

Communication for Development in Research, Extension and Education¹

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Preamble

(1) Innovation can most usefully be seen as an outcome from concerted action or synergy among multiple actors or stakeholders in some theatre of innovation. Development Communication seeks to understand, foment, facilitate and monitor the process by which a set of actors moves towards synergy. It focuses on the participatory definition of the contours of the theatre, the composition of the actors in it, their understanding of their complementarity and interdependence, their linkages, interaction, conflicts, negotiated agreements and collaboration.

(2) It is *not* useful to consider innovation the outcome of transfer or delivery of results of scientific research to 'ultimate users' or farmers. Hence it is *not* useful to consider Development Communication as the tool to improve the delivery mechanism.

I have devoted a good part of my professional life to making these two points, so far without much success. Even my AKIS concept gets retranslated in terms of the linear model. Is this a unique case of the regiment being out of step with the single soldier, or have I wasted my time? Please make up your mind on the basis of the arguments I present below.

1. Introduction

The very title of my paper could mean different things to different people. Take a student in a US Land Grant University; some of us have been in that position. To this person, Research, Extension and Education reflect the Land Grant ideology that regards the integration of these tasks, coupled to independence from policy, as the source of success and power, if not superiority of American universities, and the secret behind the efficiency of American agriculture. For the average agriculturalist in Europe, Research and Extension refer to services that have been the responsibility of the state but are now increasingly privatised. They have been widely used as policy tools to bolster agricultural productivity and the competitive position of national agricultural industries. The word Education invokes qualification and competence building especially of farmers and their sons (Mulder, 2004). Members of the IPM Farmer Field School (FFS) movement, and we might well have some of them in our midst, could, upon seeing the title, think of the lack of impact of Research on FFS, and of the fight with the World Bank about whether FFS represent a ‘fiscally unsustainable form of extension’ (Quizon et al et al, 2000), or an empowering and transformational form of adult education (e.g., Pontius et al, 2002; Eveleens, et al, in press²). In most developing countries, finally, the words Research, Extension and Education are not necessarily linked. Research and Extension usually are the responsibilities of different directorates of the Ministry of Agriculture, while Education is the responsibility of another Ministry. Thoughts would not immediately turn to *agricultural* education. What the three have in common is not immediately clear.

In all, my subject is like the proverbial word ‘dog’. Depending upon the experience of the sense maker, ‘dog’ can elicit meanings all the way from a loveable, cuddly ‘best friend’ to a fearsome, bloodthirsty, growling police weapon. But it is good fishing in murky waters. Nothing better than a Babylonian confusion to promote one’s own view.

The Agricultural Knowledge and Information System (AKIS)

In my perspective, my subject is AKIS, the Agricultural Knowledge and Information System (Röling, 1988, Röling and Wagemakers, 1998), a concept that I developed based on the work of Nagel (1980) and Swanson and Peterson (1989, Swanson, 1990), especially using the Soft Systems notion of Checkland (1981 and with Scholes, 1990). Engel and Salomon (1997) played key roles in further elaborating the concept and in developing a powerful methodology called RAAKS based on it.

AKIS has struck a cord. The notion has been widely adopted... again with very different meanings. A brief review of some of them allows me to emphasise what I consider unhelpful developments of the concept.

For McDowell (2004 and 2001) a professor at Virginia Tech (USA), AKIS ‘generates and conveys the new knowledge needed to address problems affecting agriculture’. I would no longer define AKIS as if it were an actor itself with an agency of its own, for it is people, not systems that have agency (Röling and Leeuwis, 2001). How would an AKIS know what the problems in agriculture are?

² Unfortunately, the Eveleens et al overview of the history of IPM in Asia which gives voice to many of the key players in that remarkable social development has for two years been on someone’s desk in FAO and is losing relevance.

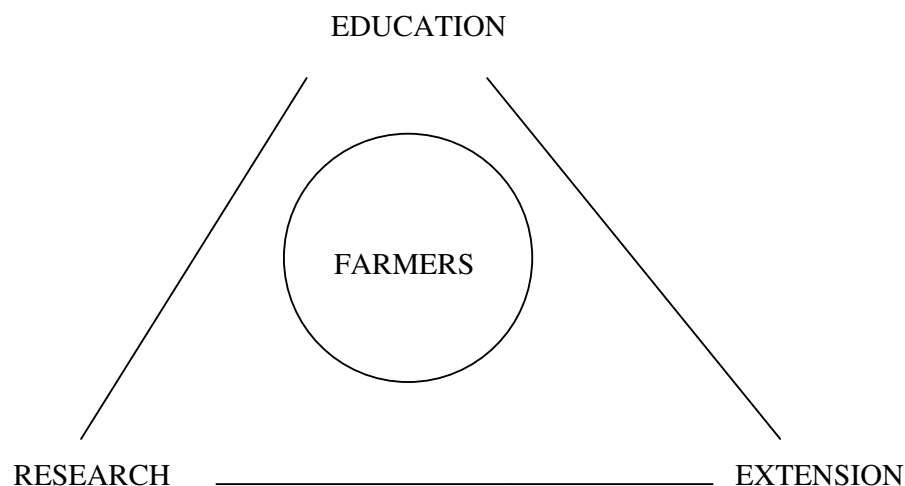
Other interesting alternative definitions are presented in an overview by ISNAR (Chema et al, 2003). FAO and the World Bank (2000) define AKIS as follows:

‘An AKIS links people and institutions to promote mutual learning and generate, share and utilise agriculture-related technology, knowledge and information. The system integrates farmers, agricultural educators, researchers and extension personnel to harness knowledge and information from various sources for better farming and improved livelihoods’.

This definition conforms to my original intention. It considers the AKIS as a system made up of people. But the definition also has two aspects that I no longer agree with, reason why I am glad that my 1988 book is out of print. (1) In the definition by FAO and the World Bank, the components of the system, i.e. farmers, educators, researchers and extension personnel, are *given*. I have learned that, depending upon the situation the key players in an AKIS can include businessmen, informal leaders, priests, and many others. Defining the components *a priori* creates important blind spots before one has even started and takes away from the need to come to an agreement as to who the important players are in ‘the theatre of innovation’ (Engel, 1995). Defining the components *a priori* removes the need for stakeholder analysis. (2) In the definition by FAO and the World Bank, the AKIS is considered an entity that exists in the world. As will become clear below, for me the key point about the concept of AKIS is that it holds promise that a set of complementary actors gel into a synergistic system once they begin to see themselves as a system. Making that happen is a key role for development communicators. But I am running ahead of my story.

Chema et al (2003) themselves provide the AKIS model presented in Figure 1. This model again pre-determines the components of the system. But they go further, and emphasise the *national character* of the AKIS in making a distinction between the National Agricultural Research System (NARS), the AKIS and the National System for Innovation (NSI).

