

**AGRICULTURAL KNOWLEDGE AND INFORMATION SYSTEMS
IN KENYA – IMPLICATIONS FOR TECHNOLOGY
DISSEMINATION AND DEVELOPMENT**

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Abstract

This paper reports on a study of agricultural knowledge and information systems (AKIS) undertaken by the Kenya Agricultural Research Institute and the Ministry of Agriculture. Field research was conducted in four districts of Kenya, including high-potential and pastoral areas, to document and assess the significance of different actors and organisations as potential uptake/dissemination pathways for agricultural technologies, and to consider ways to improve the performance of the knowledge and information systems in the districts. Databases of the organisations, institutions and actors involved in agriculture in the four districts were compiled, and a series of participatory and rapid appraisal exercises were carried out with people concerned with agriculture in selected sub-locations and divisions within each district.

The AKIS of Kenya's smallholder farmers are diverse and complex, varying with agricultural enterprise, agroecology, and from district to district. Agribusiness plays a major role in the AKIS of Kiambu district near to Nairobi, whilst government and non-government agencies are the major 'external' actors in the pastoral areas of West Pokot. NGOs and church organisations are particularly active in Homa Bay, but their coverage is limited. Links between external institutions and organisations, for both government organisations and NGOs, are generally weak and poorly coordinated.

The major sources of knowledge for smallholders are local (neighbours, family, markets and community-based organisations). Between 40 and 70 per cent of respondents reported government extension as an important source of information, though both farmers and extension personnel themselves expressed dissatisfaction with the quality and frequency of their interactions. NGOs are also important sources of information in those areas where they are active. Churches, chief's barazas (community meetings) and agricultural companies are significant information sources in some locations.

Most farmers considered that their most pressing information requirement which was not being adequately addressed was information on technical details of farming (e.g. chemical application rates, how to manage late blight in potatoes, where to get certified seed, the most appropriate varieties for a given location, housing and management of livestock, etc.).

Inadequate human resources (government and non-government extension) and poor local leadership (particularly for CBOs) were seen as the most serious barriers to effective information flow by farmers, whereas government and NGO extensionists stressed lack of resources to mobilise communities, and poor communications with researchers leading to information distortion.

Potential delivery systems and entry points for knowledge dissemination were tabulated, but were quite diverse – district-specific and commodity-specific strategies are needed. Increased use of networking and pluralism in provision of extension and research services are advocated to increase cost-effectiveness, equity and efficiency of agricultural development. The importance of participatory learning approaches was emphasised by many of the study participants. Government research institutes could capture a pivotal role in the AKIS of the future through increased emphasis on strategic alliances with other development agencies, the production of teaching materials designed for facilitating participatory learning, and the production of 'basket-of-options' information materials for farmers and extensionists.

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Acronyms

| | | | |
|--------|---|--------|--|
| ACK | Anglican Church of Kenya | KIOF | Kenya Institute of Organic Farming |
| ADPP | Animal Draft Power Programme | LABALU | Lake Basin Land Use Programme |
| AEP | Agriculture and Environment Programme | LH | Lower Highlands agroecological zone (2000–2400m altitude) |
| AI | artificial insemination | LM | Lower Midlands agroecological zone (1000–1500m altitude) |
| AIC | African Inland Church | MHAC | Manor House Agricultural Centre |
| AKIS | agricultural knowledge and information systems | MoA | Ministry of Agriculture |
| AMREF | African Medical Research Foundation | MoH | Ministry of Health |
| ASK | Agricultural Society of Kenya | MYW | <i>Maendeleo ya Wanawake</i> – national body coordinating women’s groups |
| BAT | British-American Tobacco, Ltd | NCPB | National Cereals and Produce Board |
| CARE-K | Canadian and American Relief Everywhere-Kenya | NGO | non governmental organisation |
| CBO | community based organisation | OFPEP | On-Farm Productivity Enhancement Project |
| C-MAD | Community Mobilisation Against Desertification | PRA | participatory rural appraisal |
| DFID | Department for International Development, UK | RAAKS | rapid appraisal of agricultural knowledge systems |
| EAT | Environmental Action Team | SDA | Seventh Day Adventist |
| ELCK | Evangelical Lutheran Church of Kenya | SWOT | strengths, weaknesses, opportunities, threats analysis |
| GO | government organisation | UM | Upper Midlands agroecological zone (1500–2000m altitude) |
| GoK | Government of Kenya | UH | Upper Highlands agroecological zone (2400–2800m altitude) |
| ICIPE | International Centre of Insect Physiology & Ecology | VI | VI Agroforestry Project (a Swedish NGO) |
| ILRI | International Livestock Research Institute | | |
| KARI | Kenya Agricultural Research Institute | | |

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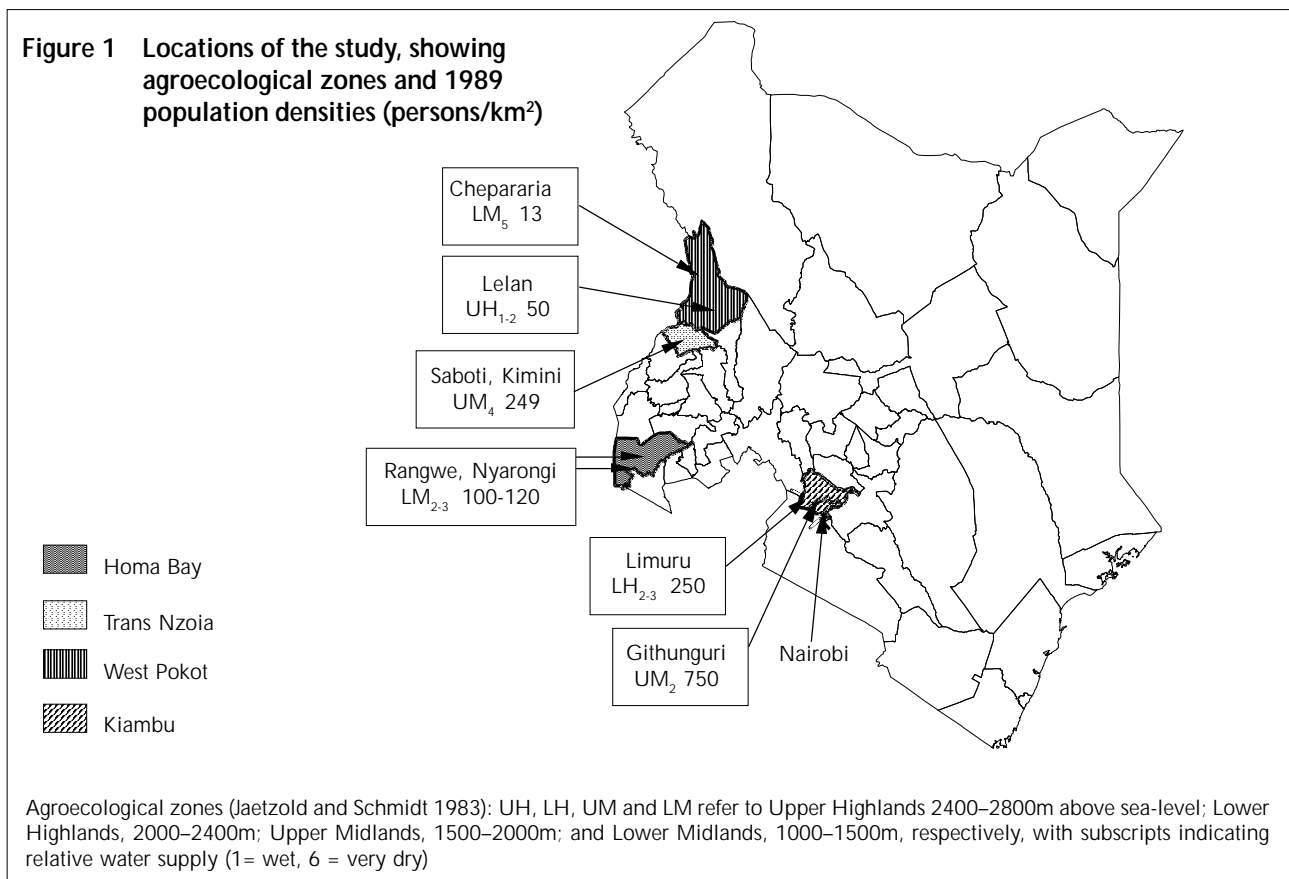
1 INTRODUCTION

Kenya has a great variety of agroecological conditions broadly correlated with altitude and aspect, ranging from arid pastoral rangelands to tropical alpine conditions (Jaetzold and Schmidt, 1983). Over fifteen major ethnic groups practise farming in Kenya, with population densities ranging from 12 persons/km² in parts of West Pokot to over 800 persons/km² in Kiambu (Government of Kenya, 1993). Infrastructure development varies considerably, and farm sizes range from less than one acre in the densely populated areas to over 100 acres (Government of Kenya, 1993), largely affected by the agricultural potential of these areas. This diversity in agroecology, ethnicity, population density and infrastructure expresses itself in the various farming systems found within the region, and influences local agricultural knowledge and information systems (AKIS) (Röling, 1989). Many different organisations and actors are involved in developing and disseminating agricultural knowledge and skills in different parts of Kenya, leading to a broad range of opportunities and needs for information transfer.

