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# **LIVESTOCK PRODUCTION EXTENSION: ISSUES, CASE STUDIES AND POLICY OPTIONS**

**NRI Socio-economic Series 12**

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D Barton**

**NATURAL RESOURCES INSTITUTE**  
*The University of Greenwich*

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*This publication was funded by the United Kingdom's Overseas Development Administration. However, the Overseas Development Administration can accept no responsibility for any information provided or views expressed.*

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**Natural Resources Institute**

ISBN: 0 85954 480-X

ISSN: 0967-0548

Price: £5.00



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## Foreword

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This series is based upon work carried out under the socio-economics and related research programmes at NRI. Its purpose is to provide an easily accessible medium for current research findings. Whilst it is hoped that the series will be of interest to those concerned with development issues worldwide, it may be of particular relevance to people working in the developing countries.

The topics covered by the series are quite diverse, but principally relate to applied and adaptive research activity and findings. Some papers are largely descriptive, others concentrate on analytical issues, or relate to research methodologies.

The aim is to present material in as straightforward a fashion as possible so that it can reach a wide audience. We are interested in the views and opinions of readers and welcome any feedback to this series.

Alan Marter  
Social Sciences Research Manager

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## Acknowledgements

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The authors acknowledge the contributions of their fellow researchers on the three case studies, Steve Ashley, Len Reynolds and Trevor Wilson, without whom this study could not have been written. We are also grateful for the assistance of numerous officials in government ministries, World Bank Offices and other institutions in the three countries, and for the assistance, forbearance and hospitality of the livestock producers we interviewed. For assistance in the

conceptualization and design of this research, and in the analysis of findings, we are grateful to Christine Okali, Maggie Gill, Tjaart Schillhorn van Veen, Cees de Haan and Dennis Purcell. Responsibility for interpretations and opinions expressed remains that of the authors.

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## Summary

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As resources become more constrained, there is an increasing need to provide meaningful information on livestock production and the integration of crop and livestock farming systems, as well as on preventive medicine and general livestock health. It is vital that the information is delivered in such a way that it reaches, and can be understood by, farmers of all income groups. Although some national extension services are already in place, many are only reaching the wealthier farmers who could afford to pay for the information under a cost-recovery system.

It is important to involve livestock producers in the development of any new extension system through participatory needs assessment. It is also necessary to improve linkages with research so that specific needs can be addressed. When the extension systems have been installed or suitably refined, their successes and failures should be regularly monitored and evaluated so that any adjustments can be made.

The provision of livestock production extension is assessed with reference to case studies in Burkina Faso, Kenya and India. Existing systems are reviewed and their impact evaluated. In a final section, the roles of different institutions and methodologies are evaluated, and lessons for the future are discussed.

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# Introduction

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In this study, current issues concerning the extension of livestock production messages in developing countries are reviewed and analysed. The work is based largely on three case studies which were carried out in Burkina Faso, Kenya and India in early 1995 (Barton and Reynolds, 1995; Matthewman and Ashley, 1995; Morton and Wilson, 1995).

The objectives of the research were to improve policy and strengthen programme design in the livestock sector. The usefulness of the information, and the efficiency and sustainability of its provision, were to be enhanced, taking into account both public and private sector roles. This was to be achieved by:

- (a) studying existing systems in the government and non-government sectors for the generation and delivery of livestock production information in the three countries, focusing on identification of user needs, generation and delivery of information, feedback mechanisms, and cost-effectiveness and finance;
- (b) a comparative analysis of the three case studies.

The comparative analysis is described in this work.

The project focused on mixed crop-livestock production systems in higher potential areas, and livestock production in peri-urban areas. These systems were identified as those in which demand for livestock production information was most likely. The delivery of information to pastoralists, particularly to sedentarizing pastoralists in Burkina Faso, was also considered.

The study begins with a brief look at some of the current issues in agricultural extension in general. Livestock production extension is then examined. Particular attention is paid to why this sub-sector has been neglected by both programmers and researchers, why the need for livestock production extension may be increasing in developing countries, and how livestock production extension services can be categorized. The three case studies are then summarized, and policy questions raised by different forms

of livestock production extension (as part of crop-based extension systems, through animal health services, and as a free-standing service) are examined. The major issues of research-extension linkages, participation, equity, cost-recovery, communication, and monitoring and evaluation, are considered in relation to the three forms.

## CURRENT ISSUES IN AGRICULTURAL EXTENSION

This section is not intended to be a full review of current thinking on extension; it is merely a flagging of some of the issues which will be discussed below in connection with livestock. Definitions of agricultural extension vary considerably. Although they generally centre around the transfer of information to farmers, they may include, to a greater or lesser extent, the diagnosis of farmer constraints, organized linkages to agricultural research, the encouragement of farmers to join/form organized groups, and the provision of material inputs and other agricultural services. Moris (1991) inclines towards inclusive definitions whereas Röling (1988) considers extension to be the communication of information. Both, however, note the 'persuasive' element of extension, i.e., "getting farmers to do something they would otherwise neglect" (Moris, 1991). Others, such as Farrington (1994) and Beynon (1995), do not think persuasion is an inherent part of the definition of extension.

In the following discussions, 'extension' will usually mean the assembly and delivery of information. The extent to which these functions are, or should be, integrated with the generation of information, the diagnosis of farmer constraints and the delivery of other services, and the extent to which they are, or should be, persuasive, constitute some of the questions which need to be addressed.

### The Training and Visit System (T & V)

Agricultural extension in developing countries, and the debates which surround it, is dominated by the 'Training and Visit (T & V) System'. T & V was based on the Israeli

extension service and was used in a World Bank-funded project in Turkey in the late 1960s. Since then, it has been promoted by the World Bank in projects in Asia, Latin America and Africa, and by publications such as Benor and Baxter (1984).

According to Benor and Baxter, the key features of the system are:

- professionalism
- a single line of command
- concentration of effort
- time-bound work
- field and farmer orientation
- regular and continuous training
- linkages with research.

During the development of the system, an orientation towards 'contact farmers' was also considered to be a key feature, but this is considered less central as the system has been adapted to different countries.

The 'single line of command' refers to the placing of extension in one department which "should be solely accountable for the operation of the extension system, notwithstanding the required co-ordination and liaison with other organizations". In reality, structures vary greatly, especially where extension is managed within regional bodies which carry out several agricultural functions with technical supervision by a national extension department. This is the practice in all three of the case study countries; extension is managed by the CRPA in Burkina Faso, the District in Kenya and the State in India, and co-ordinated by national level departments. Another variant is the existence of enclaves of special donor funding which operate some of the features of a national T & V system. If, as is often the case, livestock falls under a separate apex ministry, or a department within such a ministry, the 'single line of command' requirement poses a problem for livestock extension.

'Concentration of effort' refers to the removal of "the supply of inputs, data collection, distribution of subsidies, processing of loans, or any other activity not directly related

to extension" from extension workers' duties. This suggests that the definition of extension has been restricted to the transfer of information and contrasts with Moris (1991) who sees many of the above activities as functions of extension. Farrington (1994) notes that the line has softened recently, "allowing extensionists to supply recommended inputs, especially in remote areas". Again, questions are raised about livestock extension for which vets and paravets may be the natural agents.

In our view, one of the most important features of T & V systems is their 'time-bound nature'. Moris (1991) states that "there is an agreed message for each time period over the season, conveyed to subject matter specialists [by researchers] in a monthly 2-day meeting and by them in fortnightly training sessions to field extension workers", although the intervals between meetings may in fact vary between countries. There are two aspects to this time-bound nature: the regularity of interactions at each level of the hierarchy, i.e., researchers with subject-matter specialists (SMSs), SMSs with extensionists, and extensionists with farmers; and the yearly calendar of subjects to be covered each month which is planned at the beginning of the season. The first aspect provides a valuable means of improving the efficiency of the extension services if it is interpreted with some flexibility. The second is linked to the concept of front-line extension workers (FEWs) implicit in the T & V model, and to the orientation of T & V systems towards annual crops.

FEWs and supervisory staff are expected to make frequent, regular visits to farmers, often in their fields. The streamlining of reporting and administration has been promoted to this end.

SMSs receive regular and continuous training from researchers. This training is usually passed on to FEWs according to a calendar planned at the beginning of the agricultural season. In theory, regular training allows the constant flow of new recommendations from researchers to farmers at the times of the year when they are most relevant, but it may also allow and encourage a minimalist approach to training. Extension workers with



low base levels of agricultural knowledge can be trained to keep a month ahead of the farmers they are advising. When T & V functions in this manner, it has profound implications for the abilities of individual FEWs to respond to farmers' needs, particularly regarding complex subjects and matters which are not season-specific. However, although FEWs in the Israeli extension service (on which T & V was based) have a much higher general educational level than those in many developing countries, the cumulative experience of FEWs with low formal qualifications should not be underestimated.

The T & V system institutionalizes research-extension linkages, and although it has generally succeeded in channelling information from research to extension, it has been less successful in conveying farmer needs upwards from farmers, through extension to research, even though this is an expressed aim of the system.

The transmission of messages to contact farmers for passing on to their neighbours used to be a feature of many T & V systems. These farmers were chosen to represent, and be able to communicate with, all classes of farmers in a community, but contact farmer systems have often been associated with inequity (see below). There is an argument that the efficiency objective of the system can also be met by FEWs working with groups, particularly in those African countries where the use of groups in rural development is an important part of their culture (traditional or political).

The T & V model has had an enormous impact on the thinking surrounding extension systems around the world. Its cost-effectiveness has been demonstrated by controlled economic analysis (Feder *et al.*, 1985) and its overall efficacy, by external evaluation (Bindlish and Evenson, 1993; Bindlish *et al.*, 1993). However, there are several important questions which either arise directly from T & V, or apply to it as much as to other models.

### **The role of farmers in T & V**

One of several criticisms of T & V (in Africa) is "that it

has a strongly 'top-down' and mechanistic methodology (and) that it assumes available 'off-the-shelf' technologies suitable to farmers' needs" (Moris, 1991). Although the well-defined T & V communication channels should be available for transferring information from farmer to extension manager and researcher, as well as *vice versa*, the real needs and constraints of farmers tend not to be transmitted upwards. 'Top-down' approaches, and the assumption that farmers are too ignorant to contribute to their own development, have always been major features of development programmes and planning. The move away from these attitudes is far from complete, and such thinking may have become more common among middle-level, technically trained staff than among researchers and policy-makers.

Irrespective of the design of their projects and their personal views on participation, FEWs are unlikely to have received any systematic training in the methods needed to encourage farmer participation, and are unlikely to view any form of research, participatory or otherwise, as part of their duties.

The way in which T & V actually operates may not satisfy a farmer's immediate need for information if, as is often the case, FEWs have a low base level of agricultural knowledge and depend on their monthly or fortnightly training for the information they are supposed to transmit. Although the yearly calendar of extension themes may give due consideration to farmers' needs, it can be over-constraining if unexpected problems arise, or if more information is needed.

T & V extension is now such a loose category that there are many ways of avoiding these problems. For example, FEWs can be sufficiently well-trained to respond to farmer requests on the spot, or to determine farmer needs through participatory techniques. Alternatively, they can get information from SMSs within a short time-scale, as is the case in the areas of Burkina Faso where the T & V system is working well. T & V extension can also be run in close parallel with research efforts concentrated on farming systems; a successful example of this in Zambia is documented by Sutherland (1988).

## **The limits of complexity in T & V**

The inability of FEWs to respond to farmers' needs for information varies with the nature of the agricultural problem. It is easier to deliver simple, season-specific information about crops through a T & V system than techniques whose applicability to farmers is inherently more variable and less seasonally predictable, or bound up in a complex package which cannot readily be reduced to discrete simple messages. The World Bank evaluated 107 projects (World Bank, 1994) and noted that "in most T & V systems there has been limited farmer education in the more complex aspects of farm operations, such as integrated pest management or soil and water conservation". Byerlee (1988) makes a similar point by implying that a shift is needed from T & V with "its emphasis on communicating messages or recommendations to farmers" to the education of farmers in diagnostic, technical and management skills. These points are equally relevant to livestock production extension.

## **Issues of targeting and equity**

The issues of targeting and equity are closely linked in the design and management of extension programmes. Throughout its history, organized agricultural extension has tended to focus on a minority of farmers because of resource constraints and efficiency arguments. This restriction has often been rationalized by citing the diffusion process, i.e., if the extension services deal with just a few 'progressive farmers' who are representative of their fellows in everything except their readiness to adopt innovations, the innovations will be carried to the rest of the population by diffusion once they have been adopted by the minority. However, Röling (1988) points out that this strategy takes no account of the heterogeneity of agricultural populations with regard to resources. Innovations will be more or less appropriate to the different sub-groups depending on their access to resources. Diffusion from the innovative to the less adventurous is more likely to take place within a resource-homogeneous sub-group for whom

the innovation is mutually appropriate, than between sub-groups.

Many of the innovations proposed by extension services are more likely to be adopted by wealthy farmers unburdened by risk and with land and labour to spare. The assumption that the whole population is homogeneous confuses innovative farmers with wealthier ones, and this confusion has occurred time and again in extension systems. It has been argued (e.g. Röling, 1988) that inequity in extension not only fails to benefit poorer farmers but also actively disadvantages them. This is because the adoption of innovations by wealthy farmers sharply increases their production, leading to a drop in prices and a consequent lowering of incomes for those not reached by the system.

Although inequity often happens by default, it can also be buttressed by explicit arguments in favour of targeting the wealthy (or making no effort to target anyone else). These arguments include the following: growing demands for food necessitate rapid increases in yield/ha; export markets demand an efficient and unsubsidized agricultural system; scarce human and financial resources should be concentrated on those farmers most likely to contribute to the national economy rather than on their own subsistence; development will mean that holdings will be concentrated and many small farmers will move out of agriculture altogether (Röling, 1988).

However, counter-arguments have been proposed, in terms of both equity and efficiency, in favour of targeting such categories as the poor and women. These groups represent an untapped productive potential and could contribute both to their own and others' food security, and to exports. This concept is summed up by Röling (1988) in the 'holding ground approach', that small farmers should be supported with research and extension so that the processes of rural modernization and urbanization can be managed slowly with minimal social costs.

T & V extension is designed, in principle, for equity. The contact farmer system should ensure that there is liaison between extension workers and all strata of farmers.

Benor and Baxter (1984) state that “contact farmers...should represent proportionately the main socio-economic and farming conditions of their group....tenants, sharecroppers, young farmers and women farmers may be contact farmers”. In practice, the system has often drifted towards inequity in the same way as other approaches; extensionists have frequently confused contact farmers with progressive farmers. Moris (1991) notes that “while in theory T & V urges that [contact] farmers represent a cross-section of the community, the methodology as such does not ensure a spread of attention. It probably over-represents active, commercially oriented farmers (who are the most eager to gain Ministry approval in order to tap the subsidized inputs often on offer in African settings)”. Moris also suggests that some African countries have favoured the more equitable group approach to extension.

In practice, it is difficult to ensure equity in terms of extension worker targets and the design of management and monitoring systems. The contact farmer system does at least allow effort to be concentrated and progress to be measured by assessing adoption rates. While striving for equity, the impact of a system may become diluted and directed merely towards increasing numbers of farmer contacts.

Gender is a special case with respect to inequity in extension. The importance of women as farmers, especially in Africa, and the very high proportion of rural households in developing countries which are female-headed or effectively female-headed (because of male labour migration, for example), is now generally recognized. However, there is plenty of evidence to show that the interests of women are not taken into account in extension systems, and that women are ignored by extension agents. Saito and Weidemann (1990) suggest several reasons for this, including culture, heavy workloads which cut into extension contact time, and the agents’ perception that women have little decision-making power and a lesser ability to understand extension messages. The design of gender-sensitive extension systems is difficult. The constraints faced by women (such as poor access to credit and inse-

cure land tenure), and their particular concerns (over crop and livestock species, for example), can be lost in a system which deals with both sexes, and any structure which focuses on the best interests of women can quickly become marginalized when resources are scarce or management problems mount up.