Figure 1: AKIS model according to Chema et al 2003: 19

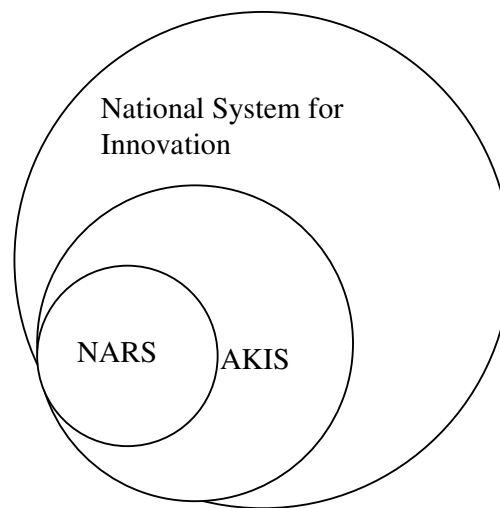


The NSI is defined as:

‘... that set of distinct institutions which jointly and individually contribute to the development and diffusion of new technologies and which provides the framework within which governments form and implement policies to influence the innovation process. As such it is a system of interconnected institutions to create, store and transfer the knowledge, skills and artefacts, which define news technologies. The element of nationality follows not only from the domain of technology policy but from elements of shared language and culture which bind the system together, and from the national focus of other policies, laws and regulations which condition the innovative environment’ (Metcalf, 1995).

Figure 2 shows the presumed relationship among NARS, AKIS and NSI. Note that ‘the NARS is no longer seen as the epicentre of innovation but one of a variety of sources’ (Chema et al, 2003).

Figure 2: Linking NARS, AKIS and NSI (source: Chema et al, 2003:21)



If one thinks of the AKIS in terms of research, extension and education and limited to the generation of technical innovations, it makes sense to distinguish it from a NSI. Anyone familiar with the West African scene, for example, would agree that with their *given* knowledge and technology, local farmers would be able to greatly increase their productivity if they were given an opportunity to sell their products at a reasonable price (Hounkonnou, 2001; Röling et al, in press). Hence knowledge, information and even tested technologies are not in the minimum; what is lacking are the institutions, marketing chains and conducive policies at the scale level above the farm. I would agree, therefore, that achieving innovation requires more than an AKIS, if AKIS is defined as a *national system that exists in the real world, is composed of given actor categories* (farmers, research, extension and education), and serves to generate *technical knowledge*. Point is, I do not agree with any of these assumptions (in italics) about the AKIS.

Why is an AKIS not a National system?

An AKIS, in my mind, does not stop at national boundaries. In our era of globalisation, multinational companies peddle their technologies across the globe, the production of BT cotton in China has undermined small farmers’ mainstay in West Africa, and the global treadmill, of which more later, ensures that many of the world’s farmers operate on a global diffusion curve (Rogers, 1995). This does not mean that local, regional or national actors could not gel into an effective AKIS. What it does mean is that the boundaries of an AKIS cannot be considered as

given. Like, the boundaries of any soft system, they are arbitrary and depend on the configuration of actors in a given 'theatre of innovation' (Engel, 1995).

Not Existing in the Real World. Here we come to a difficult aspect of AKIS that I nevertheless consider crucial, if we are to use Soft Systems Thinking (Checkland, 1981) for understanding and enhancing AKIS. A system is a construct. One can look at a bunch of elements and processes and usefully consider them a system. One can then reify one's construct and act as if that system really exists, even though it is a figment of one's imagination. That is perhaps useful if the system considered is an automobile or a Cow Pea plant. This position is not useful, however, when we are dealing with sets of linked actors, such as farmers and researchers. In such situations, the effect of systems thinking only emerges *when the actors involved see THEMSELVES as forming a system and are aware of their mutually complementary roles with respect to a synergistic outcome.* This perspective on the AKIS as a *reflexive device* is crucial for effectively looking at the role of development communication, as we shall see.

Why is an AKIS not composed of given actor categories?

Just as the geographical boundary of an AKIS is arbitrary and negotiated, so is the composition of its elements. Who is or is not part depends on the sense making of the actors involved. Their perspectives might be widely different. For example, us men have been reluctant or even resistant to see women farmers as an important element in an AKIS. The example shows that the composition of the AKIS often is contested. We glibly say that 'farmers' are a component of the AKIS. But we all know that farmers are not a homogeneous category, and reaching the hard-to-reach, i.e. effectively making them part of the AKIS, is a task that has largely eluded public sector attempts to alleviate poverty. One cannot *a priori* limit an AKIS to extension agents, agricultural scientists and teachers. In some theatres of innovation, local leaders play a crucial role, in others NGO workers or private companies make indispensable contributions. In all, the composition of the AKIS is arbitrary and must, in the end, depend on agreement as to which categories of actors are required go achieve synergy with respect to supporting innovation in a specific context.

Why is an AKIS not only technical knowledge?

We assume all too easily that development of agriculture is a question of technologies, miracle seeds, fertilisers, chemicals, machinery, natural enemies, ways to enhance Mycorrhiza, and so forth. Without even being aware of it, this thinking in terms of component technical innovations that enhance agricultural productivity deeply prejudices our ability to be open-minded about what is required. In my own part of the world, for example, one of the main problems is that agriculture has become so productive that food is relatively very cheap (less than 10% of the consumer Euro goes to food and beverage of which only a fraction reaches primary producers), that farmers find it hard to maintain a livelihood from agriculture, while the externalisation of the costs of intensive modern agriculture has become intolerable and requires increasingly Draconian legal frameworks to control. In my part of the world, an AKIS is, therefore, not so much about technology to produce more of the same, but about a fundamentally new social contract for agriculture.

My notion of AKIS has to do with networks of multiple stakeholders, with learning and with interaction. It has to do with the way we make sense of the future and of the opportunities that are available. An AKIS *is* not a predefined construct; it emerges from interaction (usually temporary) between actors who mutually complement one another's contributions. The actors are aware of the fact that they form a system and do their best to maintain it. They talk a lot about their system. In my experience it is possible to facilitate the emergence of such an AKIS.

In this broad sense, AKIS has everything to do with innovation. In fact, innovation can be called the emergent property from the interaction of multiple stakeholders who consider themselves as an AKIS and who can play complementary roles with respect to realising the innovative potential of a situation. Facilitating, and creating the framework conditions for, the emergence of AKIS in this sense is the challenge for Development Communication.

With that I close the definition of the area of discourse for this paper. The rest of the paper is designed as follows. First I must, again, spend time on the three interlocking dominant narratives that continue to dominate our area of discourse. It proves extremely hard to get rid of this outdated trio. I will then present by way of example, the context for West African agriculture to show that the three narratives do not apply and that we need an alternative way of approaching agricultural development. I then formulate a number of principles for development communication in research, extension and education. I end with a few conclusions.

