

FARMER PARTICIPATION IN RAINFED AGRICULTURAL RESEARCH; NOTES AND
IDEAS FOR INITIATIVES IN THE SUDAN

Report to Richard Longhurst, Ford Foundation, Khartoum

PURPOSE AND METHOD

The purpose of my four days (3-6 March 1989) has been to explore and discuss the potential of farmer participation in rainfed agricultural research with special reference to the Northern Sudan, and to help in identifying means of promoting it.

The method you set up of meetings with key people, interspersed by discussions between ourselves, and culminating in the morning's seminar at Wad Medani and the meeting with the Director-General and senior staff of the Agricultural Research Corporation, has allowed us to cover a lot of ground and develop thinking. All the same, these notes can be no more than part of a process and a statement of ideas, since much will change as events unfold, and I may well make suggestions which prove unprofitable or impracticable.

THE NEED AND POTENTIAL

The need requires little emphasis. Sudan desperately needs to produce more from its Northern rainfed sector. This is found within a belt of 400,000 square miles (roughly 2/5ths of the country as a whole) of semi-desert and dry savanna across the North, 280,000 square miles of it sandy, and 120,000 square miles of it cracking and non-cracking clays. Many of those who live in this belt have insecure and inadequate livelihoods. Past efforts of agricultural research have achieved rather few gains for them, and no dramatic advances. Mechanised agriculture has spread fast in some areas, but its sustainability is in question. Despite the efforts of Global 2000 (the Carter/Borlaug initiative to promote high-yielding packages) in the rainfed areas, there does not appear to be, or to be on the horizon, any major widely applicable breakthrough. The great question is whether there are new ways of attacking the problems and opportunities presented by these huge areas. The implication of some of the attached papers, and of the arguments presented in the lecture in Khartoum and seminar in Wad Medani, is that there are.

Let us start with the biological and economic potential. This appears to be much greater than is currently achieved. The word "vast" is often used. Some of this potential no doubt could be realised through conventional commodity research and extension, and through improved livestock and livestock management. But as these have not achieved much under the generally more favourable conditions of the past, there seems little reason to suppose the future will be sharply different unless something new and better is done.

Much of the potential probably lies, not in simplifying packages, but in the diversification and complication of farming systems. This may entail new combinations of soil, water, grasses, crops, shrubs, trees and livestock, and the development and exploitation of micro-environments. Water, soil and nutrient harvesting and concentration are one set of changes which might, environment by environment, raise productivity and reduce risk. Agroforestry is another, in which

trees tap deep moisture and nutrients, and photosynthesise through more of the year, complicating farming systems to make them less vulnerable. Other potentials can be sought through making available to farmers a wider variety of germplasm so that they can adapt better to changing conditions, and be less vulnerable to risk. Finally, the regional and international transfer of germplasm for non-commodity crops still probably holds high potential - including grasses, shrubs, trees, vines, vegetables, tubers, and famine foods. One can envisage a scenario of these northern rainfed areas of the Sudan in 20 to 30 years time, in which extensive microcatchments for water harvesting, microconcentrations of water, nutrients and soil, agroforestry in many forms, all linked with livestock, exploit many sorts of indigenous and introduced plants. The patterns and combinations would be diversified and complicated, and would provide biomass and fodder which protected cultivators and herders better, with carry over stocks for bad seasons and years.

These potentials differ from those identified by normal "green revolution" and "transfer-of-technology" approaches, which emphasise packages, mechanisation, simplicity, and uniformity. Those approaches may well have some potential, but the manner in which they often simplify by removing trees and growing monocrops is questionable from a long-term environmental and productive perspective. The potentials described are precisely those which traditional agricultural science finds it hard to study and develop, which is part of the explanation why they have not already received more attention.

The question is: how, environment by environment, can these potentials be identified and developed?

THE CONVENTIONAL APPROACH

The normal approach has been to increase the numbers and improve the quality of agricultural and other scientists. However obvious and desirable this may be, it has not worked very well. The 1977 review of agricultural research in Sudan (sponsored by the Ford Foundation) foresaw that the cadre of agricultural scientists would rise from 360 to 700, or 94 per cent, by 1989-92; in the event, the average cadre for 1982-86 was 206, down 43 per cent; and I was told it was now (early 1989) be of the order of 160 (an unconfirmed figure), or less than half what it was in 1977. Moreover, one view expressed was that it was likely to decline further, despite extensive training programmes abroad.. As an illustration of this problem, even the Western Sudan Agricultural Research Project which has had heavy donor support and excellent buildings and similar facilities, has an establishment of 39 but only 20 scientists in post, and two of the four stations which have been built are unstaffed.

