoE, or a CSO	IPM research, medical research,market research	as above, but with less technicalities, plus information about environment, nutrition and health	The Government and the Parliament. Several Ministries, Civil Society Organizations, Traders of inputs, Agricultural Research Institutions	Both participatory and top-down approaches, using all methods and media, according to difficulty of technical contents, media availability, number and typology of stakeholders, budget availlable.
5. Communication for market development				
The MoA or the interested party, very often an interested trader	as above	as above	CSOs, opinion makers, consumers	Mostly top down approach, based on a continuous flow of information, through events and mass media.
Development agency	market research	organization of producers associations or cooperatives	interested groups of farmers	Very participatory, with meetings, study tour, training, continuous advice

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