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## **The New Mission of Agricultural Research and Extension in African Agriculture**

**Dirk Kohnert and Paul G. Weber**

### **Introduction**

According to conventional understanding, the main objective of agricultural research in Africa is the development of modern technology for African smallholders, whereas transfer of technology is held to be the major task of agricultural extension services. That is, research and extension are considered to be linked but nevertheless independent departments of the development service: the former concentrates on the elaboration of viable techniques or messages as well as extension-methods, the latter executes extension on as broad a scale as possible. Whereas this method may have had success in developing European and Asian agriculture, it has failed to show the same effect in Sub-Saharan Africa.

In this paper we give a critical analysis of the conventional division of labour and propose new roles for agricultural research and extension, in order to find specific solutions for the problems of different target groups of development assistance in African agriculture.

### **Critical analysis of the conventional division of labour between agricultural research and extension**

Up to the late 1960s, agricultural research stations saw their main duty as promoting the modernization of backward methods of cultivation in Africa by putting together technology packages to initiate a 'Green Revolution' in developing countries. In the 1970s, however, it was increasingly recognized that the high technology packages were only suitable for a small minority of commercial farms. If they had an impact at all, they often increased socio-economic differentiation and dependency in the countryside instead of alleviating hardship among the poor through the take-off of self-sustained growth (Byres 1981).

In order to exploit the production potential of the majority of African peasants, it was necessary to take into account the diversity of production

and household systems in the countryside. The farming systems and on-farm research approaches (see Steiner 1987 and Pillot 1987 for a comprehensive overview) were meant to offer a framework for developing viable techniques for African smallholders, perfectly adapted to meet their different objectives, as well as the demands of the African states for increasing production. Various mechanisms for feed-back by the target groups were expected to guarantee the success of these approaches. Nevertheless, the division of labour between research and extension was preserved (Albrecht 1987; Bellinger 1990).

According to the present state of the art, the main bottleneck for growth in smallholder productivity is the lack of viable innovations adapted to the specific agronomic, economic and social constraints of the target groups. The extension of the chain of research into the peasant environment can be seen as an answer to this problem. Nevertheless, agricultural research remains a closed shop within academic circles, now enlarged by social scientists, who were suspected hitherto by their agronomic colleagues of being unqualified to undertake applied quantitative research. Increasingly, one tries to get closer to the grass-roots. However, decisions on methodology, approach, research design, and more often than not objectives, even within the realm of on-farm experimentation, remain in the hands of scientists, held to be uniquely qualified to decide on these questions.

As a result of this professional blindness centuries of indigenous methods of generating and transferring innovations by African peasants themselves have been unexploited until recently. The mainstream of current thinking in African developing countries still holds that 'scientific research' has to be given priority over 'non-scientific' (i.e. inferior) peasant experimentation. This distinction, however, is not justified either from a methodological point of view or from that of a target group and a basic needs orientated development policy (Chambers and Jiggins 1986: 5-7).

The most important criteria of science, namely the relevance of the problem and (inter-subjective) falsification, simply apply to different degrees to each of the two innovation approaches. Agricultural research under controlled conditions is generally well documented and liable to falsification, but regrettably, it has often proved to be irrelevant for target groups of resource-poor farmers. Assisted experimentation by the peasants themselves is highly geared towards solving their specific problems, but it is often impossible to repeat every step in the experiment. Rather, this kind of research follows a pattern of trial and error, and is rarely planned in advance and in detail. Its results, however, are generally subject to outside control, and are also accessible to other peasants.

In short, the major bottleneck for agricultural research and extension in Africa south of the Sahara is the lack of relevant information adapted to

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the highly differentiated African peasantry (Kohnert 1990). Developing an adequate methodology to search for these innovations is a pre-condition to overcoming this bottleneck. Therefore, it is reasonable to concentrate future technical assistance on participatory methods of developing innovations for resource-poor farmers which overcome the outdated conventional separation between research and transfer of technology.

### The new roles of agricultural research and extension

The suitability of any approach to research and extension depends firstly on the significance of the problems to which solutions are to be found. In our opinion research efforts should focus on urgent social and ecological problems. There are still too many research projects, reports, and dissertations that lack relevance, either because they do not analyse such problems at all, or because they lack the minimum of methodological requirements, for example with respect to the link between problem, goal and the falsification of hypotheses.

Secondly, the target group - its social organization, values, interests, and resources - is an important factor in research and extension. For example, quite a number of recommendations to improve the situation of the small-scale farmer are worthless, because they do not consider the constraints and potentials of this target group. The institutions in charge of research and extension have to be taken into account as well. Their personal and organizational structures and their specific orientations, interests and resources, have to be articulated and considered in evaluating the impact of their research proposals and findings. Finally the social and economic environment has a definite, but often unacknowledged, influence on the research orientation.

