

Communication and Sustainable Agriculture

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ABSTRACT We endanger our ability to produce enough food for future generations by causing environmental problems. To reduce these dangers we have to take decisions which are often not in the shortterm interest of individual farmers and consumers. Some of these dangers can be reduced by decisions of individual farmers, but others require collective decisions by groups of farmers or government regulations. These regulations can only be enforced, if the majority of the people accept that they are needed. Increasing the competence of (groups of) farmers to analyse their environment and take decisions accordingly is crucial for effective individual and collective decision making.

To reduce these dangers an effective two way communication is needed between researchers, farmers and government officers. The communication model of Berlo can help to increase the effectiveness of the communication, which has a clear sender and-receiver, but not so much the interactive communication in group discussions and dialogues. This interactive communication is quite important to increase the competence of farmers to solve their problems. Effective communication requires that the sender does not only know his message, but also his audience and understands the reasons why they are behaving as they are behaving.

The communication system should be well planned on the basis of an analysis of the Agricultural Knowledge and Information System. The communication agents should be separate from the agency enforcing government regulations otherwise they will not be able to gain and maintain the confidence of their farmers. The effectiveness can be increased if farmers' organizations share the responsibility for managing the communication agency.

1. Introduction

Before I can discuss how communication can help to develop a sustainable system of agriculture, I will first have to discuss briefly where I see the dangers for sustainability. One reason to be brief is that during this conference many speakers have discussed this problem much more thoroughly than I am able to do.

The Brundtland Commission defined sustainable development as development that meets the present needs without compromising the ability of future generations to meet their own needs. A difficulty with this definition is that our aspirations have raised a lot in the past decades. If we believe that we need to realise all these aspirations and accept that other people on this earth have the right to realise the same level of living we have in the West, it seems to be impossible to meet the need of future generations. We may have to decrease our level of aspiration, but few people are willing to do so.

In the field of agriculture sustainability is endangered through the amount and kind of chemicals we use, the waste products we produce, the depletion of resources like fresh water, soil erosion and salinity. There are regional differences in the seriousness of these dangers. To decrease these dangers does not only require decisions by individual farmers, but also collective decisions by groups of farmers to prevent e.g. soil erosion or salinity. It is no exception that it is in the interest of an individual farmer to behave in a way which endangers the future if others do the same. In a number of cases this problem can be solved by collective decisions by a group of farmers, e.g. to prevent overgrazing. In other situations it can only be solved by government regulations e.g. to ban dangerous chemicals. Low external input agriculture is in my opinion not the solution, because this will often result in low output levels. In order to produce enough food this makes it necessary to extend farming to areas, which are not suitable for sustainable agriculture.

Often sustainable farming systems require the application of locality specific knowledge. These systems may e.g. require that the farmer does not spray his crop each week, but only when the balance between damaging insects and their enemies is disturbed too much in favour of the damaging insects. This makes it impossible to follow a general prescription of a specialist, but the farmer has to learn to observe the situation in his crop carefully and to make his own decisions accordingly. That means that we replace chemicals by the knowledge of competent farmers. Increasing their competence is a precondition for successful sustainable agriculture (VAN DE FLIERT, 1993).

Also the indigenous knowledge gathered by farmers over the centuries can often be valuable for developing sustainable agricultural systems. However, this knowledge may not be directly applicable any longer, because it has to be modified as the situation has changed as a result of the increased population pressure, the higher level of living desired and the availability of new knowledge from scientific research. Indigenous knowledge is only one of the sources of information which should be used to design sustainable farming systems.

2. Required flows of communication

If we like to improve communication we first have to know which kind of messages ought to flow from who to who.

A good communication **from researchers to farmers** on sustainable agriculture is important. Researchers study how present farm practices endanger sustainability and how sufficient food can be produced and farmers problems can be solved in a way which is less dangerous for agricultural productivity in the future. This research is of limited use unless farmers know and understand these research findings.

