

SPORE



Information for agricultural development in ACP countries

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Illustration: Norman Reynolds, photo: J. Best/University of Reading

The Internet alleviates rural isolation

Cheap and efficient communication aids development. Urban centres have grown out of people's need to be able to communicate with each other. From this congregation and communication spring self-perpetuating economic activity and development. Rural areas have been left behind, but with better telecommunications and wider access to modern electronic information technology they will have a chance to catch up.

Imagine a world-wide road network. The "roads" have fast-moving traffic, safely carrying important "packages" to their destination. Business is flourishing. Raw materials are ordered on time, manufacturing and service industries run efficiently and manufactured goods and other products are priced competitively and delivered to satisfied customers around the world. Every single individual, whether a farmer living at the end of a track (which disappears in the rainy season), or the sales manager of a big commercial enterprise close to the international airport, could be linked to this network. That, at least, is the theory but, in practice, it seems that there is a big diversion sign around many of the ACP States. If the diversion signs were removed,

what impact would that have on rural development?

The "road network" is the internet and the fast-moving traffic are packets of information data. The major advantage of the internet over other means of communication is that people can 'speak' to each other, no matter who they are or how far apart they may be. Their communication is cheap, quick and two-way, unlike radio, TV and print, and the quantity and variety of information that can be instantly transferred is staggering.

When two people speak by telephone, a part of the telephone system is entirely dedicated to the call, which means that when many people want to use the telephone system at the same time its capacity is quickly exhausted and no line is

available. When two people use the same lines to communicate by internet, the information is broken down into small packets of data which then flow like a stream of traffic across the network. The packets of data, which get mixed up with everyone else's data, are routed through junctions. Even though a single communication may be broken into separate data packets which follow separate routes, the receiver gets the complete, reconstituted message. As long as senders and receivers have a computer, modem, appropriate software, a telephone line, and an understanding of how to use the equipment, they can exchange information. However, users also need to know how to make good use of all that the internet can offer.

be obtained for their crops if they were exported rather than sold in the nearest market town. They may want to know what transport will be available to move the goods, how much that would cost and whether, therefore, the venture would be profitable. In any business transaction, the better informed the seller, the better the chance of a fair price. A fruit grower may want technical advice to help judge the perfect time for harvesting the crop (see box). Agricultural researchers may need information which relates to their work and which they know will be available only from a major university on the other side of the world. University students returning from

which is addressed to a specific person or organization. Usenet is rather like a notice board that anyone, anywhere, can look at and to which anyone can pin their own notice. It is a way of asking questions and receiving answers from people who are interested in the same subject. This would be similar to CTA's Question-and-Answer Service but anyone could read both questions and answers and make their own contribution. Many individuals can gain the benefit of such a service if the organization that has access to the internet then distributes the information to those who have not by means of printed information sheets or even via local radio.

Wide Web, for example, will provide so many answers, or so many options for finding answers, that the task may become so tedious that it is abandoned. With access to a telephone line, which is, in any case, necessary in order to access the internet, the secretary would have been better advised to telephone the local agricultural store and ask when the fertilizer will be in and what it will cost.

As with any other form of communication it is important to know how to define what information you need and how to communicate that need. Then comes the problem of knowing how to use the information received. The better the first two tasks are done, the easier is the third.

Precise, accurate and free of bias?

Another point which is related to the importance of being precise when seeking information is the need for that information to be accurate. In this respect the internet has both advantages and disadvantages. On the one hand it allows the user to access information from many different places, some of which may be a great distance apart; this could permit a degree of comparison and potentially a lack of bias. On the other hand, all information has, at some stage or another, been made available through the activity of a human being and human beings wittingly, or unwittingly, often give inaccurate information. There may be a temptation to feel that because information has come via a medium of sophisticated modern technology, it must be valid. A conversation on the internet may be as informal as a conversation with a stranger in a bar or at the bus stop. Who would place great confidence in such a casual exchange of information? This is not to say that such information should be mistrusted, but that it should be subject to the same level of scrutiny and judgment as any other information source.

It should be remembered that in addition to its undoubted advantages for accessing information that is worthwhile or even essential, the World Wide Web provides commercial suppliers, not all of them totally honest, with a wonderful, world-wide shop window. The same level of judgment needs to be applied to these suppliers' beguiling advertisements on the internet. There are disturbing stories, for example, of unscrupulous operators selling spurious AIDS cures via the internet. Inducements to buy additional computer software or more sophisticated hardware in order to use the internet ever more efficiently are likely to be more tempting. A cynical observer might suggest that these products have built-in obsolescence, for this is how the service providers make their money. Nevertheless, new products are constantly becoming available and to be able to identify a potential crop pest from the scanned image of its wing sent from a remote location in Africa to a London-based institution may be

deemed a very cost-effective piece of technology.

Cost before benefit

Apart from the potential benefits and drawbacks of using the internet, there are technical challenges which, until now, have limited its use in many ACP States and which largely remain to be overcome. The most significant of these is the telephone system. Many ACP States have inadequate, obsolete telephone systems that cannot satisfy the demands of social communication, let alone commercial development. Although radio or satellite links can overcome shortcomings in land-based telephone systems, these also require investment and any commercial investor or service provider will need to be confident of a return on their investment. This confidence is in part dependent on economic and political stability. Furthermore, a population that needs basic education and better health care is unlikely to press for a better telecommunications network, even though the opportunity of being able to communicate cheaply and efficiently may be the most effective means of stimulating economic development which may, in turn, provide the best hope of acquiring better health care and education.

In addition to telephone access, users of electronic information technology must be able to purchase suitable computers, modem equipment and software. The setting up and use of these will almost certainly require, at least in the early stages, back-up services from the suppliers and training. The equipment must be robust enough to withstand less than ideal climatic conditions and must be housed in a reasonably dust-free, dry atmosphere. Security for any portable, expensive equipment is always a problem as

is ensuring that the equipment is used only by those who know how to operate it properly and who will pass on its benefits to others. There will be an initial investment required in equipment and an ongoing cost in telephone charges and subscription costs to the service providers who provide access to the internet. Most organizations find that by using e-mail instead of the telephone they reduce the cost per call. This is especially the case if international telephone calls can be replaced by e-mail, which usually requires only a local call to the service provider.



This typical homepage is part of an information system designed to help agricultural geneticists

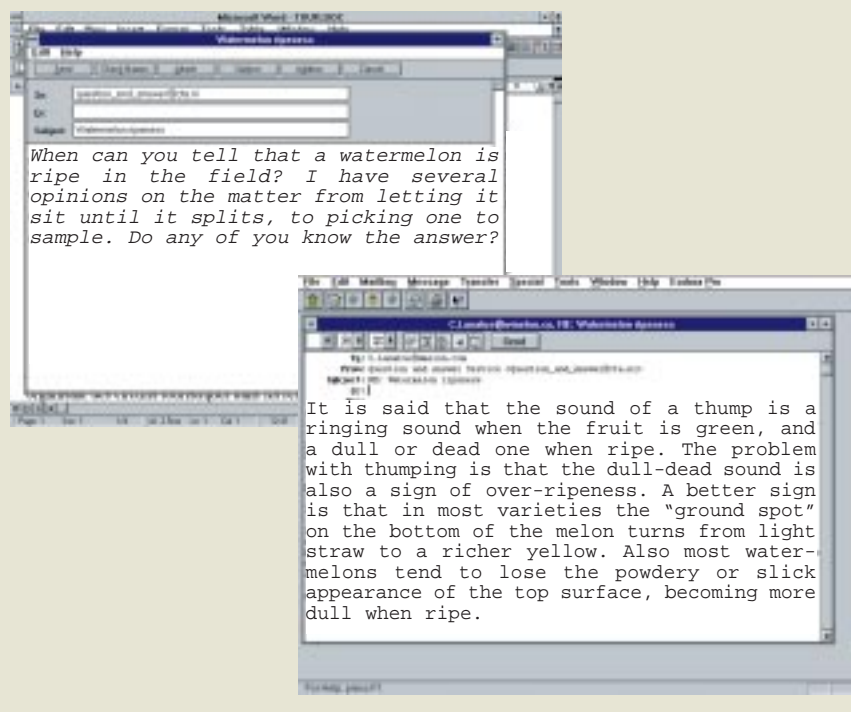
However, the tendency is for the volume of communication to grow and, while this is desirable if it indicates that a previously unsatisfied demand for communication links is now being met, it also has a cost implication.

The internet and the electronic information services to which it gives access have already shown phenomenal growth rates and have brought prosperity and economic development to users and providers alike. The ACP States should not be left behind. Some are already on-line and the chance is there for others to catch up. The internet, like information itself, should be available for all who need it, but it could be that many of the ACP States will be left further and further behind in a world that is accelerating fast along the world's information super-highways.

EXAMPLES OF USENET GROUPS THAT SPORE READERS MAY FIND INTERESTING

- alt.agriculture.fruit
 - alt.agriculture.misc
 - alt.sustainable.agriculture
 - bionet.agroforestry
 - bionet.biology.tropical
 - bionet.parasitology
 - sci.agriculture
- } alt=alternative
- } bionet= biological sciences
- } sci=sciences

ONE USENET USER'S QUESTION - AND A REPLY



higher degree studies overseas may need to maintain contact with their tutors or supervisors in order to complete research work or, indeed, the university professors may wish to learn from their ex-students. The internet also provides access to distance learning, through which formal qualifications can be obtained by pursuing home study courses backed up by materials and tutoring accessed via the internet.