### **Costs, cost-recovery and private sector extension**

While T & V is presented as more rational and cost-effective than other forms of extension, it is very costly in absolute terms; large numbers of FEWs and supervisors need to be fielded and provided with transport and housing, and a constant stream of contacts and meetings need to be facilitated with material, fuel and administrative support. Moris (citing both John Howell and Nigel Roberts of the World Bank) makes the distinction between the economic viability of T & V (the relationship between costs and marginal increases in farmers’ outputs) and the financial viability, i.e., the possibility of recurrent costs being provided from government revenue. If mechanisms for direct or indirect cost-recovery from smallholders are weak or absent, as in the majority of developing countries, financial viability is unlikely to be achieved.

Since the mid-1980s, these problems have become even more pressing because fiscal crises, particularly in Africa, have been dealt with by structural adjustment policies which have included cut-backs on public sector employment. Moris (1991) makes the following statement about the 1980s: “The supreme irony is that the World Bank was simultaneously promoting its T & V system, a 1960s type of public extension at complete variance with the structural adjustment lending portfolio”.

Whether or not the irony is admitted, this sort of issue has generated a renewed interest in cost-recovery and the roles of the public and private sectors in extension. A useful theoretical base has been found in institutional economics, including the theory of public and private goods (Umali and Schwartz, 1994; Umali *et al.*, 1992). ‘Pure’ agricultural

information (that which is not embodied in a material technology such as seeds or agrochemicals) is a public good because its use by one farmer does not subtract from the possibility of another farmer using it, and because in the medium-term, it is impossible to exclude other farmers from using it. Attempts to charge for the delivery of such information may engender a 'free-rider problem', i.e., farmers may be unwilling to pay because they fear that others will receive the information free. As a public good, the provision of the information should be a government responsibility. Specific agricultural technologies, and 'pure' information provided under special circumstances (e.g. contract farming) where costs can be recovered from participating farmers, are private benefits which can be better provided by private sector organizations. This is a very brief summary of an argument which includes the question of externalities and the distinction between private goods and excludable, but non-subtractable, toll-goods.

The new thinking on private extension and cost-recovery may be part of a general intellectual and developmental trend away from public expenditure, but given the general tendency of all extension systems to drift towards inequity, it can be justifiably presented as a fairer system; if the benefits of extension are likely to be 'trapped' by the wealthier rural strata, this group should be made to pay for them whenever possible. The state can then provide free extension where not to do so would produce unacceptable externalities (e.g. soil conservation), and an extension 'safety net' for those unable to pay for more specialized 'fee-for-service' extension.

### **The neglect of communication under T & V**

Since its inception, debates about T & V, and the fresh wave of publications about private sector roles and cost-recovery, have concentrated on institutional and economic issues. Extension in communication, and its links to education, has tended to be neglected. Hulme (1991) contrasts this neglect with a previous period when the issues which surrounded extension were mainly learning and commu-

nication; the shift in emphasis is ascribed to the T & V system itself and its emphasis on 'scientific' Taylorist management.

It is debatable whether major governmental systems which are not T & V based have paid any more attention to communication, but Hulme's observations have re-focused attention on these important issues. It has generally been assumed that if messages are suitable, and if management systems allow for their regular delivery to farmers, they will be adopted. However, the economic rationality of the messages may not be the only determinant of adoption; culture, and the form may also be important.

More attention needs to be paid to extension media other than lectures by extension workers. Electronic media, visual aids, theatre and competitions have always been used, but generally in the context of small pilot projects or by NGOs. Communication has to be a two-way process, and the recognition of this is connected with the question of participation.

## **ISSUES IN LIVESTOCK PRODUCTION EXTENSION**

### **Livestock production extension between two camps**

Extension in the field of livestock production has been neglected by both policy-makers and researchers. This may have been partly due to its marginal position between agricultural extension and animal health services. Historically, agricultural extension services have developed around crop production and have remained focused in this area. They have been mostly staffed and managed by people with training in crop production, and the concept of an 'extension calendar' is closely related to the seasonal nature of cropping.

Livestock services in developing countries have been run mainly by vets and have focused on animal health

issues such as curative treatment of individual animals, preventive measures for maintaining health, and health screening of animal products. In many countries, the government ministries or departments concerned with livestock have been dominated by health issues and the veterinary profession. Livestock production has often been accorded a marginal status between the two well-defined sectors and associated interest groups. It has sometimes been neglected by both, and sometimes shuffled between the two.

### **How important are production constraints? Changing livestock production systems**

The concentration on livestock health rather than production has of course been justified by the immediacy of animal disease as a problem for livestock producers in developing countries. With more effective control of serious diseases such as rinderpest and Newcastle disease, and more easily available treatments against many diseases and parasites, these constraints are now being overcome. However, as this happens, new constraints to the further development of production are emerging, particularly with respect to genetic potential and farmer knowledge of nutrition and husbandry. As confidence in disease control increases, farmers are prepared to invest more in animal production, so they require advice on ways of increasing production and reducing costs.

The relevance of these new constraints may not yet have been fully recognized by policy-makers because they have emerged during a period in which the validity of 'indigenous technical knowledge' in general, and the rationality of traditional livestock production systems in particular, have been vigorously defended by many researchers (see Scoones, 1994a). This line of thinking is attractive and very necessary, particularly in view of the inequitable and environmentally damaging policies which have attacked traditional pastoralism through land privatization and sedentarization. However, it may also have obscured the basic fact that many livestock keepers in developing coun-

tries are not pastoralists, or are in no way connected to a traditional livestock-rearing background.

Bourn and Wint (1994) analysed the results of several recent large-scale aerial surveys of livestock in Africa and concluded that 'cultivation and human habitation are the best predictors of livestock distribution'. Livestock biomass was strongly correlated with rainfall; the highest livestock densities occurred in areas receiving about 825 mm/year and which are far more humid than those areas associated with traditional nomadic pastoralism. There was usually little difference between dry and wet season livestock density. These results may signal a much greater importance of livestock farming by sedentary farmers in Africa than was previously envisaged. However, Bourn and Wint (1994) and Scoones (1994b) point out that these observations raise many other questions including: have livestock moved on to farms or farms moved on to the livestock areas; what are the implications of longer-term rainfall changes; who owns the livestock; to what extent is the movement of livestock into areas newly cleared of trypanosomiasis responsible for the observed patterns; what are the long-term trends, given that no comparable data have been presented before?

Bourn and Wint's data confirm, on a macro-scale, a major strand of field research on crop-livestock integration, especially in the West African Sahel (Spiers and Olsen, 1992) but also in East Africa (Tiffen *et al.*, 1993). McIntire *et al.* (1988) relate such integration primarily to population pressure, but there are other contributory factors. Population pressure and the creation of new markets as a result of urbanization have led to more land being brought under cultivation at the expense of grazing land. In some areas, the adoption of animal traction has allowed each farmer to cultivate greater areas and has created a need for fodder or grazing for the draught animals. Farmers have also increased their livestock holdings as an insurance against drought, as a way of investing the proceeds of cash-cropping, or because they profited from low livestock prices during recent droughts. Increasingly, pastoralists have settled and started to cultivate, either as a direct

result of impoverishment, or from a desire to establish use-rights to land before others. The reduction of trypanosomiasis in some sub-humid areas is both a cause and effect of increased cultivation and crop-livestock integration (Bourn and Wint, 1994).

Although these processes are complex and the subject of much debate, the implications for extension are clear. In Africa, large numbers of livestock are now either being kept by people without a traditional background in livestock production, or are being used for non-traditional purposes within rapidly changing production systems. This argument does not apply in south and southeast Asia, where integrated mixed farming systems are much more widespread and well-established, and where no dramatic changes in livestock ownership and distribution are occurring. In addition to the general view that genetic and nutritional constraints have emerged as health constraints have been overcome, the changes in Asian livestock production which have necessitated new information derive from two sources: the new opportunities presented by irrigation and green revolution technologies; and the growing opportunities for dairy production.

In both continents, the raising of livestock in urban and peri-urban areas is becoming increasingly important as urban populations grow and in some countries, as urban living standards and the concomitant demand for animal products rise. Trends in urban and peri-urban livestock production are markedly affected by macro-economic factors and government policies. In India, government and donor support has greatly stimulated dairy production and marketing through co-operatives (in both rural and peri-urban areas). The liberalization of dairy marketing in Kenya (Jaffee, 1995) may have had a similar effect. In the West African Sahel, dairy production is developing slowly, but the recent devaluation of the CFA franc and the ending of subsidized EU beef exports to coastal West Africa have created the environment for rapid expansion into urban fattening activities. In various developing countries, fattening and other livestock enterprises have provided an important employment opportunity for the

large numbers of civil servants and parastatal employees laid off during structural adjustment. All forms of peri-urban livestock production create a demand for information because they involve new recruits to livestock production or new techniques (use of bought fodder and concentrates) and a more systematic approach to the storage and marketing of animal products.

Developments in animal health, and trends towards mixed farming and peri-urban livestock systems, are therefore creating or increasing the demand for information on livestock production. The diversification of livestock farming from extensive pastoral systems to those in which livestock are integrated into mixed systems as draught animals, dairy animals or fattening animals, has resulted in changes in information needs and changes in the demand placed on extension services. Information on different types of production system is required to meet the needs of rich and poor farmers with varying numbers of animals. It is also required to support new enterprise development in response to changing farming systems, increased demand for livestock products, and increased opportunities for investment in livestock, as financial incentives increase.

### **Livestock extension systems**

There are several ways of classifying the systems for livestock production extension. The distinction between crop-based, animal health-based and free-standing services is crucial and is used as an organizing principle in this study. Other typologies, however, describe different dimensions of extension systems. In practice, these may show a strong degree of overlap (T & V systems, for example, tend to be crop-based, free, governmental, and to deal in 'pure' information), but they may also cut across one another (for example, NGOs can provide crop-based, animal health-based, and specialist livestock production services).

*Crop-based/animal health-based/free-standing*

Livestock production extension can be delivered under

## BOX 1 INFORMATION FOR CHANGING LIVESTOCK PRODUCTION

New trends in production are creating an actual or potential demand for information, which is already available or can be developed through research on:

- genetic improvement of livestock breeds and advice on cross-breeding, husbandry of improved breeds, fertility (effects of feeding on reproductive performance, use of artificial insemination, related health issues)
- husbandry, building construction, yarding, hygiene, routine care, seasonal management calendars and appropriate recording methods
- cultivation of fodder crops, selection of food crops for optimum stover and straw production, use of tree fodders, alley farming, integration of soil conservation measures with livestock feed supply, harvesting of natural hay, storage of hay, fodder and crop residues
- rationing, use of concentrates and other supplements in intensive systems and, strategically, in extensive systems
- storage, composting and use of manure, collection and use of urine
- animal traction, feeding of draft animals
- hygienic collection, storage and processing of milk
- marketing of livestock and livestock products

the banner of 'general' agricultural extension which, in practice, means extension concentrating on crops. T & V-based services all fall into this category but they vary in the degree to which they are committed to including livestock messages, even on paper. The Kenyan national extension service attempts to deliver livestock production information in a crop-based T & V system, whereas the Indian State departments of agriculture have implemented T & V systems which currently have no livestock content at all. As discussed above, there may be a contradiction between the types of structure necessary to transmit crop messages and livestock messages, and livestock production extension may become marginalized as a result.

Livestock production extension can also be the responsibility of institutions which, in principle or in practice, are dominated by animal health concerns and staffed mainly by vets (and paravets at the field level). The Indian State departments of animal husbandry are good examples of this, employing "few if any animal productionists" (Matthewman and Ashley, 1995). Although such systems may transmit some information to producers, this func-

tion is often de-emphasized in favour of curative and preventive health measures and food hygiene duties.

Livestock production extension may also be provided through dedicated services or projects, and although there are few examples at a national level, some area-based multi-lateral or bi-lateral projects (such as the Soum project in Burkina Faso), and many NGOs (such as BAIF in India and APSS in Burkina Faso), have adopted this approach. The co-operative or private sector extension services which either provide inputs, or purchase animal products, fall into this category.

This system for categorizing NGO and governmental services and projects is useful but not always water-tight. The Burkinabé national extension service, for example, is clearly crop-based, but animal health specialists are closely, and rather ambiguously, related to it; they often provide information on livestock production for particular groups such as pastoralists.

### *Bureaucratic/crusading/participatory*

This relates to the way in which the content of extension

messages is defined. In 'bureaucratic' systems, messages originate from formal research structures. In spite of their commitment in principle to 'bottom-up' communication, the majority of national T & V systems fall into this category. Bureaucratic systems have several advantages, including access to a (potentially global) pool of research expertise, systematic procedures for prioritizing research findings and turning them into extension messages, and continuity of the organization as messages come and go. Their disadvantages are that real producer needs may be overlooked in favour of research-led work, and inflexibility with regard to variations among producers and changing requests for information.

By contrast, 'crusading' services select just one recommendation (or a few) on which to build the organization, rather than use the organization to evaluate the messages. Many examples can be found among NGOs, such as APSS in Burkina Faso which focuses on the mowing and storage of hay, and BAIF in India which concentrates on cross-breeding. Many governmental projects, such as the Kenyan NDDP, could also be described as crusading on one, or a small number of themes. Recommendations provided by some crusading organizations and projects have obviously been arrived at through systematic and rational project identification procedures, but in many NGO and governmental services, the main ideas have been generated by prejudice or by individual interest, and may prove useless to producers. The LUCODEB campaign in Burkina Faso is just one example (Morton and Wilson, 1995); when this happens, the viability of the whole organization may be called into question.

'Participatory' extension systems differ from both the other types in that messages are generated by systematic enquiries among and with the users of the extension service. Truly participatory extension involves purpose-designed organizational structures and an approach to needs assessment which goes beyond structured questionnaires. In the field of animal production extension, few significant examples were found. AKRSP-India (Matthewman and Ashley, 1995) is a good example orga-

nizationally, but it has restricted livestock activities. However, many bureaucratic and crusading organizations include participatory elements. In the Burkinabé extension service for example, particularly in some of its better-funded enclave projects, participatory needs assessment is often being used, and FEWs are being made more immediately responsive to farmer information needs.

#### *Contact farmers/groups*

This distinction has already been discussed under general extension issues. The use of contact farmers was once regarded as a criterion for T & V systems but many of these, especially in Africa, now work with farmer groups. A number of multi-lateral and bi-lateral projects also work with groups, and the group approach has become almost the hallmark of NGO extension work. The use of pre-existing groups in extension can be useful when some element of cost-recovery is required, and it can minimize the 'free-rider' problems associated with charging for a non-excludable good.

#### *Government/NGO/co-operative/private*

These extension systems are categorized by the organizations which implement them. Private livestock production extension systems are rare due to the difficulties of cost-recovery, but Kenchick in Kenya may provide a current example. Matthewman and Ashley (1995) describe the extension system of the Indian dairy co-operatives in detail. Again, boundaries can be vague; NGOs may use government personnel or information sources, and co-operative movements may be partly state-sponsored.

#### *Pure information/information linked to inputs*

'Pure' information can be distinguished from the information delivered in connection with material inputs, or with other benefits such as credit and market outlets; to some extent, this distinction can also be applied to information delivery systems. Traditionally, T & V systems only dealt with pure information as part of their 'concentration of effort'. Linking information to material benefits is a



strategy which may be used by the for-profit private sector to increase sales of inputs, or increase production, in cases where the company is assured of the benefit of that increase. It can also be the hallmark of a variety of projects which seek to address the most pressing constraints on producers, given that poverty and isolation may mean that market mechanisms are insufficient for channelling inputs to producers or buying their products. Some NGO projects link extension to the provision of animals for genetic improvement, often on highly subsidized terms, or to the stimulation of new livestock activities such as the fattening of sheep by women.

#### *Free/cost-recovery*

The majority of livestock production extension systems examined during this study were free; the trend towards cost-recovery has not yet had much of an impact in the poorest developing countries. Cost-recovery in 'pure' extension is difficult because agricultural information is, even in the medium-term, a non-excludable good. Also, when considering charging for extension, the welfare of poor farmers (and pastoralists), and the environmental importance of messages which affect both animal production and conservation, need to be taken into account. Cost-recovery can occur if the organization transmitting the information benefits from the sale of an input, or has *de facto* or contractual exclusive rights to purchase the product; under these circumstances, extension costs can be recovered from producer prices. This applies to the Indian dairy co-operatives (although the National Dairy Development Board, which assists the co-operatives, receives government and donor funds) as much as to for-profit operations such as Kenchick.