2. Three interlocking but indestructible narratives

Our area of discourse is underpinned by three indestructible narratives that have emerged from the experience in the Mid-Western States of the US. In the early forties, farms in these States became homogeneous populations of small firms, all operating on the same commodity markets, all producing the same products, while they were not, individually, able to affect the price. Therefore it was most rational for them to produce as much as possible against the going price, although the collective effect of this practice is a slight over-production, and given the inelasticity of demand for food, a continuous pressure on farm gate prices. This situation can be called a 'treadmill' (Cochrane, 1958) in which all farmers try to be as efficient as possible and in which they are in fact continuously competing with each other. In these conditions, innovations, such as hybrid maize (Ryan and Gross, 1943), diffuse rapidly (Rogers, 1995), and a relatively small investment in public extension, research and education has a very high rate of return in terms of increased productivity, falling food prices, and reduced employment in agriculture (Evenson et al, 1979). In all, this American experience, after the Second World War replicated across Europe and in Green Revolution areas, especially in Asia, has in our area of discourse led to the dominance of the following three interlocking and indestructible narratives, which are familiar to most of you:

- i. The Diffusion of Innovations (Rogers, 1995);
- ii. The Agricultural Treadmill (Cochrane, 1958);
- iii. Technology Transfer based in an effective knowledge system (e.g., Havelock, 1986).

2.1 *Diffusion of Innovations*

This one is perhaps the best-known narrative. The basic notion is that innovations, novel ideas, autonomously diffuse among members of a relatively homogeneous population after their introduction from outside, either through a change agent, through people who straddle the local and external worlds, or through other media. This diffusion process usually starts slowly and then gathers steam, so that the 'diffusion' curve marking the rate of adoption of the innovation by individuals over time typically has the shape of a growth curve. One can distinguish people who adopt fast and people who are slow to follow. Endless studies have been carried out to identify the discriminating characteristics. This has led to a rather circular argument: research shows that 'progressive' farmers (i.e. those with large farm sizes, education, access to outside agencies, etc.) are the ones who are early to adopt. Therefore, extension efforts should focus on these farmers to achieve rapid diffusion. But these farmers were early to adopt partly because extension agents already pay a lot of attention to them. Diffusion studies often have provided the rationale for what can be called 'the progressive farmers strategy'.

The popularity of the diffusion of innovations narrative can be explained by the fact that empirical studies of cases where an innovation diffused to a large proportion of the farmers in a population in a very short time have created an expectation that technologies, once introduced to few farmers through extension and research efforts, will diffuse rapidly on their own and multiply the public sector effort. 'Diffusion works while you sleep'.

At one time, diffusion of innovations research was the most popular form of social science research with literally thousands of surveys of diffusion processes published. And it must be said

that it is an exciting area. Many questions arise with respect to such issues as the nature of the individual adoption process, the sources of innovation, collective innovation, diffusion across geographical space, the nature of leadership in innovation processes, diffusion as a creator of inequity, etc. The original American work has been replicated in virtually every country in the world. And when rural sociologists get tired of it, agricultural economists rediscover it and start afresh. The whole narrative has been beautifully written up by Rogers (1995³).

Diffusion research has had a tremendously important imprint in our circles. The narrative has reinforced the following assumptions, even if these assumptions have been explicitly rejected by the research. One of the characteristics of a narrative is that, once it has become widely accepted, it become impervious to correction.

1. Innovations come from outside, usually are developed by scientists and then introduced into rural communities, groups of doctors, consumers or other populations. The possibility that innovations emerge locally is not emphasised;
2. Innovations tend to be looked upon as technical component technologies that diffuse on their own, without paying much attention to the farming system into which they are adopted. They are like silver bullets. In actual practice, farmers usually spend a great deal of time on adapting innovations. What is more, the focus on technical innovations that enhance productivity detracts from a focus on system innovations to improve the sustainability of a farming system. Yet innovation in the area of resource management increasingly is becoming a condition for improving rural livelihoods.
3. All adopters are on the same development path, except that some are ahead and others behind. The Dutch rural sociologist Van der Ploeg (1994) has shown that this assumption of a single development path is erroneous. Given the same economic and technological conditions, farmers tend to follow very different development paths. What stands out is diversity and ability to act autonomously.
4. The community in which an innovation diffuses is homogeneous in that all farmers are assumed to benefit from the innovation. In actual practice, innovations tend to be differentially relevant, depending on access to inputs, land, labour, credit, and so on. Adoption of innovations by some might pre-empt others from benefiting.
5. Technical innovation is a good thing. In actual practice, one can imagine situations where innovation is not good at all. For example, the adoption in Europe of hormones to enhance productivity of dairy cows by 10 % would put tremendous pressure on the price of a commodity that is already cheap. It would leave cows with a more miserable life and would mean a sharp drop in the number of farms that are able to survive. Yet, once introduced, a farmer could ill afford not to adopt the technology. And that brings us to the treadmill.

2.2 *The Agricultural Treadmill*

Table 1 shows briefly how the treadmill works (based on Cochrane 1958):

³ This is the last version the author is aware of. But knowing Everett Rogers, there probably is a newer and even better version available by now, and if not, it is about to be published. The basic textbook 'Diffusion of Innovations' has been updated every ten years since 1961.

Table 1: Key elements of the Agricultural Treadmill

- Many small farms all produce the same product;
- Because not one of them can affect the price, all will produce as much as possible against the going price;
- A new technology enables innovators to capture a windfall profit;
- After some time, others follow ('diffusion of innovations' (Rogers, 1995));
- Increasing production and/or efficiency drives down prices;
- Those who have not yet adopted the new technology must now do so lest they lose income (price squeeze);
- Those who are too old, sick, poor or indebted to innovate eventually have to leave the scene. Their resources are absorbed by those who make the windfall profits ('scale enlargement').

This is a coherent and well-known story indeed. And policy based on the treadmill has positive outcomes. For one, the advantages of technological innovation in agriculture are passed on to the customer in the form of cheap food. For example, in my country an egg still has the same nominal value as in the sixties. The very structure of agriculture makes it impossible for farmers to hold on to rewards for greater efficiency (Hubert, et al, 2000). Meanwhile, labour is released for work elsewhere. One farmer can now easily feed a hundred people. When the treadmill runs well at the national level in comparison with neighbouring countries, the national agricultural sector improves its competitive position. Furthermore, an important advantage is that speech making farmers do not protest against the treadmill. They only profit from it. A farmer on the treadmill can only make a good living if he is ahead of the pack. Unlike industrial workers, farmers collectively usually do not claim rewards for greater labour productivity. A final advantage is that the treadmill will continue to work on the basis of relatively small investments in research and extension. These have a high rate of return (Evenson, et al, 1979).