Therefore, a problem- and target-group oriented approach is likely to be the most promising means of pursuing the actual mission of agricultural research and extension. In view of past experience with rather ineffective agricultural research and extension in Africa, and in order to assure a maximum of problem- and target-group orientation, we may suppose that development of innovations is most effectively achieved by farmers' experiments and by the communication of the findings among farmers themselves. If we admit this thesis, it means that there is a need to revise the respective roles of agricultural research and extension organization in the following directions.

1. Conventional agricultural research, whether within the research station or on peasant farms, should acknowledge that its analysis of the problem as well as solutions offered are mainly those of scientists themselves, and not those of the peasants. To use comparative advantage more

effectively, scientists' research should focus on the development of sustainable strategies, addressing those problems which would be neglected if one merely attempted to meet short-term individual or group interests. It should focus on macro-economic, social and ecological problems, and try to find sustainable solutions, for example to maintain and protect threatened natural resources, as well as developing instruments for monitoring and steering social change. The problem orientation of such a research approach would have to be reinforced by an institutionalized monitoring of farming systems, as well as macro-economic and ecological developments.

The localization of scientists' experiments on peasants' fields (on-farm research/testing) can by no means guarantee that innovations are adapted for different categories of farmers. The choice between on-station research or on-farm testing should be a question of suitability: it depends on the type of problem, e.g. a macro- versus a micro-economic orientation, and not so much on the degree of target-group orientation. Research staff should be held fully responsible for observing the rules of scientific research, for analysing problems at the farmers' level, and for evaluating the results. But, in contrast to conventional understanding, it is difficult to see how they could be made responsible for the eventual adoption of innovations. However, they should admit that their scientific findings are the scientists' answers to the scientists' questions. If they are successful, their findings may be valuable for guiding peasant experimentation.

2. At the same time we propose restricting the conventional 'extension service' or 'transfer of technology' units to guiding and assisting peasants' experimentation on demand. Peasants' experimentation covers not only the testing of scientist' recommendations, but would have to incorporate a genuine search for indigenous innovations by peasants themselves. Such an understanding of agricultural research and extension fits well into a range of concepts which were developed in the late 1980s to answer the failure of the classical research and extension approach. The new concepts are known by different names, the Farmer First Approach, Low External Input Technology Development (LEISA), Recherche-Developpement, etc. (Chambers 1989; Haverkort 1989).

Highly staffed, expensive state organizations which try to contact every village, as required for implementing the Training & Visit approach, are no longer needed. These could be replaced by guided peasant experimentation based on the demand of innovative peasants, representative of each production system or social stratum of the village community, and by the promotion of target-group specific means of communication to guarantee the exchange of research results.

The approach outlined above, i.e. putting into farmers' hands the development of innovations and the communication of their experience, receives further support from the fact that, in the past, farmers did develop viable innovations on their own and actively spread their experience — sometimes even contrary to the intentions of local (colonial) government (Hogendorn 1966). An important role in this diffusion of new technologies has been played by traditional indigenous means of communication, usually ignored or even disqualified by 'modern' administrations, as well as by many development planners.

An integrated research and extension approach, acting on demand as described above, could be implemented in four steps:

1. Enhancing farmers' analysis of problems: first, on individual farms of peasant innovators, identified for each social stratum or production system, and second at community level, the latter especially for ecological and social problems. What counts most is quality, not quantity; this task would require few but highly motivated and experienced communication specialists, dedicated to helping the peasants and to living and working with them.

2. Assisting farmers to obtain access to problem-related findings of scientific agricultural research and of other farmers' experiences.

3. Assisting farmers who are willing to perform their own experiments in the planning, layout and monitoring of experimental designs, and eventually in reducing experimentation-related risks.

4. Helping farmers to document results, as well as to encourage the use or revitalization/adaptation of traditional means of communication, education and training (griots, theatre, traditional masks, age-grade group competition, etc.). Complementary to the latter one might organize visits to innovative peasants, agricultural fairs, and a regional rural radio network, well adapted to the specific problems of the target groups. In more developed regions one could even think of assisting in the drawing up of community development plans.

It is obvious that such a participatory approach requires a revision of the conventional goals and objectives of development projects in the sense of enhancing self-help capacity, rather than concentrating on growth of production. Neo-classical economists could maintain that the latter objective will still play an important role, and therefore, the conventional roles of agricultural research and extension still need to be maintained. This would, however, reduce participatory approaches to mere survival programmes. We might even go further and say that such a statement would testify to a mistaken judgement of the impact of the classical research and extension approach on production and productivity.