There are of course other variables in livestock production, such as species specialization and the choice of extension media, but the above typologies describe the main organizational dimensions. They will be referred to in the summaries of the three case studies.

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## The case studies

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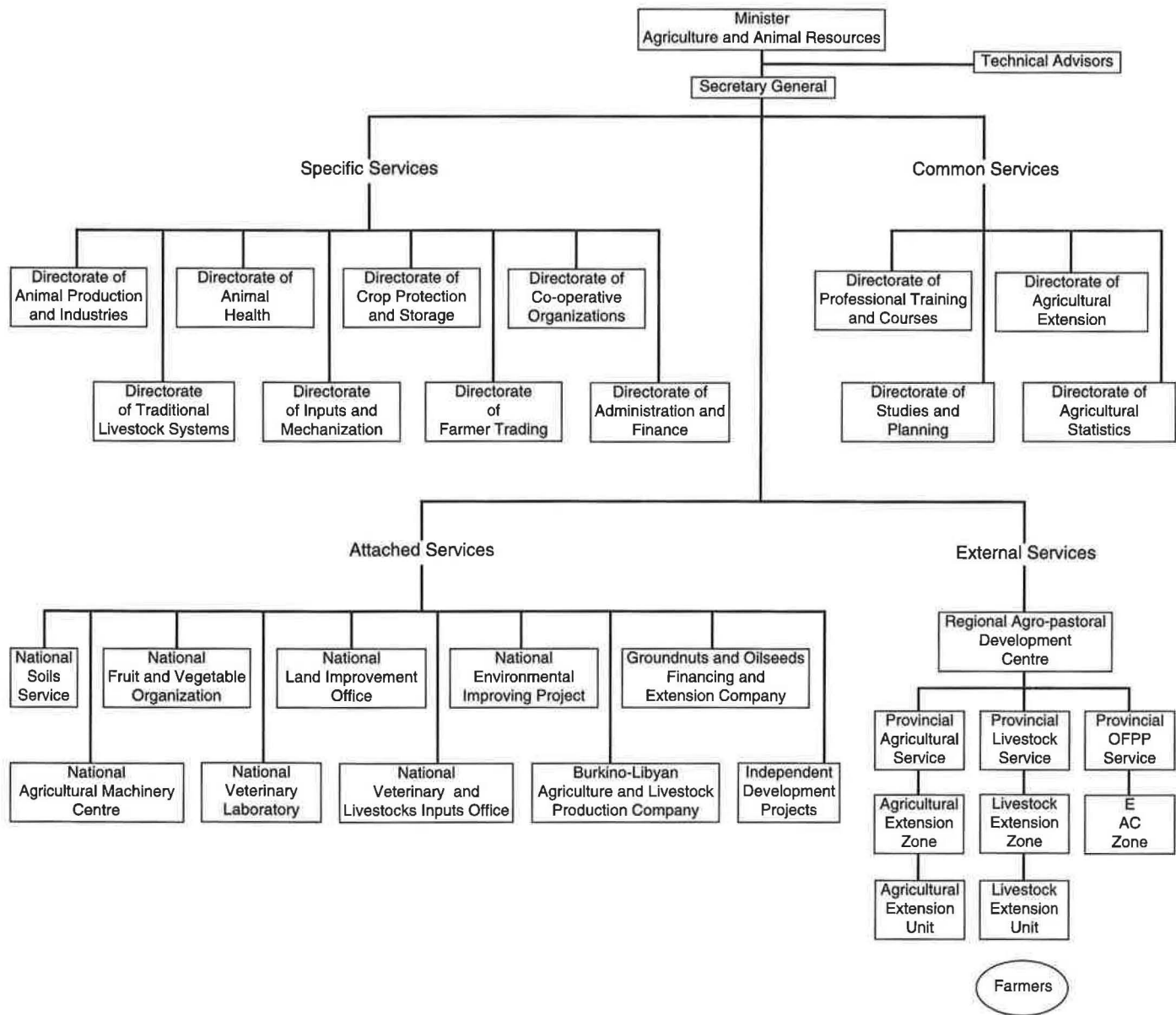
The case studies took approximately one month each. A team consisting of a social scientist and a livestock production specialist visited a variety of projects and services in each of the three countries to obtain secondary information on livestock extension. Interviews and participatory meetings were held with rural and peri-urban livestock producers. It had originally been intended to focus on those communities in which more than one livestock extension service was operating, but this was only possible in Kenya. In India and Burkina Faso, there appeared to be a tacit agreement to 'dovetail' the provision of services, at least as far as government organizations were concerned.

As time was limited and each team was working through the organizations actually providing the service, the studies tended to become biased towards the successfully functioning projects rather than representative communities, or communities which receive little or no extension. Quantitative data which would allow meaningful discussion of the costs and benefits of the different services and projects were also difficult to obtain. This is a general problem with extension, but it was exacerbated by the problem of disaggregating expenditure on livestock production from other costs.

In spite of the difficulties, a wealth of data on the institutional set-ups, links to research, and success in influencing livestock production systems, were derived from a great variety of extension delivery systems.

### **BURKINA FASO**

The Burkina Faso study covered most of the country but particularly the semi-arid north and the high potential southwest. A lot of the time was devoted to examining the national extension system and its constituent projects and services.



**Figure 1** Organogram of the Ministry of Agriculture and Natural Resources

## The national extension system

The Burkinabé national extension system, which is funded largely by the World Bank under the Agricultural Services Support Project (PR SAP), has most of the features of T & V. It does not, however, have a 'single line of command', but is placed within the complex and partially devolved structures of agricultural service provision in Burkina Faso (Figure 1).

The Ministry of Agriculture and Animal Resources consists of a number of Directorates. Those specifically related to livestock are:

- (a) the Directorate for Organizing the Traditional Livestock Industry, which is responsible for the planning and management of pastoral zones in the more arid north and enclaves in the south, and the organization of traditional pastoralists;
- (b) the Directorate for Livestock Production and Industries (DPIA) which includes services dealing with general livestock development, poultry and small livestock, and processing and marketing of animal products;
- (c) the Directorate for Animal Health which is responsible for preventive and curative health services for livestock.

At national level, the Directorate for Agricultural Extension (DVA) is the main implementing agency for PR SAP. It provides technical supervision to the national extension system, including the extension of animal production messages. This feature of PR SAP is reinforced by the relative absence of FEWs with livestock training or orientation. In the majority of the country, any livestock extension is delivered through a generalist and (in practice) crop-based extension system.

As with other agricultural services, the operation of extension is devolved to 12 Regional Centres for Agro-

Pastoral Production (CRPAs). Each CRPA covers between one and three provinces, and within each province there is an agricultural extension service which is divided into zones and units, each with an agricultural officer.

In each province there is an SPA (Provincial Service for Agriculture), an SPRA (Provincial Service for Animal Resources) and an SPOFPP (Provincial Service for the Organization of the Professional Training of Producers). The Head of each of these services reports directly to the Director of the CPRA.

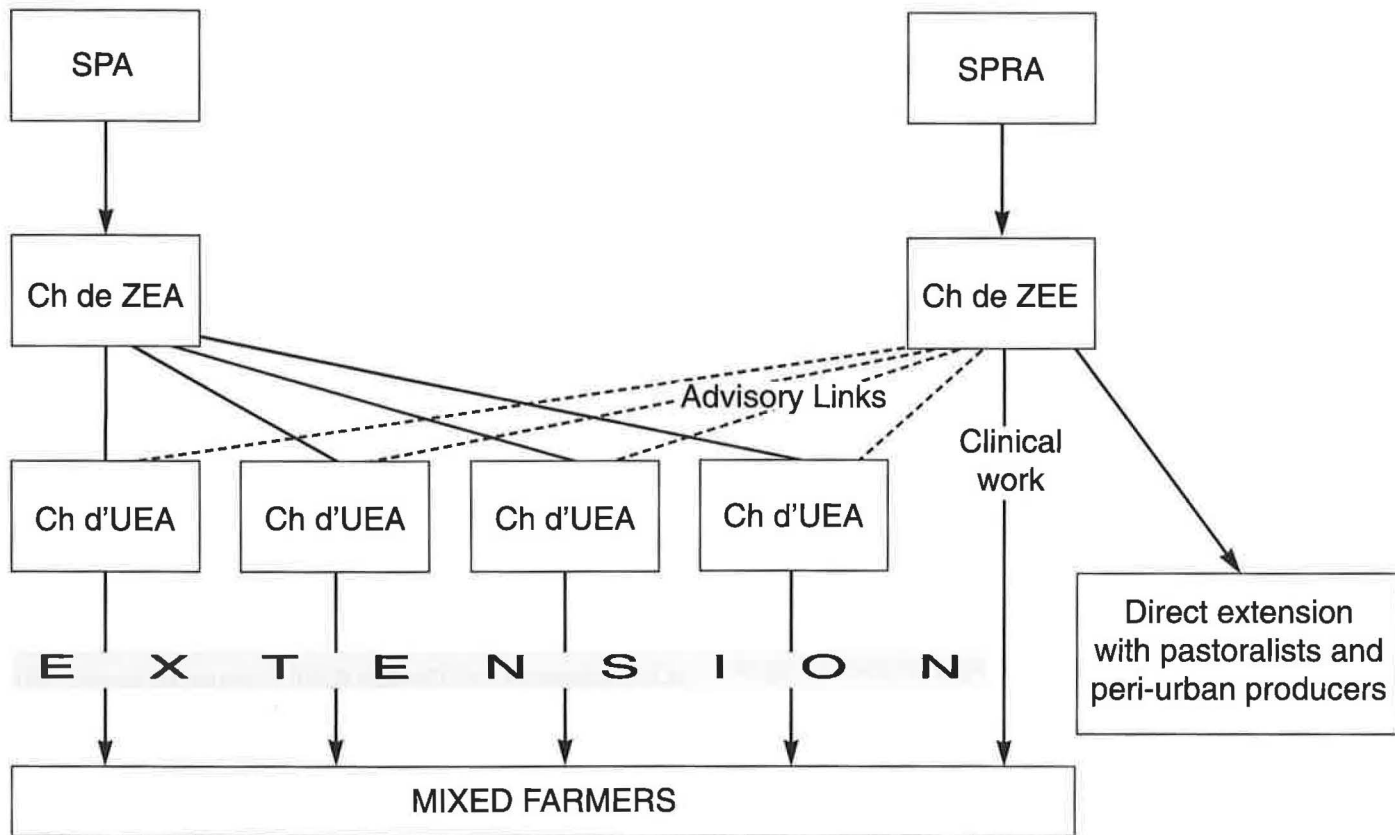
There are usually between five and ten geographical zones in each province known as Zones d'Encadrement\* de l'Agriculture (ZEA) and Zones d'Encadrement de l'Élevage (ZEE) for crop and livestock-related activities, respectively. For each activity there is a Chef de Zone, reporting to the relevant provincial service. For crop-related activities, each zone is divided into about four or five Unités d'Encadrement de l'Agriculture (UEA), each consisting of six to twelve villages. For livestock purposes, such subdivision is rare; about 10 ZEE are divided into 44 Unités d'Encadrement de l'Élevage (UEE), compared to over 800 UEA nationwide.

The Chefs de ZEE, who report to the Directors of the SPRAs, have a number of functions including inspection of meat on sale at local markets, curative and preventive veterinary work, and livestock extension. None of these functions is officially supported by PR SAP. The PR SAP Appraisal Report, which assumes a unified crop-livestock extension service while being distinctly inexplicit on the methods and structures for livestock extension, did not foresee a role for the Chefs de ZEE in livestock extension (Compaoré *et al.*, 1994).

The relationship which actually exists between the ZEAs and the ZEEs is shown in Figure 2. Livestock extension messages are passed, if at all, by the Chefs d'UEA. Chefs de ZEE have assumed the role of supervising the

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\* "Encadrement" (roughly meaning 'putting within a framework') is difficult to translate; it has connotations of training, supervision and group formation. In some cases, the zone is also regarded as a Zone d'Encadrement Agricole et Cooperative (ZEAC, or Agricultural and Co-operative Training Zone), and also has a Chef de Zone reporting to the SPOFPP.



- Ch** Chef
- SPA** Provincial Service for Agriculture
- SPRA** Provincial Service for Animal Resources
- ZEA** Zones d'Encadrement de l'Agriculture
- ZEE** Zones d'Encadrement d'Elevage
- UEA** Unités d'Encadrement de l'Agriculture

**Figure 2** Crop and livestock extension systems in practice

passing of livestock messages through the Chefs d'UEA; they present this as "having to work through" the Chefs d'UEA. Direct contact between Chefs de ZEE and producers occurs mainly during veterinary work and meat inspection, and extension with a few groups or individuals selected by the Chefs de ZEE themselves, especially pastoralists, more market-oriented producers, and peri-urban producers. Some government documents suggest that there should be an alternative model of a national network of UEEs and livestock-specialized extensionists working in parallel with the UEAs; it is claimed that the implementation of this model has been temporarily delayed due to lack of resources. However, it appeared unlikely that the model would ever be implemented and in fact, the latest indications are that government and donors are considering more, rather than less, integration of agriculture and livestock extension services at a zonal level.

Extension is based on a yearly calendar with extension themes being decided at the beginning of each season by the CRPA. The themes used to be chosen on the basis of informal feedback through the extension system on producer needs, particularly from the end of season meetings between front-line agents and village groups. Between the 1994 and 1995 seasons, a more systematic information gathering and diagnostic exercise was carried out using relatively open questionnaires.

The programme for the CRPA Centre-Sud is cited here as an example. For most months, it contains one theme in crop production, one in livestock production and one in farmer organization. The themes in livestock production were as follows:

May	Importance of timely vaccination
June	Cultivated fodders
July	Prophylaxis, hygienic housing
August	Treatment of internal and external parasites, feed hygiene
September	Mowing and storage of natural fodder

October	Collection of crop residues
November	Urea treatment of straw
December	Use of agro-industrial by-products
January	Rations for animals in fattening
February	No livestock theme.

Regular meetings at various levels, and a network of subject matter specialists (SMSs), link extension to the research effort of the National Institute for Agricultural Studies and Research (INERA).

Unlike other T & V systems, extension is generally delivered to groups, thus reflecting the importance of the village group in Burkinabé administration and political culture. The proliferation of various forms of formalized village or farmer groups has been a feature of development in francophone Africa (Mercoiret, 1995) with Burkina Faso being foremost in the trend. The reasons for this include the general interest in regulating rural affairs epitomized by the pervasive concept of *encadrement*, the revolutionary politics of the Sankara government of 1983–87 (Otayek, 1989), and the adoption of *gestion de terroir*\* as a national strategy in 1986 (Engberg-Pedersen, 1995). *Groupements villageois* and *groupements d'éleveurs* are therefore important features of many projects, and the smaller *groupes de travail* are the major channels for transmission of extension messages. Bindlish *et al.* (1993) reported that 27% of farmers are members of *groupes de travail* and a small number of others are non-members but regular attenders of group extension activities.

The functioning of the current hybrid national system is very variable. The information needs defined by informal feedback from producers are now supplemented by questionnaire surveys and more systematic participatory diagnosis, particularly in some specially funded enclave projects. The main thrust of all livestock production extension in rural areas is to increase the availability of dry season fodder by cultivating fodder crops, cutting natural hay, and constructing hay-barns in which natural or culti-

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\**Gestion de terroir* and the related *aménagement de terroir* both refer to village-level management and conservation of natural resources.

vated fodder can be stored away from sun and rain to conserve its nutritive qualities. Further important themes are the construction of hygienic housing for all species and the building of sheltered pits for composting manure with household and crop wastes.

Extension themes are changing slowly. Although the system of monthly meetings between researchers and SMSs does allow a regular flow of ideas from research to extension, it suffers from two constraints:

- (a) only a minority of research staff participate in the meetings and these come predominantly from the Production Systems Research Programme rather than from 'vertical' programmes like Animal Production;
- (b) systems for transmitting research priorities from extensionists or producers are not working well, so little relevant research is being carried out.