All in all, it is very understandable that policy makers have grasped the treadmill as the fundament for agricultural policy. It represents market forces in optimal form. According to WTO we must work towards a global treadmill. For example, the four million small farmers in Poland must leave the scene quickly so that Polish agriculture can become 'competitive'. A competitive agriculture, that is the key slogan, also for global agriculture.

However, the Treadmill also has a number of negative aspects that are increasingly less acceptable (Table 2).

Table 2: The negative consequences of the Agricultural Treadmill

- It is not consumers but input suppliers, food industries, and supermarkets who capture the added value from greater efficiency. Large corporations are well on their way to obliterate competition in agriculture. Only farmers are squeezed.
- The advantages of the treadmill diminish rapidly as the number of farmers decreases and the homogeneity of the survivors increases. The treadmill has a limited life cycle as a policy instrument.
- Eventually, the treadmill is unable to provide farmers with a parity income. That becomes clear from the subsidies we must give our farmers. We want to reorient that flow of subsidies, but do not as yet have a good alternative. At the time of writing, the European Commissioner for Agriculture was working on it. In the meantime, recent research shows that 40% of farm incomes in the Netherlands are already based on activities other than primary production (Oostindie et al, 2002).
- The competition among farmers promotes non-sustainable forms of agriculture (use of pesticides and hormones, loss of bio-diversity, unsafe foods, etc.). The treadmill is contradictory to nature conservation, drinking water provision, landscape conservation, and other ecological services.
- The treadmill leads to loss of local knowledge and cultural diversity.
- A global treadmill unfairly confronts farmers with each other who are in very different stages of technological development, and have very different access to resources. Although the costs of labour in the North are many times those in the South, labour productivity in agriculture in the North is still so much greater that small farmers in developing countries do not stand a chance (Bairoch, 1997). The global treadmill prevents them from developing their agriculture and denies them purchasing power at the same time. This effect is only exacerbated by export subsidies paid to farmers in the North to overproduce.
- The Treadmill leads to short-term adaptations that can be dangerous for long-term global food security. I think for example of the possible and much disputed disappearance of arable farming from the Netherlands. In the US, one now speaks of the 'Blank Hypothesis'; agriculture in the US will disappear by 2030 because food can be produced more cheaply elsewhere (Blank, 1998). The new American subsidies might prevent this for a while. But it does become evident that the treadmill does not support the contribution to global food security of the most productive agricultural areas in the world. There are those who say that organic agriculture cannot feed the world. I think it is more appropriate to say that one cannot feed the world as long as the treadmill is in operation.

I conclude that within the self-imposed boundaries of treadmill thinking there is no way to solve some of the more important challenges that now confront us, especially in countries and situations where conditions are different from those in the Midwestern States of the USA in the forties. But the same goes in my own country. To continue with treadmill policies, as the farmers want us to do, means further reducing the fraction of our incomes that goes to primary production at ever-greater externalised costs. The treadmill does not fit our age. We have to re-invent agricultural economics and the major pressure is for us to get off the treadmill and to imbed land use in other social and economic mechanisms.

2.3 Transfer of Technology

The third narrative is the transfer of technology. Science is the growth point of human civilisation. It develops the technologies that help us escape from what the Bible calls the 'vale of tears'. Science ensures progress. Extension *delivers* these ideas to *users*. Science is good, but stupid people do not always appreciate it. If farmers do not adopt the scientists' ideas, chances are that they are backward and don't know what is good for them. Or the culprit might also be

extension. After all, many extension workers have been badly trained. A third possible reason can be a ‘fatal gap’ in the linear flow from science to farmers, for example because subject matter specialists are missing (McDermott, 1987).

Transfer of Technology assumes a one-way and uninterrupted flow of technologies from fundamental scientists, to ultimate users via various intermediaries and delivery mechanisms (Figure 3). It therefore is also called the linear model is (Kline and Rosenberg, 1986; Chambers and Jiggins, 1987).

Figure 3: Transfer of Technology (also called ‘The Linear Model’)⁴



This is the typical thinking behind technology transfer. It is an important ideology

By way of example, we present the difference between two situations: (1) the transfer of knowledge, and (2) the co-creation of knowledge. In the first situation, an expert, such as an agricultural extension agent or a medical specialist, seeks acceptance of, or compliance with, his way of looking at the world or of solving a problem. In the second situation, a group of stakeholders with different and often complementary experiences or knowledges agree on ways forward to improve their shared problem (Figure 4).

The column ‘Co-creation of Knowledge’ shows that totally different and equally credible narratives do exist to the more familiar ‘Transfer of Technology’. However, it is my feeling that especially in public agencies for agricultural research, extension and policy-making, and also in many agricultural universities, the three dominant narratives described in this chapter inform decision making about agricultural development.

To my mind, any discussion about development communication must start with reflection on the three narratives. It is my conviction that they reflect certain historical conditions and a phase of agricultural development that is not necessarily ubiquitous or very relevant from a development communication perspective. In the next section I provide an example of a different context.

⁴ Confusion exists in our field in the use of TOT. In some publications, such as those by Robert Chambers, it refers to Transfer of Technology. In publications that have an IMP background, TOT refers to Training of Trainers, a key ingredient in the quality of Farmer Field Schools (FFS).

Figure 4:
Comparing Transfer of Technology and Co-creation of Knowledge on a few key aspects

Key Factor	Transfer of Knowledge	Co-creation of knowledge
Nature of problem	Lack of productivity or efficiency	Lack of concerted action
Key actors involved	Expert and target audience	Interdependent stakeholders in a contested resource or shared problem
Desirable practices	Target audience uses improved component technologies	Stakeholders agree on concerted action (e.g., integrated catchment management)
Desirable learning	Target audience adopts technologies developed by expert. In best situation: diffusion of innovations among members of target audience. Learning of expert is not relevant in this situation	Through interaction, stakeholders learn from and about each other. They try out ways forward in joint experimental action that allows discovery learning. They become able to reflect on their situation and empowered to deal with it
Facilitation	Expert demonstrates, persuades, explains, promotes	Trained facilitator brings together stakeholders so as to allow interaction. He/she creates spaces for learning and interaction (platforms). He/she manages the process, not the content.

3. Exploring the context for agricultural innovation in West Africa⁵

However poor and miserable some West African farmers might be, all have *veto power* when it comes to accepting the results of agricultural research: there is no way that one can force autonomous farmers to adopt technologies. It proves very hard to get this veto power on the retinas of some agricultural researchers and administrators as an inescapable framework condition for effective research.