This article reports on a study undertaken by the Kenya Agricultural Research Institute (KARI) and the Ministry of Agriculture (MoA) of the AKIS of four districts to document and assess the significance of different actors and organisations as potential uptake/dissemination pathways for agricultural technologies, and to consider ways to improve the performance of the knowledge and information systems. The study employed qualitative methods of social enquiry (Engel, 1997; Garforth and Usher, 1997) and focused particularly on the perceptions of smallholder farmers, community based organisations (CBOs) and local actors in both pastoral and high-potential farming areas.

2 METHODOLOGY

The study was implemented in Trans Nzoia, West Pokot, Homa Bay and Kiambu districts (Figure 1). Methods and tools were selected from rapid appraisal of agricultural knowledge systems (RAAKS), participatory rural appraisal (PRA), and strengths, weaknesses opportunities and threats analysis (SWOT) (Salomon and



Engel, 1997; Pretty et al., 1995)¹. In each district, key actors (MoA, KARI, NGO and CBO representatives, private companies, churches, and other government departments) described their perceptions of the knowledge and information systems in their areas, listed and categorised agricultural actors, and selected two divisions for study. This was followed by a meeting in each selected division (MoA officials, NGO and CBO representatives, church groups, other government departments) to document their perceptions of the knowledge and information system, and to select two sub-locations for data collection. In each selected sub-location, meetings were held to identify key actors for agricultural knowledge and information; identify agricultural knowledge and information types; identify and select stakeholders for further analysis; rank agricultural enterprises with different groups of men, women, youth, NGO and government representatives; and recruit nine local people to implement the interviews and data collection in their sub-location. The data collection teams were recruited on the basis of knowledge of the local area, ability to guide discussion, relate well with the community, ability to read and write (minimum 50 per cent of the team), and gender balance. They were trained in PRA and RAAKs tools and pre-tested the checklists with the consultants, KARI and MoA staff. Feedback meetings were held in each sub-location to triangulate and confirm the data collected. A total of 1100 people from the four districts contributed their opinions and perceptions to the study (Table 1).

3 THE FARMING SYSTEMS OF THE FOUR DISTRICTS

The study areas covered a wide range of agroecological zones and population densities. Small scale agriculture is predominant throughout, with 10–20 per cent of farmers growing high value cash crops (sugar-cane, tobacco, coffee, tea, flowers and horticulture). Most of the livestock kept are indigenous breeds; dairy cattle (pure and crosses) are largely confined to high potential areas. Infrastructure is fairly well developed in Trans Nzoia, with population densities of 250 persons/km² (1989 census data). Agroecological zones in West Pokot range from UH₁ (upper highlands/mountainous terrain) to LM₆ (lower midlands/rangelands), resulting in a wide range of enterprise combinations. Infrastructure development is relatively low throughout the district, as are population densities. Mixed farming is practised in the wetter areas (UH, LH, UM and LM_{1,3}), whilst pastoral farming is the main system in the rangelands. Mixed smallholder farming is predominant in Homa Bay (87 per cent of farmers), and infrastructure development is relatively poor in the study areas selected, with fairly low population densities (100 persons/km²). Kiambu district is close to Nairobi with its substantial markets, and has a relatively well developed road network. Large scale farmers (10 per cent of the total) specialise in high value cash crops (coffee, tea, flowers and horticulture) for sale locally or abroad.

In all four districts, income generation was the most important criterion for ranking agricultural enterprises according to the smallholder farmers, CBOs and traders interviewed, followed by provision of food for the family. Other important aspects were ease of marketing, ability to provide good returns from limited space, and ability to provide returns in a relatively short period of time. Men, women, youth and extensionists were in broad agreement about the most important enterprises in each area – poultry and vegetables tended to be ranked higher, or more frequently, by women; whereas agroforestry was mentioned only by men, not by women farmers.

Maize, poultry, vegetables, beans, agroforestry and sweet potatoes were listed as high priority enterprises in all four districts, regardless of agroecological zone. Dairy, beef cattle, Irish potatoes, finger millet, pyrethrum, wool sheep and coffee were considered high priority only in the cooler areas (upper highlands to upper midlands); whereas fruits, sorghum, pasture, cattle, bees, sheep, cassava, groundnuts, sugar cane, sunflower and pearl millet are the major enterprises in the warmer, lower midland parts of Kenya.

4 AGRICULTURAL KNOWLEDGE AND INFORMATION SYSTEMS IN THE FOUR DISTRICTS

Organisations and institutions

Using simple check lists, details of the organisations, institutions, groups and individuals considered active in agriculture were collected by the study teams and supplemented by the various district extension staff who participated in the study. These were tabulated for each district to form AKIS databases for the study areas, detailing names and locations, membership, primary purpose and principal agricultural interests.

Public sector

Between 16 and 20 government departments, parastatals and/or international agricultural research centres are active in agriculture in the four districts (Table 2). Comments throughout the study suggest a public sector that is both centralised (i.e. decision-making in Nairobi) and fragmented (i.e. poor coordination between ministries and departments within districts).

Private sector

Organisations, institutions and individuals providing goods and services to farming communities include individual traders and stockists, trading companies, seed and livestock suppliers, agrochemical and veterinary goods suppliers, transporters, tractor and oxen rental suppliers, providers of artificial insemination and bull schemes, pest control groups and consultants, ethno-veterinarians and millers. The private sector is much more active in Trans Nzoia and Kiambu than in West Pokot or Homa Bay. The involvement of agribusiness in technology development and dissemination is largely limited to high-potential investments and cash crops/

Table 1 Actors/stakeholders consulted during the study

| District Division | Trans Nzoia | | | West Pokot | | | Homa Bay | | | Kiambu | | |
|--------------------------------|-------------|--------|----------|------------|-------|----------|----------|--------|----------|--------|------------|----------|
| | Kiminini | Saboti | District | Chepararia | Lelan | District | Nyarongi | Rangwe | District | Limuru | Githunguri | District |
| Farmers | 23 | 30 | 53 | 54 | 50 | 104 | 48 | 30 | 78 | 62 | 73 | 133 |
| CBOs | 27 | 33 | 60 | 13 | 20 | 33 | 17 | 41 | 58 | 4 | 5 | 9 |
| Traders/stockists | - | - | - | - | - | - | 4 | 7 | 11 | 3 | 3 | 6 |
| GoK Depts. | - | - | 2 | - | - | 2 | - | - | 4 | - | - | 4 |
| NGOs | - | - | 3 | - | - | 4 | - | - | 4 | - | - | 2 |
| Private companies | - | - | 2 | - | - | - | - | - | - | - | - | - |
| Sub-location feedback meetings | - | 19 | 19 | 79 | 68 | 147 | 120 | 95 | 215 | 75 | 74 | 149 |
| Total | - | - | 139 | - | - | 290 | - | - | 370 | - | - | 303 |

enterprises, however. Many private sector individuals and companies are considered to be very exploitative in their dealings with smallholder farmers.

NGOs

Twelve, eight, eight and four agricultural NGOs are active in parts of Trans Nzoia, West Pokot, Homa Bay and Kiambu respectively (Table 2). Some of these are also involved in knowledge generation through adaptive research, carried out either by local farmers (e.g. CARE-K in Homa Bay) or by NGO staff (e.g. MHAC and EAT in Trans Nzoia), as well as sector-oriented service delivery at local level. In Kenya there are more than 1,000 registered NGOs involved in a wide range of development activities, spending over £100m annually, with considerable experience in knowledge dissemination, training, provision of goods and services, and capacity building at a local level. NGOs are clearly of considerable (and growing) importance to any knowledge dissemination effort in Kenya. Their limitations, however, include: low capacity to cover large areas and numbers of people; poor record of partnerships with government and the private sector; tendency to create parallel structures; and institutional impermanence. Recent initiatives to encourage NGOs to work more closely with each other have not had much impact so far (Keengwe et al., 1998).

Churches

Religious organisations have played, and continue to play an influential role in rural Kenya. Many forms of association beyond the family are church based, including women's groups and friendships, and church leaders are often locally influential. As such, they offer convenient entry points to many CBOs. Their long-term commitment to development makes them excellent potential partners for knowledge dissemination. There is also a strong potential for collaboration in adaptive research and technology verification with agriculturally-oriented development wings of the major churches. Horizontal linkages between divisions of the same church operating in different districts, and between different churches operating in the same area, are often weak, however, and their involvement in agricultural activities varies district by district, and even division by division.