Surf or sink

The internet should be thought of as the infrastructure for communication; by using that infrastructure in different ways, various services can be obtained. The most well-known are the World Wide Web, e-mail and usenet or news (see box). The World Wide Web is the main service to use to undertake a search for information yourself. E-mail is used to contact an information provider directly, rather like a telephone call or fax

The value of information depends on the relevance, and therefore the value, of the question to which it is attempting to respond. If the question has been correctly addressed, a response is little more than a mechanical process, which is why computers are so good at it. If you post a question into an inappropriate usenet discussion group, for example, you could wait for ever for a sensible answer. Asking the right question, therefore, actually requires more skill, understanding and intelligence than supplying the answer. For example, the secretary of a farmers' organization may be asked by the members to find out about applying fertilizer to the season's crop of maize. The answer could come back as, "N50kg/ha, P25kg P₂O₅/ha, K50kg K₂O/ha", when in fact the information actually required is, "Three weeks' time, 100 shillings a bag". Computers are very good at supplying answers but very bad at guessing questions. In an attempt to find the question, the World

Glossary

E-mail Text messages sent over the internet from one individual to one or many individuals. Such text messages can be sent to any e-mail address worldwide for the same cost as sending it to an address next door.

E-mail conference Opinions/queries within a specific subject area are sent by e-mail to a regulator, who will forward relevant items to all registered participants.

Encoding files A process which must be used to send anything other than text files by e-mail. Many e-mail packages will automatically encode and decode files as they are sent or received.

FTP File transfer protocol. Used to send large files, or to collect large files from another computer across the internet.

Internet The global network of computers which provides the basic electronic infrastructure over which all internet activity takes place.

Intranet A network of computers within an organization, often only accessible to members of that organization.

Internet service provider (ISP) The majority of internet connections are made by contacting an ISP which acts as a gateway onto the internet.

IRC Internet relay chat. Real time written conversations over the internet between individuals or groups.

Modem The device used to connect a computer to a telephone system, usually a box outside the computer or an additional card (circuit board) inside the computer. The modem speed determines the speed of the connection to the internet and therefore can reduce the time taken to send/receive e-mails or to download web pages.

On-line Being connected to the internet. Internet connections can either be made as required, logging on to an internet service provider (ISP) to send e-mails, check for incoming e-mails, surf the web etc., or a leased line can be established with the ISP providing a continuous link to the internet.

Search engine Specific web pages which are able to search the internet for information. Can be used to search for www pages, or usenet groups while also enabling searches to be made for documents in a particular language. To make an effective search it is necessary to be specific about what is needed. Entering 'Agriculture' into one of the search engines returned just over 870,000 web pages, while 'Tropical agriculture' still returned over 340,000.

Usenet Groups Internet discussion locations. Questions, opinions or comments can be posted to relevant 'groups'. Anyone with internet access can then read and respond as they wish.

Web surfing The process of jumping from one web page to another using the 'links' contained within web pages (see 'World Wide Web').

World Wide Web A vast collection of information pages. Web pages can contain text, pictures, graphics, sound and moving images, amongst other things. They often also contain 'links' which can take you to other related sites. There is however little order on the world wide web, and so finding relevant information can be very time consuming.

Weeds - friend or foe?

Farmers throughout the world look upon weeds as pests and generally speaking they are right to do so. With neither sufficient time nor money to control their weed problems, farmers feel justified in holding this opinion. But there are those who recognize that there may, after all, be something to gain from weeds, both in terms of time and money.

For the majority of African farmers, weeds represent the main threat to their crops because the work involved in getting rid of them is arduous, time-consuming and therefore requires considerable manpower. This work adds to the final production costs. Many farmers in developing countries spend more time on weeding than farmers elsewhere, for the simple reason that they have no means of control other than to dig or hoe weeds out manually. It has been estimated that it takes between 15 and 20 days to clean a hectare of heavily weed-infested land, or half that time if the land is less badly infested. If the life cycle of the weed species is properly understood, the number of times that weeding has to be carried out can be reduced by ensuring that it is done at the optimum time.

Herbicides can undoubtedly alleviate the workload considerably and have also contributed significantly to improved yields, but they have done no more than partially solve the problem. For many people herbicides are not an option, either because they are too expensive or because, as happens in some more remote regions, they are difficult to obtain. Chemical control does, however, pose problems of its own. The toxicity of the chemicals used may directly affect the health of the user. If applied at an incorrect dosage rate, or at the wrong time, herbicides can damage the crops they are designed to protect. Their use is not simple, and may require a level of education that many farmers in developing countries lack. Furthermore, repeated use of herbicides gives an advantage to resistant species which then proliferate to the detriment of the growing crops. Some weed species cover the soil and reduce the growth of other weeds. If a selective herbicide is then used, the long-term effect may be infestation by a weed species that is more invasive and more difficult to control than the original weed cover.

Nevertheless, weeds must be controlled if good crop yields are to be obtained. A piece of land that has not been kept free of weeds may lose 85% of its yield potential. Digging up weeds and hoeing are still the most effective methods of control and the timing of the task makes all the difference to its success. Draught power can help to reduce the labour required.

Deep ploughing will be useful for getting rid of some weed species, for example *Cyperus rotundus*, which dries out when brought to the surface. Other, more drought resistant, species will be positively encouraged by such practices and each little piece thrown up to the surface will grow into a new plant. Integrated weed control offers a variety of solutions. In Sri Lanka, for example, there has been some success in controlling *Chromolaena odorata* by introducing a predatory caterpillar. Could the same method be adapted for use in Africa?

Weeds as mulch

Weeds are certainly a major nuisance for farmers, but ground cover also has a beneficial effect. It protects land from rain and wind erosion while at the same time providing a useful quantity of biomass which can be incorporated to enrich the soil. Here, too, an understanding of the species

involved will determine the efficacy of the operation, because some will need to be dug in at a specific time of the year in order to avoid a new infestation. Even on cultivated land, well-controlled ground cover can sometimes benefit crops by forming a living mulch to help keep humidity levels up. Weeds can be cut down before they seed, again to form a green mulch, which can be spread around crops in order to preserve moisture and inhibit other weeds. If fed to animals or used as bedding, for example for draught animals or rabbits, weeds can be usefully recycled and their value enhanced. Some weed species should be allowed to grow close to cultivated crops because they attract crop pests, such as insects or caterpillars, away from the crop itself. Others may have the effect of discouraging the influx of pests. Local knowledge is invaluable in these instances.

Apart from such uses as mulch, green manure or forage, some weeds have an intrinsic value which is often unrecognized. Members of the Malvaceae family (which includes hibiscus and abutilon) have considerable economic potential in the production of fibres, notably for sound and heat insulation, for which outlets are rapidly expanding. Other potential niche markets are also worth exploring. The presence of certain species will reveal the composition of the soil and how it has been used in the past. They may also indicate precisely which areas need to be irrigated or drained, which crops may be the most suitable and what needs to be done to improve the soil. Such information can replace costly laboratory analysis to which farmers in ACP countries are, in any case, unlikely to have access.

Farm production costs can be reduced if weeds are properly understood and, in some cases, weeds may even be a source of gain. Farmers have every interest in turning weeds to their advantage, at least in so far as they are able. In any case, the cost of controlling weeds should never be more than what is gained by the effort. Knowledge, and therefore information, to say nothing of imagination, is of great importance to farmers if they wish to engage with the enemy and, perhaps, seize the opportunity of recruiting future allies.



Farmers do not need to eliminate *Chromolaena odorata* entirely, since this weed has beneficial effects on crops

CHROMOLAENA ODORATA BLESSING OR CURSE?

In Cameroon, women complain bitterly that since *Chromolaena odorata* appeared in their fields they have to spend twice as long weeding as before. It is absolutely essential that this weed is dug out completely. In Côte d'Ivoire, on the other hand, farmers hesitate to eliminate the weed totally from their fields because their crop yields seem to be higher when it is present. They recognize that *Chromolaena odorata* protects the soil from erosion and kills nematodes, which are a serious crop pest. Furthermore, as M. Zignagba, a farmer in Mbaïki, Central African Republic, explains, "If *chromolaena* is growing on our fallow land it avoids us having to cut down large trees, which is always a problem with our limited means."

Survival strategies for small-scale agro-processors

A burning sense of optimism at the start of a new business venture can quickly turn to ashes of disappointment when things go wrong. The best policy is to limit the potential for disaster by careful initial planning, to make provision for the inevitable setbacks and to strive at all times to keep ahead of the competition. Nowhere is this more likely to be essential than in the crowded and competitive field of small-scale agro-processing. If successful, such enterprises can help to add value to local agricultural produce, stimulate off-farm business activity in rural areas and kick-start a thriving rural-based economy.

In the Koumassi district of Douala, Cameroon, the price of a cooked cob of maize may vary by as much as 50% within 300 yards. Intense competition drives down the price to a level at which it may no longer make economic sense to go on trying to sell it. If there is little investment in buildings, equipment or packaging the loss of profit may be bearable, and at least one can eat the merchandise, but for a small business struggling to meet loan repayments on capital investment, competition of this sort will be disastrous. In any new agro-processing venture, choice of product is of paramount importance but it is by no means the only consideration. Budding entrepreneurs will need to turn their thoughts to finance, personnel, training, sourcing raw materials, location, packaging, marketing, management and many other larger or smaller worries that beset any new enterprise and threaten its survival.