Further constraints are low recurrent budgets for operation (85 per cent of the ARC budget being said to be devoted to salaries), shortages of vehicles and funds for travel, and a rapid turnover in staff, some of whom leave for other countries.

The normal response to this situation is the conventional effort to train, retain, and post staff. This direct approach looks unlikely to do more than, at best, hold the line in the immediate future. sufficient. Any realistic approach has to foresee a continuation of

these conditions, and to ask how, given staff shortages and low morale, those who remain can be encouraged and helped to do useful work. By good fortune, there are new ways coming available which show promise of being able to meet some of this need.

FARMER FIRST OR FARMER PARTICIPATORY APPROACHES

One way to make better use of existing facilities and staff is to ensure that they are working with farmers to meet farmers' priorities. Usually, scientists assume that they know what these are. For much rainfed agriculture, more and more evidence is pointing to the errors in this view. A good starting point is therefore to identify farmers' own agenda of their needs. Farming systems research has sought to establish agendas which meet farmers' needs, but normally without the shortcut of farmers' own analysis; and FSR has been vulnerable to premature elephantiasis, with a mixed track record outside the hands of the more able practitioners.

Promise of a more cost-effective approach is presented by the new and complementary paradigm for agricultural research, variously termed farmer-first (FF) and farmer participatory research (FPR) (the title does not matter). This has evolved mainly over the past five years. Its methods have now been described in hard journals (e.g. *Experimental Agriculture*, and *Agricultural Administration and Extension*). It is proving especially effective with rainfed agriculture, with its diverse, complex and risky conditions contrasting with the more uniform, simple and controlled conditions of green revolution and irrigated agriculture. In essence, in FF approaches farmers participate and are often the main actors in the various stages of research, including analysis, selection, design and experiment (see figure 5, page 21, of the Farmer First paper attached). There are many variants, but much of the core of the approach is described in the references to the attached papers. The role of the outsider is convenor, catalyst, consultant, supporter, searcher, supplier, and travel agent.

In practice, on the ground, FF approaches include the following activities:

- analysis by farmers and communities to identify their needs and to generate requests for advice, germplasm, technologies, principles and ideas (Ashby, Bunch, Knipscheer, Lightfoot, Norman..) (This ex ante analysis by farmers is very important, and I think much more easily doable than scientists are at first inclined to believe)
- innovator workshops where innovating farmers come together with scientists (Abedin and Haque, Ashby, CUSO Thailand, Khon Kaen University, etc)
- searches (by outsiders) for indigenous technologies (scattered examples e.g. Biggs, Brammer in Bangladesh but this is still underdeveloped and/or underreported)
- involving farmers in seed selection either on or off-station (Ashby, Maurya....)

- seed-breeding in which a wider range of germplasm is made available to farmers for their "baskets" and for their evaluation (Maurya)
- searching (by outsiders) to fill the basket of choices (many sources, especially agricultural NGOs such as World Neighbors, SCF (USA) in Sudan, Eastern Visayas Programme in Philippines....)
- farmers' experimenting and testing (World Neighbors are the leaders in this - see Roland Bunch's writings)
- farmer-to-farmer extension (World Neighbors, Fujisaka at IRRI, OXFAM in Burkina Faso, and more and more NGOs...)
- interregional and international transfer of non-commodity germplasm (grasses, shrubs, trees, vining plants, tubers, vegetables, wild foods etc etc) in response to farmers' priorities and requests. This, in my view, is grossly underexploited still. (After some 7-8 years of extensive agroforestry research, the only two technologies known to have diffused from the Central Research Institute for Dryland Agriculture research station in Hyderabad are two introductions - stylosanthes, a grass from Australia, and Acacia albida, a tree from Africa, both of which were eagerly sought by farmers as soon as they saw them)
- multiple innovation by and with farmers. This involves changing several things at once, typically involving earth shaping, planting crops, grasses, shrubs and/or trees in new positions, and the management of water, and the creation of new micro-environments. Examples are fish with rainfed rice in NE Thailand, and water and nutrient concentration (normally called harvesting) in many parts of the semi-arid tropics, with the Yatenga Project in Burkina Faso as the now classical example. In Sudan, the microcatchments made by farmers on 25,000 feddans in the SCF(USA) programme on the Atbara River near Showak is a local example. Ian Scoones of IIED (who was here for the RRA workshop) is in the middle of a paper on "patches" in agriculture which I expect to help to open up this huge field.