*Fiches techniques*, or extension guides, are jointly drafted at the meetings, but they are not always adapted to the problems in hand; they consist of solid text and provide little in the way of audio-visual material or other communication ideas for the transfer of technology. The *fiches techniques* are placed in the yearly calendar worked out at CRPA or project level, and FEWs visit villages to talk about the topics on which they have been recently trained. Neither the selection of themes, nor the order in which they are addressed, was considered to be a problem or constraint by producers in the communities visited. Farmers and herders felt that they could raise questions with extension workers, or ask for specific themes to be covered, and get a response, if not instantly, at least in a matter of weeks.

Although the official literature mentions a range of extension 'tools', the researchers gained the distinct impression from farmers that most animal production extension consists of an extension worker monologue rather than a dialogue; there appeared to be very little transfer of technology by demonstration. Evidence of the use of posters, leaflets or other visual aids was equally

scarce. This can be partly attributed to the extension workers' strongly held belief, shared by the higher echelons of the service, that illiteracy is a bar to the understanding of even simple and instructive designs. In spite of claims to the contrary by central and provincial services, very little audio-visual material appears to have been adapted for extension purposes, and use of the potential impact of specialized radio and television programmes is totally inadequate. Indicative livestock prices at major domestic markets and at Port Bouet in Côte d'Ivoire are broadcast in a number of local languages, but producers feel that this is of limited use to them.

In terms of impact, some extension messages appear to be completely inappropriate. However, a more widespread problem is that in a system of spontaneous crop-livestock integration driven by resource constraints, recommendations may become appropriate to different households at very different times. Under the current system, the adoption rate of labour-intensive technologies, such as the building of hay-barns and construction of manure pits, is bound to be variable, and the understanding of some of the technologies adopted was demonstrably superficial.

### **Extension with peri-urban producers**

The Chefs de ZEE also carry out extension among peri-urban producers and here, the picture is very different. Peri-urban fattening, largely for export to Côte d'Ivoire, has taken off since the devaluation of the CFA franc, and the possibilities for commercial dairy production have increased. A combination of the attractiveness of success, kinship networks, and other forms of patronage, means that livestock officers prefer to channel their effort into extension with wealthier peri-urban producers; they advise these individuals or groups on cross-breeding, the use of nutritional supplements (particularly agro-industrial by-products), and business development. Messages arise from the expressed needs of the articulate producers and the general expertise of the livestock officers, but they

actually have less impact than might be expected; animals for fattening were still being fed mixtures based on availability and personal choice, so the effect on the poorer producers was obviously minimal. This peri-urban extension highlights the question of equity; costs are high because of the level of attention given to individuals and because the extension is carried out by more highly trained staff. The country benefits as a whole by ensuring a flow of information on best practices to urban producers, but the individual peri-urban extension activities could be more focused and better organized; they should definitely be run on a cost-recovery basis as soon as possible.

### Special projects

Within the governmental sector but outside the national T & V system, there are a number of projects on livestock production extension. PDAV, the French-funded national poultry project which is now expanding into small ruminant production, has successfully organized a network of volunteer vaccinators who are paid only by a sanctioned mark-up on the vaccines and medicines they sell. Their role in the delivery of production information is minor and their curriculum is dominated by preventive and curative health concerns. PDAV does, however, organize slide shows for producers with commentaries by project staff members; these last just over an hour and cover all aspects of the projects' activities, but Letenneur and Richards (1994) suggest that the presentation is too long and insufficiently focused.

Another French-funded project, the PDRI-HKM, is experimenting with a "system of support to farm enterprises"; careful and participatory diagnosis is based on the overall nature of the farm enterprise and the mobilization of producers into overlapping groups according to particular subjects/needs. Although adoption rates appear to be high, a note of caution can be detected in project documents concerning the success of the system (although it is still a new initiative), particularly with regard to the difficulties of training CRPA staff to operate

independently in the diagnosis of farmers' problems and the provision of advice. The project appears to have returned to the development of *fiches techniques* and extension sessions pre-programmed around set themes, i.e., to elements of the T & V system.

The NGO-funded, but governmental, PAE/Yatenga has made strenuous efforts to encourage stall-feeding and soil conservation; its methods include an innovative community drama called 'Amadou comes home'. Amadou, a migrant, returns home after a long absence to find positive changes in village life such as new practices in soil conservation, agro-forestry, cropping and livestock; these, added together, amount to *gestion du terroir*. Specific livestock themes covered by extension involve the construction of hay-barns and livestock stables, and detailed advice on the quantity and timing of supplementary feeding. The project is achieving high rates of adoption but at high cost in terms of both human resources and subsidies on inputs such as fertilizer and construction materials. As in other projects (e.g. APSS), it can be argued that PAE/Yatenga is influencing people towards practices which are over-costly and even counter-productive (for example, penning sheep).

Government projects linked to marketing operations (for milk and for rabbit meat) in the peri-urban sector also contain strong elements of hidden subsidy.

### NGOs

Burkina Faso has one notable NGO, APSS, which, although open to all in principle, operates mainly among members of the Fulani ethnic group and is thus perceived by its members to be a Fulani organization. Originally confined to the Sahel area of northern Burkina Faso, APSS is now popular with Fulani groups throughout much of Burkina Faso and has branches in Niger, Mali and Senegal. News of the organization is quickly spread and Fulani groups who wish to apply for membership send representatives to Dori for training. The extension work centres primarily on the need to conserve hay, a novel concept

for the mainly pastoral Fulani; building a hay-barn is a prerequisite for membership.

APESS also runs training services on animal production and health, women's development and enterprise management for women, and literacy. Training is focused on short residential courses. A key part of its strategy is to encourage literacy in Fulfulde in an Arabic script; the APESS magazine *Jawdi Men* covers the same material in Fulfulde and French. The opportunity to read and write their own language in a script with which they already have some familiarity is evidently very attractive to Fulani; one group described it as "an opening of the spirit". APESS also appeals to the specifically Fulani consciousness through traditional poetry and song (Box 2), and through an ethos of individual competition.

The appeal of APESS may be based on the Fulani identity, but its extension work is innovative and highly idiosyncratic. Although hay storage may represent an adaptation to the increasing shortage of land which circumscribes transhumance, it has been elevated to an almost mystical significance. A competitive element is also evident, with yellow turbans being awarded to the builders of the finest barns.

In accordance with Fulani tradition, the emphasis is on milk production from cattle, with meat being regarded as a by-product. Goats, which are considered by the leaders

of APESS to be "destroyers of the environment" and a species no-one will invest labour in, are totally neglected.

The ability of APESS to inspire its members is well-demonstrated. One group living hundreds of miles from the Dori headquarters claimed that it is the most useful of all the organizations with which they have contact, even though they only receive two or three visits a year. A group of 10 men had been trained in livestock production at Dori, and one man was able to pass on the literacy training he had received. The short residential courses for farmer/herders are the most radical alternatives to the T & V system available in Burkina Faso, and their success is reflected by the number of organizations which have funded them.

Measuring impact when the organization has a self-selected, geographically dispersed clientele raises methodological problems. Although there is an air of success surrounding the project, remarks made by the group mentioned above suggested that the actual rate of adoption may be lower than anticipated: "we accept the ideas but we do not all practise them; we are lazy good-for-nothings". Beyond this comment lies the important question: are the hay-barns promoted by APESS, which are usually built of adobe bricks on a 4 x 8 m plan, a rational use of the considerable labour required?

Although the APESS strategy has succeeded in moti-

## BOX 2 THE APESS SONG

He whose animals are not hungry will not be hungry  
He whose animals are not hungry will not be poor  
If this is so, cut great loads of hay  
And keep it in well made barns  
So your cows may eat in the dry season.  
It is time to realize that times have changed  
And the bush has come into the barn

*Jawdi Men* 1, 1992



vating people through ethnic and moral appeals and a spirit of competition, the central extension message may not have a wide application. As some government projects and parts of the national extension service have adopted the APSS model, the issue is central to the whole of livestock extension in Burkina Faso.

## Conclusions

The Burkina Faso case study has provided many lessons for the assessment of livestock extension which will be discussed more fully in the final section. The main conclusions are as follows.

- (a) The simple categorization of livestock production extension systems into free-standing, crop-based, and animal health-based, is inadequate. The great majority of animal production extension is provided by generalist, or crop-based, extension workers. Extension may be provided in niches of the crop-based system by livestock-specialized staff who also have animal health duties. As the clientele of these particular extension services are specially selected, and as staff are more highly trained and more available to producers than the generalist workers, a meaningful comparison cannot be made with the performance of the general system.
- (b) T & V presents both opportunities and constraints. Many of the rural farmers and herders interviewed expressed a general contentment with the extension services and the changes brought about in their production. The efficacy of the national system with respect to crop-based messages was demonstrated by Bindlish *et al.* (1993). Two years later, there are signs of progress in livestock extension but there is still a long way to go. It was noted that extension calendars are relatively flexible and that producers can have issues of interest to them addressed if not immediately, at least within a relatively short time. The recent 'participatory programming' exercise enabled a more systematic identification of producers'

needs, and a trend has been established towards setting extension calendars, and identifying messages, at provincial and even lower level, rather than at CRPA level.

- (c) Imaginative models of extension present both possibilities and pitfalls. APSS and some of the governmental projects are getting results in terms of adoption but at a high cost and with some doubt about the appropriateness of the messages.
- (d) The national research systems still appear to be unable to produce appropriate recommendations. The system for generating livestock production messages, the INERA Animal Production Research Programme, and its interface with extension, is clearly inefficient because it fails to make use of available resources such as international research networks and information on producer needs emanating from the extension system. As a result, promising avenues of research, such as alley farming, are not pursued, and research of doubtful relevance, such as the nutritional content of fodder in urban markets, is carried out instead. The system for assembling information and compiling *fiches techniques* and extension calendars can be considered efficient within its own terms, but its effectiveness is limited by the orientation towards text-based *fiches techniques* and the complete lack of interest in alternative media.

## KENYA

### Background

The Kenya case study involved visits to farmers, extension workers and supervisors in Nyeri and Machakos Districts. The efficacy of existing strategies for delivering livestock production information was assessed through discussions and visualization exercises. The study illustrates the difficulties encountered when changing from predominantly crop-based T & V extension to a unified

system offering both crop and livestock messages. These changes have implications for the further training of both crop and livestock FEWs.

The situation in Kenya is complicated by the special projects, the National Dairy Development Project (NDDP), the National Poultry Development Project (NPDP) and the Integrated Small Animal Project (ISLP) which are funded by bi-lateral donors. As they are staffed by Ministry of Agriculture and Livestock Development and Marketing (MALDM) personnel, there are fewer staff available for more general livestock extension activities. While it is acknowledged that the special projects have contributed greatly to national development objectives, more FEWs with a knowledge of general livestock production are needed. It is hoped that a unified extension service will overcome the shortfall in skilled personnel during the life of the second National Extension Project (NEP II).

### **The Kenyan national agricultural extension service**

Under NEP II, it is anticipated that a unified extension service will be developed with crop and livestock information provided by one FEW. The earlier project, NEP I, concentrated entirely on agriculture (cropping) and left livestock extension to the Departments of Livestock Production and Veterinary Science. Although the organization of the unified service follows the T & V approach, FEWs are expected to work with groups of producers rather than individual contact farmers. Agricultural research is in the process of adopting a farming systems approach in which the emphasis is placed on demand-driven, on-farm research performed in close collaboration with extension staff and farmers. In reality, none of these plans have yet been fully translated into action.

Older staff at MALDM underwent a certificated training course which covered both crops and livestock, but those more recently qualified have specialized in either one discipline or the other. Under NEP II, funds for retraining were included in the budget to enable agricul-

turalists to provide livestock advice, and livestock staff to provide crop messages. This funding has so far proved inadequate and the proposed schedules have not been met.

In addition to the current unified agriculture/livestock production extension service, a pilot scheme is beginning under which the Department of Veterinary Services (DVS) will offer advice on animal health in conjunction with NEP II. If the scheme is successful, disease prevention advice, and the animal health assistants (AHAs) who deliver it, will be incorporated into NEP II. As AHAs have no specific training in agriculture, retraining needs (and costs) will be considerable.

#### *Sources of information for livestock producers*

FEWs derive most of their day-to-day information from their original training. Central Province has produced an updated extension manual, but availability is limited. FEWs have access to some written material from the Agricultural Information Centre (AIC) but its coverage is by no means universal. The most widely circulated written information comes from the special projects which have designated funds for this purpose.

The role of subject matter specialists (SMSs) is to resource FEWs and provide a first point of contact between research and extension. Formal structures and meeting schedules between research and extension are impressive on paper, but the objectives remain to be achieved. Quarterly professional meetings, farm tours, visits to research stations, and meetings between personnel from research and extension, are intended to facilitate the flow of information to and from SMSs; in 1994, few tours were undertaken and few meetings were held.

Agricultural shows provide an opportunity for demonstrating techniques to farmers, FEWs and the general public, and for exhibiting improved livestock breeds. The Agricultural Society of Kenya planned 13 shows for 1995, but MALDM believes that preparing for the shows occupies a lot of staff time and resources which could be used elsewhere.

Co-operative dairy societies are predominantly milk purchasing and marketing organizations; the larger ones offer some production advice directly to their members at field days. Although some smaller societies plan to offer production and technical services, they are currently constrained by their poor financial situation.

Current government policy promotes the privatization of clinical services, artificial insemination (AI) and dipping. Large-scale farms provide the main livelihood for private veterinary practice; small-scale farmers are generally less able to afford their charges. Most veterinary work is directed towards the dairy sector, with the commercial poultry sector being second in importance; treatment of sheep and goats is uneconomic and therefore minimal. Private vets currently provide little advice on disease prevention; it is only offered following on-farm treatment.

Kenchick is the largest private poultry company in Kenya, employing four field staff, each of whom service 20–25 private producers under contract to Kenchick. The minimum flock size for contract farmers is 3000 birds. Kenchick field staff are trained by the company and receive relevant research material published in international journals. Advice on production is limited to the contract farmers who may pass the information on to others. However, this extension information is only relevant to large-scale producers and is unlikely to diffuse to small-scale farmers.

Agriculture is taught in schools, many of which also run 4-K clubs to foster interest and pass on agricultural advice. This information is intended to be passed from the students to their farming parents. Many of the pupils will eventually become farmers themselves.

## Nyeri District

Visits were made to both high and medium potential agricultural areas in the District of Nyeri where the three livestock-related special projects, NDDP, NPDP, and ISLP, are operating. Nearly all NEP II's front-line staff come from

agriculture (in the ratio of 20 agriculture:1 livestock production), with three times as many livestock production staff working on special projects as on NEP II. The advantages of special project extension work in this District relate mainly to the availability of operational funding for transport and allowances. Staff : farmer ratios under NDDP are around 15 times better than under NEP II. However, this creates continuity problems when special projects end.

By early 1995, about 70% of FEWs had received some, if not all, of the planned two-week retraining. However, the courses contained no practical work, and were generally felt to be insufficient to build confidence. The written hand-outs which accompanied the course were often based on livestock information from the special projects. The Central Province Extension Manual was also used, although there were not enough copies to go round. Messages were most highly developed for dairy cattle (including forages) and poultry, with some additional messages for dairy goats and bees. Limited attention was paid to indigenous livestock varieties and pigs.

The Ministry's extension service, including the special projects NDDP, NPDP and ISLP, was the major source of information for farmers. *Barazas* (chiefs' meetings), neighbouring farmers, dairy co-operatives, mass media, schools, private vets and agricultural shows also provided important information (Table 1).

Table 2 outlines the types of information available to livestock producers in Nyeri District. Dairy farmers adopt some of the messages received, but rarely all. Few farmers practice complete zero-grazing, i.e., allowing animals to graze when grass or labour is short. Fodder conservation on farms is very rare. Bee keepers recognize the relevance of the extension message but are constrained by other factors from adopting improved techniques. Dairy goat production, which is promoted by ISLP, is currently dominated by larger farmers so the project's target of assisting the smallest farmer, or those without dairy cattle, is proving difficult to achieve. Pig producers suffer from a shortage of information on all aspects of production and marketing.