The first consideration must be the consumer of the end product. It is important to know what is already available to consumers, whether there are indications of their preferences and whether demand is being met. Any competition within an established product range will have to be based on price or quality or both. Many businesses grow from very small-scale, even domestic, production of a popular food, with production expanded to meet growing demand locally, regionally or even nationally. A study supported by CTA and CIRAD (the French Centre de coopération internationale en recherche agronomique pour le développement) suggests that products that are successful in one region of a country may stand a good chance of being introduced successfully elsewhere. In Cameroon, for example, some types of pre-cooked food products can be found throughout the country, whereas others are limited to either the north or the south. Whilst the first person on the scene with a new product may have the advantage of facing no immediate competition, the challenge will be to overcome customers' established preferences. Preferences within regional rural areas tend to remain conservative, but the big new markets are in the



Successful businesses generally have small beginnings

rapidly expanding towns and cities where regional differences become diluted.

Developments outside the control of individuals may open up market opportunities. For example, devaluation of the CFA franc pushed up the price of imported bottled drinks in francophone West Africa, giving local producers an unexpected advantage. It may be a good idea to start local manufacture of a popular imported foodstuff, but the technology or process may not be entirely straightforward. Popcorn, for example, can only be made from certain varieties of maize and these may not be available locally and would therefore have to be specially introduced and grown for the purpose.

Money matters

Business developments invariably cost money and obtaining credit for buying equipment, hiring labour, purchasing raw materials, packaging etc., is likely to be a major challenge. Banks do not lend money unless they are very confident that the business will be successful. Since a new business cannot provide previous years' accounts to demonstrate profitability, a business plan will be required and most people will need professional help in compiling such a plan. If it meets the bank's requirements, collateral will, of course, also be required to secure any loan. For this reason many people turn to relatives, friends or to informal loan arrangements such as, for example, tontines (a form of friendly society in francophone Africa) if they are unable to finance their

business developments from their own personal resources. It may be necessary to consider whether a processing business should be located near to the supply of raw materials or near to the market. Location may also depend on where suitable premises can be found and, perhaps, on the reliability of the electricity supply. A high proportion of those interviewed for the CTA/CIRAD study stated that electricity cuts were their biggest problem. Perishability of goods, either raw or processed, will be another consideration. A processing unit may have to limit its production not for lack of customers, but because the goods are perishable and cannot reach more distant markets with sufficient shelf-life remaining. This is more likely to happen as businesses become larger, and those hoping to expand from a local to a national market often find their plans thwarted by an inadequate distribution system.

Owners of successful businesses will be fully conscious of the pressure to employ relatives, and friends of relatives, but to remain successful the advantages and disadvantages of employing family members will have to be very carefully weighed. Training and supervision of personnel will be necessary to ensure that product quality is consistent. This relates not only to taste and appearance but also to size and weight of packs and availability. Repeat business is the easiest to gain but the easiest to lose if products fail to meet expectations. Satisfied customers make the best marketing team a business can have.

Packaging requirements will depend upon the product and on the market being targeted but may be a decisive factor in a product's success or failure. Legislation will have to be complied with, not only to ensure product safety but also to provide consumers with information to which they may be entitled relating to ingredients and weight.

Careful planning, and reliable information on which to base that planning, are essential for any business, but if an agro-processing venture is well planned there is no reason why it should not succeed. There will always be a market for food products that match consumers' needs for quality and convenience at an affordable price.

Dangerous pesticide stocks removed



Pesticide containers kept in the open will deteriorate and leak their dangerous contents

Obsolete pesticide stocks pose a serious threat to public health and the environment as storage conditions rarely meet international standards. In many countries, pesticide containers are kept in the open where containers deteriorate and leak their contents, which contaminate soil, surface water and groundwater. Many of the chemicals are so toxic that a few grams could poison thousands of people or

contaminate a large area, and as most stores are in urban areas, the danger this poses is considerable.

According to the UN Food and Agriculture Organization (FAO), donor countries, aid agencies, agrochemical companies and recipient governments are all responsible for the steady accumulation of obsolete pesticides in developing countries. FAO estimates that there are more than 100,000 tonnes of these

substances in developing countries: 20,000 tons in Africa alone. Some stocks are over 30 years old and, due to the absence of environmentally sound disposal facilities, stocks are constantly increasing.

FAO has recently disposed of some 370 tonnes of unused pesticides in Zambia and Seychelles as part of its on-going programme to help developing countries clean up obsolete pesticides. Storage sites were cleaned and highly dangerous and persistent chemicals, including DDT, Lindane, Dieldrin, Atrazine, Diazinon, Captan, Malathion and Hexachlorocyclohexane (HCH) were shipped to Europe for incineration. FAO received financial assistance from the Dutch Government and the German Technical Cooperation Agency (GTZ) for the operation, which cost US\$1.3 million.

The cost of disposing of obsolete pesticide stocks in Africa alone are estimated to exceed US\$100 million. FAO is currently seeking financial support from agro-industry companies for pilot

disposal operations in the Gambia (20 tonnes), Senegal (300 tonnes) and Botswana (200 tonnes). None of the developing countries has facilities for the safe and environmentally sound disposal of pesticides, which requires high-temperature incineration. The long-term solution to the problem lies in preventing the accumulation of these obsolete materials; stocks should be kept as low as possible and pesticide use should be drastically reduced.

FAO has prepared Guidelines on *The prevention and accumulation of obsolete pesticides. Pesticide storage, Stock control and Disposal of bulk quantities of obsolete pesticides* which are available in Arabic, English, French and Spanish. Further information is available on the FAO Webpage: <http://www.FAO.Org/Waicent/FAOINFO/AGRICUL/AGP/AGPP/PESTID/default.htm>

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From famine to fulfilment

The famines which devastated Ethiopia a decade ago are hopefully a thing of the past, as the country has turned itself around from importer to exporter of grain. A combination of the effects of market liberalization and a period of good rains has transformed the situation to such an extent that Ethiopia has exported increasing amounts of cereals to Kenya and other neighbouring countries, according to the NGO Sasakawa-Global 2000 which works in Ethiopia.

FAO estimates that the cereal harvest in 1996 exceeded 11 million tonnes, up 20% from the year before and double the production at the beginning of the decade. The largest increase came in maize production, which grew by 30% in one year.

However, this upturn in the grain supply has had its downside by causing internal prices for grain to slump. Last year the European Union purchased about 5% (100,000 tonnes) of the main season grain crop for food aid and

this year the expected purchase will be in the region of 7% (144,000 tonnes). This will be distributed within Ethiopia itself to people too poor to buy it on the open market.

The linchpin of the revolution has been the greater availability of fertilizer after the ending of state monopolies, despite the fact that this has by-passed many poorer farmers who cannot afford the fertilizer. However, a policy to target these farmers by providing them with a subsidy for fertilizer, coupled with improved roads which will cut the cost of distribution, should off-set the imbalance between the remoter poor farmers and those closer to urban centres.

The cereal surplus has been mainly in maize, and farmers are being encouraged to grow more wheat and tef, the traditional grain crop of the country. Many of the heavy clay soils in the highlands of Ethiopia are under-utilized because they drain slowly and are hard to work. A simple metal implement known as a 'broadbed maker' allows farmers to create



Farmers in Ethiopia are being encouraged to grow more wheat

raised beds that have good drainage and where wheat will thrive. A workshop that produced a dozen metal implements three years ago sold 12,000 last year.

Researchers have been working on a different problem with tef, Ethiopia's most popular cereal. Under normal conditions yields tend to be low because, if fertilized, particularly with nitrogen, the weight of grain causes the crop to fall over before it is harvested. A plant hormone (Moddus) is being used in trials that will both shorten and stiffen the stalks of tef.

Noting the improvements already achieved in maize, and those likely to be achieved with wheat and tef, Marco Quiñones, Sasakawa-Global 2000's Country Director in Ethiopia, considers that within the next three to five years, "Ethiopia could be the first country in sub-Saharan Africa to achieve a broad-based Green Revolution."

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Compost from household waste

Management of household waste is becoming a major problem for many larger towns and cities in sub-Saharan Africa. In spite of the efforts of municipal authorities, refuse and rubbish of every sort continues to pile up with all its attendant health hazards. At the same time, soil fertility is in decline, particularly in surrounding urban areas where the soil has been over-exploited and where there has been little attempt to restore its organic content. As a result, the physical, chemical and biological state of the soil is poor.

About half of all household refuse is organic in content and could therefore be used to help solve the problem of soil degradation. A Burkinabe scientist has developed a simple method for composting refuse in a way that is appropriate at household level. The principal steps in the method are as follows:

Select rubbish which is easily biodegradable for composting.

Mix it with crop residues such as straw, grass, or other organic matter, for example, sawdust.

Make compost heaps by alternating layers of refuse, crop residues etc. and water copiously until liquid seeps out of the heap.

Use poultry droppings or cattle dung as a means of adding micro-organisms.

Turn the heap regularly and incorporate earthworms into the compost material.

After two months a good quality compost will have formed which, after sieving, can be used for growing vegetable crops and cereals.

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Protecting young trees from termites

Termite damage can be a major problem for farmers wanting to plant trees on their land. Chemical control is expensive and may also be damaging to the environment, but there are other methods which may help to keep termites away.

If poultry manure is mixed in with the compost being used for transplanting the young tree seedlings, or wood ash or burnt cereal straw is spread on the soil around the base of the young trees,

termites will be discouraged. Another proven method is to attract the large predator ants of termites. In order to do this, bones are ground down to form a powder which is then mixed in with the soil when the young trees are planted. Watering the trees with water that has been used for cooking cereal grains is also effective.