CBOs

Since independence, the *Harambee* movement ('working together for development') has encouraged self help and self-help groups. Many self-help groups are well developed, particularly in the higher potential areas of the country, and provide potential entry points for knowledge dissemination and generation. Most NGOs maintain links with CBOs, and have often been responsible for their formation. CBOs active in

Table 2 Organisations and institutions active in agriculture in the four districts

| | Trans Nzoia | West Pokot | Homa Bay | Kiambu |
|---|-------------|------------|----------|--------|
| Community based organisations (farmer groups, women's groups, self-help groups, dip committees, water committees, youth groups, etc.) | >260 | >80 | >164 | >85 |
| NGOs/churches active in agriculture | 12 | 8 | 8 | 4 |
| Government departments/ Parastatals/ International Agencies | 16 | 20 | 17 | 16 |
| Schools | ++ | ++ | ++ | ++ |
| Input suppliers/Stockists (tools, chemicals, fertilisers, feeds, etc.) | ++ | + | ++ | ++ |
| Service Suppliers (AI, ploughing, pest control, veterinary and para-vets, etc.) | ++ | + | + | ++ |
| Traders and transporters (Private companies – large and small, individuals, etc.) | ++ | + | + | ++ |
| Other agribusiness (Producers/networks for milk, horticulture, tobacco, chickens, flowers, etc.) | ++ | | + | ++ |

+ Present but numbers not estimated; ++ Many present, numbers not estimated

agriculture in the study area include women's groups, 4K clubs, youth groups, dip committees, water committees, zero-grazing groups, commodity groups and farmer cooperatives. Their primary focus is usually fundraising; agriculture tends to be the secondary focus. In arid and semi-arid marginal areas, CBOs have often been established as part of relief food efforts.

Activities linking the various actors of the knowledge systems

Service linkages

In the areas of study in Trans Nzoia these include veterinary services, tractor hire, AI, crop spraying, supply of seeds and seedlings, and supply of other inputs. In the Homa Bay and Kiambu study areas service linkages mainly revolve around veterinary services (authorised and ethno-veterinary) and inputs supply. In the West Pokot study areas these are generally confined to para-vets, water committees and veterinary services.

Market linkages

In Trans Nzoia these are supported by maize traders, *Kenya rundas* (traders/transporters who operate by bicycle), vegetable vendors/hawkers, milk hawkers and private processing plants. In West Pokot and Homa Bay the principal marketing linkage is with individual livestock traders, and also with commodity traders. In

Kiambu the principal market links are with farmer cooperatives, private processing plants and individual traders.

Extension and training linkages

In the Trans Nzoia and West Pokot (Lelan division) study areas extension and training activities are mainly carried out by GoK, though there is also locally intensive implementation by NGOs. In the Homa Bay study areas there is more extensive coverage by NGO and church groups, private companies (BAT and Mastermind specifically for tobacco), as well as by government. The main extension and training links in the Kiambu study areas are with cooperatives, private veterinary practitioners and private companies. Neighbours, friends, family members, community based groups and traders play an important role in dissemination (extension/training) in all areas, but particularly in lower West Pokot district and Nyarongi division of Homa Bay.

Basic needs linkages

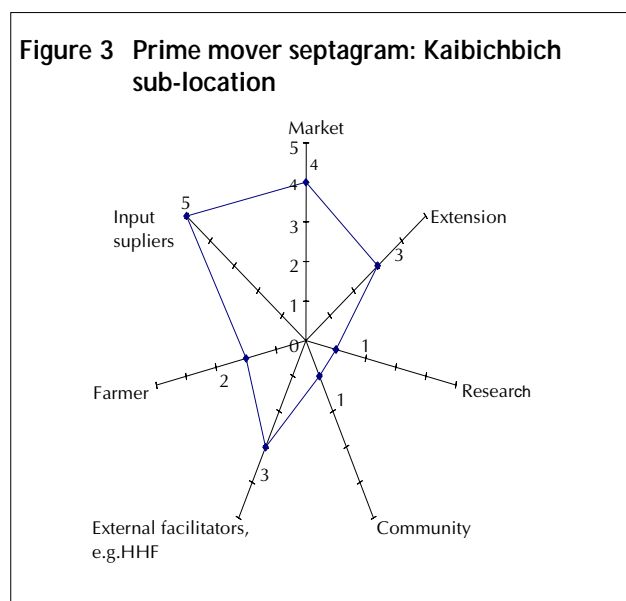
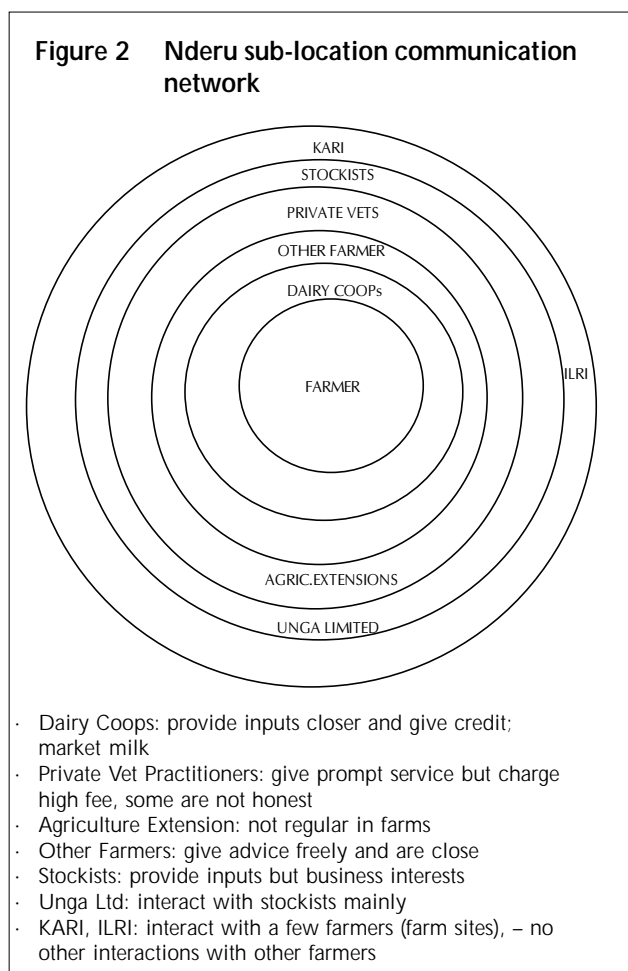
In the pastoral study area of West Pokot, NGOs and churches (ELCK, VI, OXFAM, World Vision) play an important role in the provision of basic needs to the pastoral communities (shelter, sanitation, etc.).

Information seeking linkages

Particularly in Kiambu and Trans Nzoia, individual farmers, CBOs and traders seek information from GO and NGO agencies on agricultural problems and market situations.

Communication networks

Communication network diagrams were prepared by farmers and CBOs in all sub-locations as aids to visualising the relative importance of organisations/institutions for provision of information (e.g. Figure 2 – distance from the centre indicates the relevance to the organisation concerned). In Nderu (Kiambu) farmers



rated the dairy cooperative as their most important source of information, followed by other farmers. Government extension and private vets were rated third in importance, followed by stockists and Unga Ltd (a national feeds supply company). KARI and ILRI were also mentioned. In Homa Bay and West Pokot NGOs and churches (VI, ELCK, CARE-K, C-MAD, LABALU, AEP, and ADPP) were considered important, but only in those few divisions where they are active. In Kiambu government extension, dairy cooperatives (Limuru and Githunguri), private veterinary practitioners, stockists, hawkers and traders were considered the most important. In Trans Nzoia, other farmers, stockists, *Kenya rundas*, VI, village elders and veterinary services were rated key in provision of information. In all cases local actors were the most important sources for agricultural information, and the relative importance of the many different external actors varied with location.

Prime movers

Prime mover septagrams were used to assist in visualising who has the most influence on agriculture on a day-to-day basis (e.g. Figure 3 – the higher the point the stronger the influence). In Kaibichbich (West

Pokot) input suppliers and the market were seen as most influential in farmers’ day-to-day lives, extension less so, and research and committees even less so. In Trans Nzoia the septagrams varied according to location – extension, research and policy were considered influential in Sabot where KARI has on-farm trials, but not in Kiminini. In Kiiria (Kiambu) research, marketing, input suppliers and extension were perceived as influential by men, whilst processing plants and credit were not. Women considered all of these as less important than the men did. In Kamdar (Homa Bay) men gave great importance to government security officials (stating that cattle theft was a considerable problem in the area), whilst women considered other producers, government and non-government extension as more important.