This is not a full, but an illustrative list. There are more activities and actions in the papers of the IDS Conference (July 1987) on Farmers and Agricultural Research: Complementary Methods (forthcoming as an edited book in June). The point is that each activity is different from conventional on-station commodity research, and each, especially when combined with others, appears to present considerable potential in the Sudan as elsewhere in CDR (complex, diverse and risky) agriculture.

Some advantages of these approaches are:

- i. identifying and meeting farmers' priorities, and involving them in the whole R and D process. If this does not guarantee adoption and spread, it gets close to such a guarantee.

- ii. farmers providing the continuity which scientists cannot sustain. This is a hypothesis suggested by the strategy and experience of World Neighbors. It could be important in Sudan over the next decade if scientists continue to move and leave fast.
- iii. multiple simultaneous innovation as described (e.g. land shaping for microcatchments, planting new combinations of groundcrops, grasses, shrubs and trees etc) is more feasible and better done by farmers on their fields than by scientists on their research stations. Farmers can better judge what fits their conditions and needs, are not tied to rigid experimental designs, and find it easier to modify and adapt what they are doing in the light of experience as they go along.
- iv. parsimony in the use of scientists' skills and time. Scientists' advisory and search role has more immediate payoffs than extended physical and biological research on station. In particular, obtaining new germplasm can be an effective measure, which, if successful, often has a wide and quick impact, as in the Indian example of *Stylosanthes* and *Acacia albida* mentioned above. Yet I have the impression that only a very small proportion of most scientists' time is spent on "search and supply".

ACTIONS WORTH CONSIDERING

These points present, though only in outline, much of the case for a programme in Sudan to encourage and support FF activities, especially in the Northern rainfed belt. The first steps would presumably have to be further search and discussion by you to

- a. find more people who are either working in the FF mode, or who are sympathetic and wish to do something
- b. gain agreement from senior people to permit their staff to try out and further develop these new modes, and
- c. identify institutions with which to work

On institutions, it does not seem useful for me to make many suggestions, given my ignorance of the local scene. However, on the basis of our visits and discussions, three which look promising and worth followup are WSARP (the Western Sudan Agricultural Research Project) - Dr Dafulla Dafulla, the Faculty of Agriculture at the University of Gezira - Dr Osman Fadl and others. and Save the Children Fund (USA) - Mr Edmund Resor, for their FF work near Showak and perhaps elsewhere. Your proposed field visits will be important as explorations to find other institutions and people outside Khartoum and Wad Medani, as well as to get a sense of working conditions in agricultural research stations.

On actions, several ways forward can be suggested. Those which follow are a first listing of a menu. I am not suggesting that they should all be undertaken. But by selecting from them, it should be possible quite quickly to get a measure of the needs and opportunities, and to support some of those who are able and willing to pioneer.

A. Quick Reviews and/or Workshops

A series of quick reviews could be commissioned. The purpose would be to find out the current state of knowledge, practice and technology. Reports on these reviews might be contributions to a workshop. Alternatively, to avoid delay, you could convene one or more meetings of a few people to discuss the state of knowledge on these topics:

i. past and current involvement of farmers in agricultural R and D in Sudan

Agricultural R and D would be interpreted widely to include activities of government research organisations, universities, and NGOs. Agricultural extension would not be the major focus but would not be excluded to the extent that it involved farmer-to-farmer extension, or encouraged farmers' own experiments and adaptive trials.

ii. the internal and international transfer especially of non-commodity germplasm

"Non-commodity" is intended to de-emphasise the staple crops like sorghum, millet, simsim, wheat, cotton and groundnut, where I presume that a good deal of transfer and testing has taken place and continues to do so. It is intended instead to direct attention to grasses, shrubs, trees, vining plants, tubers, vegetables and famine foods, and other non-staple plants and crops. The questions are how much transfer takes place, what obstacles there are to it, and how it might be improved and intensified, to provide farmers with more of what they want and need, and to put more in their baskets of choices.

iii. indigenous and introduced microenvironment creation and management

This would cover indigenous rainwater and nutrient management. Water harvesting is reported from Kordofan and Darfur, and may well be widespread. Wadis and khors are said to be exploited in various ways to create and exploit microenvironments. Flood recession agriculture, including seasonal basins of water, deserves examination. Agroforestry and home gardens also tie in with this, and either might justify a separate study.

iv. agricultural research and NGOs

This review would examine current agricultural R and D and extension activities by NGOs, and their contacts with agricultural research institutions. Attention would be paid to how NGOs and agricultural research do and can help each other, especially in farmer participatory research. (NB ILEIA is meant to be producing a manual on how NGOs can tap into national agricultural research systems)

B. Larger Workshop or Conference

This could be on a bigger scale and more carefully prepared than the quick workshops above, and could include some international participation.