A typical example is an important and highly regarded international agricultural research agency in West Africa. Its concern is with soil fertility management. After excellent research, it had come to the conclusion that improving soil fertility in West Africa is a question of soil organic matter first and nutrients second. This research showed that planting, and ploughing under, the luxurious growth of the velvet bean (*Mucuna spec.*) is the most efficient way to increase soil organic matter. When this thinking was made public, it predictably drew some criticism. After all, *Mucuna* has been tried time and again. Invariably farmers complain that one cannot eat the beans, that it is hard and painful to incorporate the vegetative matter into the soil, that the bean occupies the land for two seasons during which food production is impossible, etc. Nowhere in West Africa has *Mucuna* been taken up as a green manure. Undaunted, the representative of the agency proclaimed that this was not his but the farmers' problem and that if they wanted to escape from the vicious circle of land degradation and poverty they should plant *Mucuna*. As a scientist he knew what worked, acceptability by farmers was not his problem. This approach is a typical example of linear thinking. The scientist is right and his lack of impact is the farmers' problem.

But the lack of impact of agricultural research in West Africa cannot be blamed on lack of innovativeness on the part of the farmers. West African farmers can be considered among the most innovative in the world. Their indigenous systems represent sustainable, resilient and intelligent forms of agriculture that have supported expanding communities over the centuries. They took up maize, Phaseolus beans, cassava, tomatoes and many other current staple crops that originate from Latin America in fairly recent historical times. West African farmers have coped with the rapid population increase during the last twenty years and have adapted their farming systems to deal with new problems such as declining soil fertility, declining rainfall and weed emergence. Gold Coast tribesmen of old have made cocoa Ghana's major export crop without any government assistance, a development that only came to a halt when excessive taxation virtually killed the goose that laid the golden eggs.

Our favourite example of West African farmer innovativeness is the development, by farmers on the Adja Plateau in Benin, of a new farming system based on an oil palm fallow that deals with extremely high population pressure on the land, 'comatose' soils, and the weed *Imperata cylindrica*, and that is profitable to boot, through the production of *Sodabi*, an alcoholic drink distilled from the palm wine that is harvested when the palm fallow is cut down (Brouwers, 1993).

Enough said. Small-scale farmers in West Africa are amazingly innovative. Perhaps village levelling mechanisms and fear of jealousy-inspired black magic lead to some reluctance of farmers to stick their head above the parapet, but on the whole, one cannot blame stagnant agricultural productivity in West Africa on the traditionalism or conservatism of farmers. Hounkonnou (2001), who for 12 years has surveyed the West African development scene has

⁵ Based on a section of Röling et al, in press.

come to the conclusion that the only thing that ‘works’ in rural West Africa is ‘rural dynamics’, the continuous innovative struggle of rural people to improve their lives

The question then is: why has it not been possible for agricultural research to link into this rich lode of innovativeness? We believe it is too easy here to place the all the blame on the disciplinary myopia of some researchers and the linear transfer of technology paradigms that international and national science & technology institutions have been following. However serious an impediment this is. After all, for years now West Africa has been the scene of sensitive efforts of various actors to use participatory approaches (e.g., Defoer, 2002; Van Paassen, 2004). Below we explore three factors: (1) farmers’ lack of countervailing power, (2) the lack of markets and service delivery institutions at the middle level, and (3) the systematic creaming off of the wealth generated by West African agriculture by pre- and post-independence governments⁶.

3.1 Farmers’ lack of countervailing power

Without going into too much detail, most observers would agree that the demise of colonialism has left West African countries with a vacuum in terms of checks and balances so that corruption, political adventurism, and exploitation of the powerless could have free play. Part of this picture is the total absence of countervailing power of organised farmers. Farmers have no control over commodity prices, input selling companies, government produce buying schemes and marketing boards, policies to import cheap foodstuffs that undercut local farmers and so forth. If one compares this situation with industrial countries, the sharp contrast stands out.

In most industrial countries, farmers have power that is disproportionate to their numbers, but reflects the fact that they collectively own most of the land of the country. They are extremely well organised, and their representatives can be found in the capillaries of the political system. In fact, in many industrial countries farmers are so powerful that they are able to override concerns for health (e.g., food safety), environmental pollution and toxification, nature protection, sound water management, tourism, animal welfare, and even prudent economic practice. Farmers in industrial countries have a well-organised institutional influence on decisions about agricultural research and extension, and they are embedded in networks of service delivery organisations, many of which they own themselves through their own co-operatives.

Based on the experience in industrial countries, one could say that the fastest way to develop West African agriculture is not to strengthen what in Francophone countries are called ‘*les organismes d’ intervention*’, but farmers’ countervailing power *vis-à-vis* those ‘*organismes*’ (Röling and Jiggins, 1998).

Until quite recently, there was little chance that such advice would be heeded in West African countries. Colonial governments had no interest in farmers’ countervailing power. Heaven forbid! They were good at creating the incentive structures required for small-scale farmers to produce the raw products required by their industries. Hut taxes put the pressure on the need to generate cash. And the ‘cash crops’ such as cotton, cocoa, etc., were the only ones that could generate cash. Carefully designed ‘supervised credit’ systems that integrated credit delivery, produce buying, input delivery, and farmer payment (after deducting credit repayment and interest) allowed the effective mobilisation of the energy of millions of small farmers across West Africa. The SODECOTON is a good example.

⁶ De Janvry and Dethier (1985) list the following factors: (1) farmers have no political clout; (2) taxing the beneficiaries of research; (2) lack of co-ordination between technological and economic policies; and (4) little ex-ante analysis and participatory research.

Post-independence Governments had every reason to maintain this mechanism. For this to succeed, farmers needed to remain unorganised, ignorant of the scandalous percentages that governments were creaming off commodity export prices, and powerless to defend themselves against official corruption. Now the situation is changing. Commodity prices have nose-dived. Low prices have made farmers neglect their plantations and crops so that productivity has remained very low, starving governments of revenue. What is more, industrial agricultures, benefiting from years of investment in research and productivity enhancement, are now able to import food grains into West African countries at prices that are a disincentive for West African farmers to produce for the market (Bairoch, 1997). For Kenya in East Africa, it is said, for example, that maize can now be imported into the country at prices that are lower than the cost price of the most efficient local farmers, including large white farmers. Obviously, there is little reason for KARI, the Kenyan Agricultural Research Institute, to invest in maize research in this situation (pers. comm. Dr Cyrus Ndiritu, former KARI Director, July 2003). In West Africa, examples abound of donor schemes, such as Sassakawa 2000, that successfully create the conditions for small farmers to produce 7 tons of maize per hectare, only to find that farmers do not adopt the required practices because they cannot sell the surplus. Perhaps the opportunity for a Green Revolution in West Africa has passed forever.