Linkage matrices

Linkage matrices were prepared by the rural data collection teams to analyse which actors link to one another (e.g. Table 3). Throughout the study areas the perception was that almost all institutions/organisations link directly to farmers or CBOs; and almost all have limited linkages with the other organisations originating

Table 3 Kamagai sub-location linkage matrix (Homa Bay)

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
|--------------------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 AEP | X | X | ? | ? | X | ? | X | ? | ? | X | X | X | X | ? | X | X | ? | X | ? | X | ? | ? | X | X | |
| 2 Agriculture ext. | X | X | X | X | X | ? | X | ? | ? | X | X | X | ? | X | X | X | X | X | ? | X | X | X | ? | X | |
| 3 Livestock | X | X | X | ? | X | X | ? | ? | ? | X | X | ? | X | ? | ? | X | ? | X | ? | ? | ? | ? | ? | X | X |
| 4 Veterinary | ? | X | X | ? | X | - | - | - | - | X | X | ? | X | ? | ? | X | X | X | - | - | - | ? | X | X | |
| 5 Care-K | ? | X | ? | ? | X | - | X | ? | ? | X | X | ? | ? | ? | X | X | ? | ? | ? | X | ? | ? | ? | ? | |
| 6 Farmers | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | ? | X | X | X | X | X |
| 7 AMREF | ? | ? | ? | ? | X | ? | - | - | - | X | ? | ? | ? | ? | ? | X | ? | ? | X | - | - | - | - | - | |
| 8 Danida/Forest Dept. | - | X | X | ? | ? | X | - | ? | ? | X | X | X | X | ? | X | X | ? | X | ? | X | ? | ? | ? | X | X |
| 9 B.A.T. | ? | X | ? | - | ? | X | - | X | ? | X | X | - | - | ? | ? | ? | ? | ? | X | - | ? | - | ? | - | ? |
| 10 Mastermind | ? | X | ? | - | ? | X | - | X | ? | X | X | - | - | ? | ? | ? | ? | ? | X | - | ? | - | ? | - | - |
| 11 Provincial Admin. | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 12 Neighbours | X | X | X | X | X | X | ? | X | X | X | X | X | X | X | X | X | X | X | X | ? | X | X | X | X | X |
| 13 Traders cereals | X | ? | ? | ? | - | X | - | - | - | X | X | X | X | X | X | X | X | X | X | - | - | - | ? | X | ? |
| 14 Livestock traders | X | ? | X | X | ? | X | - | - | - | X | X | X | X | X | X | X | X | X | ? | X | - | - | ? | ? | ? |
| 15 Jaggery | ? | X | ? | ? | ? | X | - | - | - | X | X | X | X | X | X | X | X | X | ? | X | ? | ? | ? | ? | ? |
| 16 4K Club | ? | X | ? | ? | X | X | ? | X | ? | - | - | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? |
| 17 Women's groups | X | X | X | X | X | X | X | X | ? | ? | X | X | X | ? | X | X | X | X | ? | X | X | ? | X | X | X |
| 18 Youth groups | ? | X | X | X | X | X | ? | X | X | ? | X | X | X | X | X | X | X | X | X | ? | ? | ? | ? | ? | X |
| 19 Farmers' groups (AEP) | X | X | X | X | ? | X | ? | X | X | X | X | X | X | X | ? | X | X | ? | ? | ? | X | X | ? | ? | X |
| 20 Water committees | ? | ? | ? | ? | ? | ? | X | ? | ? | ? | X | X | ? | ? | - | ? | X | ? | X | ? | ? | ? | ? | ? | ? |
| 21 Catchment committees | X | X | ? | ? | ? | X | ? | X | ? | ? | X | X | ? | ? | ? | X | X | X | X | ? | ? | ? | X | ? | ? |
| 22 Dorcas movement (SDA) | ? | X | ? | ? | X | X | ? | X | - | - | X | X | ? | ? | - | X | X | X | ? | ? | - | ? | ? | - | - |
| 23 Kari | ? | X | X | ? | X | X | - | ? | - | - | X | X | ? | ? | ? | ? | X | X | X | ? | - | ? | ? | - | X |
| 24 Labalu | X | ? | X | X | ? | X | - | - | - | - | X | X | X | ? | - | ? | X | ? | ? | - | - | - | ? | ? | ? |
| 25 Stockist | X | X | X | X | X | X | - | - | - | - | X | X | ? | X | - | X | X | X | X | - | - | - | X | X | X |

Figure 4 Basic configurations, Trans Nzoia District

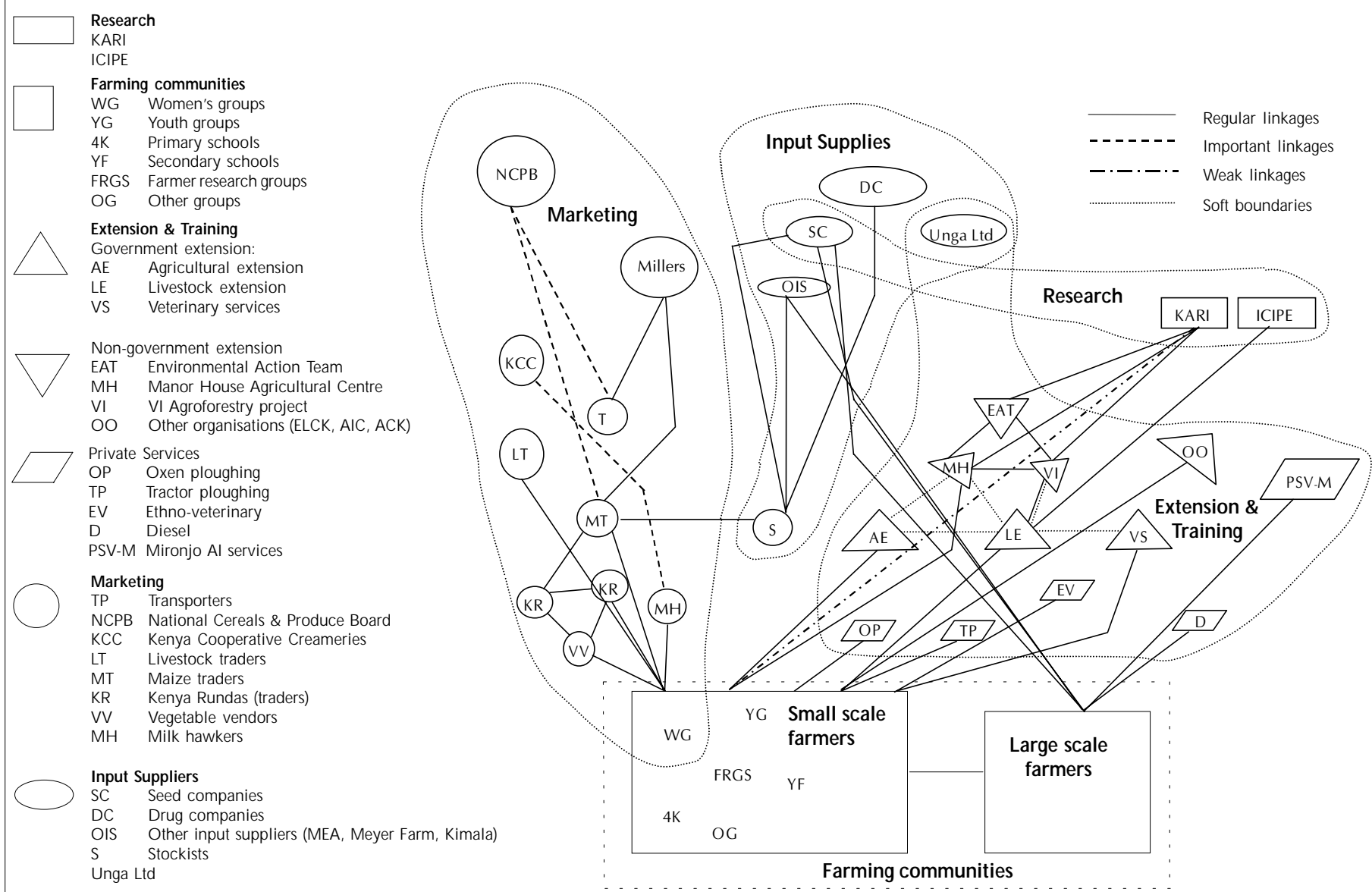


Figure 5 Basic configurations, Homa Bay District

- Research**
 - K KARI
 - IC ICPE
 - KE KEFRI

- Extension & Training**

Government extension:

 - AE Agricultural extension
 - LE Livestock extension
 - VS Veterinary services
 - FD Forest Department
 - HP Homa Bay prisons
 - GA GoK/Amref

Non-governmental organisations:

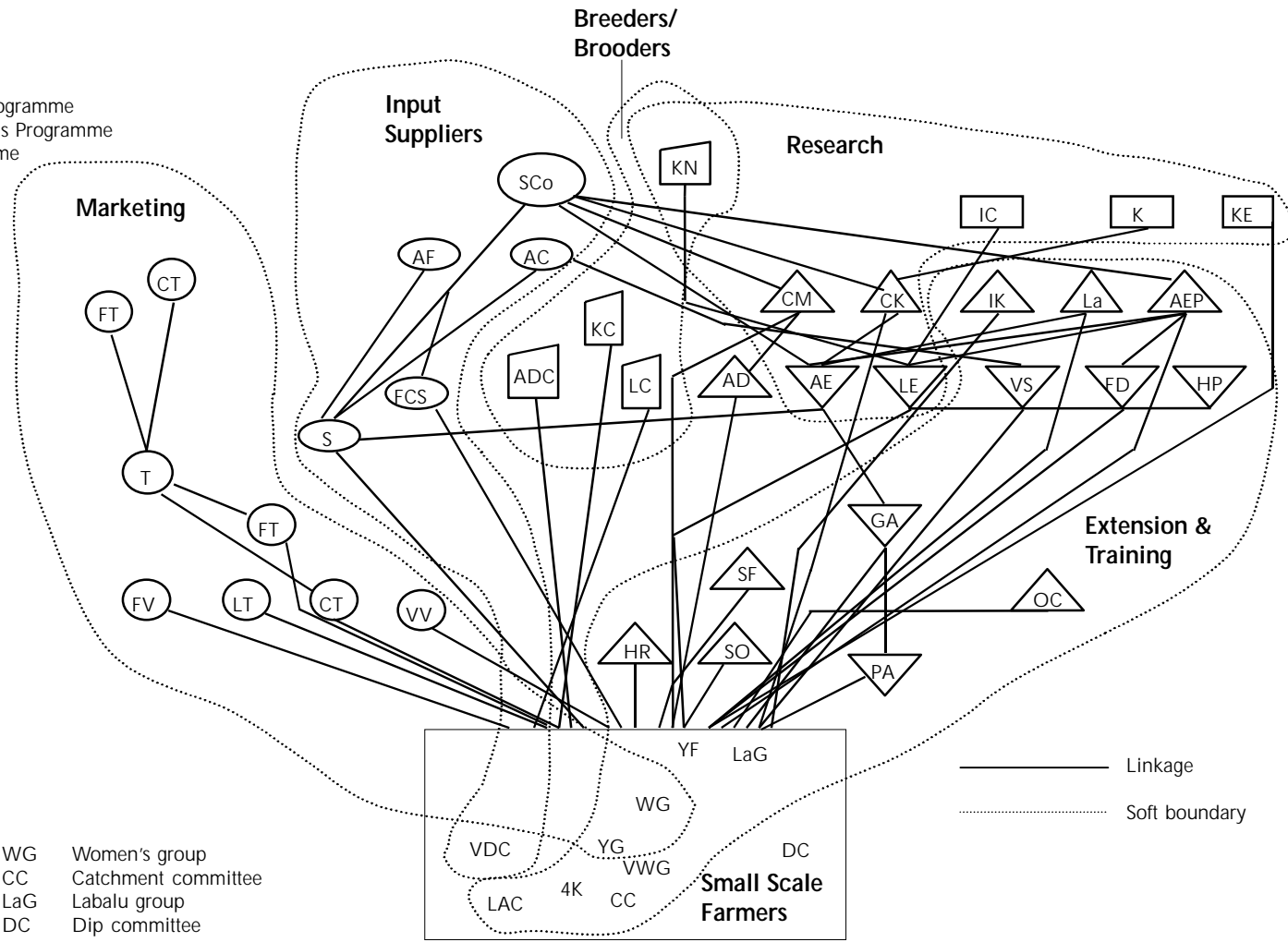
 - HR Homa Bay Rural Development Programme
 - IK Indegenous Knowledge Promotions Programme
 - AEP Agriculture Environment Programme
 - La Labalu
 - CK Care Kenya
 - CM C-MAD
 - AD Animal Draft Power Programme
 - So SONOBO
 - PA Provincial administration
 - SF South Nyanza Future in our hands
 - OC Other church organisations

- Breeders/Brooders**
 - KARI Naivasha
 - ADC ADC Farms
 - LC Lake chick
 - KC Kenchick

- Input Suppliers**
 - S Co Seed companies
 - AF Animal feeds
 - AC Agro-chemicals
 - S Stockists
 - FCS Farmers cooperative services

- Marketing**
 - T Transporters
 - FT Fruit traders
 - FV Fruit vendors
 - VV Vegetable vendors
 - CT Cereal traders
 - LT Livestock traders

- Small scale farmers**
 - VDC Village development committee
 - LAC Location agroforestry committee
 - YG Youth group
 - YF Young farmers
 - 4K 4K clubs
 - WG Women's group
 - CC Catchment committee
 - LaG Labalu group
 - DC Dip committee



————— Linkage
 Soft boundary

Figure 6 Basic configurations, Kiambu District

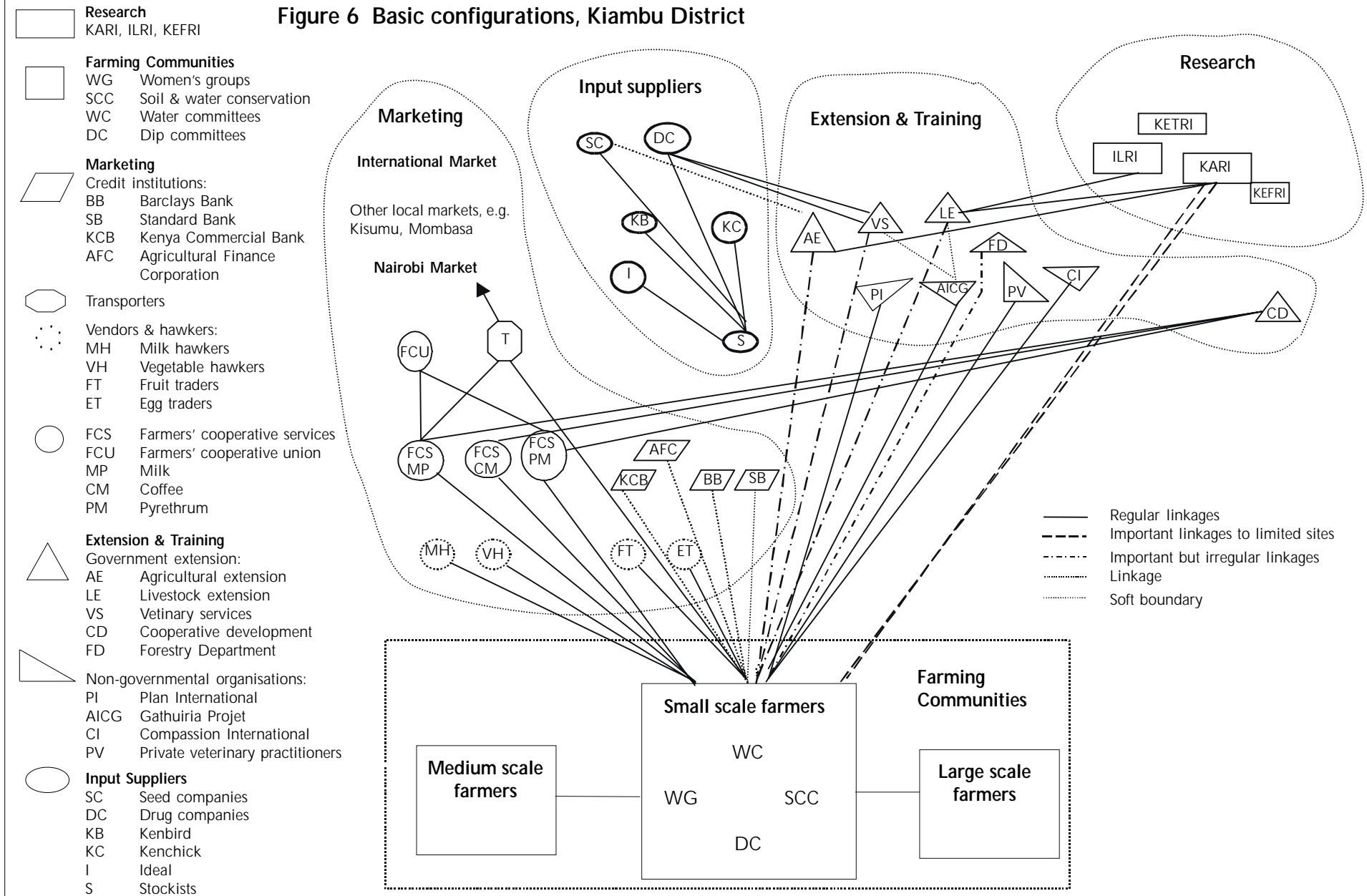
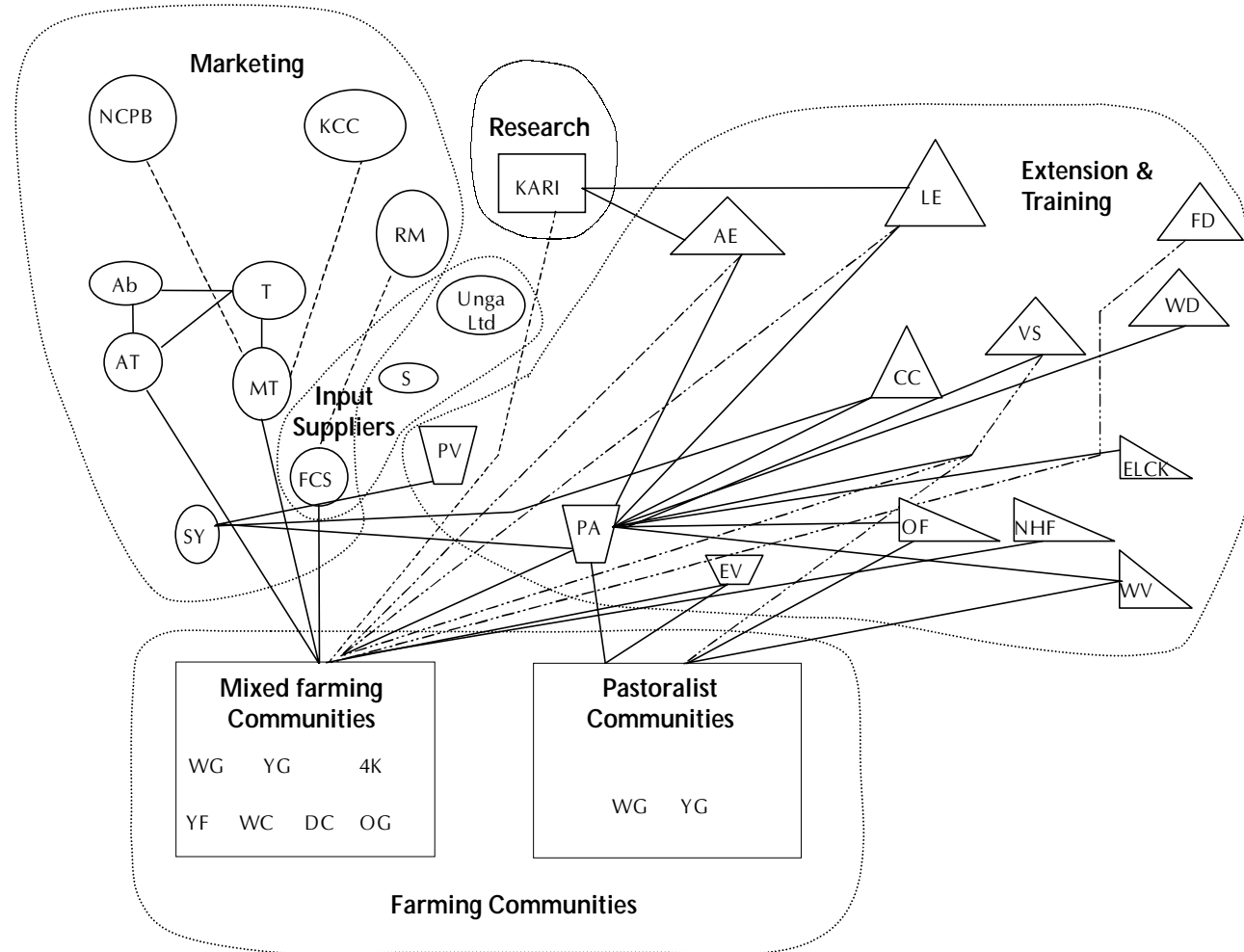


