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'PUTTING THE LAST FIRST'[1]

by Robert Chambers

Professional development these days takes place in a context of cores and peripheries of knowledge. Globally, there are gradients from extremes of wealth and power in urban, industrial cores to extremes of poverty and impotence in rural, agricultural peripheries. These gradients, between 'first' and 'last', exist both between rich and poor countries and within poor countries themselves. The wealth and power of the cores attract and sustain concentrations of professionals, resources and capacity to generate and spread knowledge. The knowledge of the cores is prestigious, and described as modern, scientific, advanced, sophisticated and high technology. It is also powerful, being supported by and supporting the machinery of the state and of commerce. As a colonising, unifying and standardising force, it pushes out into the peripheries, propagated through communications, commercialisation and education. In the receiving rural peripheries, there is an unconnected scatter of people who are powerless, low status and poor. They have many localised sets of skills and funds of indigenous technical knowledge particular to their communities and conditions, but these are rarely recognised or valued by the bearers of modernity from the cores.

In this system, the cores attract those who gain education and seek advancement. Like iron filings drawn by a magnet, they point and move inwards and upwards. During their careers, professionals move along the gradients as they strive for promotion, prestige, recognition, higher income and better living conditions. Within the Third World they transfer from rural to urban, and from urban to metropolitan centres. They then feed the international brain-drain to the richer countries. At the very centres are the black holes of defence and space programmes in the USA and USSR, sucking staff and resources towards them.

First modes of analysis fit badly with last realities. Critics such as Gunnar Myrdal, 1968, E.F. Schumacher, 1973, and Michael Lipton, 1977, have in their different ways attacked the unthinking transfer to Third World environments of the values, technologies and prescriptions of the urban industrial rich. It is now conventional wisdom among many development professionals that the first priorities of the affluent North (sophisticated armaments, diseases of the overfed and ageing, multiplicities of costly drugs, high-input mechanised agriculture, and so on) distract from priorities for the poorer majority of people in the

South. But curiously little attention seems to have been paid to how those who are first perceive, misperceive or do not perceive at all, those who are last and their conditions.

Errors and explanations

One starting point for trying to understand the application of core or 'first' thinking to peripheral or 'last' people and conditions is to examine past errors. Considering the manifest power of science and the vast human, financial and physical resources devoted to research, it is astonishing how often, and how badly, development professionals have been wrong. Many deeply held beliefs for which empirical evidence was mustered in their day have now largely been rejected. Some of these concerned the poor themselves: beliefs that the rural poor were inherently lazy and fatalistic and that small and subsistence farmers were ignorant and irrational. Others concerned agricultural practices: beliefs that the capital-intensive mechanised monocropping of temperate climates would be widely suitable in tropical conditions; that group or communal farming by peasants would work; that the intercropping of small farmers was uneconomic and inefficient; that on-farm post-harvest losses of cereals were high, with 30 per cent often quoted. Others concerned the nature of deprivation: the belief that the problem of hunger was mainly one of total food production, rather than mainly one of entitlement or effective demand, as is now understood (Sen, 1981); that malnutrition was more a problem of protein deficiency than lack of calories; that human calorie requirements were higher than is now believed. The list could be extended but the point is already made. It is alarming how wrong we were, and how sure we were that we were right. And it is humbling and sobering to speculate on how many of the 'first' beliefs of today may in their turn prove to be wrong.

There are several obvious explanations of past error: the arrogance of those with power, status and supposedly superior knowledge; the low prestige of professions and people close to the poor; the minimal resources devoted to research on 'last' subjects; the behavioural biases of rural development tourism, usually based on a brief and hurried rural visit by the urban-based professional to those who are better off and more accessible, to the neglect of the poorer and more remote (Chambers, 1983, pp. 10-23); the human capacity to explain the misfortune and poverty of others in terms of moral turpitude and divine justice; the comforting stereotypes of colonial natives and post-colonial

peasants as lazy, stupid, stubborn, ignorant and fatalistic; and the unwillingness, inability and lack of opportunity for first professionals to listen to, study and learn from those who are last.

Beyond these, there are two other levels of explanation: values and preferences of first professionals; and the structure of first thinking.

First values and preferences

The values and preferences of first professionals are typically polar opposites of last realities. These can be presented as two parallel and contrasting lists, as in Table 13.1. Most professionals see first values as sophisticated and scientific, and last realities as primitive and based on ignorance.