Recent evaluation of development projects in West Africa (Liihe 1990; Elwert 1990; Ayeh 1990; Durand 1989) has shown that increases in agricultural production (if any) have been due primarily to improved

input supplies, credit facilities and better marketing conditions, state-backed research and extension of new technologies in agriculture being of minor importance. It is interesting to note that the failure of the conventional research and extension approach becomes apparent only when economic conditions are in decline, while the inefficiency of the classical approach is rarely stated under conditions of a prosperous economic environment, which allows for (subsidized) input supply, credit and marketing facilities. However, production and productivity promoting inputs and services do not necessarily have to be provided by organizations which are in charge of agricultural extension. It would be better to separate clearly production promotion from efforts to improve farming systems or community development. The latter is undertaken at grass-roots level and should not be left to short-term economic policy, but should be promoted to secure sustainable agricultural production systems and to preserve natural resources.

The adoption of the new approach of integrated agricultural research and extension allows for both a considerable slimming of frequently over-staffed state and para-statal extension services, and a reduction of the role of the state to its genuine tasks of policy making and of promoting a favourable environment for private initiative. In this respect, the proposed approach fits well into on-going structural readjustment programmes.

## Conclusion

So far, the common objective of agricultural research and extension in developing countries has been the transfer of technology, developed by agricultural research institutions in order to increase agricultural production. Recent evaluations of agricultural projects in Africa have revealed a disappointingly low degree of adoption of the proposed technology packages. This apparent ineffectiveness is due to the lack of innovations adapted to the farming systems of resource-poor farmers as well as to outdated concepts of agricultural development. To overcome this bottleneck, the search for viable innovations should not be left to conventional agricultural research alone. Indigenous agricultural systems of knowledge also have to be revitalized. One of the main tasks of a revised integrated research and extension services should be to support farmers' experimentation on demand in providing viable options, limiting risk, and analysing and developing indigenous knowledge. The communication of the solutions, education, and training should be left to more efficient external channels, either of the peasantry itself or of professional organizations.

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**Abstract:** Recent evaluations of rural development projects in Africa revealed a disappointingly low degree of adoption of the proposed messages or technology packages. This apparent ineffectiveness of the conventional agricultural research and extension system is due to the lack of innovations adapted to specific constraints of the different farming systems of resource-poor farmers, as well as to outmoded concepts of rural development. To overcome this bottleneck the authors propose new roles for agricultural research and extension in Africa: the search for viable innovations should not be left to conventional agricultural research alone. The latter should focus on the development of sustainable strategies, answering those problems (macro-economic, social, ecologic) which would be neglected, if one merely attempted to meet short-term individual interests. Indigenous agricultural systems of knowledge would have to be revitalized as well. One of the main tasks of research and extension services should be to support farmers' experimentation in providing viable options, limiting risk, and analysing and developing indigenous knowledge. The communication of solutions should be left to more efficient external channels, either of the peasantry itself or of professional organizations.

Dirk Kohnert et Paul Weber - Les nouveaux objectifs de la recherche agronomique du développement agricole en Afrique

**Résumé:** Les récentes évaluations des projets de développement rural en Afrique révèlent que les solutions proposées ou les "paquets technologiques" ne sont que très peu adaptées. Cette apparente inefficacité de la recherche agronomique académique et des systèmes de vulgarisation est due à l'absence d'innovation adaptée aux contraintes propres des différents systèmes de production des paysanneries pauvres aussi bien qu'aux concepts démodés utilisés pour le développement rural. Pour dépasser ce blocage, les auteurs proposent de nouveaux objectifs pour la recherche agricole et la vulgarisation en Afrique. La recherche d'innovation viable ne consisterait pas en la seule recherche agronomique conventionnelle. Cette dernière devrait se focaliser sur le développement de stratégies d'autosubsistance, apportant des réponses à ces problèmes (macro-économiques, sociaux, écologiques) qui seraient négligés, si on ne s'attachait qu'aux intérêts individuels à court terme. Les systèmes agraires indigènes doivent être remis à l'honneur. Une des principales missions des services de recherche et de vulgarisation serait d'apporter leur soutien aux essais mis en place par des agriculteurs pour développer des options viables, limitant le risque, s'appuyant et développant le savoir-faire local. Les résultats devraient être communiqués par des canaux extérieurs plus efficaces, aussi bien parmi les paysans eux-mêmes, que parmi les organisations professionnelles.