Figure 7 Basic configurations, West Pokot

- Research
KARI
- Farming communities
Small scale mixed farmers
Pastoralist farmers
WG Women's groups
YG Youth groups
4K Primary schools
YF Secondary schools
OG Other
DC Dip committees
WC Water committees
- Marketing
NCPB National Cereals & Produce Board
KCC Kenya Cooperative Creameries
MT Maize traders
AT Animal traders
T Transporters
Ab Abattoirs
FCS Farmers' Cooperative Society
SY Sale yards
- △ Extension & Training
Government extension:
AE Agricultural extension
LE Livestock extension
VS Veterinary services
WD Department of Water
FD Forestry Department
CC County Council
- △ Non-governmental organisations
VI VI agroforestry project
OF Oxfam
WV World Vision
NHF Netherlands Harambee Foundation
ELCK Evangelical Lutheran Church of Kenya
- ▽ Others
PA Provincial Administration (Ass. Chief)
EV Ethno-veterinary
PV Paraveterinary
- Input suppliers
S Stockists
Unga Ltd



outside rural communities, i.e. horizontal linkages between institutions were perceived as weak. Some linkages were noted between input suppliers and government extension, and in some cases between NGOs and churches. Similar conclusions were reported in other AKIS studies carried out in Kenya² and in Ethiopia and the Philippines (Ramirez, 1997).

Basic configurations

Basic configurations diagrams were constructed as overviews of the AKIS of the different districts. These configurations synthesise the results of the semi-structured interviews, communication networks, septagrams and the feedback meetings with the rural community representatives (Figures 4–7). Whilst local actors had the greatest day-to-day influence and were considered the most important sources of information, each study area also had a considerable number of external actors. Horizontal linkages between most of the external organisations were generally poor; their predominant links were with the farmers and farmers' groups associated with the organisation. Markets and input suppliers (agribusiness) are more important in the relatively well developed Kiambu and Trans Nzoia districts, and the training, extension and basic services constituent is more prominent in West Pokot. The NGOs active in Homa Bay also contribute to research through their adaptive research programmes.

5 EFFECTIVENESS OF THE NETWORKS SERVING FARMERS

Agricultural sources of information

Table 4 summarises the various and varied sources of information quoted by farmers, CBOs and traders in the sub-location feedback meetings. Friends, relatives, neighbours, women's groups and school/youth groups were reported as major sources in every division. Other organisations such as farmer cooperatives, dip committees and agroforestry committees were significant in some divisions. Stockists, traders and markets were mentioned as important sources in all but two divisions, and other agribusiness sources were important in some divisions. Ethno-veterinarians were reported as major sources of information in West Pokot, where they receive support from World Vision and the Evangelical Church. Commercial banks were listed as important information sources in Kiambu. All divisions considered the Ministry of Agriculture as a major source of information (although quality and frequency of interactions often received negative comments – see below), and most also reported getting agricultural information from *barazas* (local meetings called by the area chiefs – appointees of the Office of the President.)

In three of the four districts (West Pokot, Homa Bay, Kiambu), information sources were ranked separately by men and women farmers. Overall, women emphasised community sources, ranking neighbours, churches, CBOs and *barazas* most frequently. Men also indicated the importance of community sources

(especially family members and neighbours), but overall gave the highest priority to government extension. Similar results were reported from a study in Machakos and Makueni districts (Njuguna and Kooijman, 1999). For both men and women together, the sources ranked most frequently in the top five were neighbours, *barazas* and GoK extension, followed by churches and family members. Farmer training colleges and organised tours were mentioned least frequently. Semi-structured interviews with individual farmers showed similar patterns (Table 5). Government extension staff were mentioned as important information sources by half to three-quarters of respondents, and neighbours and relatives were listed as amongst the most important sources. NGOs and churches were important sources of information only in those divisions where they were operating. Radio was mentioned as a medium of agricultural information in all divisions (Table 6). A review of a survey of 1,400 maize farmers in Kenya carried out between 1992 and 1994 indicated similar percentages of farmers reporting contact with government extension services (Salasya and Hassan, 1999), as did a recent case study of Embu and Mbeere districts (Kimenye, 1999).

Types of information received

Table 7 summarises the types of information obtained by farmers, CBOs and traders as reported during semi-structured interviews. Operational skills was the main type of information received in all four districts, followed by awareness/understanding (new opportunities/problems, etc.). Technical information was reportedly received by 16–33 per cent of farmers, and 22–50 per cent of CBOs. However, most end users felt that information flow for this category was particularly deficient; the major knowledge gap expressed in the feedback meetings in all four districts was for technical information (e.g. how to manage late blight in potatoes, where to get certified seed, the most appropriate varieties for a given location, housing and management of livestock, etc.). Similar concerns were raised in the Machakos district study (KARI, 1999).

Problems of information flow

The results presented above indicate that government extension is a major source of information in all the communities investigated. However, neither the communities nor the extension personnel themselves were satisfied with the quality or frequency of interactions. The main problem perceived by farmers and CBOs in information flow was inadequate human resources, both in terms of numbers and knowledge/skills for GoK and NGO extension (Table 8). De-motivating factors were considered important – poor attendance of meetings, ignoring information, dishonest leaders (CBOs), use of the same farms for demonstrations, inadequate means for farmer exchange visits and mismanagement of groups. De-motivating factors mentioned by GoK and NGO extensionists included lack of commitment and interest, inadequate