Communication **from farmers to researchers** is at least as important. In the first place farmers, and certainly Chinese farmers, have a lot of valuable experience on which researchers can build. In a simple way farmers make their experiments and test and adapt the recommendations of researchers for improved farming practices. Secondly researchers can not develop recommendations for improved farming practices unless they first understand why farmers are farming the way they are farming.

In order to develop farming systems for sustainable agriculture it is usually necessary to integrate knowledge developed by researchers in various disciplines and knowledge from farmers based on their experience and common sense. A difficulty is that a researcher is by definition a person who knows a lot about little, whereas as farming problems can only be solved if we take an integral view on the farm as a whole. To participate in this process of integration of knowledge is difficult for many researchers, especially in countries where few agricultural researchers have a farm background. Status differences might make it difficult for a researcher to learn from a farmer, but without first learning from farmers he is seriously hampered in his possibilities to contribute to solving farmers' problems. I am happy that as a student at the agricultural university I had to work 5 months on different farms to learn from farmers.

Communication **from farmer to farmer** is in the first place important to enable farmers to learn from each others experience. Research shows quite clearly that most farmers adopt new farm practices mainly after they have heard from their colleagues about their success with these practices or preferable they have seen this success with their own eyes (ROGERS, 1983). Often the social status of a farmer in a community depends to a large extent on his way of farming. Sustainable agriculture might require a change in the group norms on what one considers good farming. These norms may make it e.g. difficult for a farmer to decrease the use of pesticides even if that would increase his income, because his crop does not look good.

Communication between farmers is also necessary to make collective decisions which promote sustainable agriculture. I have the impression that in the Chinese culture it easier to make decisions which are in the interest of the group as a whole, but not in the short term interest of each member than in the individualistic Western culture.

Communication **from the government to farmers** on regulations to promote more sustainable farming systems is not only necessary because these regulations will have no impact unless they are known to the farmers, but also because they can only be enforced if the vast majority of the farmers are convinced that these regulations are necessary. In my country we are not allowed to cut a tree without permission from the government, but on the land of people who are not convinced that this is a wise rule, trees might die for unknown reasons.

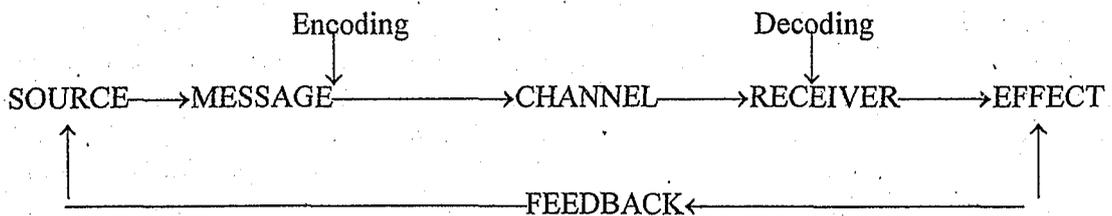
The government is only able to formulate wise rules if there is a good communication **from farmers to the government**. Otherwise the government might make wrong predictions of the consequences of their rules. This requires also a good communication **from researchers to the government**, but researchers are only able to provide the right kind of information in this process if there is a good communication **from the government to researchers** on the decisions the government has to make and the information which is needed to make good decisions.

Also communication with the consumers can be important, because products produced in a sustainable farming system might not look so nice as products produced with a lot of chemicals. If the consumers refuse to buy these products or pay only a low price for them, farmers will not adopt this sustainable system of production.

3. Communication models

We have seen that good communication between different groups is necessary to develop sustainable agricultural systems. At the same time we know from experience that rather often our attempts to communicate fail. Our message may not reach the intended audience or reach them only in a distorted way. In a situation where we can only develop a sustainable agricultural system by sharing information available to different groups the result of communication may not be shared meaning, but in a fight. To prevent this we have to understand these communication processes. Communication models may be of some help.