**Table 1** Livestock producers' sources of information and their rank (Nyeri District)

Sources	Dairy farmers	Bee keepers	Dairy goat farmers	Pig farmers
Ministry extension service*	1	2	1	2
<i>Barazas</i>	2	5=	2	-
Other farmers	3=	3	3	1
Co-operatives	4	4	4	-
Radio	6	5=	6=	-
Newspapers	7	7=	6=	4
Schools	5	7=	-	-
Agricultural shows	3=	6	5	3
Social services	-	1	-	-
Product processors	-	-	-	5

Note: \* Ministry extension services include the extension provided by special projects (i.e., NDDP and ISLP) and veterinary services provided by the District. 1=most important. 7=least important.

Constraints to the expansion of dairying include the cost and availability of AI and drugs in the wake of privatization, shortage of credit for the small farmer, and late payment for milk from co-operatives. Bee keepers are constrained by a lack of credit for the purchase of improved hives, despite the potential profitability of up-grading, and a shortage of market and processing information. The purchase of dairy goats is constrained by lack of credit, so poor farmers are unable to benefit from introducing goats on to their farms.

Research-extension contact appears to be limited, and there is no evidence of on-farm trials in the District. Neither is there much evidence of feedback from farmers to researchers. Demonstration forage plots have been established from time to time, but there has been little follow-up to determine farmer perceptions.

### **Machakos District**

Mixed farms were visited in high and medium potential areas of Machakos District where the ratio of agriculture: livestock production staff available for NEP II was around 5 : 1. This reflects the relative lack of special livestock

projects in the District, with only NPDP operational. Extension work is carried out mainly through contact farmers, although the number of follower farmers was said to be low (between three and five). There has been little development of the group approach.

In one Division, less than 30% of agricultural FEWs had received any retraining in livestock production, and less than 10% had received the full two weeks. The retraining had not included any practical work. Contact farmers, who often had larger farms and were therefore more affluent than average, appeared to be given livestock messages whether they were relevant or not.

NGOs are more important in Machakos than Nyeri. The Church of the Province of Kenya has developed a group approach to dairy cattle and poultry extension, using similar material to that of the NDDP and NPDP; it also receives assistance from SMSs and FEWs. World Neighbours and the Intermediate Technology Development Group are training paravets and supplying inputs (at cost). The paravets refer farmers to MALDM staff if they feel out of their depth, but they do provide simple advice on disease prevention.

**Table 2** Types of information provided by different sources for livestock producers (Nyeri District)

Source	Dairy farmers	Bee keepers	Dairy goat keepers	Pig producers
Ministry extension service	General husbandry, calf-rearing, feed and forage, milk hygiene, prices	General husbandry, harvesting, wax-processing, capturing colonies, apiary siting, feeding	Breeding, feed and forage, worming, hoof trimming	General husbandry, breeding, housing
<i>Barazas</i>	Disease	General husbandry, marketing	General husbandry, nutrition	-
Other farmers	Planting material, general husbandry	Indigenous knowledge, predator control, apiary siting	General husbandry, forage production	General husbandry
Co-operatives	Prices, breeding stock	Grading, prices	Breeding, disease prevention	-
Radio	General husbandry, prices	Prices, marketing	Housing, forage production	-
Newspapers	General husbandry	Hive design	Housing	General husbandry
Schools	General husbandry	Honey and human nutrition	-	-
Agricultural shows	General husbandry	Hive design, processing, marketing	General husbandry	Breeding, nutrition
Social services	-	Processing	-	-
Product processors	-	-	-	Prices, grading

Ministry extension is the most important source of information on livestock production. Other sources include *barazas*, neighbours, the co-operative union, mass media, schools, shows, churches and NGOs (Table 3).

Table 4 shows the types of information provided. Dairy farmers have adopted Napier grass production and zero-grazing, assisted by the widespread application of soil conservation techniques (terracing). Bee keepers receive

useful information on management and husbandry, but they still require more advice on processing and marketing. Although extension messages for indigenous cattle, sheep and goats are understood, they are rarely adopted. Pig producers receive little extension so output is low and investment limited. The intensive poultry messages have been adopted by very few, although cross-breeding (cock-reel exchange) is popular with small, free-range producers.

**Table 3** Livestock producers' sources of information and their rank (Machakos District)

Sources	Dairy farmers	Bee keepers	Indigenous cattle, sheep and goat farmers	Pig farmers	Poultry farmers
Ministry extension service*	1	1	1	-	1
<i>Barazas</i>	6=	-	2	-	2
Other farmers	2	8	7	1	3
Co-operatives	-	2	3	-	-
Radio	5=	5	8=	4=	4=
Newspapers	5=	7	8=	4=	4=
Schools	7	6	5	-	6
Agricultural shows	4	9	4	3	6
Churches/NGOs	6=	-	6	2	5
Social services	-	3	-	-	-
Books/pamphlets	3	-	-	2=	-
Ministry of Health	-	4	-	-	-

Note: \* Ministry extension services include the extension provided by special projects (i.e., NPDP) and veterinary services provided by the District. 1=most important. 9=least important.

Further expansion of dairying is constrained by a shortage of credit. Only those farmers with sources of non-farm income can afford the required investment. The cost of AI and drugs is likely to increase considerably with privatization. Bee keepers cannot afford to invest in modern hives and equipment, despite the advantages in terms of production. The extension service has had little impact on the productivity of indigenous cattle, sheep and goats. The provision of semen from exotic breeds for AI may not be appropriate in drier areas without improved husbandry. Pig farmers receive little or no extension. Small farmers have insufficient capital to invest in intensive poultry production and there is some concern that the poultry breeds on offer for cross-breeding are not well-adapted to the small farmer's management system.

Livestock on-farm research was limited to a research-driven, dual-purpose goat (DPG) project in which the role

of farmers and extension staff was subordinate to the demand for research data. Although indigenous breeds, especially draught animals, are particularly important in the District, there appeared to have been no relevant messages about them from research. Meaningful research-extension links need to be developed for the mixed farming areas.

### Conclusions\*

In the past, the Kenyan national agricultural extension service (NEP I and NEP II) was biased towards the provision of advice and information on crop production, which reflected the importance of this sector to the national economy. This resulted in livestock production being relatively neglected, and the current extension service has many more crop production specialists and extension workers than livestock specialists. Although the national

\* It is important to note that the conclusions apply to the time of the study (early 1995).

**Table 4** Types of information provided by different sources for livestock producers (Machakas District)

Source	Dairy farmers	Bee keepers	Indigenous cattle, sheep and goat farmers	Pig producers	Poultry farmers
Ministry extension service	General husbandry, calf-rearing, feed and forage, milk hygiene, breeding, disease control, prices	General husbandry, harvesting, capturing colonies, apiary siting, feeding	Breeding (AI), feeds and forage, worming, housing	-	General husbandry, housing, vaccination, nutrition, marketing
<i>Barazas</i>	Vaccination, availability of stock, fodder production	-	Vaccination	-	Breeding
Other farmers	Housing, fodder production, milk hygiene	Indigenous knowledge	Milk and manure production, draught power	General husbandry, housing, nutrition	General husbandry, breeding, housing
Co-operatives	-	Record keeping, credit	Fodder production	-	-
Radio	Vaccination, quarantine, breeding	Prices, marketing general husbandry	Concentrate feeds, vaccination, prices	-	Prices
Newspapers	Breeding	-	Prices	General husbandry	Prices, breeding
Schools	-	Diseases	Vaccinations	-	Cockerel and pullet exchange
Agricultural shows	Breeding, fodder conservation, housing, zero-grazing	Crops to attract bees	Feed and forage, cross-feeding	Breeding, nutrition	Breeding, cockerel and pullet exchange, nutrition
Social services	-	Hygiene	-	-	-
Product processors	-	-	-	-	General husbandry
Books/pamphlets	General husbandry	-	-	-	-
Churches/NGOs	Vaccination, availability of breeding stock	-	Vaccination, fodder production	Breeding	Vaccination

agricultural extension service anticipates radical changes to enable it to respond more readily to the demands of producers, the plans have not yet been translated into action.

### *Training*

The development of a unified extension service has been hindered by insufficient operational funds for retraining, transport and allowances. Retraining under NEP II has not been universal and not enough time has been allowed for it. More emphasis needs to be put on practical work.

Careful thought must be given to the development of curricula which meet the needs of a unified government extension service. This will be particularly important if, or when, veterinary staff are included in the system. FEWs should also be introduced to the concept of the participatory approach so that they will be sympathetic to the needs of their clients.

### *Research-extension linkages*

The need for demand-driven agricultural research in Kenya is recognized. The Kenya Agricultural Research Institute (KARI) has adopted a farming systems approach which emphasizes the need for participatory rural appraisal, research-extension linkages, and on-farm research. Evidence that the linkages were operational, or that on-farm research had started, was hard to find. The formal structures for research-extension linkages exist, mainly on paper, but it is essential that they should be fully adopted as soon as possible so that demand-driven research and extension can become a reality.

There was little evidence to suggest that in the past 10–15 years, any new technologies relevant to livestock production had emerged from research for dissemination by extension to mixed, small-scale farming. The small amount of new information that has become available in recent years has originated from the special projects. The lack of appropriate research, and poor research-extension linkages, has meant that few livestock messages have changed over the past decade.

### *Effectiveness of information and extension*

Returns to investment in livestock extension are probably high when the technology promoted is profitable, and inputs are available (i.e., in dairy farming). Extension effort has been concentrated in this sector, and although dairying can probably be expanded, it will continue to be restricted to those farmers with access to capital. Few messages appear to have been developed for more difficult environments where risk avoidance strategies predominate, i.e., in the drier parts of Machakos District. Although it is harder to develop technologies and messages for these environments, they have the greatest need, particularly in view of the continuing migration of landless people from the densely populated highlands to the semi-arid zones.

### *Orientation of extension*

Contact farmers, who are often the wealthy and influential members of the community, may receive advice from more than one primary source (e.g. NEP II, NDDP and NPDP). Extension services would be more effective if they were spread over a wider range of farm sizes and income groups (both individuals and groups).

Lack of credit facilities for small farmers prohibits investment in more intensive forms of livestock production. Prospects for investment in this group may deteriorate further in the future because of rising prices for veterinary care, AI, etc.

Some of the more commercial farmers (mainly dairy) are able to pay for services and seek alternative private assistance if required; this group should not receive free government extension.

### *Sustainability*

NEP II is clearly not financially sustainable and cost-recovery will remain a problem, particularly in semi-arid areas. The dairy sector offers the best opportunity for cost-recovery as the co-operatives develop their information and production services. They have a vested interest in ensuring that their members receive high quality infor-



mation. Dairying will, for many farmers, generate sufficient income to enable them to purchase advice and information.

## INDIA

### Background

The Indian case study focused mainly on the States of Haryana and Gujarat with small additional components in Punjab and Andhra Pradesh. The agricultural systems in these States have both mixed farming and peri-urban components with the potential for overlap between crop and livestock extension. Government, university, NGO and bi-lateral extension services were evaluated in terms of their approach to the provision of information to farmers, the farmers' reactions to the information made available, linkages with research, complementarity, overlaps, and effectiveness in reaching all sections of the farming community. Interviews were held with senior officials in service organizations, and members of rural communities in a wide range of situations.

### Historical context of extension in India

Since the early 1950s, there have been two phases in the development of agricultural and livestock extension in India. The first, a broad-based system known as 'community development' (CD), was abandoned because it was difficult to combine expertise in crop and livestock extension in one extension agent. It was replaced by a system in which crops and livestock were treated separately by the Departments of Agriculture and Animal Husbandry in each State. However, although a comprehensive service was provided for crop production, only a veterinary service was provided for livestock, with the implicit assumption that production extension would take care of itself. Separate projects were established for poultry, sheep and cattle extension under the Departments of Animal Husbandry.

At the beginning of the 1970s, it was noticed that the extension services focused only on the more progressive farmers, that messages were not locality-specific or appropriate to all farmers, and that extension staff lacked motivation and training. Simultaneously, experience of agricultural extension world-wide led to World Bank interest in the T & V system. The World Bank has supported extension development in 17 States of India, and in Haryana and Gujarat it was implemented under the World Bank-funded second national agricultural extension project. When T & V was introduced in India, it was essentially superimposed on the existing system. In common with the sectoral system which preceded T & V, the new model had no provision for livestock extension which was consequently excluded from plans and implementation. From the late 1950s, livestock extension has therefore been neglected in Haryana and Gujarat.

It is now envisaged that broad-based agricultural extension will build on the existing infrastructure and basic methodology of T & V. It has not yet been implemented in either Haryana or Gujarat, and there appears to be little enthusiasm for the incorporation of a livestock component in either the State Departments of Animal Husbandry in Haryana, Gujarat and Punjab, or in central government. However, some members of the Departments of Agriculture in Haryana and Gujarat seemed relatively positive.

It was generally felt that the introduction of livestock into T & V would be unsuccessful because:

- (a) the plan to nominate the Department of Agriculture as the lead organization would continue to prioritize agriculture and subordinate, and consequently neglect, livestock inputs;
- (b) under the current T & V system, many FEWs are already over-worked and may not be able to accommodate the additional workload.

Similarly, as current staff had been trained primarily in agriculture, some felt that they would be unable to provide an adequate technical service, especially to their

more advanced clients who require complex and up-to-date information. This was one of the reasons why the CD system was replaced by a sectoral approach.

Some scepticism was expressed, and repeated in the State agricultural universities, about how amenable livestock production is to the kind of regular, standard messages provided for crops. The longer time-scale involved in animal production, the slower pace of new technical developments and messages, and the lack of synchronization between different animals and herds, are particularly thought to inhibit the usefulness of regular messages.

All senior representatives of Departments of Agriculture felt that some kind of parallel system, specifically for livestock and under the control of their departments, was a preferable option; it was claimed that only financial shortages had prevented such systems from being established already. The National Department of Animal Husbandry has recently requested that alternative policies for livestock extension be considered in a study commissioned under Dutch bi-lateral aid.

In view of the fact that the livestock sector has been poorly served by T & V, and that many are reluctant to incorporate livestock into the new broad-based system, the performance of other organizations which are already providing livestock extension services, such as State agricultural universities, dairy co-operatives, NGOs and national research institutes, is worth considering.

## **Livestock service organizations in India**

### *Departments of Animal Husbandry*

These sub-divisions of the Ministry of Agriculture are responsible for animal husbandry and veterinary issues. They are staffed mainly by vets and veterinary auxiliaries with few, if any, livestock specialists. They provide an animal health service through a decentralized network of veterinary hospitals and village dispensaries. Veterinary hospitals are better equipped, and perform more complex treatments, than the dispensaries which are restricted to first aid and routine activities.

Their activities include:

- informal extension by veterinary staff while interacting with farmers (but with no guidelines on the messages to be transmitted);
- passing on information at camps organized to provide clinical veterinary treatment;
- discussions, meetings, advice and demonstrations of new techniques at livestock fairs, shows and competitions held in districts and villages;
- programmes for cattle, poultry, small ruminant and pig production.

The departments receive an annual budget from State governments, for which proposals are submitted in advance. Extension activities are limited by a shortage of funds for transport and travel.

### *Sources of information for livestock producers*

As there is no formal extension service in Haryana State Department of Animal Husbandry, farmer information needs cannot be formally identified. Similarly, the spread of extension messages cannot be assessed and there is no feedback from the field to planners or researchers. Information requirements are therefore based on the informal assessments of departmental officers, using field experience and aggregate targets for production and numbers of cross-breds or inseminations.

There are no recommendations about the messages to be transferred and no official agenda. Field staff therefore have little or no guidance. The extension messages they do pass on are based on experience, previous training, and any other sources. The messages most often relate to cross-breeding through AI, balanced feeding (including concentrate), and the growing of green fodder crops. There appears to be an inclination towards dairy-orientated systems and large ruminants, especially cattle and buffalo.

In general, the veterinary service was well used by all categories of farmers. All the respondents knew where the nearest veterinary institution was and would visit it without hesitation if an animal was sick. However, the

degree to which veterinary staff were used for services other than those related to health was more variable. Wealthier and more 'progressive' farmers (wealth and progressiveness are highly correlated) reported that they frequently asked for animal production advice and received good information. Poorer and less commercially orientated producers, however, did not ask for any information and none was given, other than that directly related to the health matter in question.

Those farmers requiring news of more advanced technical developments appeared to be well served by the current system. They obtained information through discussions with veterinary staff, television, newspapers and journals, attendance at mass education meetings both in the immediate vicinity of their village and often elsewhere, and by contact with friends, relatives and other progressive farmers. Most were engaged in dairying, usually to provide a supplementary income and to complement more important farming activities.