Table 4 Sources of information received by farmers in the four districts

| District | Trans Nzoia | | West Pokot | | Homa Bay | | Kiambu | |
|--|-------------|--------|------------|-------|----------|--------|--------|------------|
| | Saboti | Kimini | Chepareria | Lelan | Nyarongi | Rangwe | Limuru | Githunguri |
| Local sources and CBOs | | | | | | | | |
| Friends / relatives | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Neighbours | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | - |
| Women's groups | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| School/ youth groups | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | - | ✓ |
| Farmer cooperative societies | ✓ | ✓ | ✓ | ✓ | - | ✓ | ✓ | ✓ |
| Farmer producer groups and committees | ✓ | - | ✓ | ✓ | - | ✓ | ✓ | ✓ |
| Water points | - | - | ✓ | - | - | ✓ | ✓ | ✓ |
| Environmental movement ("Green Belt") | ✓ | - | - | - | - | ✓ | - | - |
| Agribusiness (formal, informal) | | | | | | | | |
| Stockists / traders | - | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | - |
| Market points / livestock sale yards | - | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | - |
| Ethno-veterinarians | - | - | ✓ | ✓ | - | - | - | - |
| Bull schemes/ A.I. / oxen hire | ✓ | ✓ | - | - | ✓ | - | - | - |
| Private vets | - | ✓ | - | - | ✓ | - | ✓ | ✓ |
| BAT, Sony | - | - | - | - | ✓ | ✓ | - | - |
| Unga Feeds | ✓ | - | ✓ | - | - | - | ✓ | - |
| Kenchic, Sigma | - | - | - | - | - | - | ✓ | - |
| Commercial banks | - | - | - | - | - | - | ✓ | ✓ |
| Transporters | ✓ | ✓ | - | - | - | - | ✓ | ✓ |
| Government sources | | | | | | | | |
| Ministry of Agriculture | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Forestry Dept. | - | - | - | - | ✓ | ✓ | - | - |
| Fisheries Dept. | - | - | - | - | ✓ | ✓ | - | - |
| Development Authorities | ✓ | - | - | - | - | ✓ | - | - |
| Min. of Health Clinics | - | - | ✓ | - | - | ✓ | - | - |
| Office of the President (<i>barazas</i>) | - | - | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Farmer Training Centres | ✓ | - | ✓ | - | - | - | - | - |
| Coffee Foundation / Pyrethrum Board | ✓ | - | - | - | - | - | ✓ | ✓ |
| KPCU | - | - | - | - | - | - | - | ✓ |
| NCPB | - | - | - | - | - | ✓ | - | - |
| Agricultural colleges | ✓ | - | - | - | - | - | - | - |
| KARI / ILRI/ ICIPE | - | - | - | - | ✓ | - | ✓ | ✓ |
| NGO / church sources | | | | | | | | |
| EAT | ✓ | ✓ | - | - | - | - | - | - |
| VI Tree Planting Project | ✓ | ✓ | - | - | - | - | - | - |
| MHAC | ✓ | ✓ | - | - | - | - | - | - |
| OXFAM | - | - | - | ✓ | - | - | - | - |
| World Vision | - | - | - | ✓ | - | - | - | - |
| AEP | - | - | - | - | - | ✓ | - | - |
| C-MAD | - | - | - | - | ✓ | - | - | - |
| CARE-K | - | - | - | - | - | ✓ | - | - |
| ADPP | - | - | - | - | - | ✓ | - | - |
| AMREF | - | - | - | - | - | ✓ | - | - |
| OFPEP | - | - | - | - | ✓ | - | - | - |
| KOLPING | - | - | - | - | - | ✓ | - | - |
| Plan Intl., Compassion Intl. | - | - | - | - | - | - | ✓ | - |
| KIOF | - | - | - | - | - | - | - | ✓ |
| ELCK | - | - | ✓ | ✓ | - | - | - | - |
| Catholic Diocese | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | - | - |
| AIC | - | ✓ | - | - | - | - | ✓ | ✓ |
| ACK | ✓ | ✓ | - | ✓ | - | - | - | - |

Table 5 Sources of information mentioned by smallholder farmers (% respondents from semi structured interviews)

| Information source | Trans Nzoia | West Pokot | Homa Bay | Kiambu |
|----------------------------------|-------------|------------|----------|--------|
| <i>Local / community sources</i> | | | | |
| Farmer's own experience | 6 | 18 | 19 | 21 |
| Market place | 6 | 7 | 8 | 11 |
| Neighbours | 38 | 65 | 56 | 70 |
| Parents/children/relatives | 46 | 49 | 46 | 21 |
| CBOs | 13 | 8 | 11 | 51 |
| Stockists / traders | 6 | 27 | 11 | 35 |
| <i>External sources</i> | | | | |
| Extension activities* | 21 | 19 | 17 | 41 |
| GoK officials | 42 | 54 | 74 | 49 |
| NGO personnel | 43 | 9 | 28 | 7 |
| Churches | - | 0 | 8 | 9 |
| Print media | 13 | 11 | - | 10 |
| No. respondents | 53 | 102 | 65 | 133 |

*Refers to demonstrations, field days, tours, workshops, ASK shows
 - No response or not available

material resources and transport, and farmers simply ignoring information. Similar comments by Kenyan farmers and extensionists have been recorded in many other reports (i.e. den Bigelaar, 1995; Rees, Nkonge and Wandera, 1997; Rees et al., 1997; Sutherland, 1999; Salasya and Hassan, 1999).

6 UPTAKE PATHWAYS AND ENTRY POINTS FOR TECHNOLOGY DELIVERY

Potential uptake pathways and entry points highlighted by the study are summarised in Table 9.

Government of Kenya

GoK delivery systems are perceived by rural people to be important sources of agricultural information. However, Government pathways are faced with considerable constraints, and are unlikely to be effective unless human, financial and information problems are addressed.

Community based organisations

The number and variety of CBOs makes them attractive as potential users of agricultural information, but their very number and diversity also makes it difficult to generalise about delivery systems/uptake pathways. Any agency interested in agricultural development needs to pay particular attention to cataloguing CBOs and their

uptake pathways in their mandate regions. Some general remarks are made below.

Women's groups

Maendeleo ya Wanawake (MYW) is a national network supposed to act as a coordinating body for women's groups, and to support them through both political and technical activities (i.e. advocacy and lobbying for change; training and skills development). As such, MYW has a network which reaches to local levels, and this could provide a ready-made delivery system for knowledge dissemination. However, its networking activities are not effective in all districts, and some women's groups are not affiliated to MYW. Women's groups, like others, have to register with the Ministry of Social Services to qualify for financial assistance from GoK and donors. The Ministry of Social Services could act as an entry point for women's groups, but in practice rarely update their records or carry out any organised follow up activities. Through group meetings the Home Economics section of MoA operates with most women's groups on activities related to family nutrition, kitchen gardens and child care. This could be an entry point to groups that complements the use of the conventional MoA extension services.

Rural health clinics

AMREF in Homa Bay and Trans Nzoia, and primary health care clinics in all districts display information materials, and would welcome agricultural information also.

Youth groups

Youth groups, young farmers, 4K clubs and schools are best reached through the MoA Rural Youth Office rather than through the Ministry of Education. It was noted during the study that most of the youth groups are particularly interested in short-term cash enterprises, and less in the reduction of production costs and/or environmental conservation.

Dip committees

After government support to village daps was withdrawn, various groups and committees came into being to operate daps as private enterprises. Some youth groups in Trans Nzoia are operating daps on a commercial basis and some dip committees in Homa Bay are operated by farmers. Private vets in Trans Nzoia and Kiambu also give support in some cases. Such dip committees would be very appropriate for dissemination of better animal health and husbandry practices.

Table 6 Media by which the farming communities have received agricultural information

| District Division | Trans Nzoia | | West Pokot | | Homa Bay | | Kiambu | |
|-------------------------------|-------------|----------|------------|-------|----------|--------|--------|------------|
| | Saboti | Kiminini | Chepararia | Lelan | Nyarongi | Rangwe | Limuru | Githunguri |
| Organised tours | - | - | ✓ | ✓ | - | - | ✓ | ✓ |
| Organised workshops/ seminars | - | - | - | - | ✓ | ✓ | ✓ | - |
| Field days/ASK shows | ✓ | ✓ | ✓ | - | - | - | ✓ | - |
| Radio | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Print materials | - | - | ✓ | - | - | ✓ | ✓ | ✓ |

Soil and water catchment conservation committees

The considerable number of soil and water catchment conservation committees makes them attractive as potential uptake pathways for general crop and livestock practices, particularly those oriented towards conservation and/or reduced costs of production. When the soil and water conservation projects come to an end (after two or three years of government support), most of the committees become dormant. But it would be easy for other organisations to revive them as uptake pathways for agricultural information. The District Soil and Water Conservation Offices would be an ideal entry point to these committees.

Other committees

Water committees, location agroforestry committees and village committees are active in some districts/divisions and should be noted when delivery systems/uptake pathways are being inventoried.

Chiefs and barazas

The Provincial Administration (*barazas*) were mentioned by some respondents as potential delivery systems, but the authoritative nature of chiefs/assistant chiefs was seen as a potential problem for the uptake of technical, as opposed to civic, information. However, chiefs are key stakeholders in all aspects of rural life and should be consulted or actively involved in any dissemination effort, particularly in low potential areas.

Service providers (agribusiness)

The larger scale agribusinesses with their networks of stockists, traders and farmers offer potential dissemination pathways, provided they are assured that the distribution of information would enhance the popularity of their outlets and that the information was consistent with their range of products.