A well-known model was developed a generation ago by Berlo:



Let me explain this model by using my communication of the Berlo Model to you as an example:

In my mind I have a certain idea of this Berlo model, what is the message I like to convey to you. However, I can not send this idea, I first have to encode it words, in this case English words spoken with a Dutch accent. That is transmitted to you by a channel, either by a paper or my voice, but you have first to decode this message before you can form your own idea of the Berlo model.

One difficulty can be that you do not use the same key for decoding as I have used for coding, e.g. you may first have to decode it in Chinese before you can form your idea of this model. This implies that the sender has to understand the keys used by his receivers and thus their way of thinking in order to be able to communicate effectively. He has to know what his audience knows and does not know about the subject. If he overestimates their knowledge, it is likely that he will encode his message in way that the receivers cannot decode it. If he underestimates their knowledge he might bore them.

Secondly this process can be influenced by emotions. I have e.g. a negative attitude towards eating dog meat, not because this meat is not nutritious or healthy, but because I am raised in an European culture, where we see dogs as pets. This makes it difficult for you to convince me that I should try this meat. Also the attitude towards the sender of the message influence the communication process. Confidence in his capabilities and motivations is crucial for successful communication. If the extension agent, who tries to inform farmers about sustainable farming systems, at the same time has to enforce government regulations on environmental problems as a police man, it is nearly impossible for him to gain this confidence.

Thirdly in this model communicating a message is something different than giving somebody a coin. If I give you a coin this coin will not change, but if I give you a message this message has to be integrated in the picture you have in your mind of our world. This is an active process, which might change the message greatly.

Lastly the message will only reach you if you tune in at the same channel at which I am sending. Even if you are in this hall, it is quite possible that your mind is wandering away from my channel, e.g. to think about the presentation you have to give tomorrow or about the implications for your work of what the previous speaker said. Therefore successful communication requires that the sender knows which communication channels his target groups uses and what their information needs are and tries to help them to realise these needs. In that case the receivers will be inclined to tune in to a channel that provides them with important information. I must admit that my information about your information needs is limited at present.

It can also be important to use a communication channel with the receivers use frequently. Extension organizations have e.g. tried to focus more on female farmers as their target group, because they do a lot of the work and with the increasing number of men working in the cities they get also a more important role in decision making. Therefore one organised a meeting with the villagers, but did this at a moment the women were expected to cook the meal. As a result few of them participated in this meeting.

Often it is more effective not to tell your audience what they should do, but to create a situation in which they discover this themselves. In that case the message is not an alien element in their mind, which soon will be forgotten again, but it has become something of themselves and they will be more motivated to use this new knowledge in their problem solving

This discussion implies that for effective communication it is not only important to know your message, but also to know your audience (WINDAHL and SIGNITZER, 1992). To obtain this knowledge formal and informal methods can be used. In marketing communication it is quite usual to use formal surveys, that is to interview a random sample of farmers and ask them information about their situation and resources, their knowledge on and attitudes towards issues related to the message. This is not very often done by extension agencies, but I am convinced that these agencies could often increase their effectiveness by using these surveys for designing extension messages and strategies.

The experience is that speakers who use informal methods to get to know their audience are more successful than those who do not. If they are asked to give a lecture to a farmers meeting in the evening, they come to the village already early in the afternoon to talk with a number of farmers and to see their fields. This makes it possible to focus on problems which are important in this village and to illustrate the messages with local examples. Also to learn first from farmers is an effective way to gain their confidence.

Also successful editors of farm journals spend a good deal of time to interact with farmers at markets and other locations where farmers get together to meet each other. One of the most

successful German editors has the habit when he visits a village to select one of his subscribers at random and visit him as well. These kinds of techniques are useful, but what is even more important is the eagerness to learn from your target group and to listen to them.