Arid Lands Information Network
PO Box 3
Dakar-Fann
SENEGAL

Useful publications

BioNET-INTERNATIONAL News is the newsletter of BioNET-INTERNATIONAL. The first issue, which appeared in September, covered the First Global Workshop as well as the endorsement of the concept of a global taxonomy programme by the Conference of the Parties and news from the LOOPS (Locally Organized and Operated Partnerships).

BioNET-INTERNATIONAL News, Technical Secretariat BioNET-INTERNATIONAL, Bakeham Lane, Egham, Surrey TW20 9TY, UK
Email: bionet@cabi.org



Controlling nematodes biologically

Root-knot nematodes (*Meloidogyne spp.*) are major pests of a range of crops in tropical and sub-tropical climates. The high cost of nematicides has precluded their use in subsistence agriculture, and management of root-knot nematodes has relied on the use of crop rotations, resistant or tolerant cultivars and a range of cultural and physical methods.

Biological control agents (BCAs) are capable of providing effective control of some pests. The nematophagous fungus *Verticillium chlamydosporium* has shown considerable potential for reducing root-knot populations. Trials conducted in Zimbabwe have shown that the fungus was effective in reducing the number of healthy nematode eggs being produced, and that mechanical incorporation of the fungus into the soil was more effective than using soil drenches. The fungus survived in microplots for three years from a single application, which may be adequate to establish the fungus in the soil for several crop cycles. Some non-host and nematicidal crops currently used in management strategies to reduce root-knot nematode populations were found to support colonization



Photo Brian Kerry / IACR-Rothamsted

The nematophagous fungus *Verticillium chlamydosporium* colonizing a nematode egg

by the fungus. This would suggest that the degree of nematode control could be enhanced and the length of rotation decreased by applying the fungus with these crops. The fungus could have considerable potential in management strategies for resource-poor farmers.

Professor Brian Kerry
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IPMEurope Workshop

IPMEurope was created with the aim of developing a common IPM research policy in Europe for the European Commission and the EU research institutes. In June, IPMEurope held a Workshop in Friedberg, Germany with the objective of discussing with some of their partner organizations and representatives from developing countries the extension of IPMEurope's mandate.

The meeting reviewed two resource papers: *Towards a common IPM policy* and *IPMEurope: where next?* In addition, the participants joined working groups to debate the principal themes addressed in the papers. The main conclusions and recommendations endorsed by the workshop participants fell into three main areas: food security, social issues, and environment. They will be considered by IPMEurope when developing future plans.

The follow-up to the workshop will be the preparation of a policy paper and proposals to included an overall strategy clearly expressing the principle and concept of IPM as a contributory factor in promoting sustainable agriculture. The aim is to promote understanding of IPM principles to the EC, to the EU Member States, and their partners in development. It will also aim to influence attitudes to IPM within the EU and national agricultural systems. A programme to establish the 'long-term viability' of IPMEurope will be developed. Participants expressed the opinion that none of these aims would be achieved unless IPM was 'farmer driven'.

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Putting off pests

Stem-borers can cause immense damage to maize and sorghum: in some cases losses as high as 80% have been recorded, especially with one particularly damaging species, *Chilo partellus*. Stem-borers are difficult to control by chemical means because of their habit of burrowing inside the plants. Scientists at the Institute for Arable Crops Research (IACR-Rothamsted), UK, the International Centre for Insect Physiology and Ecology (ICIPE), Kenya and the Kenyan Agricultural Research Institute (KARI), have made some interesting discoveries during their search for an effective means of biological control to the stem-borer problem.

Together, these organizations started by selecting grasses, which are more attractive to the stem-borers than the cereal crops they attack, to act as 'trap' crops around the perimeter of crop fields. However, they also found that some plants acted as 'repellent' crops and drove the insects away. One of these, molasses grass (*Melinis minutiflora*), when grown in every third row of crop,



A 'trap' crop such as napier grass will entice stem-borers away from some crops

proved particularly effective in driving the stem-borers away from maize and sorghum and into the trap crops planted around the edge of the field. The molasses grass was found to have the additional benefit of exuding a chemical which attracted parasitic wasps of stem-borer, which were deceived into thinking that there were higher numbers of stem-borers present in the cereal crop. The wasps proceeded to kill the stem-borers that were in the crop before flying on to adjacent fields and attacking the stem-borers present there.

The trap crops, which were of napier grass or sudan grass planted round the edges of the fields,

also had additional benefits. Both grasses are not only good for stabilizing soil but are also good forage crops that can be cut-and-carried for zero-grazed cattle. Napier grass is also able to survive during periods of drought, and can act as a wind-break and prevent wind-lodging, which is common when the stems of maize and sorghum have been damaged by stem-borers.

ICIPE
PO Box 30772
Nairobi
KENYA

IACR-Rothamsted
Harpenden
Hertfordshire AL5 2JQ
UK

PROMES software

This is a new software package which has been devised by a team of development specialists for the management, monitoring and internal evaluation of development projects. It is intended for both government and non-government organizations of whatever type and size, and can be adapted to suit individual needs. Its capacity for storing and analysing data will be useful to all those who are concerned about continuous evaluation of both their own and their partners' efforts. This is particularly useful at a time when the need to show results and demonstrate efficiency are at the forefront of everyone's concern.

The first version of the software has been successfully used by 13 African projects. A new, revised version, which is even more powerful, will soon be available in English, French, Spanish or Portuguese.

System requirements: IBM compatible PC with Pentium processor, 16 Mb RAM, 256 colour VGA screen and Windows 95.

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THE NETHERLANDS

Detoxifying *Canavalia* seeds



Jackbean has high potential as an economic crop

One of the serious problems facing most tropical developing countries is how food production can keep pace with rapidly rising populations and provide feed for livestock without resorting to expensive imports. There is a constant quest for improving current popular crops and finding ways of exploiting under-utilized ones.

The genus *Canavalia* comprises a small group of some 48 species, which are distributed through the tropics. These are vigorous, exceptionally productive, large-seeded tropical legumes, which originally grew in the drought-ridden regions of Arizona and Mexico and were utilized as high protein food and forage plants by the indigenous

peoples. Among the genus, *Canavalia ensiformis* (jackbean) is considered to be the species with the highest potential as an economic crop due to its excellent agronomic characteristics. Its excellent germination and rigorous initial growth make establishment relatively easy and, under optimal agronomic management conditions, total yields of forage from jackbean can reach up to 10 tonnes of DM/ha. Dry seed yields of 2.5 t/ha have been reported in Zimbabwe and Nigeria as well as other areas outside Africa.

Canavalia seeds contain about 300g crude protein and 600g carbohydrate/kg dry matter. However, they possess toxic and antinutritional factors unless treated, and a variety of trials have been conducted to find ways of eliminating these factors from the seeds. The best method was found to be to crack the seed, then cook for 1 hour or pressure cook for 15 minutes before drying and milling. This latter approach allows the process to be completed within a day. However, where means of cracking the seed were not available, soaking the seed for 72 hours prior to cooking for 1 hour or pressure cooking for 15 minutes was the best alternative.

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Cassava mosaic virus disease pandemic

Cassava mosaic virus disease (CMD) is so prevalent in some countries that it is regarded as a normal feature of cassava plants; little attempt is made to control the disease and impaired, sub-standard yields are accepted as normal. There are no definitive estimates of the losses sustained but they are likely to exceed 12 million tonnes in Africa alone.

In Uganda, however, the situation is completely different in that a severe epidemic now affects much of the country. The symptoms associated with the epidemic are exceptionally severe and lead to almost complete crop failure in some of the most widely grown varieties. Crops become virtually worthless and are frequently abandoned, causing severe food shortages. Deaths have occurred in some of the worst affected areas in which the population is almost entirely dependent on cassava.

In Kenya an epidemic was first reported in 1995 in areas close to

the border with Uganda and, by 1997, a large tract of western Kenya was severely affected to the north and west of Kisumu, which is only 120 km from the border with Tanzania. This means that Tanzania is now at risk of spread from Kenya as well as from Uganda.

The epidemic has spread so quickly and extensively as to justify the use of the term 'pandemic'. It is associated with unusually large population densities of the white-fly vector (*Bemisia tabaci*) and with the occurrence of a novel cassava mosaic virus. This has been characterised at the Scottish Crop Research Institute in the UK and shown to have the properties of a hybrid between the two geminiviruses previously shown to cause CMD in Africa. Extensive research is in progress in Uganda by scientists of the National Root Crops Programme in association with staff of the UK's Natural Resources Institute (NRI), the International Institute of Tropical Agriculture

(IITA) and the Scottish Crop Research Institute.

Virus-resistant varieties have been introduced or developed locally that withstand both the original virus and the novel one reported recently. These varieties are being multiplied and distributed to farmers so that they can replace the mainly vulnerable ones that were being grown. Considerable progress has been made in restoring production in areas that were first affected. Many organizations are involved in disseminating the resistant varieties but much remains to be done before cassava production and food security are restored, especially in the southern districts of Uganda. The pandemic has important implications for quarantine and plant protection services. This is particularly so because of the current threat of drought in many areas, and the long delay before adequate stocks of virus-resistant varieties can be built up to replace those being

grown in affected areas and in the adjacent areas now at risk.