Poorer households were less well-informed. They had often not heard the messages, or could not clearly explain them. However, good livestock management (including feeding of concentrates and green fodder) and general husbandry, which had been learnt from their parents, were usually well understood. They also reported that messages concerning non-dairy large ruminants such as draught animals, and other kinds of livestock such as sheep, goats or camels, all of which are common in the villages visited, are virtually absent.

## **Dairy co-operatives**

The dairy co-operative movement in India is involved in the production, procurement, processing and marketing of milk and milk products. Village level co-operative societies contribute to a milk producers' union, often at district level, affiliated to a State dairy co-operative federation. A range of extension activities is conducted at society level through the primary society secretary and specialists from unions, federations, or the National Dairy Development Board (NDDB), often in collaboration with State

Departments of Animal Husbandry or other organizations. These are generally limited to members or potential members, and focus on milk cows and buffaloes. The main extension mechanisms are:

- informal information transfer by the secretary and vets
- village meetings
- film shows
- weekly bulletins containing information on prices and marketing, and farmers' questions and answers
- camps and campaigns focusing, for example, on female animal infertility, during which vets provide clinical treatment, advice, and inputs
- posters and information.

A recent restructuring has shifted the focus more towards client needs. In most cases, information requirements are assessed by regional union staff with reference to past experience, objectives and feedback, and discussion with members of the society. In theory, messages should pass in all directions to federations, the national federation, and the NDDB. Many technical extension messages originate from the NDDB at Anand who then develop a package and offer it to the unions for demonstration. Researchers transfer their findings directly to NDDB officers to be passed on in training programmes for federations and unions.

The primary society secretary is in daily contact with members. Special meetings are arranged at which SMSs from the unions visit villages and hold discussions. Both women and men regularly attend these meetings, although some women are unable to go to evening meetings.

Milk co-operative primary societies are, however, established only where milk collection is financially viable for the milk union, so business interests ultimately determine which areas receive attention. As a consequence, poorer or less densely populated areas, or those whose milk surpluses are too small to merit the establishment of a co-operative infrastructure, are excluded from the benefits of the co-operative system.

Message delivery is highly effective under some unions such as the Amul union in Gujarat, but it varies and appears to be poor in neighbouring Baroda District. Basic messages with respect to animal health, cross-breeding by AI, milk hygiene and balanced feeding (including use of green fodder and concentrates), appear to have been widely received by co-operative society members, irrespective of wealth or gender. Great efforts are usually made to involve women in society activities, particularly through the ongoing 'Co-operative Development Programme', and this appears to have paid off in terms of their overall involvement and access to services.

### State agricultural universities

The activities of two State agricultural universities, Chaudhary Charan Singh Haryana Agricultural University (HAU), Hisar, and Gujarat Agricultural University, Anand, were investigated. This section focuses on HAU which employs 1331 technical staff, 165 of whom are involved in extension, 21 in animal science extension and three in veterinary extension. The university's Directorate of Extension Education plans, organizes and co-ordinates extension activities, and has three wings: the Farm Advisory Service (FAS), the Farm Training Service (FTS) and the Farm Information and Communication Service. At university level, there are 12 extension specialists. A general approach of extension for the complete farming system, part of which is directed at livestock, has been adopted.

The FAS is responsible for the transfer of technology throughout the whole State *via* a network of 12 *Krishi Gyan Kendras* (K GK), or Farm Advisory Centres, located in the district towns of 12 of the 16 districts. The mandate for these centres is to disseminate technology in an appropriate form and provide feedback for research through a number of related research-extension activities. The K GK are currently being upgraded to *Krishi Vigyan Kendras* (KVK), or Farm Science Centres, with an expanded role

which includes the training of farmers and extension personnel, on-farm action research, and demonstrations.

The FAS provides the following services:

- workshops in which researchers interact with staff from the departments of agriculture, horticulture, animal husbandry and social welfare to discuss the problems faced by field staff, and possible solutions
- farmers' fairs organized twice a year at the university, and at localized district level
- field days at which farmers are shown examples of successful technology adoption
- shows and competitions organized throughout the State
- campaigns on issues such as disease control, deworming and the control of lice
- group meetings and discussions at district and village level between farmers, extension specialists and various agencies
- establishment of centres in adopted villages for demonstrating the impact of recommended technology
- field demonstrations organized at village level
- field testing of research findings in farmers' fields to appraise farmer response and finalize recommendations for the adoption of new technologies
- clinical camps organized in collaboration with the Department of Animal Husbandry and focusing on animal production, and health and infertility
- publications for sale and distribution to farmers, and for the benefit of extension workers and progressive farmers.

The FTS conducts training courses on a range of subjects including poultry, pig production, dairy farming, meat and meat products, milk and milk products, AI, and turkey- and duck-rearing.

The extension programme tests the technologies developed by the university on farmers' fields before formulating and promoting recommendations in a traditional way. Livestock production information appears to

be subordinate to both crop production and veterinary messages. The livestock programmes focus on veterinary issues, fodder cultivation and generally, on 'progressive' farmers.

#### *Sources of information for livestock producers*

Messages are compiled by selecting and visiting a few villages to determine general problems, and then constructing a training plan according to need. The process is superficial and results in the dissemination of broadly similar extension messages related to the intensification of livestock enterprises.

In general, it was felt that although the K GK programme in Karnal District involved and benefited larger land-owning households, it was of no use to small and marginal farmers. The ability of the smaller, less-wealthy farmer to adopt the majority of the university's recommendations was constrained, suggesting that the needs-based approach was not in fact reflecting the requirements of poorer households; however, information was not the major constraint for this group.

### **The National Dairy Research Institute**

The extension activities of the National Dairy Research Institute (NDRI) at Karnal in Haryana State were reviewed. National research institutes are directed by the Indian Council for Agricultural Research based in Delhi. The following structures within the NDRI are engaged in extension: the Division of Dairy Extension, the Operational Research Project (ORP, now renamed the Farming Systems Research Project), the KVK and the Trainers' Training Centre (TTC).

The Division of Dairy Extension, which was established in 1961, performed primarily service-orientated functions until in 1972, the arrival of new staff allowed for post-graduate teaching and research and the strengthening of extension activities; it now has a staff of 11 scientists. The Farming Systems Research Project employs lay inseminators and vets, and a number of centrally located research/extension staff.

Dairy extension is carried out in 12 adopted villages in the hinterland of Karnal town. These serve as sites at which students can gain practical experience and conduct research. Four Stockman Centres and four Lay Inseminator Centres have been established to provide the following services:

- cross-breeding with Holstein/Friesian and Brown Swiss frozen semen
- selective breeding of local buffalo and up-grading (Murrah) by AI
- fertility campaigns involving clinical treatment of animals with infertility problems
- vaccination of livestock against major infectious diseases
- provision of clinical veterinary treatment at AI centres
- group discussions and informal interactions for transferring extension messages on breeding, feeding, management and health care
- animal husbandry assistance including de-horning, de-worming and castration
- sources of information.

The emphasis so far has been largely on a top-down system of information dissemination and therefore numerous infrastructures are in place for contacting farmers. However, NDRI has moved from a station-based research approach with attached extension operations, to a farmer-led participatory approach; this has generated recommendations for on-station and on-farm research based on the appraisal of rural needs. Programmes are monitored and evaluated through a series of surveys and rapid rural appraisals. The Farming Systems Research Project operates in 30 villages distributed in four clusters, each with a dairy *Vikas Kendra* as the central village of the cluster. The selection of villages was based primarily on: the responsiveness of the local population; the proximity to Karnal; the absence of AI and vet facilities; the availability of good irrigation resources and hence the suitability for intensified cropping and dairy farming; farmer interest in co-operatives. Villages with a large propor-

tion of landless labourers, and marginal and small farmers, were also selected so that the benefit of the programme could reach the poorer sections of society.

## **Non-government organizations**

The activities of three large NGOs were reviewed. A field assessment was made of the Bharatiya Agro-Industries Foundation (BAIF), and discussions were held with the Aga Khan Rural Support Project (AKRSP) and Action for Food Production (AFPRO).

BAIF has approximately 1200 technical staff distributed throughout the network; these include the headquarters in Pune, Maharashtra State, the sub-headquarters in Ahmedabad, Gujarat State, the regional offices in each of the States in which they are active, and village centres. Research is conducted by research scientists from all disciplines, and a large number of veterinary field staff manage livestock development programmes in 590 cattle breeding centres. Although BAIF offers an integrated development approach, it is best known for promoting the cross-breeding of local cattle at the farmer's doorstep through mobile AI centres. This includes a basic AI service supported by pregnancy diagnosis and vaccination of livestock. It allows frequent interaction between BAIF staff and beneficiaries, and this facilitates the informal transfer of information. Extension efforts are also directed towards fodder cultivation and the provision of fodder mini-kits; this involves meetings and small group discussions, sometimes with audio-visual material. Short training courses for men and women, which include a livestock management component, may involve farm visits, discussions and demonstrations. Additional extension activities include the organization of livestock shows and clinical camps.

The activities of the AKRSP are concentrated on forestry, irrigation, engineering, agriculture and management in three areas of Gujarat State. AKRSP is not involved in livestock extension, partly because of a lack of suitably trained staff.

AFPRO is a Christian-based, non-profit, voluntary

organization whose staff includes experts on livestock, agriculture, water resources and women. There are eight field stations whose management, technical and support staff are responsible for the daily management of the field programmes carried out through local, small-scale NGOs. AFPRO has served as an apex body funding grass-roots NGOs in small-scale, 'barefoot technician' programmes aimed at training local people in rudimentary animal health care. These trainees provide advice as well as a veterinary first aid and vaccination service, and they form a link between the community and the Department of Animal Husbandry if serious veterinary cases occur.

### *Sources of information for livestock producers*

Although it is now a development agency involved in multi-sectoral projects, the oldest and largest of BAIF's programmes is the promotion of cross-breeding for milk production. This service is still frequently used as an entry point into new communities and is expected to develop into a broader input as needs become established. Information needs for livestock have not, therefore, been formally investigated or defined in BAIF's activity areas. Instead, a standard package approach has been adopted for interested households able to become involved.

In common with other organizations, BAIF is re-evaluating its practices and becoming increasingly responsive to the identification of community needs through a participatory approach. Evidence of this can be seen in programmes in which they have become involved in a broader range of livestock activities, such as addressing the constraints on keeping small ruminants in semi-arid areas.

The information provided by BAIF derives from conventional published research, sometimes supplemented by specific subject-orientated research. The application of these messages has been partly modified by the experience gained from field programmes. Information is assembled into packages of recommendations considered broadly suitable for most farmers. Therefore, the main outline varies little to take account of different types of producer or

different parts of the country. The packages focus on AI (using exotic breeds in particular), good management, and feeding; specific details regarding species, types of fodder, etc. are tailored to the particular circumstances involved.

BAIF's door-to-door AI service fosters an on-going relationship between staff and programme participants which can be expanded beyond livestock activities. Although this approach focuses on individuals rather than groups, group activities such as general meetings, discussions, video shows, clubs, special training courses and organized visits, are also conducted. There has been some move towards the use of novel extension methods to complement the more traditional ones. For example, a successful farmer who has adopted a particular innovation may be asked to describe his experience to others and demonstrate the results. Increasing use is also made of locally appropriate extension materials rather than those designed for general application. BAIF aims to include women in its various activities and as experience has shown that they are reluctant to join mixed groups, runs special women's training courses.

Both the male and female participants in the BAIF programme who were interviewed during the study were clearly aware of the general features of cross-breeding and animal management (general husbandry, calf management, feeding, fodder cultivation, etc.) However, some of BAIF's ideas such as the growing of fodder crops, are unlikely to be adopted by all households, and others, such as the urea treatment of straw, are generally unpopular.

### **Bi-lateral aid: The Indo-Swiss Project Andhra Pradesh (ISPA)**

The ISPA programme, directly financed by the Swiss government with contributions from the Andhra Pradesh Department of Agriculture, was started in 1975 at the Government Dairy Farm in Visakhapatnam District with the object of co-operating with the Animal Husbandry Department in the fields of cattle breeding, fodder production and dairy development. Its broad aims were to develop

buffalo and cattle production in different farming systems, and to improve income-generating capacity and nutrition. Between 1976 and 1990, the technological support provided for large ruminant development included the supply of frozen semen State-wide, the development of a feed and fodder package, and the establishment of bull mother farms, bull breeding stations, a frozen semen laboratory and a liquid nitrogen plant.

In phase V (1990-95), ISPA's livestock development policy was changed to help strengthen State-wide extension for cattle development. It will therefore be necessary for the project to become farmer need-orientated, and for 'farm-level extension models' to be developed. The programme will be implemented through a system of State-wide 'cluster villages' supported by programmes on breeding and feed and fodder development; emphasis will be placed on problem-oriented adaptive research and ecologically, economically and institutionally sustainable programmes.

#### *Sources of information for livestock producers*

In May 1992, ISPA began to develop proposals for more farmer-oriented extension with a participatory, needs-based approach. It was realized that the establishment of an infrastructure will not guarantee its use if farmers have not participated in its development. Three workshops were therefore held in Andhra Pradesh in 1994 to promote the concept of Participatory Technology Development (PTD) in animal husbandry, using needs assessment methods. PTD is intended to involve farmer-researcher collaboration to generate ideas for testing on-farm; the results are then fed into the extension system so that real needs can be addressed and appropriate solutions found. Subjects for investigation in three villages in Govindapuram cluster, Srikakulam District, include the following:

- growing subabul (*Leucaena leucocephala*) for goats
- growing fodder trees
- growing fodder in coconut gardens
- urea treatment of paddy straw (stack treatment)

- growing subabul, anjan grass and stylo (*Stylo hamata*)
- as a mixed crop in cashew orchards
- growing subabul, anjan grass and stylo as a mixed crop on vacant land
- growing subabul and velvet beans in backyard fence points on vacant land at the house
- relay cropping sunnhemp after paddy
- growing mixed jowar and cowpea after paddy
- growing fodder in orchards and fallow lands
- relay cropping after paddy harvest
- growing fodder on bunds
- growing fodder crops/trees in the backyard
- establishing fodder nurseries.

The Womens' Extension Programme complements the village cluster programme and proposes the establishment of extension cells. Each cell should comprise two male and two female extensionists and be located in the milk chilling centre.

Some conceptual problems associated with the new participatory approach were apparent. For example, members of the ISPA team seemed to disagree over basic definitions such as 'participatory technology development', 'small farmer' and 'marginal farmer' and possibly, over PTD philosophy as a whole. There were also difficulties associated with persuading non-ISPA partner institution staff to accept participatory approaches and ideas. These difficulties were manifest by the attitude that a farmer "had not learnt properly" (e.g. regarding the timely filling in of spaces in a forage crop patch) and were mirrored in later discussions in which a conventional 'teacher-learner' approach to the 'extensionist-farmer' relationship was shown. When analysing the reasons why some 'improved fodder varieties' had not been adopted, it was concluded that either the extension approach was lacking, or that the farmer had failed to use the varieties properly; the possibility that research into the varieties had been based on the wrong criteria, or that farmers' needs had not been considered, never entered the argument. This apparent lack of understanding regarding the

transfer of ISPA's ideas to staff in partner institutions highlighted the need for improved linkages. The Year Operational Plan 1995-96 includes numerous aspects of institutional support which may overcome this problem.

Three villages were visited in the Valigonda cluster, Nalgonda District, and their progress discussed with interested farmers. The farmers appeared to be responding positively to PTD, and the ISPA team seemed to be managing to generate a participatory approach to livestock extension. Of particular interest was the interaction between farmers and ISPA. Ideas were emerging from discussions and farmers were responding in their own way and learning from experience. At the same time, ISPA was responding to feedback from farmers, as indicated by the progression of ideas and policies in the sequential annual and phased planning process.

### **Other extension organizations**

Television is spreading to villages all over India, to the extent that it is relatively common in Haryana and, to a lesser extent, in Gujarat. Radio is well-established although its importance is now diminishing. Both media regularly broadcast agricultural programmes through the State broadcasting stations, and these often include livestock extension messages.