Table 13.1: First values and last realities

First values	*Last realities*
Urban	Rural
Industrial	Agricultural
High Cost	Low-cost
Capital-using	Labour-using
Mechanical	Animal or human
Inorganic	Organic
Large	Small
Modern	Traditional
Exotic	Indigenous
Marketed	Subsistence
Quantified	Unquantified
Geometrical	Irregular
Visible and seen	Invisible or unseen
Tidy	Untidy
Predictable	Unpredictable
Hard	Soft
Clean	Dirty
Odourless	Smelly

Professionals also have preferences for clients and contacts and for places and times of work, as shown in Table 13.2.

Table 13.2: Professional preferences

	First	*Last*
For contacts and clients	High status	Low status
	Rich	Poor
	Influential	Powerless
	Educated	Illiterate
	Male	Female
	Adult	Child
	Light-skinned	Dark-skinned
For place of of work	Urban	Rural
	Indoors	Outdoors
	Office, laboratory, research station	Village, homestead, field
	Accessible	Remote
For time of work	Day	Night
	Comfortable (dry, cool) season	Uncomfortable (wet, hot) season

(Adapted from Chambers, 1983, p.173).

The biases interlock. There is mutual reinforcement between first values, class, gender and ethnic preferences for contacts and clients, and the convenience, comfort, infrastructure and resources which determine places and times of work. Rural development is seen as extending the expressions of the first list into last environments. It takes the form of large exotic cattle rather than improvement to small indigenous goats; export cash crops sold by men rather than improved food crops sold by women; costly high-yielding packages of chemical fertiliser, purchased seed and irrigation for resource-rich farmers rather than cheaper organic technologies for farmers who have to rely on rain; scarce supplies of expensive 'sophisticated' drugs for the few rather than abundant supplies of cheap drugs for the many; urban curative hospitals and surgery more than rural health centres and preventive community health. Almost inevitably, first technologies are most readily adopted by and benefit most those who are least poor; for reasons of scale and cost they are best able to profit from

them; for reasons of contact, communication, knowledge and influence, they are most likely to have access to them.

Conversely, the problems and needs of the rural poor tend to go unrecognised. Even today little attention has been paid to drudgery-reducing technologies for rural women in fetching wood, fodder and water, in food preparation, and in cooking. Until recently the diarrhoeas which kill millions of children each year were neglected. Subsistence crops like millets, sorghum, sweet potato and cassava (manioc, tapioca, yucca) have had low priority in agricultural research. Mortality of the young of small stock (goats, sheep, rabbits, hens, ducks and so on); the culture and productivity of indigenous multi-purpose trees; lopping regimes for tree fodders; the value of insects as food; strategies for surviving the worst times of the year; and sequences of disposal of assets to meet contingencies – these are examples of the sort of last realities which have tended to be ignored or accorded little priority by first professionals.

To be sure, there have been some reversals, and the picture must not be overpainted. Institutions have been set up which put more of the last first. Examples include the Intermediate Technology Development Group and others concerned with appropriate technology (McRobie, 1982); the International Centre for Diarrhoeal Diseases Research in Dhaka; the International Crops Research Institute for the Semi-Arid Tropics in Hyderabad; and the International Council for Research on Agroforestry in Nairobi. But even in these, biases can still operate. A technology for millet cultivation can still be relatively capital-intensive or large-scale, and appropriate technology can still sometimes be out of reach of those who need it. Even when research concerns things which are last, the methods, materials, and locations of work can still distance the technology from the poor.

The structure of first thinking

A second level of explanation is in the structure of thinking of first professionals. Linked to values, professional rewards, class attitudes and contacts, convenience, comfort and other first characteristics, are modes of learning and analysis which can be described as first thinking. These are liable to overlook or misinterpret the last. They affect choices of subjects for research, methods of research, interpretations of poverty, development priorities, and the generation and transfer of technology. They are basic to the thinking of most development professionals.

Three orientations or biases of first thinking are:

growth and spread;
science and quantification;
learning from above.