Professor Thresh and Dr Otim-Nape would be interested to hear from anyone with information on the history of CMD in Uganda or elsewhere, and on the various approaches to control. They would be particularly interested to learn of possible precedents for the current pandemic in Uganda. There is a particular dearth of information on the disease situation in southern Sudan and eastern Zaire, where the Ugandan pandemic may have originated.

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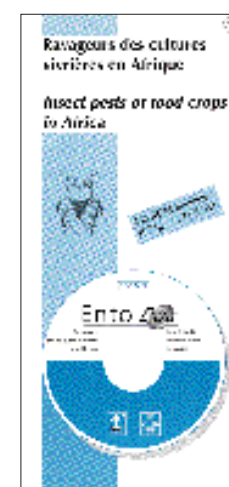
Pests on a platter

A multimedia information system on pests of sugarcane and food crops of Africa, Madagascar and the Indian Ocean region has been produced by the Centre de coopération internationale en recherche agronomique pour le développement (CIRAD).

The Ento Doc bi-lingual (French and English) CD-ROM is user-friendly and consists of 92 factsheets about pests and beneficials with hypertext links and descriptions of pests, their biology, the damage they cause and control techniques. There are four access paths to the factsheets through summaries; identification help; host plants; and zoological classification.

The cost of the CD-ROM is FF1,000 including postage but preferential rates are available to developing countries.

Librarie du CIRAD
Avenue d'Agropolis, BP5035, 34032 Montpellier Cedex 1, FRANCE



COURSES AND CONFERENCES

ANIMAL FEED AND PRODUCTS ANALYSIS COURSE

10 August - 18 September 1998
This six-week course provides basic information for farm extension services; livestock and wildlife managers; manufacturers of animal feeds and products; and NGOs and researchers.

PLANT AND SOIL ANALYSIS

16 August - 24 September 1998
This six-week course provides basic information for farm extension services and those involved with management of natural resources and environmental monitoring.

Both courses offered by: Dr I Mueller-Harvey, Faculty Analytical Laboratory, Department of Agriculture, The University of Reading, PO Box 236, Reading RG6 6AT, UK

Fax: +44 118 935 2421 - email: I.Mueller-Harvey@reading.ac.uk

STATISTICS IN AGRICULTURAL CLIMATOLOGY (SIAC)

8 July - 15 September 1998
This course is designed to provide a sound training in the use of PCs to analyse climatic data for agricultural purposes, both for research and for operational use. In particular, the course provides a thorough foundation in the use of CLICOM for climatic data management.

RESEARCH METHODS FOR EXPERIMENTERS (RMFE)

27 July - 15 September 1998
This course aims to provide participants with knowledge on how research experiments, either on-station or on-farm, can be made efficient and cost-effective by appropriate experimental design and application of suitable statistical methodology.

Details of the above two courses from: MASD Administrator, Statistical Services Centre, The University of Reading, PO Box 240, Reading RG6 6FN, UK. Fax: +44 118 9753169 - email: masd@reading.ac.uk

GENDER ANALYSIS IN AGRICULTURE, FORESTRY AND NATURAL RESOURCES

11- 29 May 1998
Designed for men and women involved at different levels in the planning, research and implementation of programmes and projects relating to agriculture, forestry and natural resources.

SMALL-SCALE INTEGRATED AQUACULTURE-AGRICULTURE

8 June - 3 July 1998
This three-week course addresses the issues of food security, income generation and farm diversification, targeting poor fishermen and farmers. The course encompasses various ecosystems - uplands, lowlands and coastal areas.

TRAINING OF TRAINERS ON SUSTAINABLE AGRICULTURE

6 - 24 July 1998
Designed for development practitioners who organize or conduct training on sustainable agriculture and related topics.

FARMER-LED EXTENSION

9 - 27 March 1998
Designed for rural development extension managers, officers and specialists. Participants review and present various approaches in agricultural extension and analyse them from the perspective of both farmers and development workers.

HOUSEHOLD FOOD SECURITY THROUGH HOME GARDENING

23 November - 11 December 1998
For participants with at least three years of experience in rural or peri-urban development, with emphasis on gardening or family food production. The course introduces techniques for using land in an intensive, yet low-cost and environmentally sustainable way.

Details of the above five courses from: Milma Resma, Training Division International, Institute of Rural Reconstruction, Silang, Cavite, PHILIPPINES
Fax: +63 46 414 2420, +63 2 522 2494 - email: iirr@phil.gn.apc.org

Please write to the addresses given above, and not to CTA, if you are interested in participating in these events.

On our 'Mailbox' page we publish extracts from letters sent to the editorial team at CTA. These letters have been selected for their potential interest to other readers of *Spore*. We also publish correspondence arising from CTA's Question and Answer Service. Readers are therefore invited to send us further information on subjects covered in *Spore*.

Spore would also be pleased to receive short articles and news items on agriculture and rural development in ACP countries; these will be considered for publication in our 'In Brief' pages. Finally, under the heading 'Viewpoint', we will continue to publish personal opinions on the subject of agricultural development in general.

Please send your correspondence to *Spore* at CTA in the Netherlands (see back page for our address) and please note that we are unable to return manuscripts.

DON'T PUT THE CART BEFORE THE HORSE!

André Mathis, SBAM (*Structure biologique pour une agriculture moderne*), Lomé, Togo, writes to us with reference to "Animal traction and small-scale mechanization" in *Spore* 69.

"In Togo, animal traction has neither increased the yields nor the productivity of those engaged in agriculture. What it has done, however, is added both to women's workload and to soil degradation. Twelve hectares of pasture are needed in order to obtain the manure to correctly fertilize one hectare of land. Taking off the forage is another factor which leads to soil infertility and degradation. The disadvantages of cultivators have been widely talked about for several years. Carts could hardly be considered ergonomic in design, black-

smiths have no arc-welding equipment, and tropical soils (with the exception of those in valley bottoms) quickly wear down steel tools. In Senegal, where there is a 'culture' of using animals, it took 25 years to introduce animal traction. In Togo, there is no similar, traditional use of animals and, in such areas, small-scale farmers will find it easier and more economical to 'domesticate' a motor than oxen. Agricultural intensification should be well and truly based on what is appropriate for the tropics where, in many places, mechanization has yet to be developed. Equipment must be developed in line with agricultural methods which have also yet to be further developed. Let us first develop our agricultural techniques and then talk about mechanizing them."

IPM ACTION GROUP LAUNCHED IN KENYA

Malachi O Orondo, Chair of the Integrated Pest Management (IPM) Action Group, Kenya, wrote to *Spore* to outline the reasons why the group has been formed. He explained that "IPM -

- have enough cash to buy pesticides
- is environmentally friendly, i.e. minimizes pollution and is sustainable
- is also better because it is participatory and recognizes and uses indigenous and cultural knowledge.

Some of our immediate objectives are:

- to establish a network with existing organizations regionally and internationally for a free flow of information
 - to encourage more practical participation and sharing of knowledge between countries in the South
 - to collect data on indigenous and cultural IPM methods and establish a reference library
 - to create awareness and enhance education on IPM by producing posters, flyers and newsletters, and using TV and radio programmes.
- Long-term objectives are:

- to standardize proven IPM methods and carry out rigorous training among farmers
 - to encourage farmers and NGOs to continue their research and to report on the new findings
 - to establish IPM pilot projects in various parts of Kenya, and
 - to train staff in specialized fields so that they can be peer leaders."
- The Group will freely share any ideas with any individuals or organizations that are interested in IPM.
- Their address is: IPM Action Group Kenya, PO Box 93045, Mombassa, KENYA

Question and Answer

Like many others who have written to CTA, **Alphonse N'Kobessa of the Forum des jeunes producteurs pour le développement, Brazzaville, Republic of Congo** is interested in raising quail and has asked us for practical information. We have summarized below some of the points that should be considered but, in general, measures which are appropriate for raising chickens are also appropriate for quail.

The quail (Coturnix coturnix japonica) responds well to intensive production. However it must be remembered that it is a bird of temperate climates and that, ideally, it should be raised within a temperature range of 20-22° C. Quail are sensitive to light and good laying will require 14 to 18 hours of daylight, which is the time during which the bird is awake. This length of time can be interrupted by short periods of darkness. Lamps can be used to prolong daylight hours and electricity saved by using low voltage lamps or by splitting the times of artificial light. Housing must be well ventilated, with wire netting partition walls and a roof that provides good protection against sun and rain. Ideally the floor should be of concrete to ease cleaning and help with hygiene. In good conditions, quail can lay an egg a day (with peak production between the tenth and twentieth week) for 8 to 10 months, producing a minimum of 200 eggs per year. The number of chicks will average between 180 and 240. The chicks will need zinc and choline in their feed, and protein and amino acid requirement will also be high, particularly to start off with. The birds are slaughtered at 45 days when they should weigh between 130 and 160g or they may be left until 50 days in order to improve the quality of the meat.

Space prevents us from giving more information but we suggest you write to the CTA Question-and-Answer Service for **Technical Summary 186**. Readers who subscribe to our distribution service may also request the manual, **Poultry** (CTA no 244 - 10 credit points).

Agricultural extension staff need innovative training programmes

Trends in agricultural development in sub-Saharan Africa indicate that increasing emphasis will have to be placed on improving the capacity of small to medium-scale farmers. Agricultural extension staff, both within the public and private sectors, have a critical role to play in enhancing the capacity of farmers to improve their productivity.