The Berlo model gives no attention to the fact that the behaviour of sender and receiver are influenced by their social environment and their history. Otherwise it is in my opinion a good model to analyse communication processes in which you have a clear sender and receiver. That is true for most mass communication and also for lectures. Much of the communication from researchers and government officers to farmers goes in this way.

4. Interaction

Most of the interpersonal communication in pairs or small groups cannot be analysed with the Berlo model, because in this kind of interaction the person who is the sender at one moment will be the receiver a moment later. So here we should not analyse how a sender influences a receiver, but how people influence each other (HARTLEY, 1993). We can also not analyse the process at one moment, but we should give attention to the historical development of the process. If e.g. two people have a fight A will explain you that he reacted in a perfectly reasonable way on the actions of B and B will explain that his actions were quite reasonable, but the starting point of his analysis of the process is a bit earlier or a bit later than for A.

This interpersonal communication plays several important roles in the process of the development of sustainable farming systems.

In the first place it is a way for farmers to share their knowledge and experiences with their colleagues.

In the second place this makes it possible to integrate the knowledge from the farmers with the knowledge of researchers in different disciplines and extension agents. This requires that each participant in the communication process is eager to learn from the other participants.

In the third place it is an effective way for extension agents to help farmers to develop their competence to find solutions for their problems which fit their peculiar situation. In a lecture one can e.g. explain the concept of economic threshold in plant protection, but not how this concept can be applied in a specific field situation. That can be done in a dialogue between the extension agent and the farmer or even better in a small group where farmers discuss this problem for a specific situation they have studied together.

In the fourth place these group discussions are crucial in the process of collective decision making.

There are many publications which discuss how an effective dialogue or group discussion can be conducted (e.g. VAN DEN BAN and HAWKINS, 1992), but one cannot learn this only from a book. The best way to learn it is through experience in a role play. In such a play each

member is assigned a certain role, e.g. the village extension agent who has been told by his boss that he should decrease overgrazing around his village and the farmer, who is proud that he has been able to increase his herd so much. Then one observes how participants in the discussion react on each other and analyse this afterwards. In this analysis one gives not only attention to the facts, but especially to the motions which have been aroused. In interpersonal communication it is quite important to learn from ones own experience and from the experience of being put in the shoes of others.

Such a role play can also help us to become aware of the way in which our values influence our behaviour. KLUCKHOHN made a distinction between three value orientations which influence our behaviour towards sustainable agriculture:

1. man sees him self as subordinate to nature,
2. man tries to be in harmony of nature and
3. man tries to be the master of nature.

Much of the behaviour of people in the Western world is based on this last orientation, but we are starting to realise that we are not really capable to master nature. We can e.g. breed a plant variety which is resistent to a certain disease, but after some time the disease succeeds to adjust itself to its new environment and to break this resistance. Do I see it correctly that in China the orientation is traditionally more towards being in harmony with nature? Is this orientation changing with the rapid changes in Chinese society?

5. Agricultural knowledge and information system

For decision making on sustainable farming systems we need knowledge and information on the alternatives from we can choose, on the consequences we can expect of each of these alternatives and on the value we attach to these consequences. The question arises which persons and institutions contribute which kind of knowledge and information, how do they cooperate and support each other or perhaps which conflicts arise between them, how is knowledge and information generated by one person or institution communicated to and used by others, how is it stored for later use and how is it retrieved? Are resources wasted because there is an overlap between what different institutions are doing? Are there gaps, because crucial information is not generated by anybody or not communicated to those who need this information? (See: ROLING, 1988)

I am not able to answer these kinds of questions, certainly not for the Chinese situation, but if we try to develop sustainable farming systems it would be useful to give serious attention to them to be able to manage the development and communication of the necessary knowledge and information effectively. In the whole field of environmental issues one of the serious problems is lack of agreement between experts. Another is the conflicting interests between different actors, e.g. between the industry producing plant protection chemicals and people who try to prevent pollution by chemicals. Farmers and politicians are often confused by the conflicting information they get from different sources.