Whatever be the case, present West African Governments are waking up to the need to provide farmers with a better deal. A good example is the new price policy for cocoa in Ghana. But effective farmer countervailing power over the decisions that affect their lives is still a long way off.

3.2 Failing marketing chains and service institutions

If there is one thing that strikes those who have been acquainted with rural development in West Africa over the years, it is the lagging development of the institutions at the middle level, such as transparent marketing institutions, dependable veterinary health services, affordable credit provision, competitive input delivery mechanisms, accessible extension services, produce transport, etc. The only dependable institution in the West African rural scene seems to be the market trader with her sense for business and trade. Recently imposed structural adjustment policies have largely destroyed whatever public service delivery mechanisms were available. From an economic point of view, this was perhaps the right thing to do; given the low productivity in monetary terms of West African agriculture, investment in service delivery simply does not pay. But the fact remains that the absence of a network of service institutions in which agriculture is embedded severely constrains agricultural development. Time and again, pilot projects are mounted that artificially create the conditions for a rapid productivity growth. Then, when it comes to scaling up their indeed impressive effects from the pilot level and to replicate the project on a larger scale through existing institutions, the effects collapse. The existing institutions are simply incapable of creating the conditions in which small-scale West African farmers can apply their innovativeness to the benefit of the public cause. As it is, in the absence of a decent monetary income, they focus on subsistence production and are 'organic by default'. Inputs are too expensive to apply, and producing a surplus is irrational. Small wonder, that those who measure agricultural development against the growth of productivity per hectare, are not impressed by West Africa's innovative performance (Chema, et al, 2003). They see only stagnation in what is, in fact, a highly dynamic, innovative and adaptive performance, given very adverse and rapidly changing circumstances.

In all, one can conclude that it has not been possible, to date, to set in motion in most of West Africa the agricultural treadmill by which innovation is propelled by the market and technological advance exerts downward pressure on prices, to the benefit of consumers, and the

competitive position of the country's agriculture in the world market. Meanwhile, WTO has incorporated West African agricultures into a global treadmill in which they do not stand a chance. West African agriculture, if it remains unprotected, runs the risk of remaining a source of subsistence until farmers can escape into off-farm jobs.

The situation described has important implications for agricultural research. It is irrelevant to assume goals for technology development, such as productivity increase. It is equally irrelevant to implicitly assume that conditions can be created that will allow large-scale adoption of a technology, if those conditions are not available at present. Further, it is irrelevant to develop technologies that can only be adopted as long as special conditions can be created through small-scale projects.

3.3 Creaming off farmers' wealth

Industrial countries cream off farmers' wealth and exploit their energy through the treadmill mechanism described above. As we have seen, food becomes increasingly cheaper as farmers continue to compete with each other by trying to be ahead of the pack. Farmers' countervailing power does not work in the case of the treadmill mechanism. The influential farmers in the agricultural organisations are the ones that grab the windfall profits; hence they benefit from the treadmill. In no European country have farmers ever protested against the fact that the treadmill annually leads to a 2 – 3 % decrease in the numbers of farmers. The influential farmers buy the land of the dropouts and benefit again.

In West Africa, creaming-off agriculture has taken another route. Since the vast majority of the population was engaged in agriculture at the time of Independence and since the only wealth generated at the time was the revenue from export crops, the new governments had little option but to exploit the wealth generated by agriculture. We have described the consequences in terms of run-down of export industries, low yields per hectare food production, and, according to some, constant mining of the nutrient reserves of West African soils without replenishment (Stoorvogel and Smaling et al, 1990).

At present, things have begun to improve. Urban development creates markets for food commodities that cannot be imported cheaply, such as cassava and various vegetables. The fact that farmers increasingly have alternative sources of income (e.g., through urban wage employment, emigration, etc.) means that they no longer have to accept any monetary income they can make from export crops. Governments are forced to offer farmers better deals. In other words, new opportunities seem to be emerging, but these are by no means automatic or obvious.

Our (superficial) survey of the West African context shows that it is very different from the one in which the three interlocking dominant narratives emerged. But in a situation where farmers do not have clout, it is all too easy for people, explicitly including Africans educated in the 'Western tradition', to, often implicitly, make decisions that are based on an industrial country context. The most glaring example of this is the tacit assumption that agricultural research serves productivity increase in terms of tonnes per ha. One scheme after another tries to achieve this. The predictable result is overproduction, a rapid fall in prices, yet another wrong prediction of the internal rate of return of a project, and disillusioned farmers. There must be another way. That is the challenge for development communicators.

4. Development Communication in agricultural research, extension and education?

I would not have come down so hard on the three narratives, if it had not been for my long experience in various forums, which has taught me how much money and effort is wasted as a result of informing decisions about objectives, strategies and investment on the basis of these three narratives. What is worse, these three narratives form a screen that filters out new ideas, and make it impossible to invest in local experimentation that might lead to new ideas. With such strong narratives, it even becomes impossible to imagine that an alternative is possible.

It is time for me to become constructive. Where do we go from here? Let me begin by saying that as a social scientist, I am much better at explaining what has happened than at designing a bright new future. For example, Pontius et al (2002) who document the great achievement of the Farmer Field School Movement that emerged from FAO's IMP Programme in rice in Asia acknowledge me as someone 'who helped us to understand what we are doing and why we should continue doing it'. Meanwhile it is they themselves who as dedicated, inspired and highly motivated practitioners, in close collaboration with farmers, Master Farmer Trainers and others, over ten years slowly evolved Farmer Field Schools and Community IPM as practical alternatives to the three dominant narratives. I am very honoured to have been asked to address you as a social scientist. But I am not a designer of recipes for the future. Transfer of Technology does not apply also in my case. What I can do is to suggest some principles.

4.1 *Farmers have veto power, better listen to them!*

According to Sir Albert Howard (1943: 221), that great pioneer of organic agriculture who designed large-scale agricultural production systems that did not depend on chemical fertilisers, 'the approach to the problems of farming must be made from the field, not from the laboratory. The discovery of things that matter is three-quarters of the battle. In this the observant farmer or labourer, who have spent their lives in close contact with Nature, can be of the greatest help to the investigator'.

As I said, farmers have veto power when it comes to participating in induced innovation. There is no way one can force them to innovate. Therefore, one must listen to them, take them seriously, and involve them in one's work. There seems no other way. It seems to me that development communicators in research, extension and education, especially if they subscribe to the Millennium Goals, must ensure that farmers are given a voice in the development process. An example of a pioneer who developed such an approach is given below.

Tekelenburg (2002) worked for eight years in Cochabamba, Bolivia, in a development project that sought to regenerate ancient degraded mountain lands in the High Andes using Cactus Pear for human, cattle and cochineal feed and for re-vegetating the barren slopes. Out of this experience, Tekelenburg drew conclusions for the types of 'agricultural research' that were required for a development project that is effective in reaching the rural poor. He suggests the following fundamental questions that must *all* be answered to achieve 'development' outcomes.