However, major problems exist: most agricultural extension staff do not have the requisite training to carry out their tasks effectively; the curricula of most agricultural faculties or colleges in Africa marginalize the social science component, particularly agricultural extension courses; even though most of their graduates usually work in public and private agricultural extension services on completion of their studies; and most of the programmes in agricultural faculties are neither demand-driven nor based on employment market demands such as those of the Ministry of Agriculture or the private sector who could be willing either to employ or to sponsor students to pursue programmes which are of immediate tangible benefit to them.

Innovative extension training programmes are needed which will enable extension staff to acquire critical thinking, problem-solving and communication skills, in addition to knowledge and skills in agricultural technology. Only then can they deal with the multifaceted problems they encounter in their work with farmers and community groups. To respond to this need, a pilot BSc Agricultural Extension programme designed for mid-career agricultural extension staff was launched in November 1993 at the University of Cape Coast, Ghana. The programme is focused on training mid-career agricultural extension staff who hold diplomas and certificates and are already working with farmers.

The pilot programme was developed through a partnership between the Ministry of Food and Agriculture Ghana, the Sasakawa Africa Foundation, Winrock International Institute for Agricultural Development, and the University of Cape Coast, Ghana.

The new training programme is clearly different from the dominant approach to training agricultural extension staff, where the emphasis is on 'transfer technology'. Rather than formulating prepackaged prescriptions, the new curriculum embraces strong

collaboration with the stakeholders, including farmers and local agricultural agencies (both public and private). The stakeholders are given greater decision-making power in terms of the design and implementation of the curriculum. Farmers and other clientele of the programme are not viewed as mere 'end-users' or 'end-recipients', but as active collaborators in the learning process.

There is a strong extension or social science bias in the programme. This is underlined by the fact that in the four-year Post-Certificate programme, 65% of the courses are devoted to extension or extension-related courses, while in the two-year Post-Diploma programme, 83% of the courses are devoted to extension or extension-related courses. Theory and practice are integrated through the eight-month off-campus Supervised Enterprise/Experience Projects (SEPs). The SEPs constitute the nerve centre of the innovative programme. After a period of in-residence instructions on the University campus, students return to their place of employment to undertake action-oriented research/extension projects - the SEPs. The SEPs are designed to immerse students in valuable farmer-focused, experience-based learning activities that mirror the total milieu surrounding subsistence and semi-commercial farming systems. They are meant to also reduce the discrepancy between the training and the various tasks that the extension staff are to perform in their real work environment after their training. Development of critical thinking and problem-solving skills, systems thinking capabilities, and development of lifelong learning attitudes are emphasized.

This innovative programme is attempting to assist mid-career extension staff to understand and articulate their intentions; to assist them to examine their actual behaviour in their real work environment; to identify and describe the gaps that exist between their intentions and their actions; and to undertake the independent or group self-designed experiential learning projects (SEPs) in their

Dr Moses Zinnah works with the Winrock International Institute for Agricultural Development as Team Leader and Deputy Director of the Sasakawa Africa Fund for Extension Education (SAFE). The programme he is working with is based at the University of Cape Coast, Ghana.



work environment that narrow the gaps between their intentions and their actual behaviour. The detection of errors and the ability to explore ways and means of correcting them is the essence of the innovation programme.

The experience gained during the past three years indicates that genuine dialogue and collaboration between agricultural institutions of higher education, farmers, public and private agricultural organizations can lead to jointly-agreed responsive training programmes. It is also becoming clear that training programmes developed by agricultural institutions of higher education as a result of dialogue and collaboration with stakeholders, ensure strong commitment on the part of administrators and staff to pursue those programmes on a more sustained basis.

We believe that investment in human resources through appropriate training offers the best returns. There is considerable scope in Ghana, and sub-Saharan African countries in general, for improving the training of agricultural extension staff, especially mid-career staff. We are trying to spread the idea across sub-Saharan Africa. The aim is to share experiences among institutions committed to the same vision - the training of mid-career agricultural extension staff. Already the momentum is building, as major universities in Africa, including Alemaya University of Agriculture in Ethiopia, Sokoine University of Agriculture in Tanzania and Makerere University in Uganda, have embraced this new approach.

The innovative training programme in Ghana is evolving and will continue to do so over the coming years. We recognize that in a changing world, learning is not a destination, but is a journey for us all.

The views expressed are those of the author and do not necessarily reflect those of CTA

Livestock development policies in Eastern and Southern Africa

Senior livestock policy advisers and experts as well as scientists in the field of animal production and livestock services in 21 Eastern and Southern African countries, as well as representatives of European and international livestock institutions, research organizations and donor agencies took part in a seminar on *Livestock development policies in Eastern and Southern Africa* from 28 July to 1 August 1997 in Mbabane, Swaziland. The seminar was organized by CTA in collaboration with the OAU/IBAR (Organization of African Unity/Interafrican Bureau for Animal Resources) and the Ministry of Agriculture and Cooperatives of Swaziland, with scientific support from the European Commission (DG VII and DG XII) and the International Service for National Agricultural Research (ISNAR).

This was CTA's second seminar on livestock development policies, and built on the experience gained during a similar seminar held in Abidjan, Côte d'Ivoire, in February 1996. The focus then was on the humid and sub-humid zones of West and Central Africa, while the Mbabane seminar looked at Eastern and Southern Africa (ESA).

The results of the week-long seminar were summarized in 52 recommendations to strengthen the policy dialogue and promote livestock development in ESA. The seminar highlighted the lack of specific livestock policies in some countries of the region as the major constraint to development. Accordingly, the highest priority was given to building capacity in each country to develop appropriate policies, formulate strategies and evaluate their impacts. The

main recommendation for each government was that clearly defined livestock policies be formulated, as well as detailed national strategies and investment plans for the development of the livestock sector. At the same time, it was recommended that each country review all existing policies that may have negative effects on agricultural development such as inappropriate subsidies, taxation on agricultural inputs, price controls that favoured consumers, non-sustainable services like free dipping, liberal importation of livestock and livestock products and communal land ownership.

Participants decided that in general governments should reduce their participation in production and marketing of livestock and livestock products, and should support the trend towards privatization in animal health delivery systems, as well as private land ownership and investment.

Delegates also emphasized as a matter of urgency, the need to implement livestock development programmes which give specific attention to the identification, characterization and documentation of existing Animal Genetic Resources (AnGR), as well as programmes, including research, for their improvement, increased use and conservation, and impact assessments to ensure that the importation of foreign germplasm did not adversely affect indigenous AnGR.

To promote trade at regional level, it was recommended that countries harmonize import and export regulations, as well as policies on standards. In addition, regional policies need to be established to allow for effective free flow of quality information among countries, not only to promote trade but also break the isolation of professionals in various countries. In this connection, delegates felt that international policies should be established to stimulate North-South professional linkages.

After the seminar, the recommendations of the Mbabane and Côte d'Ivoire seminars were consolidated into one set of recommendations for an environment more conducive to livestock development in Sub-Saharan Africa. This was submitted to the OAU Fifth Conference of Ministers Responsible for Animal Resources, which met in Mbabane in the week following the ESA seminar.

Facilitating innovation for development

In collaboration with CTA and STOAS, KIT has recently published a "RAAKS resource box" which contains a textbook, a manual and a set of cards. The RAAKS (Rapid or Relaxed Appraisal of Agricultural Knowledge Systems) is a participatory action-research methodology developed by Paul G H Engel to support and enhance innovation processes in agriculture. Shared knowledge, alliances and networking are some of the key words of this methodology, to which many experts and field workers contributed. The textbook entitled *The social organization of innovation - a focus on stakeholder interaction* describes the concepts and theoretical background, as well as lessons learned from multiple case studies. The manual, *Networking for innovation - a participatory actor-oriented methodology*, addresses the method itself and gives a brief introduction to building an efficient RAAKS team. The set of laminated cards in a binder, *Windows and Tools*, is designed to help in gathering, organizing and interpreting information in a participatory manner. Together, the manual and cards provide a menu of field-tested methodological elements for development teams to use in their work to promote innovation.

This book will be of interest to researchers, university lecturers, managers and extension agents.

Facilitating innovation for development - A RAAKS resource box by P G H Engel and M L Salomon, ISBN 90 6832 1099

Royal Tropical Institute (KIT),
PO Box 95001, 1090 HA Amsterdam,
THE NETHERLANDS
Available from CTA. Credit value: 80 points.



Information policies in agricultural research institutions

This year CTA has organized two further workshops on the theme of information management policy within national agricultural research institutions in Africa. A workshop held in Mali for representatives of NARS in West and Central Africa, which was the first phase of a study launched by CTA in 1996, was reported in *Spore* 68. This year's workshops were held for member countries of the Commission de l'Océan Indien (COI) in Mauritius (23-25 June) and for member countries of the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA) in Kenya (10-12 July). Participants included representatives of national agricultural research institutions, agricultural training institutions and international organizations, as well as information professionals.

These workshops, like the one held in Mali, focused on the role of information in institutional development and on the use of research results in each region. In particular, the aims were:

- to establish the current status of information management within the NARS of the countries concerned, possibly

comparing this with the situation found in West and Central African countries;

- to encourage institutions to adopt policies and strategies that are appropriate to the management of agricultural information;
- to encourage NARS to work together at the level of sub-regions and thereby achieve economies of scale.

Two studies of information practices and needs, which had been carried out in the regions concerned prior to the workshops, backed up the findings of the participants, particularly with respect to the following points:

- institutions remain isolated from each other at national, regional or international level;
- there is a need for information on potential partners in the sub-region;
- there is a need for NARS to produce research results which justify a more proactive dissemination process;
- there is a lack of competence in the use of modern communication technology.