Other organizations, such as banks or insurance companies, sometimes employ agricultural specialists in their village branches to offer advice. Information is also provided by retailers of agricultural and veterinary pharmaceuticals, either informally through shop-keepers, or formally through company representatives.



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# Lessons for extension policy

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## LIVESTOCK EXTENSION THROUGH CROP-BASED SYSTEMS: T & V AND ITS ALTERNATIVES

The further development of crop-based extension revolves around the issue of the T & V system and its alternatives. The central question with regard to policy is whether livestock production extension should be delivered within generalist services which are, in practice, crop-based, and secondarily, whether these should be delivered within T & V extension systems.

In Kenya and Burkina Faso, and probably in most other African countries, national extension systems which are, in principle, run along T & V lines are currently the only realistic channels for the transmission of livestock information to the mass of rural crop-livestock producers. T & V systems already have national coverage with a well-organized management structure and clearly defined lines of communication to research. In spite of opinions to the contrary, these countries are never likely to be able to fund a separate national livestock extension system with the same advantages, so the interests of livestock keepers, such as improvements to needs assessment, FEW training and research-extension linkages, must be central amongst policy options.

By contrast, the State-level T & V systems in India have never included livestock extension. T & V was developed earlier in India than in Africa, and was closely associated with the availability of 'green revolution' technology such as irrigation and improved cereal varieties. Partly because of the greater development of the human resource base and government structure, and partly because of the sheer scale of the country (and the States within it), India has more alternative institutions for livestock extension. These include the co-operatives, which deliver extension on a more restricted scale, and the State Departments of

Animal Husbandry whose extension activities, although limited, have good coverage for animal health, their own connections to research, and the political clout to block the transfer of their functions elsewhere. Policy options are therefore more widely discussed and although incorporation of livestock messages into the general State extension systems should be considered, further development of extension in the animal health services, the co-operatives and the private sector, is probably more important.

Areas where the use of T & V for livestock production extension was seen to be problematic included:

- management structures and the relation of extension to livestock ministries
- the integration of extension services at field level
- the training of FEWs
- the appropriateness of pre-determined extension calendars
- responsiveness and participatory methodologies
- research-extension linkages.

### Management structures and the relation of extension to livestock ministries

In all three countries, the relationship between the extension services and livestock ministries has been a problem. The livestock sub-sector is sufficiently distinct for the governments of many developing countries to establish separate ministries, and for virtually all governments to establish departments at sub-ministerial level. However, it is also sufficiently integrated with other forms of agricultural production to justify its inclusion in those extension services. As a result, an endemic tension exists between extension services and livestock ministries or departments.

In India, in spite of the recent rhetoric about 'broad-basing' extension (Macklin, 1992), there is no evidence that the State-level Departments of Extension have made any attempt to transmit information on livestock production. This can be partly attributed to green revolution origins, and partly to the existence of State-level Departments of Animal Husbandry. Even though these latter departments

may have had very little role in transmitting livestock production information to farmers, their existence and their nominal responsibility for livestock extension appears to have constrained any other developments within government.

Historically, repeated separations and mergers of the agriculture and livestock ministries in Kenya have affected the operations of extension projects. The World Bank-funded national extension project (1983–91) was not originally designed to cover livestock, but when the ministries of agriculture and livestock development merged in 1984, the project expanded into livestock extension activities, although not as part of an integrated service. When the ministries were separated again in 1987, some livestock extension activities continued to be financed by the Ministry of Livestock Development, but funding for a parallel extension service was denied. Under the second national extension project, it was agreed that agriculture and livestock development staff should jointly serve in a single service. In fact, the two ministries have recently merged again.

The same basic structural tensions exist in Burkina Faso between the central Directorate of Agricultural Extension which has overall responsibility to the government and the donor, the World Bank, for management of the extension service, and the Directorates of Animal Production and Industries, and Animal Health. The Directorate of Animal Production and Industries also implements some of its own 'pastoral extension' activities under the same World Bank project, and there are indications that it would like to expand on these. A partial solution to the structural problems has been the general decentralization of agricultural development and service delivery to regional level. Agricultural functions have been devolved to the CRPAs whose directors report to the secretary general of the ministry. Although the Directorate of Agricultural Extension has a special responsibility for extension, the directors of CRPAs (and therefore their subordinates) are not under its line management and can receive equally technical support from the live-

stock directorates. This arrangement (which also functions at district level in Kenya) does not guarantee an integrated extension service, because within each CRPA there are still separate, though much smaller, groups of livestock staff working alongside provincial extension services.

In addition to its many other benefits, real decentralization of all agricultural development and service delivery functions to regional level helps to minimize structural problems between central extension and livestock departments, as neither has line management responsibility over extension in the field. This is not the same as the 'single line of command' described by Benor and Baxter (1984), but that proposition takes no account of the political realities of the powerful livestock departments.

### **Integration at field level**

The integration of crop and livestock extension functions at local and field level is a separate issue. Extension in Kenya is managed by District Extension Co-ordinators (DECs) under District Agricultural Officers. Under the DECs are extension officers at divisional, location and front-line levels; in principle, each of these posts can be filled by either a crop or a livestock specialist but in practice this has been slow to happen, partly because special projects have tended to hive off the livestock specialists.

Integration also has implications for training. As a transitional measure, crop specialists must be given basic training in livestock production, and *vice versa*. In Kenya, a shortage of funds has meant that the scheduled two-week retraining programmes have not reached all FEWs, and their classroom-based nature and lack of practical work, which will present problems for crop FEWs required to demonstrate livestock techniques in the field, has been criticized. Staff felt that if basic animal health was to be integrated into the service as well, three-month training courses would be necessary. In the longer term, there must be changes in the ordinary FEW training curriculum to reflect the needs of integration.

If there is no practical alternative to the integration of at least basic livestock production extension into the national system, the Kenyan model of full integration at local level seems to be generally preferable to the complex system actually practised in Burkina Faso. However, if decentralization is accepted, regional entities should also be given the freedom to plan their own structures to suit local conditions.

### **Responding to producer needs: extension calendars and participatory methods**

Participatory needs assessment should have a role in all extension. Well-proven methods such as participatory rural appraisal (PRA) enable extension managers to determine the priority needs of rural producers in a cost-effective way. This approach can be extended into participatory technology development (PTD) in which producers also participate in the formulation of solutions. An important feature of the work carried out by special projects, universities and NGOs is the piloting and refinement of these methods so that they can be introduced into the national extension service. The Indo-Swiss Project Andhra Pradesh in India is a good example of this (Box 3), and the Soum project is playing a leading role in introducing 'participatory programming' into the Burkinabé extension service.

However, these exercises are inappropriate for both crop and livestock extension if the results are then aggregated (i.e., for large geographical areas). Even within a locality, the planning and delivery of particularly livestock extension must take account of inter-household differences. In any one locality, different farmers may keep their animals under different systems of husbandry, for different reasons, and with different capital and labour inputs. The extension agent must be able to cope with individual need, and not assume that all livestock farmers have the same goals. Livestock extension planning cannot therefore be based rigidly on a seasonal calendar of extension messages planned at the beginning of each agricultural year.

Livestock production may not be amenable to the

kind of standard, regular messages provided for crop production. A message on supplementation, for example, is unlikely to have the same general relevance to a whole community as a message on the timing of maize weeding. This would apply even in a relatively static farming system.

The provision of livestock extension is largely justified by the fact that changes in farming systems generate a need for new information. These changes will not be experienced equally within communities. In Africa, crop-livestock integration is driven by resource constraints, so the point at which investment of labour for the cultivation of fodder and construction of hay-barns and manure pits etc. becomes worthwhile, will vary between households, even within one locality. Similarly, households may take up an opportunity for commercializing livestock production at different times.

There are thus three imperatives for livestock production extension: participatory needs assessment, responsiveness to inter-household variation, and ability to address information needs as they arise and not as determined by a calendar. Taken together, these represent a serious challenge to the current T & V system and place a demand on livestock extension agents to respond to producer needs for information and expertise, rather than act as 'transmission belts' for a centrally designed schedule of messages.

Alternatives to the T & V model, based on participatory needs assessment and participatory technology, are now being developed, especially by NGOs. Those encountered during the case studies inclined more towards specialist livestock production information than integrated crop-livestock information, but examples can be found from elsewhere. The Aga Khan Rural Support Programme in India, whose livestock activities are restricted to the provision of information on fodder cultivation, illustrates the methodology well (Matthewman and Ashley, 1995). Some special projects providing crop-livestock information have departed completely from the T & V model, notably the PDRI-HKM and the PAE/Yatenga in Burkina Faso. These share many of the features of special livestock production projects. Projects adopting participatory

approaches are valuable as models for good practice and in situations limited by time and space, but costs are high, they have a large human resource requirement, and they cannot be replicated. It is worth noting that when the PDRI-HKM changed from T & V to the 'system of support for farm enterprises', only 35% of existing FEWs were able to adapt to their new roles as 'advisers' (PDRI, 1993).

On a wider scale, the provision of extension to mixed crop-livestock producers will probably come about by reforming current systems. T & V systems already vary enormously in practice. In Burkina Faso, 'participatory programming', which is becoming the norm within the national extension service, uses formal questionnaires rather than the more effective PRA which might lead to PTD. 'Participatory programming' still leads to the production of annual calendars, although these are now designed at province rather than regional level, and staff are increasingly encouraged to regard them as guidelines only.

In contrast to the requirements of both crop production and animal health, information on many aspects of livestock production may not be urgent. If a FEW receives a query on supplementation, or the design of a manure pit, on which he needs further advice before giving a recommendation, the delay is unlikely to have disastrous consequences for either the animal or the producer. A further strategy for aiding responsiveness would be to develop non-conventional extension tools for FEWs.

### **Research and research-extension linkages in T & V systems**

Institutionalization of two-way research-extension linkages, and privileged links to national agricultural research systems (NARS) are supposed to be among the strengths of T & V systems, but in both Burkina Faso and Kenya, the relay of new research findings on livestock production to extension was totally inadequate. Some of the reasons are common to NARS.

#### *Institutional problems*

Whatever the arrangements on paper, the fact that many

NARS remain outside the control of agriculture ministries is often an obstacle to co-ordination. In Kenya, arrangements under a Memorandum of Understanding between the MALDM and the Kenyan Agricultural Research Institute have yet to become effective. In Burkina Faso, the fact that the National Institute of Agricultural Research (INERA) is placed within the Ministry of Secondary and Higher Education and Research complicates co-operation between research and extension.

#### *Poor resourcing*

The level of resources, especially in subordinate research stations, can be very poor in spite of donor support such as the World Bank Agricultural Research Project in Burkina Faso. The Animal Research Programme in the regional research centre at Farako Ba has no scientific journals or animals.

#### *Inadequate networking*

Researchers are often unaware of, or fail to make use of international and regional networks for the dissemination of research results and methods, even when the service is free.

#### *Top-down orientation*

Research programmes in NARS are frequently motivated by researcher interest and a professional reward system based on numbers of academic publications rather than the formulation of useful recommendations. Producers' views fail to feed up through the extension hierarchy, or if they are, do not influence research agendas. Alternative systems for producer participation in research, such as the 'Regional Technical Committees' in Burkina Faso, function intermittently at best.

#### *Inequity*

If it is useful at all, research may be biased towards the needs of larger-scale farmers.

Some problems may be more specific to the livestock sub-sector.

### *Compartmentalization*

In Burkina Faso, the 'horizontal' INERA Production Systems Research Programme is responsible for linkages to extension and mediates those linkages for 'vertical' programmes such as livestock. In practice, this minimizes the links between livestock research (and individual livestock researchers) and extension.

### *Undeveloped methodologies*

Adaptive research methodologies, particularly participatory on-farm research, are less well developed for livestock production and researchers may not make full use of the resources provided for them. Although there are 17 adaptive research centres in Burkina Faso, hardly any livestock research is being carried out in any of them.

## **PROVISION OF EXTENSION THROUGH ANIMAL HEALTH SERVICES**

Examples of successful and established animal health services providing production information to mixed crop-livestock farmers other than that linked to material inputs such as drugs, vaccines or semen, were absent in all three countries studies. However, there was some indication of a trend towards such a delivery system.

**Burkina Faso.** 'Volunteer vaccinators' from the PDAV are moving beyond their existing role towards the provision of information but so far, this has applied mainly to poultry. Although farmers thought the information useful, there is some concern, in particular, about the large poultry houses the producers have been advised to build. The vaccinators' curriculum is still dominated by health concerns.

**Kenya.** Where relations between the respective District officers are good, animal health assistants from the Department of Veterinary Science (DVS) are working informally with livestock FEWs under the Department of Livestock Production to deliver production-oriented messages. The mid-term review of NEP II recommended

the integration of front-line animal health services into the national extension service. This would mean a major change in the role of DVS and its relationship with farmers, from a reactive delivery of health services to a proactive delivery of information (Barton and Reynolds, 1995). Animal health assistants would also have to be retrained.

**India.** The State Departments of Animal Husbandry (DAH) are dominated by vets and veterinary auxiliaries, have the widest mandate for livestock development among mixed farmers, and are probably best placed to deliver livestock production information. However, there is currently no formal extension service and extension accounts for a very small proportion of DAH budgets. DAH staff may be involved in informal extension activities, but without a formal extension structure they lack the means of assessing producer information needs.

Animal health issues, such as disease prevention through vaccination campaigns, reduction of mortality and morbidity losses, disease surveillance, meat hygiene and public health, have understandably remained priorities. However, the provision of an efficient animal health service has channelled resources away from extension. Animal health services usually focus on district clinics, to which farmers can bring their animals, or call-outs to individual animals. This is not conducive to mass extension. The routine provision of advice and information had not been included in the animal health services studied.

Vets and veterinary auxiliaries are unlikely to be trained in communication, and their professional systems of reward probably relate to numerical targets of animals treated / vaccinated or drugs supplied. This is true for both government employees and groups like the volunteer vaccinators of the Burkinabé PDAV. The transmission of 'pure' information may be marginalized because it attracts fewer, or no, professional rewards (although the volunteer vaccinators and their clients / neighbours denied that they neglected 'pure information' for this reason).

Although animal health services have not yet fulfilled their potential as vehicles of mass extension, they could

still have a role in countries where they are well developed and have wide coverage. If specialist livestock producers are widely scattered, they can be advised cost-effectively during their attendance at clinics, animal health camps and fairs. Animal health services could also be complemented with a parallel, separately staffed livestock extension service, possibly operating from clinics and hospitals.

A few observations on pastoralists (although largely outside the scope of this study) are worth noting. In Burkina Faso, production extension delivered in special projects by staff with veterinary training appeared to be successful, if expensive. Paraveterinary projects, many run by NGOs, generally have a good record with pastoralists (Butcher, 1994) and often include some production information, even though there is little need for it except in the special case of sedentarization.

In all three case studies, involvement of government animal health staff and private vets in production extension with peri-urban producers and the wealthiest strata of livestock owners in rural areas, was seen. Animal health staff provide expertise on livestock production which is accessible to, and valued by, many producers. Their advice is unlikely to be spread widely through any mass delivery system, so in the case of government employees it is likely to be distributed through patronage and mutual understanding. The alternative is to provide the information for a fee, either through cost-recovery, or through a privatized veterinary profession. Both strategies have complex, but not necessarily negative, implications for equity and important implications for the efficacy of extension. Cost-recovery will ultimately mean that producers demand a high quality of service, and that old barriers between animal health and animal production will be disregarded.

## LIVESTOCK PRODUCTION EXTENSION THROUGH SPECIALIST SERVICES

No major examples of government livestock production extension services operated independently of both animal health and crop-based extension were found in the three

countries studied. Specialized production extension services were seen in special projects, NGOs, co-operatives, as research spin-offs and to a small extent, in the private sector.

### Special projects

Special projects are either area-based with livestock extension as one activity, or sub-sector- or species-specific.

**Burkina Faso.** The Soum project is essentially an enclave within the national extension service. The FAO dairy project and the GTZ rabbit project in Bobo Dioulasso are examples of peri-urban special projects.

**Kenya.** The National Dairy Development Project and the National Poultry Development Project, both funded by the Netherlands, and the Integrated Small Livestock Project supported by GTZ, are operating at national or at least multi-district level.