1. *What are the useful a-biotic and biotic relationships that can be construed?* For such questions, Tekelenburg had to go right back to fundamental research, for example, for understanding the life cycle of a new pest.
2. *What can technically make a difference?* A great deal of applied experimentation and conventional agricultural research, grounded in international scientific work, had to be carried out for this purpose. What pheromones can be used to attract the males into traps? What natural enemies can be used to control it? The general question is: what

are the best available technical means for given (i.e. assumed) human problems? Most agricultural research falls into this category.

3. *What can work in the context?* Answering this question requires an analysis of the context in which small farmers live. This is usually achieved by paying attention to the agro-ecological zone. But equally important is the analysis of the market, input provision, transport availability, risks of theft, etc. As we have seen, it is no use to carry out research on maize productivity in Kenya if you can import it 20% cheaper than it can be produced with the best local technology;
4. *What can work in the farming system?* Here farmers' labour availability, gender differences, knowledge, access to land and other resources, market opportunities, etc., determine the range of appropriate options that fit the local system. At this point, one has to leave a disciplinarian or sectoral perspective altogether and focus on how the outcomes of the research fit into the local system. Will it work within that system? It is the fundamental question of the Farming Systems approach.
5. *What will be acceptable?* What systems do farmers want and need, given their explicit enthusiasms, alternatives, cultural inclinations, experience, livelihood strategies and superior insight into local conditions and constraints? To answer this question, and avoid invoking farmers' veto power, one has to leave behind any pretence that the scientist can determine what is best. The question cannot be answered without engaging farmers as co-researchers and without empowering them to have clout over the research process.
6. *How can the outcomes be scaled up?* Most research projects can be considered expensive, small-scale, pilot efforts that only become socially effective if the experiments are replicated at a societal scale, for example in factories or in markets. In this respect, the work of Latour (1999) on Ferdinand Jolliot, the husband of Marie Curie, who worked to ensure that atomic energy became part of France's policy repertoire, is a classic study of scaling up. Scaling up is not only a question of doing more of the same, i.e., through the diffusion of a given technology among farmers, but especially a question of institutional change in marketing chains, consumption patterns, education, government budgets, etc.

It is important to realise that *all* these questions need to be answered. It is also important to realise that these questions cannot be answered in the sequence in which they are listed above. In fact, one usually runs into these questions time-and-again, as the project progresses, and fundamental research questions might well be the outcome of a project rather than its beginning.

I believe that especially the questions 4 through 6 require attention from development communication. The challenge is to create social spaces for learning (Jiggins and Röling, 2003) in which farmers can be listened to and influence the answers to these questions. I feel that considerable international investment in experimentation with creating such spaces is required.

4.2 Farmers have no negotiating power; better find ways of giving it to them!

One of the principles of IPM is that 'the farmer is an expert'. This principle is increasingly recognised all over the world. One recent example from my own country is the recognition by official Water Management Boards that farmers have considerable local hydrological knowledge that the Boards can use to their benefit. Farmers may be experts, but they lack a collective voice, at least not in many developing countries. This lack of influence of farmers is beginning to be a handicap. In the early days of the Green Revolution, farmers were more or less considered as the lowest rank in the hierarchy. Scientists and administrators determined what needed to happen and farmers were told what to do. In many countries, if farmers did not like the new 'high yield variety' and continued to plant their old varieties, the authorities would not hesitate to call in the

army or police to destroy the old crop. Prices were set at the national level, uniform technical packages of varieties, fertilisers and pesticides were recommended across huge domains assumed to be homogeneous. It worked for a while. Now that second generation problems are beginning to be felt (such as pest resistance and emergence), and now that the next advance must come from capturing diversity, a powerless peasantry is no longer the right partner for agricultural development. Farmers must have voice, they must be given full opportunity to help make development work.

The same can be said for the highly diverse, risk prone, rain fed areas where the Green Revolution has not worked. It has proved virtually impossible to ‘develop’ these areas without involving farmers in inventing the solutions. For scaling up the usually small-scale pilots it is necessary that farmers develop political clout.

Most of us who have seen IPM Farmer Field Schools in action have been impressed especially by the extent to which the process of discovery learning during the Farmer Field School has given farmers a new sense of self-confidence and pride. They have learned to engage in systematic experimentation. They have learned to conduct meetings and draw their own conclusions from observation. They have become empowered. In Indonesia, the IPM Farmer Field Schools eventually led to a Farmer Organisation that can act as a credible partner in policy making. Of course, people who think in terms of the three dominant narratives are unlikely to look at IPM Farmer Field School benefits from this perspective.

It is remarkable that the experience in the industrial world has gone unheeded in this respect. There is not an industrial country where farmers do not have power usually far in excess of their numbers. Such farmer power has been a crucial ingredient in the success of these countries to develop efficient agricultures. Developing the political clout of farmers seems the shortest route to development. To my mind, *that* should be a primary objective of development communication, not the use of ICT, wide screens and megaphones to better zap preconceived messages to farmers.

4.3 Innovation is not the end-of pipe result of a linear process but the emergent property of interaction among multiple stakeholders in an AKIS

I have started off by defining our area of discourse in terms of AKIS, a network of actors in a theatre of innovation. These actors potentially can make complementary contributions towards innovation. The network is based on shared perceptions with respect to the issues at stake. Working in a network mode on a basis of egalitarian interaction is not immediately acceptable in most public agricultural domains where hierarchy, protocol and protection of turf are dominating values. Yet I believe there is much scope for working in an interactive mode, as long as farmers are fully involved as partners. As I said above, an AKIS should not be seen as an organogram, with the Minister on top and a multitude of arrows linking bureaucratic units. An AKIS is a voluntary coalition of interest, made up of people who have come to form a theatre of innovation because they have confidence that a useful play can be enacted in that theatre. An AKIS is a more or less temporary configuration of actors and institutions considered relevant for bringing improvement to a situation. One can even think of it as a task force or a project team. Sometimes improvement might come from new technologies developed in answer to the questions posed by Tekelenburg above. But in many situations, the priority problems will be institutional, organisational, or political. They will have to do with the creation the framework conditions for agriculture to become more productive, more sustainable and more socially just. It is crucially important to consider such types of change as innovations. Enhancing and facilitating AKIS in this sense is a tremendous challenge for development communication.

One project in my experience that has developed an intelligent and inspiring approach to introducing the kind of changes we are talking about is the Proyecto Nuevo Paradigma (De Souza Silva et al, 2000). It works with a very small staff, located in Costa Rica. The staff acts to inspire, mobilise, train, support and facilitate a network of country teams, each recruited from enthusiasts assigned by their respective Ministries of Agriculture to participate in the project. Each country team experiments in its own country with one or two new approaches. These are discussed and analysed during workshops in which all country teams come together. The country teams are each financed by their home governments, only the project team and its facilitation work are paid by a donor. It is a highly successful and inspiring effort supported by a progressive donor who can tolerate an open-ended outcome.