State of the art papers for Sudan might be presented. It would be good to have reports from those - agricultural scientists, university researchers, workers in NGOs - who have been using FF/FPR approaches (e.g. Save the Children near Showak).

Any international participants might be selected from the following:

Zainul Abedin (Bangladesh, biological scientist, Bailey will know)
 Jacqueline Ashby (CIAT, sociologist)
 Louk Box (Netherlands, sociologist)
 Roland Bunch (World Neighbors, USA)
 John Farrington (ODI, agricultural economist)
 Sam Fujisaka (IRRI, social anthropologist)
 Peter Gubbels (World Neighbors, West Africa)
 Anil Gupta (Indian Institute of Management, Ahmedabad)
 Bertus Haverkort (or one of his colleagues) (ILEIA)
 Janice Jiggins (De Dellen 4, Andelst, 6673 MD Netherlands)
 Clive Lightfoot (IRRI, agronomist)
 D.M. Maurya (India, breeder)
 David Norman (Botswana, agricultural economist)
 Christine Okali (OXFAM America, Boston)
 Gordon Prain (CIP, social anthropologist)
 Robert Rhoades (CIP, social anthropologist)
 Paul Richards (London University)
 Diane Rocheleau (Ford Foundation, Nairobi, geographer)
 Suriya Smutkupt (Faculty of Agriculture, Khon Kaen University)
 James Sumberg (John Farrington will know current address)

(Some of the addresses are in the Ann Waters-Bayer review paper which you have, together with some other names).

I am sure there are by now many others, but these are ones I know, or especially know of. It is difficult to select between them, but I would go first for Ashby, Lightfoot and Norman for government agricultural research, and either Gubbels or Bunch for NGOs' approaches. All these have hands-on experience, are able and articulate, and are pioneers who can communicate well. David Norman has a semi-arid background, but I do not know about the others. Perhaps it does not matter too much. It is sad not to be able to recommend anyone from ICRISAT in India, though there may be people I do not know working with ICRISAT in West Africa (? Peter Matlon). Among its 150-odd (?) scientists, ICRISAT in Hyderabad has to my knowledge no sociologist or social anthropologist! Responsible as they are for the semi-arid tropics, they seem at present to be resolutely facing in the wrong direction, and I would advise caution in involving them, since for all their scientific excellence, they might weigh in with heavy normality and set the clock back to the late middle ages.

If you wanted papers on special subjects you could think of

Norman	farmer groups, or whatever he is onto next
Ashby	whatever she is onto next
Gubbels	getting started with communities
Rocheleau	ethnohistories as a way in
Rhoades	scientists and farmers face to face
Lightfoot	whatever he is onto next

(If you wanted to be avant-garde on the breeding side, you could go for the implications of FF for breeding and seed distribution and testing, but that might better be pursued by one of the CGIAR Centres if and when they wake up to this. Convening such a conference would require specialised knowledge.)

The format of any conference or workshop would need careful thought. I could send you a copy of my internal evaluation of the IDS Conference of July 1987 on Farmers and Agricultural Research: Complementary Methods" which might give you some ideas; though I doubt whether it would make sense or be possible for a conference here to be as open-ended as that one was.

C. International Training and Travel

This is important and difficult.

It would be ideal if one could point to a course on FF approaches; but as far as I know none exists. There is a great need for this, but very few people yet who could run one. Perhaps the best to do here is to keep alert for opportunities, and try to encourage someone like Jacqueline Ashby, or the CIP group, or Clive Lightfoot and his Filipino colleagues, to set one up. Supporting such a course would be an ideal Foundation activity, but as far as I know nothing is in hand.