Participants at the two workshops therefore recommended:

- setting up an integrated regional information system - SIROI (Système d'information de la région de l'Océan Indien) and

RAIN (Regional Agricultural Information Network) to collect and exchange information about institutions (research centres, laboratories and others), scientists, research programmes and results;

- involving the NARS in each region in the development and setting up of the information systems;

• setting up a training scheme, integrated with the information system project, which would enhance the capability of local professionals, NARS personnel and scientists to manage databases, to use Web servers on the Internet and to format Web pages.

Participants at the workshop in Mauritius agreed to establish a monitoring committee which would be composed, on a voluntary basis, of representatives of NARS in the sub-region.

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Quatre Bornes
MAURITIUS
Fax: +230 425 95 64

ASARECA: Association for Strengthening Agricultural Research in Eastern and Central Africa
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Entebbe
UGANDA
Fax: +256 42 21126

Publications from CTA

Mycotoxins are poisonous chemical compounds produced by certain fungi and are associated with diseased or mouldy crops, although the visible mould contamination can be superficial. The effects of some food-borne mycotoxins are acute, with symptoms of severe illness appearing very quickly. Other mycotoxins occurring in food have given rise to longer-term chronic or cumulative effects on health, including cancers and immune deficiency.

Mycotoxins in grain is produced by the Group for Assistance on Systems Relating to Grain After Harvest (GASGA), and covers in its 11 pages definitions of mycotoxins; fungal ecology and mycotoxin production in food; prevention and control of mycotoxins in stored grains and seeds; and mycotoxin detection. The leaflet will be useful for all managers of grain stores and those giving advice on grain storage.

Mycotoxins in grain - Technical leaflet No 3 June 1997. Available from CTA. Credit value: 5 points



The leaves we eat written by John Bailey and produced by the South Pacific Commission, was first printed in 1992 with financial assistance from USAID. Due to popular demand the book has been reprinted this year, with financial assistance from CTA. The 97-page booklet provides new information about Pacific green leafy vegetables. New nutrient data are discussed, together with some relevant health issues which are now of growing importance in the Pacific. The book will be of interest to field workers, farmers' associations, and village level food processors (including those outside the Pacific).

The leaves we eat ISBN 982 203 245. Available from CTA. Credit value: 10 points

Integrated pest management in the tropics - current status and future prospects edited by Annalee Mengech, Kailash Saxena and Hiremagalur Gopalan 1995 ISBN 0 471 96076 4 will be of interest to researchers, university lecturers and policy makers. Available from CTA. Credit value: 20 points

How to obtain CTA publications

As you will have read in *Spore* 71, CTA publications are now only available free-of-charge to subscribers to the Publications Distribution Service. Those who have returned the application form sent with *Spore* 70 will, in due course, receive a response to their application and, if admitted, two publications order forms together with an indication of the number of credit points available.

Credit values have now been assigned to all publications on CTA's list. Subscribers can order these publications within the credit points available to them. Order forms must be used; publications can no longer be requested from CTA by other means of communication.

Non-subscribers who apply by letter, fax or email will be sent an application form. Applications will be considered from agricultural and rural development organizations in the ACP (Africa, Caribbean and Pacific) Group of States; individuals resident in ACP countries may also apply.

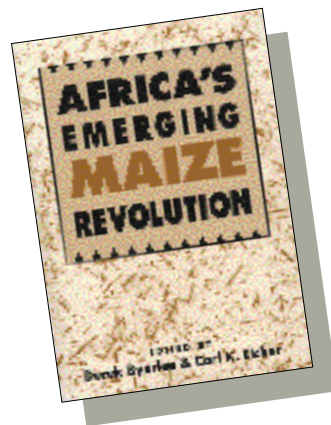
Those who are involved with agricultural and rural development in the ACP States, but who are non-residents, should write to CTA giving details of their requirements.

Maize grains ground in Africa

By the year 2020, Africa's 1995 population of 600 million is expected to have doubled to 1.2 billion. Increased food production will therefore play a vital role in ensuring food security, democracy and peace in the continent in the twenty-first century. In most African countries the key to economic growth is growth in agriculture; and the key to renewed growth in the agricultural sector is rapid technical change in food production.

The past two decades have provided encouraging successes with maize, as the use of new seed and associated technologies has increased smallholder maize production. The African experience can provide lessons for increasing food production more generally.

Africa's emerging maize revolution presents the results of extensive field research on the maize economy in six African countries (Ghana, Kenya, Malawi, Nigeria, Zambia and



Zimbabwe), as well as broader-based studies of maize research and extension, soil fertility, seed distribution, fertilizer, and marketing and processing.

Africa's emerging maize revolution edited by Derek Byerlee and Carl Eicher 1997 301pp
ISBN 1 55587 754
Pbk price US\$29.95

Lynne Rienner Publishers Inc.,
3 Henrietta Street, Covent Garden,
London WC2 8LU, UK

New generic technologies in developing countries

Over the last two decades, the world has been in the grip of several technological revolutions which are radically transforming the lives of people in the highly industrialized countries. Rather than abating, these revolutions are gathering new strength by drawing an increasing number of developing countries into their orbit. The driving forces behind them are three classes of technologies: information and communication, biotechnology and new materials. Though generic in character, these forces are bringing about profound changes across-the-board in the production, distribution and consumption of goods and services.

The central purpose of this book is to explore the avenues open to the developing countries as they strive to become the beneficiaries of these forces, rather than its victims. The experience

of a handful of the technologically more successful developing countries like Brazil, China, India and Mexico are examined, but the factors that have held up technological advance in the weaker countries are also analysed. The creation and strengthening of national capabilities in science and technology emerge as being crucial, as does the role of entrepreneurs in disseminating the technologies. Appropriate forms of development assistance, backed up by suitable aid and trade policies, are affirmed as being indispensable catalysts in this process.

New generic technologies in developing countries edited by M R Bhagavan 1997 340pp
ISBN 0 333 65049 2
Pbk price UK£15.99

Macmillan Press Ltd, Houndmills,
Basingstoke, Hampshire RG21 6XS,
UK

Unless otherwise stated, the books on these two pages are not available from CTA. Readers are advised to write to the publishers for further information.

Tropical cattle

This book consists of three distinct, but closely related, parts. The first is an account of the origin and distribution of cattle through the tropical and sub-tropical world, citing contemporary evidence from anthropological, archaeological, historical, linguistic, livestock husbandry and genetic studies. It is a first, and therefore controversial, attempt to provide a comprehensive overview as to the origin of the very large number of tropical cattle breeds.

In the second part, an attempt is made to classify and describe all major tropical and sub-tropical breeds in Africa, the Americas, Asia and Oceania. The primary purpose of classification is to facilitate conservation of all these breeds and to provide

basic information for the selection of those breeds most suitable for inclusion in breeding projects. Requirements for future breeding strategies and policies are discussed in the third part of the book, together with the role that biotechnology could play in future tropical cattle breeding plans.

The book will be of interest to those interested in, or involved with, farming, livestock husbandry, veterinary science, anthropology, archaeology and economic history.

Tropical cattle: origins, breeds and breeding policies by W J A Payne and J Hodges 1997 336pp ISBN 0 632 04048 3 price UK£60.00

Blackwell Science, 108 Cowley Road, Oxford OX4 1JF, UK

Small-scale irrigation for arid zones

Africa is greatly in need of enhanced and more stable agricultural production. Yet efforts to develop the region's irrigation sector have foundered in the past, possibly because the approaches have been inappropriate to the physical and socio-economic conditions. Although large-scale systems, centrally controlled by commercial or government enterprises, may be the quickest way to increase production, irrigation should also be developed on small-scale farms operated by individual farmers or associations of farmers.

This publication is an attempt to distil current information on small-scale irrigation methods that might be appropriate, and to offer some ideas on the possible adoption and adaptation of such methods by farmers in the semi-arid areas of sub-Saharan Africa.

Small-scale irrigation for arid zones - principles and options by Daniel Hillel 1997 56pp
ISBN 92 5 103896 1
The Publications Division, FAO,
Viale delle Terme di Caracalla,
00100 Rome,
ITALY

African inland fisheries aquaculture and the environment

The environmental degradation of African inland waters, although still not as severe as in industrial countries, will become a serious problem within the next decade if no preventative management actions are taken. Nevertheless, there is still potential for increased production which can be realized by improving the management of existing stocks, utilizing unexploited stocks and increasing the exploitation of reservoirs.

This book examines the relationship between fisheries, aquaculture and the environment from

a management perspective, and covers the major issues facing freshwater resources management in Africa. It will be of interest to fishery administrators, managers and fishery scientists, as well as anyone dealing with environmental projects and aquatic pollution.

African inland fisheries, aquaculture and the environment edited by Katya Remane 1997 400pp
ISBN 0 85238 238 3
price UK£49.50

Fishing News Books, Osney Mead,
Oxford OX2 0EL, UK

Training opportunities in grain post-harvest technology for developing countries

This 60-page booklet outlines training facilities and the type of training (country by country) provided by the GASGA member organizations and other institutions in member countries as well as some non-member countries. The training is aimed at developing country personnel working in the post-harvest area of grain and other durable agricultural produce.

