LAND TO LAB AND LAND TO LAND:
CONCEPTS AND POSSIBLE APPROACHES

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"...agricultural research can be done in laboratories and experimental fields but agricultural technology can be developed only in farmers' fields, since technology has both economic and ecological dimensions. Technologies have to be location-specific to be ecologically, economically and culturally sustainable."

M.S. Swaminathan, August 1989

The Transfer-of-technology (TOT) Model

The Transfer-of-technology (TOT) model has had its successes in irrigated green revolution areas, where packages have been transferred from research and adopted and adapted by farmers in relatively uniform and controlled conditions, and relatively simple farming systems. In this model, technology is generated in laboratories and on research stations and then handed to Extension to transfer to farmers. Non-adoption of technology is attributed to farmers' ignorance or to farm-level constraints, and the corresponding prescriptions to improve performance are better extension communication, and removing or reducing farm-level constraints to make the field and farm more like the research station.

With the more complex, diverse and risk-prone rainfed agriculture, however, the TOT approach has not worked well. A high proportion of recommendations are not adopted (estimates range from 70 to over 90 per cent). Increasingly, the uncomfortable conclusion is being drawn that the fault lies not in farmers' ignorance, and not in farm-level constraints, but in the technology itself and the processes which have generated it.

In this view, the bad fit of technology can be attributed to these factors among others:

i. the perceptions and priorities of scientists and engineers differ from those of farmers;

ii. conditions and resources on research stations differ from those on farms;

iii. farmers' plots chosen for demonstrations are typical and receive special treatment;

iv. subsidies and other inducements persuade farmers to adopt or accept new technologies temporarily even when the technologies would not interest them without the inducements;
v. misleading impressions of programme performance are given by visits to special, often roadside, plots where conditions are good and adoption can be shown.

In consequence, in this view, there are strong and understandable reasons for a bad fit between technologies to be transferred and farm-level and farm families' conditions.

Soil and Water Conservation Measures

Does this view apply to soil and water conservation measures for red soils drylands?

In various parts of the world, including parts of semi-arid Africa, attempts have been made to extend standardised soil and water conservation technologies to farmers in diverse environments. These technologies have been devised on research stations by scientists and engineers, or espoused by enthusiastic and committed officials of governments and aid agencies.

These standard treatments have taken several forms. One is contour earth bunds and contour ploughing. These can serve as an example. Farmers have tended to accept these bunds passively, but not maintain them, and sometime; later plough them in. (Examples can be seen by going no further than main roads leading from Hyderabad).

The reasons are not far to seek. Much land does not need new conservation works anyway. Earth bunds hold up water and tend to breach in heavy rain, aggravating erosion. They require much maintenance compared with e.g. stones or perhaps even biological barriers. They occupy farm land which is taken out of production. Perhaps most important, farmers who have not been involved in technology design and development or in choice of location, and who have not themselves worked to install conservation measures on their land, do not feel ownership or commitment to maintenance (1). To the contrary, they often resent what has been done.

Farmers' Own Practices

It is now much more widely recognised that farmers have their own conservation practices and carry out their own experiments. They can be found levelling their fields; bringing in earth and silt to improve fertility; controlling erosion with rock barriers; exploiting
erosion to trap soil and water, and to level up the low parts of fields; blocking erosion gullies with rock walls raised year by year to concentrate soil, water and nutrients in protected microenvironments; making conservation drains - waterways which remove excess runoff; planting grasses to protect bunds; capturing water to infiltrate and replenish groundwater; and so on.

In doing this they have several advantages; they can continuously observe what happens to water and soil on their land, including when it rains; they proceed piecemeal, gaining experience and adapting what they do to fit local conditions; and they will rarely take action where it is not needed.

Farmer First: Land to Lab

Farmers thus have their own experiments and trials, and their own priorities for R and D; but these will only be known if the farmers are asked what they are. For soil, water and nutrient conservation and concentration, are farmers asked their needs and priorities, and encouraged and helped to undertake their own analysis? If so, what do they say, and is it acted on, and if so with what result? Is there a research agenda that has been or could be generated from land to research station and lab? Or is this an area where new practices and methods of working with farmers could be developed and tried out?

Would this generate a new research agenda for research, including perhaps comparisons of farmers' practices and officially recommended practices on difficult undulating land, including the ease and difficulty of ploughing, the selective use of stone barriers, cost-effective methods for trapping and using silt at low points of fields, multi-species vegetative barriers, and so on?

(And is it perhaps too irreverent a speculation that some farmers might request research on how it is that we (non-rural outsiders and Government agencies) continue to advocate and implement soil conservation measures which they do not really want?)

Farmer First: Land to Land

If Dr Swaminathan is right that technology can only be developed on farmers' fields, how should engineers and scientists set about this?

Based on recent experience and innovations (see e.g. Fujisaka 1988) does this 4-point programme make sense?
i. farmers' practices, priorities and experiments. Find out what farmers' practices are. Seek to understand the reasons for them (e.g. cross ploughing on undulating land), and farmers' priorities. Identify farmers who are innovators and experimenters.


iii. farmers' R and D. Encourage and support farmers' own experiments. Provide them with ideas and materials they are willing to try on a small scale. Encourage them to monitor and discuss results, and to modify interventions. Allow them to determine the content of the experiments and trials, and ensure that they "own" them.

iv. farmer-to-farmer extension. Support lateral extension, farmer to farmer and village to village, of innovations and practices which farmers themselves find useful.

These approaches have worked elsewhere (Bunch 1985, 1988, 1989; Chambers, Pacey and Thrupp 1989; Fujisaka 1988). They appear to do best with:

* continuity of field staff
* learning from farmers
* self help without subsidy
* patience and no targets
* bureaucratic and professional tolerance and support for staff who act in this way

Does this mean that they can be undertaken only by exceptional NGOs? Or are such approaches feasible in Government organisations? Could staff who act in this way be rewarded? As Sanghi has pointed out (1989:179) there are institutional difficulties in formally recognising practices which emerge due to modifications of recommended technology at the village level. If that is difficult, is going further and supporting farmers' experiments and helping them spread the technology they develop a wildly unrealistic dream? Or within Government organisations, are there places where staff have or could be given the freedom to follow farmer-first approaches in soil and water conservation?
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Footnote

1. None of the farmers seen on two days of field visit in August 1989 in the Maheshwaram watershed near Hyderabad had repaired recent breaches in bunds constructed by Government on their land, whereas in a village in Mahbubnagar District, farmers who had designed and constructed bunds themselves had twice repaired recent breaches (slides).