However, if you had a group of, say, six key people, it should be possible, though with a fair amount of administration (!) to arrange a good trip for them, visiting some of the following: West Africa (World Neighbors contact Peter Gubbels, various organisations in Burkina Faso, etc), Zimbabwe (I do not know the organisations but contact Ian Scoones, IIED for advice), Kenya (Diane Rocheleau), Colombia (Jacqueline Ashby), Philippines (Clive Lightfoot, Sam Fujisaka), UK (John Farrington, ODI, and the Robert Willey- Steve Biggs group at UEA working with the IBFEP rainfed project in India), Netherlands (ILEIA, Janice Jiggins). In the USA, the only organisation right on this wavelength is, to my knowledge, CIKARD (Michael Warren, address in Waters-Bayer paper), but Berkeley (Miguel Altieri) might have something to offer. Cornell, Florida, and MSU are not really with this yet, as far as I know.

Another good action would be to set up a facility to enable farmers and researchers to visit similar areas in the Sudan and in other countries. One example might be a visit of those concerned with water harvesting on compacted soils (like the gadoud in North Kordofan) to Burkina Faso, subject to confirmation that conditions were similar and lessons likely to be learnt. Chris Reij of the Free University, Amsterdam, would be the best person to advise on this). Camilla Toulmin could also be a good source of advice (at IIED).

At the Swedish Red Cross meeting two weeks ago, the travel agency role was discussed in connection with water in the semi-arid tropics. The SRC may well take an initiative in this. If they do, it would save a lot of trouble. The person to write to is Johan Schaar, Swedish Red Cross, Stockholm.

Whenever there is a regional or international conference on FF/ FPR approaches, you will doubtless hear of this, and it would be a good opportunity for Sudanese to contribute and participate. There were to have been regional conferences in Southern and Eastern Africa, and the Ford grant to IDS was to have been used to support these, but for various reasons they are now unlikely to happen.

D. A Network

The development and testing of the approach and methods could be much strengthened by a good network. The key is finding the right person to manage it. A good location would be the Faculty of Agriculture at the University of Gezira. A university base would have the advantage of ease of access to both Government (the ARC) and to NGOs, and of being able to convene both easily to meetings.

The network could include all interested persons, whether in Government, NGOs, universities or parastatals. Its activities could include:

- i. a newsletter (a la ODI and informal) emphasising communication between members, and information of professional interest
- ii. distribution of papers. This could include useful papers (offprints, ephemera, etc) and books from abroad. A generous budget for this item could pay off handsomely given the hunger for books, journals and papers which was evident even on our short visits. As a start, as agreed, I will send you 30 more copies of the issue of Experimental Agriculture which is devoted to farmer participation in research. A good photocopier and plenty of paper for photocopying are important.
- iii. meetings and workshops. The manager could convene ad hoc workshops, either regionally within Sudan, when there were sufficient members, or nationally ad hoc for special topics

E. An Advisory Committee

At some point it might make sense to start convening an advisory committee, consisting mainly of mid-career professionals who are on the FF wavelength. I suggest that its brief be less open-ended than the current research competition committee, as that is receiving and funding rather normal proposals. The committee need not be large: 4-8 could be big enough. You might wish it to include people from universities, government, and NGOs (providing anyone from government was free to take part in a personal and not official capacity). This advisory committee could make recommendations on the use of a grant (whether a FAP or normal grant I cannot judge), to support for example:

- i. participatory R and D
- ii. workshops and meetings
- iii. training
- iv. network activities (see D above)
- v. studies and evaluations of FF activities
- vi. publications and dissemination
- vii. perhaps a good ideas competition or award

(This could be an annual competition for promising ideas for development, trial, or extension. The idea might be an existing practice of a farmer or farmers which appears replicable, or a new idea of a farmer or non-farmer, or some combination. The ideas would be for technologies, activities or approaches which would improve rainfed agriculture)

There might be other activities on which you would wish to seek the committee's advice, or which you would prefer to keep separate, such as the use of international consultants, and study visits and training abroad. You might also want to recommend some grants independently of the advice of the committee.

CONCLUDING

These have been a splendid few days, much enjoyed. It was sensible not to overload them with too many interviews, and to allow time for reading. I shall follow up as promised by sending various papers, and new ones as they come available. Most of the ideas and suggestions above arise directly from our discussions. I hope that setting out them out as in this report proves of use.

Khartoum
7 March 1989

Robert Chambers

ATTACHMENTS

Accessible Sources on Farmer-First/Farmer Participatory Research and
Rapid Rural Appraisal Approaches and Methods, IDS Sussex,
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Agriculture, IDS, University of Sussex, November 1988

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(Abstracts, Periodicals, Organisations) and Two (Bibliography)

Waters-Bayer, Ann Participatory Technology Development in
Ecologically-Oriented /Agriculture, Gottingen, January 1989