GASGA Joint Secretariat: GTZ, Post-Harvest Group, OE 4232, Postfach 5180, 65726 Eschborn, GERMANY

Mission de Coopération
Phytosanitaire, BP 7309 34184
Montpellier, cedex 4 FRANCE



NRI, Food Storage Group, University of Greenwich, Central Avenue, Chatham Maritime, Kent ME4 4TB, UK

Food facts on the Internet

The Internet is a mine of useful (as well as useless) information, if only the searcher knows where to begin. An incredible amount of time can rapidly elapse while searching for, and locating, even a few sources of useful information.

The Leatherhead Food Research Association in the UK had just this in mind when they compiled a guide for people in (or interested in) the food and drink industry. They have evaluated and documented important sites on the Internet in an attempt to produce a basic manual that would offer access to a broad, but comprehensive, summary of key sites across all aspects of food science and technology.

After a brief introduction to terminology and search engines, the

manual is divided into subject categories. Within each section there are descriptions of the contents of the major sites relating to the subject followed by a select listing of other relevant sites with their accompanying URLs (Uniform Resource Locator).

The guide comes as a pocket-sized, leather, ring-bound volume with 113 punched pages of information and 10 spare pages for notes.

Food information on the Internet - a basic guide compiled by the Leatherhead Food Research Association and Karen Blakeman 1997 price UK£65.00

Leatherhead Food Research Association, Randalls Road, Leatherhead, Surrey KT22 7RY, UK

Aid understood

Understanding European Community aid sets out to remedy ignorance of the EC's aid programme. It provides an overview of the evolution of EC aid and examines the legal and political basis for current assistance programmes; how EC aid programmes are managed; the source of EC aid; and the main aid instruments.

It provides a framework for comparing, across regions and countries, different categories of aid delivery and different sectors receiving aid. EC aid to each of

the main recipient regions is examined in detail, through both statistical and institutional analysis. The final chapter places EC aid in a global context, comparing the regional spread and sectoral emphasis of EC aid with those of the major OECD donors.

Understanding European Community aid - aid policies, management and distribution explained by Aidan Cox and Antonique Koning 1997 119pp
ISBN 0 85003 396 9
Overseas Development Institute,
Portland House, Stag Place, London
SW1E 5DP, UK

ALSO RECEIVED

Biodiversity information needs and options edited by D L Hawksworth, P M Kirk and S Dextre Clarke 1997 208pp
ISBN 0 85199 1831 Hbk price UK£35.00

CAB International Publishing Division, Wallingford, Oxon OX10 8DE, UK

Calliandra calothyrsus production and use: a field manual edited by M H Powell 1997

Winrock International FACT Net, 38 Winrock Drive, Morrilton, Arkansas 72110-9370, USA

Onion storage in the tropics: a practical guide to methods of storage and their selection by J Brice, L Currah, A Malins and R Bancroft 1997 117pp ISBN 0 85954 487 7 price UK£20.00

NRI, The University of Greenwich, Central Avenue, Chatham, Kent ME4 4TB, UK

The informal sector and microfinance institutions in West Africa edited by Leila Webster and Peter Fidler 1996 350pp
ISBN 0 8213 3597

The World Bank, 1818H Street, NW, Washington, DC 20433, USA

Seed production principles and practices by Miller B McDonald and Lawrence O Copeland 1997 ISBN 0 412 07551 2

Chapman & Hall, 115 Fifth Avenue, New York, NY 10003, USA

Recycling organic waste: from urban pollutant to farm resource by Gary Gardner 1997 59pp ISBN 1 878071 37 8

Worldwatch Institute, 1776 Massachusetts Ave., NW, Washington, DC 20036-1904, USA

Mineral nutrient deficiency in plantain by Alfonso Martínez Garnica 1997 ISBN 3 8236 1266 2

Magraf Verlag, PO Box 105, 97985 Weikersheim, GERMANY

PROCEEDINGS

National online meeting is the proceedings of a meeting held from 13-15 May 1997, New York, USA edited by Martha E Williams ISBN 1 57387 043 9

Information Today Inc. 143 Old Marlton Pike, Medford, NJ 08055, USA

First meeting of the LOOP Coordinating Committee CARINET is the proceedings of a meeting held from 4-5 November 1996, Port of Spain, Trinidad edited by St Clair Forde and Ronald Barrow 134pp

CARINET, Gordon Street, Curepe, Trinidad & Tobago, WI

Smallholder horticulture in Zimbabwe is the proceedings of a workshop held in August/September 1994, Harare, Zimbabwe edited by J E Jackson, A D Turner and M L Matanda 1997 229 pp ISBN 0 908307 61 6

University of Zimbabwe Publications, PO Box MP203, Mount Pleasant, Harare, ZIMBABWE

Food security in Africa: challenges, opportunities and targets for animal production is the proceedings of a conference held from 1-4 April 1996, Pretoria, South Africa edited by Dr Heinz H Meissner 409pp ISBN 0 620 200537

All Africa Conference on Animal Agriculture, c/o South African Society of Animal Science, REPUBLIC OF SOUTH AFRICA

NISC disks

The National Information Services Corporation (NISC) provides CD-ROM databases which cover scientific, practical and information disciplines. The subjects range from aquaculture to worldwide wildlife, combining information from a number of different sources and providing it in one easy to access database.

NISC have provided a number of features which are specially designed to aid users of these databases and ensure all the relevant articles are found. The database checks variations of the search information, automatically searching for alternative spellings of words (cenozoic, caenozoic or cainozoic), checking for plurals (formula, formulae, formulas) and allowing for compound words (CD-ROM, CD ROM and CDROM). A thesaurus feature on some of the CD-ROMs also helps to locate accurately and quickly the required information.

The following are some examples of the databases available through NISC:

Biotechnology Abstracts: Agricultural and Environmental - This database, published recently by Cambridge Scientific Abstracts, gathers world literature in which molecular biology and genetics are applied to agricultural and environmental areas. This

includes agricultural products, both plants and animals, new applications across the food industry and wide ranging environmental developments.

The database contains abstracts from 1983 up to the present and is currently growing at around 3,600 new entries per year - supplied in quarterly updates. Price US\$695.00

Entomology Abstracts - As more insect species are discovered and research reveals more and more about those species already identified, researchers working in the insect field could find this collection of abstracts a useful source of information. Containing articles from 1978 to the present, the database covers information from anatomy through to reproduction and genetics and is growing at over 10,000 entries per year. Price US\$1,445.00

Aquatic Biology, Aquaculture & Fisheries Resources - This 2 CD-ROM set (1971-1984 and 1985-present) combines relevant portions of a number of different databases. The subjects covered include biology and physiology, fish culture, diseases, and the culture of shellfish, plants and other organisms. Databases include the aquaculture subset of CAB abstracts, FISHLIT from the JLB Smith Institute of Ichthyology, Rhodes University, SA, and Aquatic Sciences and Fisheries Abstracts from Cambridge Scientific Abstracts. Price US\$2995.00

Fish and Fisheries Worldwide - Covering culture and propagation, limnology and oceanography, genetics and behaviour, natural history, parasites, diseases, general research and management. The CD-ROM combines information from 7 different databases dating back to 1970, and gains more than 13,500 records per year. Price US\$895.00

All prices are for an annual subscription for a single user, and exclude shipping and handling. Rates are also available for use over networks with multiple users. All CD-ROMs come complete with ROM Wright software for accessing the databases and require a DOS compatible machine with a CD-ROM drive and 180KB of RAM available (512KB without extended memory).

Those interested in these or any of NISC's other databases can try the disks free of charge for 30 days by contacting Margaret Crampton (see below). Alternatively, for those with internet access, the NISC Web site has details of these and other CD-ROMs and it is also possible to access some of the databases on a trial basis. ●

Margaret Crampton
10 Constitution Street, PO Box 377
Grahamstown 6140, SOUTH AFRICA
Tel: 0461 29698
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e-mail: NISC@ru.ac.za
<http://www.nisc.com/>

CIFC

Portugal's Centro de Investigação das Ferrugens do Cafeeiro (Centre for Research into Coffee Rusts) was created in 1955, as part of the Instituto de Investigação Científica Tropical (Institute for Tropical Scientific Research) with the aim of centralizing all the research into coffee rusts through international cooperation. The activities of the CIFC thus extended to all countries where rust already existed (Asia, Africa) and to all the other countries of Latin America still free of the disease.

More recently, the CIFC has embarked on the study of another coffee disease, coffee berry disease (CBD), which attacks the fruits of the coffee plant and causes them to fall, and can lead to losses in the order of 80% if there are

no control measures. This disease so far exists only in Africa in the countries producing Arabica coffee and in the higher altitude areas, and is caused by the fungus *Colletotrichum kahawae*. The Centre is also currently working, on pure cultures of the fungus originating from all the African countries where the disease exists.

All the work of the Centre has been carried out through international co-operation and, in many cases, through agreements in particular: an agreement between the CIFC and CENICAFE of Colombia has existed for over 30 years. Through this agreement, 20,000 seedlings are tested for rust resistance annually and 10,000 for resistance to CBD. As a result of this cooperation, it has already been possible for CENICAFE to launch a Colombian variety with a wide spectrum of resistance to strains of rust.

The Centre has led various projects on coffee in cooperation with European countries (France, Italy and UK) and developing countries (India, Malawi, Kenya, Cameroon, São Tomé). Cashew production has also been the subject of three EU projects aimed at studying techniques of traditional and *in vitro* plant propagation, the selection of superior genotypes in terms of productivity and technological qualities, resistance to anthracnose (*Colletotrichum gloeosporioides*) and the study of this fungus using molecular biology techniques, with the cooperation of Brazil, Guinea-Bissau, Morocco and the UK. ●

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