NGOs and church organisations

These are widespread throughout Kenya, but each organisation has limited coverage. Although there are some horizontal linkages between different churches and between churches and NGOs, the linkages are not strong enough to offer any particular entry points. It is

probably necessary to contact each separately to tap into their rich networks. Their main offices in the districts could be good entry points, and could also contribute materially to uptake/dissemination. In West Pokot, the Evangelical Lutheran Church of Kenya and World Vision are making determined efforts to contact and improve skills of para-vets and veterinary drug hawkers, and so would be appropriate delivery systems for animal health and husbandry information. The CBOs working with projects under the Catholic Diocese of Homa Bay are attractive as potential uptake pathways for general crop and livestock practices oriented towards sustainable agriculture. Diocese activities include training in group dynamics and leadership skills in an attempt to help the CBOs become self-sustaining. The entry point here is the Diocese of Homa Bay. Several groups have been trained in bio-intensive or organic farming practices in Trans Nzoia, Kiambu and elsewhere in Kenya. Environmental development groups have been established and trained by CARE-K in Rangwe, Homa Bay. These groups could be contacted through the Soil Organic Matter Network, Association for Better Land Husbandry, Manor House Agricultural Centre, Kenya Institute of Organic Farming (KIOF), EAT, CARE-K and a number of other NGOs and church organisations. The groups would not only be recipients of information but could also be involved in dissemination to other farmers/groups.

7 NETWORKING AND PLURALISM FOR MORE EFFECTIVE AGRICULTURAL DEVELOPMENT

Most of the external actors reported here, and particularly government institutions, interact directly with rural communities. However there is little interaction between organisations and institutions themselves, even though they have similar objectives. Similar observations have been made elsewhere (e.g. Wanga, 1994; Ramirez, 1997; Keengwe et al., 1998) and indeed have underpinned the development of the AKIS paradigm and the RAAKS methodology (Röling 1989; Engel 1997; Röling and Wagemakers, 1998). Some analysts call for the deconstruction and reconstruction of the whole system of agricultural development and support into new

Table 7 Types of information received by farmers and CBOs (%respondents in semi-structured interviews)

| Type of Information | Trans Nzoia | | West Pokot | | Homa Bay | | Kiambu | | |
|--------------------------------------|-------------|------|------------|------|----------|------|--------|------|---------|
| | Farmer | CBOs | Farmer | CBOs | Farmer | CBOs | Farmer | CBOs | Traders |
| Awareness/understanding ¹ | 38 | 27 | 27 | 23 | 18 | 24 | 46 | 50 | 0 |
| Operational skills ² | 40 | 41 | 41 | 39 | 64 | 34 | 35 | 64 | 25 |
| Technical knowledge ³ | 33 | 22 | 30 | 35 | 17 | 41 | 16 | 50 | 67 |
| Marketing information | 14 | 10 | 23 | 38 | 3 | 1 | 4 | 0 | 25 |
| Policy | - | - | - | 19 | - | - | - | - | - |

¹ E.g. Awareness of new varieties

² How to carry out farming practices, such as ploughing, spraying for pest control, etc.

³ Technical details of farming practices (recommended row spacings, ploughing depths, chemical dilution rates, sources of improved seed, etc.)

Table 8 Problems of information flow as perceived by GoK and NGO organisations, farmers and CBOs

| GoK organisations | NGO organisations | Farmers/ CBOs |
|--|--|--|
| Inadequate information on enterprises | Distortion of information when passed through other actor | Inadequate extension personnel (numbers and/or knowledge/skills) |
| Insufficient resources to sensitise communities before information is disseminated | Inadequate information on enterprises to improve productivity | Long distance/poor infrastructure |
| Poor mobility of technical staff to visit the farming communities | Farmers and other actors do not have the initiative to look for information | Inadequate extension activities |
| Inadequate capacity and skills to coordinate information flows | Information from research does not reach the NGOs as the recommendations are only channelled through MoA | Biases (gender) |
| Insufficient and untimely funds to enable staff organise extension activities | Insufficient resources to sensitise communities before information is disseminated. | De-motivating factors |
| Inadequate numbers and skills of frontline staff (extension staff at the lower levels) | Inadequate numbers and skills of local extension staff | Use of unfamiliar and technical terms |
| Low literacy level among farmers | Low literacy level among farmers | Illiteracy |
| Language barriers (translating technical information into well understood local terms) | | Outdated information |
| Uncoordinated channels of information delivery to farmers leading to unverified technologies | | Poor communication |
| Farmers and other stakeholders do not have the initiative to look for information | | Short lived sources |
| Insecurity - some people pose to farmers as extension staff when they are not | | Inadequate knowledge and skills |

coalitions or platforms of actors (Chambers, 1993; Biggs, 1995; Pretty, 1995; Engel, 1997). Although this may be too radical for most governments, it does raise questions of missed opportunities for collaboration and cost-sharing in research and dissemination and of networking and pluralism in the supply of research and extension services.

Liberalisation, structural adjustment and the increasing role of NGOs and other organisations increase the complexity of agricultural development, and offer new opportunities for research, extension and training (Zijp, 1998). The establishment of task-oriented networks and task forces is often considered the most effective way to tackle such complex issues with many different stakeholders (Carley and Christie, 1992; Alders et al., 1993). The World Bank Rural Action Plan advocates drawing the many concerned actors together in more effective partnership, and recommends pluralism in the supply of research and extension services to develop more cost-effective, equitable and efficient agricultural development (Zijp, 1998). The AKIS paradigm and the RAAKS methodology, amongst others, offer tools that could assist government and non-government organisations in such networking and the review of their roles in today's agricultural systems.

Throughout the study, farmers and other actors emphasised the need for learning through direct interaction with researchers and extensionists. Even where research institutions have developed expertise with participatory approaches (e.g. KARI), it is not possible for them to work directly with more than a tiny percentage of the country's smallholder farmers. The formation of strategic alliances with other development agencies to address agricultural issues of mutual interest is one way in which government research organisations could substantially increase their impact. Such alliances would involve working with representatives of the 'farmer-congregations' of these agencies. Increased focus on the formulation of research outputs into technical information materials for farmers, emphasising trying-out and experimentation by farmers' groups, and the development of teaching and training-of-trainer materials for intermediate users would be necessary to assist those agencies in facilitating participatory learning throughout their congregations. In this way, government research institutes could capture pivotal roles for themselves in the agricultural knowledge and information systems of the future.

Table 9 Potential delivery systems in Trans Nzoia, West Pokot, Homa Bay and Kiambu

| Uptake Pathway | Entry point | Comments |
|--|---|--|
| Government pathways: Agriculture, livestock development, veterinary services, forestry | District offices | Potentially strong, well-organised networks; under-resourced and poorly motivated |
| Government pathways: Office of the President (network of Chiefs and sub-chiefs) | District offices | Key actor in all aspects of rural life; strong networks that could easily contact all CBOs; strong potential blocking factors |
| Schools | see below – NOT Min. of Education | |
| Rural health clinics | AMREF Offices Homa Bay and Trans Nzoia only MoH Maternity Child Health Care Offices | Commonly display various information materials; potentially very effective pathway Commonly display various information materials; potentially very effective pathway |
| Women's groups | Maendeleo ya Wanawake MOA Home Economics Dept. | Bring groups together at divisional, district, provincial and national levels Focus more on health, education and home economics |
| 4K, young farmers, youth groups, schools | MOA Rural Youth Offices | Potentially strong network |
| Dip committees | MOA Vet. Services – District Offices | Potential pathway for animal husbandry technologies |
| Soil and water catchment conservation committees | MOA District Offices | Become inactive after the conservation project is complete, but can easily be re-activated for similar/other agricultural activities |
| Para-vets & veterinary drug hawkers NGO client networks | ELCK, World Vision NGO offices | West Pokot only No useful umbrella organisations identified, but potentially very effective |
| Church development congregations | District offices and Church HQ | No useful umbrella organisations identified, but potentially very effective |
| Major agribusinesses (Kenya Seed, Ken-Chic, Babayi, Nyota, Meyer, Western, Mea Ltd, dairy cooperatives, private entrepreneurs) | Head offices | Very important potential pathways; need to be convinced that the information will enhance their own outlets and not compromise their business |
| Farmers'/women's groups- AEP, LABALU, ADPP Programme | Diocese of Homa Bay | May become inactive when projects come to an end, but can be reactivated for agricultural activities |
| Organic or bio-intensive CBOs (women's groups, self-help and youth groups) | MHAC, Kenya Institute of Organic Farming | Great potential through their regular training of CBOs in bio-intensive/organic practices. |
| Farmers'/women's groups for environment and agricultural development in Rangve | CARE-Kenya | Regular visits and interactions; potential for distribution and dissemination of information. |

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ENDNOTES

- 1 RAAKS methods included actor identification, actor objectives, actor verification, communication networks, linkage matrices, task analysis, prime mover septagrams and basic configurations. PRA methods included sketch maps, ranking and historical profiles.
- 2 Other AKIS studies include flower farming in Kiambu (Wanga, 1994); the coffee and tea based systems of Embu (den Bigelaar, 1995); and dryland farming in Machakos (KARI, 1999).

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