**India.** The Swiss government is funding a number of State-level livestock production projects including the Indo-Swiss Project Andhra Pradesh and the Indo-Swiss Goat Project in Rajasthan.

Special projects are often very successful. This is partly because they are designed for specific geographical areas or sub-sectors in which it has already been established that they can have a high impact, unlike national extension systems which must cover the whole country and a broad range of agricultural activities. They are often heavily resourced, with donor funds being added to the usual running costs of the host institution; they may actually divert human or financial resources away from other areas. It is therefore particularly difficult to assess these kinds of projects economically.

The careful design and extra resourcing may have both direct and indirect effects on the quality of extension. The projects are likely to use their own dedicated research components rather than the normal research-extension linkages, and effective networking means they will probably have access to state-of-the-art thinking on participatory needs assessment and extension methods, for example.

### BOX 3 THE INDO-SWISS PROJECT ANDHRA PRADESH (ISPA)

ISPA has the most developed system of participatory needs assessment of all the projects examined in India. Farmers in the villages visited appeared to be responding positively to Participatory Technology Development, and the ISPA team was managing to generate a participatory approach to livestock extension. Of particular interest was the interaction which allowed farmers to respond in their own way to ideas emerging from discussions, and to learn from experience. An example of this was the buffalo house designed to collect urine *via* side-channels and a small concrete collecting tank. The response of ISPA to feedback from the farmers is demonstrated by the progression of ideas and policies in the sequential annual and phased planning process (Matthewman and Ashley, 1995).

The ratio of FEWs to producers tends to be higher in special projects. Farmers are usually selected according to their willingness to participate and meet the often stringent conditions. This increases the FEW : farmer ratio still more, predisposing the project to success at the expense of equity because the self-selected farmers are wealthier or better able to bear risk.

Most of these arguments could apply equally to special projects on mixed crop-livestock extension (such as the PAE/Yatenga and the French-funded PDRI-HKM in Burkina Faso), or to those hosted by animal health services (such as the Soum project). Projects which incorporate dedicated livestock production extension have a specific advantage because their commodity-based design takes into account the broader context of animal production and provides practical support.

Special projects may also provide inputs (stock, semen, fodder, stabling material) and/or act as buyers or processors for livestock products. This can involve a considerable amount of overt or hidden subsidy on prices as plant is often provided, credit is frequently interest-free, and prices may not include management costs. Extension messages directly related to these inputs/purchasing services, and even 'pure' information delivered through the same channels, will probably have high rates of adoption.

The example in Box 4 shows that some special projects can be characterized as 'crusading' in that a single

intervention or package is privileged by the design of the project itself. If the package is only appropriate to certain types of farmers, or not appropriate at all (and this does not appear to be the case with NDDP), success and adoption compared to projects/services which use a more participatory development of messages or have a more systematic link to research, are severely limited.

Special projects consisting of, or including, dedicated livestock production extension services are likely to be expensive with unquantifiable costs, inequitable (at least in the short term) because of the self-selection of farmers, and linked to the supply of inputs or marketing in a way which results in high adoption rates. It is unlikely that they can be sustained over time or replicated over broader geographical areas. Their role may be:

- (a) catalytic, as a means of testing interventions and approaches which can then be transferred in less intensive forms to national services, or;
- (b) time-bound, by combining with spontaneous diffusion processes and successfully spreading a specific innovation into the farming system on a one-off basis (Box 4).

The latter role may be particularly useful for facilitating processes of crop-livestock integration in situations of increasing population, diminishing resources, and sedentarization of pastoralists.

#### **BOX 4 THE KENYA NATIONAL DAIRY DEVELOPMENT PROJECT (NDDP)**

The basic requirements for a farmer to join the programme are the establishment of a forage plot of Napier grass, the construction of a zero-grazing unit for the animals, and the acquisition of cross-bred or dairy grade animals. The project can give advice and help the farmer to prepare a budget which can be used to justify a loan from a credit organization to buy animals, but it does not provide inputs itself. Each FEW has responsibility for about 40 registered active project farmers (compared to more than 500 under the unified NEP II system) and is in contact with a variable number of farmers in the process of meeting the conditions for joining the programme. In theory, the staff are also available to contribute to general extension activities under NEP II. Pamphlets and manuals made available to farmers or staff are also used by other FEWs under NEP II, and by NGOs.

Evaluation and monitoring indicate the levels of productivity achieved by project farmers at different levels of input. Aspects of the zero-grazing package (e.g. Napier grass) have been widely adopted across high-potential farming areas, suggesting diffusion of the technology; the project had plans to investigate this during 1995/96 (Barton and Reynolds, 1996).

#### **Universities and research centres**

University departments and research institutions often carry out extension work in limited areas while training students or adapting results to farmer level. In India, some universities and research centres have developed a more significant role. The Haryana Agricultural University advisory centres reach between 20 000 and 30 000 farmers, depending on the topic and the approach, and provide residential courses and audio-visual extension. The Farming Systems Research Project of the National Dairy Research Institute, operates across 40 villages in the area around the Institute. Although both services are moving towards some form of participatory needs assessment, the University extension service is reported to be disseminating recommendations only relevant to larger, land-owning households. Many of the comments on special projects discussed above also apply to the extension activities of research institutes; they have high levels of resourcing relative to the numbers of beneficiaries and they cannot be replicated, but they are important sources of new interventions and approaches.

#### **NGOs**

NGOs are involved in livestock extension in all three countries. Some focus on the provision of livestock on credit while others are attempting to bring about more complex changes in farming systems.

Six-S in Burkina Faso is providing sheep to women on credit for backyard fattening, and the Church of the Province of Kenya is providing heifers, also mostly to women. Both organizations incorporate an element of group liability into their credit systems. The work of APSS in Burkina Faso and BAIF in India has already been discussed under the individual case studies.

NGOs have various strengths. Like special bi-lateral projects, they can operate on a commodity basis, assisting the whole production cycle from the acquisition of the animal to the sale of its products. Linking extension to the provision of stock and inputs obviously increases the likelihood that the messages will be received favourably. NGOs are probably more committed than special projects to helping poorer livestock-producers (although BAIF has been criticized for carrying messages more appropriate



to wealthy farmers). They often lead the way in experimenting with both participatory needs assessment and communication techniques. The APESS example in Burkina Faso demonstrates the benefits which can be gained from associating extension with cultural messages. APESS also illustrates a potential disadvantage of NGOs. Rather than being participatory, they can become obsessed with a single message with which the organization is identified, i.e., the building of hay-barns. This is an extreme case of the broader problem that NGOs do not tend to possess an independent and reliable research base or good links with the national research system, but if this problem can be overcome, they are potential catalysts for the development of interventions and approaches, particularly for the poorest farmers.

### **Co-operatives**

Dairy co-operatives in Kenya are now beginning to provide production advice to members, and in India, they have become a significant force. The provision of information by co-operative societies was originally seen as an incentive to farmers and an integral part of the process of achieving India's goal of increased milk production. The information has generally targeted key issues such as improved feeding, the growing of fodder crops, fertility and milk hygiene. Co-operatives serve only part of the livestock-owning community (i.e., milk producers in the co-operative catchment area) and the information only applies to milk production in cows and buffaloes. Other livestock enterprises, and the needs of non-members, are excluded so the effectiveness of message delivery is high.

Extension is funded out of the 5–6% levy on milk prices which pays mainly for veterinary services. Although the National Dairy Development Board still receives some donor assistance, the co-operatives themselves and their higher level federations are entirely self-financing. Therefore, the extension service, which reaches 8 million members of co-operative societies, is genuinely large-scale and truly sustainable through cost-recovery from producers. The co-operatives, which are owned by members and publicly sanctioned by government, prob-

ably have an advantage over alternatives based on the for-profit private sector because these would be subject to the 'free-rider' problems by which producers take extension advice but sell their milk elsewhere. The Indian dairy co-operative movement is unique and is unlikely to be replicated elsewhere.

### **The private sector**

Developed for-profit private sector livestock extension systems were not found in the three case studies. The nearest example was Kenchick in Kenya, which provides extension to 80–100 private producers under contract to the company. The company buys the chicks and inputs and then sells the broilers. As producers have to have at least 3000 birds, this service is clearly not aimed at small-scale producers. The quality of the extension appears to be high.

There was no apparent levy on the extension; Kenchick presumably considers that costs are repaid by increasing the survival of superior birds. There may be some spill-over of information to non-contract farmers, but not at a level which threatens the profitability of extension.

This kind of arrangement has the potential for wide-scale replication in other sub-sectors without any pretence of targeting poorer producers. Although the information provided remains a 'public good', strict production contracts allow the capture of sufficient benefits to cover costs. However, strict contracts of this sort for the marketing of livestock products are still rare in Africa (Jaffee and Morton, 1995), partly because the market for local high-grade meat is undeveloped. Other possible forms of private livestock extension include information tied to, and promoting, the use of commercial feeds or AI services, but these were not investigated during the case studies.

### **GENERAL ISSUES**

Several issues were raised which relate to, and cut across, all three institutional forms.

## Research-extension linkages

In the three case study countries, research institutions were failing to produce any new findings of value to resource-poor, mixed farmers. This was particularly true of the national agricultural research systems connected with the national T & V systems in Burkina Faso and Kenya, but it also applied to special projects and even NGOs such as BAIF; any new information generated will probably be more attractive to the (relatively) wealthy.

The situation can be remedied by the bottom-up transmission of information from producer to research. In countries where national T & V systems already deal with livestock information, this will mean honouring the promise of a two-way flow of information. In other countries such as India, the question of the institutional context of the delivery of information should perhaps be postponed until needs assessments have been made amongst the resource poor. In either case, there must be a renewed effort towards adaptive research aimed at resource-poor livestock producers and the development, if necessary, of new methodologies for this purpose. International research organizations should also re-focus on dissemination strategies, such as networking, which take into account the realities of research and extension in developing countries.

## Participation and responsiveness

Participation applies to the long-term development of extension systems and the producers' role in generating information. The participatory methods which have met with some success among NGOs and special projects can now be disseminated into national systems; this is arguably the most important achievement of some projects. Participatory needs assessment is becoming a realistic goal even for large-scale national extension systems. Participatory technology development is less likely to become widespread as it depends on highly trained staff and a high staff : farmer ratio. The responsiveness of extension systems to producer needs can be considered as a separate issue; it can be a realistic goal in non-participatory systems even when the devel-

opment of messages is participatory. Given the inter-household variability of livestock information needs and the lack of seasonality relative to crop information, extension workers need to be able to respond to the needs of producers, rather than relay fixed messages. Even if a response is not required immediately, this may strain human resources.

The development of new extension tools for increasing responsiveness has yet to be explored. T & V systems in particular, but other services as well, tend to provide FEWs with information in unit or package form, for example, the Burkinabé *fiche* technique on a single fodder crop. Other extension tools need to be developed which will enable FEWs to respond to the circumstances of individual producers. Decision trees and rapid cost-benefit analysis procedures are two such tools worth examining. Livestock production extension might also benefit from the experiences of other sub-sectors, such as pest management, which deal with complex packages of recommendations.

## Equity and gender

The problems of inequity between richer and poorer farmers has already been discussed in some detail. Although gender inequities were not investigated in any depth, it was noticeable that the majority of FEWs in all three countries were men who accepted it as the norm to deal with male heads of household. The interests of women tended to be targeted in special projects, such as milk processing and marketing, rather than incorporated into the mainstream of the national systems or considered in relation to their role as producers. With the exception of the Indian co-operatives no evidence was found to contradict the general view that extension systems fail to reach women (Saito and Weidemann, 1990).

## Sustainability and cost-recovery

Very few of the services examined had any mechanism for cost-recovery and therefore, their sustainability must be in doubt, particularly during a period when the availability of government funding is declining.

As agricultural information which is not embodied in technologies has been characterized as a public good neither subtractable nor excludable, the possibilities for cost-recovery are limited, but there are three qualifications of importance to livestock extension. Firstly, if producers are under contract to agro-processing firms, the costs of extension can be recouped. Secondly, if extension is delivered to groups, the cost can be spread evenly among group members to minimize 'free-riders'. The extension services provided by the dairy co-operatives in India were the best and most sustainable systems of cost-recovery seen in the case studies and represented both these situations. Thirdly, as extension advice becomes more tailored to the circumstances of individual producers, it loses its designation as a public good. The limiting case here is the farm (or livestock enterprise) management plan; it is a subtractable good because of the time it takes to produce, and is excludable because it is only of use to a single individual (or household or enterprise).

It is clear that the practical opportunities exist for an equitable system of cost-recovery. If it is not already practised, it should be introduced for larger and more commercialized producers, either individually or in groups. This would release funds for developing more appropriate livestock services for the resource poor for whom there are the following powerful arguments against cost-recovery:

- poverty
- the paucity of appropriate messages
- the lack of mechanisms (unless strong functional groups already exist) for organizing payment for a public good
- the wider community value of extension on crop-livestock integration because it also covers resource conservation.

Beynon (1995) states that "most analysts argue that the government should continue to provide services for poorer, subsistence farmers whose needs are unlikely to be met by private suppliers". There may, however, be a case for introducing a system of token or non-cash contri-

butions. To quote the World Bank (1994), "poor resource circumstances, however, should not prevent attempts to encourage farmer contribution in non-cash terms so that their demands on, and expectations from, the service is increased". Systems such as these do not appear to exist for the small-scale mixed farmers investigated in the case studies, but the view is endorsed.

## **Communication and alternative media**

The delivery of information in the major systems investigated was primarily verbal and secondarily by practical demonstration. In all three case studies, interest in audio-visual and non-traditional media, even in tools as simple as posters, was lacking. Broadcast information was generally accorded little importance; newspapers and radio scored very low in the ranking exercises carried out in Kenya.

NGOs and special projects were the most innovative in the field of communication. APSS's song (Box 2) and magazine, and PAE/Yatenga's community drama 'Amadou Comes Home', have already been mentioned. However, the time-honoured practice of competitions with prizes is more widespread and seems to have some effect in stimulating adoption.

There is a danger that strong communication which invokes appropriate cultural symbols will also allow the adoption of inappropriate messages, though such a problem is unlikely to be long term. On the other hand, and especially where livestock extension overlaps with resource conservation, farmers may need to be persuaded to adopt practices which are not in their short-term rational self-interest, or which conflict with rooted cultural preferences. The reinstatement of persuasion as an element of extension suggests a need for increased attention to the form, as well as the content, of messages.

## **Monitoring and evaluation**

There was little evidence to suggest that organizations were successfully measuring extension outputs or longer-

term impact. Crop-based extension systems tend to be monitored by counting numbers of contacts, and animal health-based systems by counting numbers of vaccinations or inseminations, for example. The value of either method as a monitoring tool is questionable. A more appropriate and flexible method is required for monitoring output and evaluating the benefits of livestock extension, one which measures achievements and failures, analyses the reasons for success or failure, and makes recommendations for the next phase. This kind of monitoring could be combined with participatory research methodologies to provide real feedback from users.

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## Conclusion: institutional forms for livestock production extension

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As resources become more constrained, there is an increasing need for information on largely spontaneous processes of crop-livestock integration, as well as for general messages on livestock production and preventive health. If public funding is aimed at the poorer farmers, resource conservation may be served at the same time. In countries where national extension systems already have some responsibility for livestock production extension, donors should seek to enhance the integration of crop and livestock systems through restructuring (at high and field level, and including decentralization), retraining, and improving equity, participation, responsiveness and research-extension linkages. It should be possible to deliver a useful range of livestock messages under these circumstances.

If no national system exists, the needs of resource-poor farmers should be determined by participatory methods before assigning livestock extension duties to any particular institution.

Special projects and NGOs are valuable for developing specific interventions and participatory methodologies for livestock research and extension, including non-traditional means of communication. Although they may suffer from a lack of sustainability and replicability, the evidence suggests that their achievements, even in attenuated form, are being incorporated into, and benefiting, national extension systems. They may also be useful for developing time-bound tasks, such as the introduction of a specific technology, where replicability and sustainability are not issues.

Wealthier and more market-orientated livestock producers, predominantly in peri-urban areas, are already finding ways to access detailed production information, chiefly from animal health staff. These systems should be formalized on a strict cost-recovery basis, or turned over to the growing number of private vets, so that public funds can be released for extension to the resource poor.

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