6. Organization of the communication

A question is how can we organise the communication regarding sustainable agriculture most effectively. A major task is to organise the communication from researchers to farmers, but this should be done in a way that it reinforces the communication from farmers to researchers and government officers.

The number of farmers is so much larger than the number of researchers that a direct communication between them can be useful for researchers to learn from farmers, but can only have limited effect on farmers. Most farmers will not be reached by the researchers. In most countries therefore this communication is organised through an extension service, which works with generalist at the village level, often one for 500 to 1000 farm families. These generalists are supported by specialists in different disciplines and for different branches of agriculture at higher levels. These specialists are in regular contacts with the researchers. It may be that this system has to be modified somewhat for the Chinese situation. In those parts of China where there are many specialised farms, e.g. poultry farms and vegetable farms, it can be better to have at the village level extension agents who are specialised for each type of farming, otherwise they may lack the competence needed to increase the competence of these farmers.

In these extension organizations we can encounter several difficulties, such as:

1. The tradition in a government bureaucracy makes it difficult to organise an effective upward communication and a good communication system from the farmers to the researchers.
2. The village extension agents may be more inclined to please their bosses than to go out in the field in order to develop together with the farmers solutions for their problems.
3. The extension agents serve the powerful and rich farmers better than the resource poor farmers.
4. It is often difficult to find specialists, who are really competent in their field of specialisation and who at the same time wonder how their specialisation can make an optimal contribution to the development of the farm as a whole.
5. Extension agents may be inclined to persuade farmers to follow government policies, even if these policies are not in the interest of many farmers. As farmers are free to follow or not to follow the advice of their extension agent, the major consequence of this approach is a decrease of confidence of farmers in extension agents and therefore a decrease in impact of these agents on farmers.

This last point can be quite important in the field of sustainable agriculture, because it is quite possible that sustainable practices are not in the interest of individual farmers, at least not in their short term interest. A solution can be to separate the role of extension agents and of government officers who check whether farmers follow government rules. The role of the extension agent can include:

- informing farmers about government rules and about the consequences they can expect when they do not follow the rules,
- explaining farmers why government formulated these rules.

Another possibility is to bring the extension service somewhat outside the government bureaucracy and to involve farmers' organizations in the management of this service. In this

way the extension agents are more forced to give attention to the farmers' interests. It can also make it easier for the extension agents to contribute to collective decision making of farmers, e.g. on soil conservation or Integrated Pest Management.

It is not only important how the extension service is organised, but also how the farmers are organised. In several countries study groups of farmers, who analyse their problems together, make local experiments in cooperation with researchers and learn from each others experience play a very useful role. This requires a culture in which farmers are willing to share their knowledge with their colleagues. In a close cooperation between the extension agents and these study groups a lot of change can be achieved, including a change in the competence of farmers to find solutions for their problems. These study clubs are also a good way to integrate the knowledge of researchers and of farmers and to built mutual confidence.

It is also important that agricultural research is not only done on research stations, but also on farms. Sustainable agriculture often requires a change in the whole farming system. The consequences of such a change can only be studied on farms, e.g. to study what are the consequence of a change in crop rotation on soil fertility, plant diseases, labour requirements in various months, income, etc.

Between researchers and government officers involved in decision making on policies regarding sustainable agriculture a direct communication is possible. The number of government officers involved is much smaller than the number of farmers. A difficulty is that for designing these policies the work of researchers working in different disciplines has to be integrated and to be combined with the experience of farmers. This can make it necessary to use the services of a team of scientists to help to design these policies. These scientists should not do much empirical research themselves, but review the work done by their colleagues to analyse:

- what are major problems endangering the sustainability of present farming systems,
- what alternative solutions for solving these problems can be considered,
- which consequences can be expected of each of these alternatives.

In this analysis it can e.g. be necessary to integrate the work done by a toxicologists with that done by agricultural economists.

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