It is an example of an AKIS of second order. It is an AKIS for generating effective AKIS, a network for networking. I believe that a key to finding alternatives to the deadly mantra of the three narratives that emanates from the cutting edge scientists, the market fundamentalists, and the top managers, is experimentation. Or better still, such an AKIS for generating effective AKIS could support joint experiments that are already under way, where creative people are getting excited because something new is being achieved. I believe a great number of very important lessons are being learned every day in most countries in experiments with different approaches. We just do not take the time to examine them and learn from them because the three narratives have taught us everything we need to know. It is time to shake off our complacency and dare to accept that we have not done very well in terms of development and therefore than we need to accept that the only thing we know is that we don't know. We need to make a greater effort to learn together around concrete field experiments that pioneer new approaches.

In a recent water conservation project in the Netherlands (www.waterconservation.nl), we have learned that it is very effective to bring together concerned stakeholders at the field but also at the agency and provincial policy levels around a concrete problem and to learn together how to deal with it.

4.4 One must involve those who have the power to determine the framework for the agriculture and rural development sector

Alas, it is an all too common experience to see good initiatives thwarted by those who see the world as a set of variables to be manipulated (after Fresco, 1986), i.e., the people who set the conditions in which you must work. It is impossible to achieve goals without involving these 'higher' levels. I believe that development communicators in research, extension and education have an important task in bringing about transformational learning at these higher levels.

5. Conclusion

In the agricultural sector, the actors who set the scene tend to be of three kinds, in my experience. First and most ubiquitous are the agronomists, soil scientists, animal scientists, engineers and others who have a natural science background. They tend to think in terms of causes, not human reasons. In second place, I would mention agricultural economists who do think in terms of human reasons, except that they assume that humans make rational choices on the basis of cost benefit calculations. Thirdly, there are the lawyers who think in terms of systems of norms and design unambiguous regulatory frameworks.

The scientist, the economist and the lawyer each have a necessary contribution to make to development. But in a world in which people's livelihoods are increasingly determined by other people, and where achieving one's goals becomes increasingly determined by the actions of others, the three perspectives leave out a crucial ingredient: *concerted action*. Concerted action is the key ingredient in integrated water catchment management. It is the crucial ingredient in systems innovation with respect to creating realistic opportunities for the poor. It is the crucial ingredient in developing more effective marketing chains. Concerted action increasingly is, to my opinion, the crucial dimension of innovation.

When it comes to concerted action, thinking in causes, in terms of rational choice, or in terms of rules is not of prime importance. Concerted action emerges from interaction. It is based on negotiation, on awareness of interdependence, on reciprocity, and sometimes on solidarity. Concerted action results from learning about and from each other, from slow convergence with respect to goals, ideas, ways of assessing outcomes, and so on.

In my humble opinion, development communicators have a vital contribution to make by elevating concerted action and co-creation of knowledge through interactive learning to the status of a governance mechanism at par with technology, hierarchy and market.

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Annex: Propositions for Discussion

1. Food and fibre are only two of many ecological services on which humans depend. Other ecological services include drinking water, bio-diversity, climatic stability, control of pests and diseases, health, stable hydrological systems, fuel, building material, pollination and so forth. Both in the South and the North, promoting food and fibre production with total disregard for other ecological services is rapidly becoming irresponsible. Both rich and poor suffer economically, socially and psychologically from ill health (e.g., obesity), degradation, desiccation, pollution, toxification and other negative impacts from agriculture. It is time to look at agriculture in a wider (systems) perspective. Such a wider perspective has far-reaching implications for **Development Communication**. The focus shifts from technology push to the facilitation of co-creation of knowledge in complex and contested resource dilemmas in which multiple stakeholders exert competing claims on limited resources.
2. Innovative performance emerges from interaction among complementary actors in theatres of innovation. The theatres of innovation, complementary actors and their interaction all require active fomentation so as to ensure that they gel into effective knowledge and innovation systems (AKIS). Such process management is a key task for **Development Communication**. Only in few instances can this task effectively be limited to the promotion of component technologies.
3. We as **Development Communicators** must change our narratives from an outdated focus on diffusion, technology transfer and the treadmill, to the new and exciting stories that are emerging everywhere. We must learn to tap into the experiments and learning that are going on at the local level in most developing and industrialised countries. Examples are Community IPM, Landcare, Social Learning, Common Property Resource Management, Participatory Learning and Action, etc.
4. Part of the outdated focus is to regard researchers as knowledge and technology *creators*, extension staff and educators as *delivery mechanisms* of knowledge, information and technology, and farmers as ultimate *receivers and users*. In this scenario, only extension officers and educators are communicators. Modern views of innovation support a totally different view in which the functions of creation, exchange and use are supported by different actors and institutions, including research, extension and education, but also including commercial enterprise, farm women, NGO workers, community leaders, etc., depending on the situation. All these actors are actively involved in shared networks, interactions, learning processes, etc. In other words, they are all active communicators, and to the extent they are not, innovative performance will suffer. **Development Communication** has a 'meta' role to play in helping these actors become better 'interactors'.
5. **Development Communication** runs the risk of being captured by the fast professionals who have learned to regard communication as a tool for promoting commercial interests. Poverty alleviation is a product. Hence the same communication rules apply as in selling toothpaste or condoms. The focus is on clever media use, imaginative market research, etc. While accepting the value of some of these practices, we observe that their focus on *intervention* means they neglect *interaction*. Communication becomes only persuasion, instead of also listening, exchanging ideas, building concerted action and negotiating agreement.
6. An analysis of the context for agricultural development in many developing countries suggests that it is not so much the enhanced power of the '*mechanismes d'intervention*', such as public extension services or research institutions that is required, as the enhanced power of small farmers to countervail those '*mechanismes*'. The history of agricultural

development in industrial countries suggests that such countervailing power is an essential ingredient in effective utilisation of public and private funds. Building such countervailing power is a key task for **Development Communication**.

7. An analysis of the context for agricultural development in many developing countries shows that it is not so much technologies that are the factor in the minimum, but institutional frameworks within which technological innovation can make an effective contribution. If they were given concrete marketing and input purchasing opportunities, for example, small African farmers could greatly enhance the productivity of their resources with *existing* technology. It is the task of **Development Communicators** to develop effective strategies to create synergistic networks of commercial input providers, public service agencies, banks, and marketing agents. Hence the old and automatic focus on research, extension and education sets everybody on the wrong foot to begin with.