Growth and spread

'First' thinking identifies development with growth and spread. Development is seen as the intensification and spread of economic activity, with commerce, markets, cash crops, employment, roads and railways penetrating, activating and incorporating the peripheries. Most of those who emphasise the negative aspects of this process, and who see underdevelopment as an effect, nevertheless share the view that growth (only in a different form) is desirable and that services (only organised differently) for education, health, agricultural extension, communications and so on, should be pushed and spread into the rural peripheries where so many of the poorer people are to be found. Trickle-down may be largely discredited and few now believe that growth alone is enough. But it is basic to the thinking of most professionals that the growth and spread of economic activity and of services are essential elements in development.

Science and quantification

Reverence for science and its manifest power are part of first thinking. Measurement and quantification are especially valued. Facts with numbers are preferred to facts without numbers. There are several reasons for this: much scientific advance has come from precise measurement; the highest-status professions tend to be those which are strongly mathematical, with fundamental physics at the top; the softer social sciences aspiring to status and respectability have taken refuge in surveys and numbers; the analysis of figures has well-known techniques with which professionals can feel secure; numbers are needed for planners; and for some there is a basic aesthetic pleasure in mathematical manipulations.

Learning from above

Learning and training are organised hierarchically to face inwards and upwards towards those cores where knowledge is most readily generated. Sources of knowledge and learning are seen not in the rural peripheries but in the urban cores, not in rural women and men but in laboratory scientists and university professors. Much 'education' is a one-way transfer of 'knowledge' down-

wards and outwards. Learning is not horizontal, involving exploration and experience but vertical, from the top-down. In this vertical structure, the first modes of thought and values of the cores are projected downwards by those who have learned them. Rural researchers use their own first categories and thinking in designing questionnaires and imprint alien structures on rural realities. They see and find out what fits their thinking, reinforcing the vertical structure of knowledge. First values, constructs and experience are transferred to last situations and impose meanings on them.

These three orientations – growth and spread, science and quantification, and learning from above – together influence first perceptions of the last. From this perspective, Marxists, dependency theorists, structuralists, and neo-classicists all play variations on a theme. Their paradigms differ in detail but are similar in structure, applying similar core biases to the last. Thus, instead of open-ended empirical investigation of the last being allowed to generate last theory, first theory is imposed upon it. Core or first theories are thus self-sustaining. By imposing their categories and meanings on imperfectly perceived last realities, and by bending or ignoring what does not fit, they fabricate support instead of facing challenge.

The systematic exploration of first misperceptions promises to open up many domains and dimensions. By way of demonstration, two will be examined here: ideas of what the rural poor – the 'last' – need; and the generation and transfer of agricultural technology.

Analysing last needs

Basic needs and basic goods

The World Employment Conference of 1976 convened by the International Labour Organisation (ILO) adopted basic needs as an explicit goal of development planning. Basic needs were defined as having two elements:

- First, they include certain minimum requirements of a family for private consumption: adequate food, shelter and clothing are obviously included, as would be certain household equipment and furniture.
- Second, they include essential services provided by and for the community at large, such as safe drinking water, sanitation, public transport, and health and educational facilities (ILO, 1976, p.30).

A basic needs-oriented policy was also seen as implying participation of the people in making the decisions which affect them. In all countries employment also entered into a basic-needs strategy. Although the objects to be set would vary according to levels of development, climatic conditions and social and cultural values, the concept of basic needs was of universal applicability.

For all its critics, the basic-needs formulation made a useful contribution to development thinking; it focused attention on key issues and on poor people, those whose basic needs were not met. But the question can be asked whether the ideas of basic needs bore the imprint of the urban, industrial and formal sector of developed cash economies, and whether, reflecting first thinking, they neglected or misperceived the needs of people who were rural and poor.

In retrospect, it can be seen that basic-needs strategies did overlook the need for basic goods. First thinking assumes growth and spread, a market and goods available for purchase as they are in the rich world and in most urban areas in the Third World. The original ILO statement emphasised the need for the poor to gain the purchasing power to gain access to goods, tending to assume that the goods would be there. But the ILO basic-needs missions mounted at the invitation of governments in Sub-Saharan Africa sometimes found otherwise. In the rural areas of Zambia and Tanzania in 1980, many basic goods were either not available, very scarce, or very highly priced on the black market. The ILO mission to Zambia found widespread lack of soap, salt, blankets, cooking oil, paraffin, matches and the like (ILO, 1981a, pp.22-4). We are not concerned here with the causes of these shortages. But any doubt that the availability of basic consumer goods is a basic need should be dispelled by the conclusion of the Tanzania mission that 'There seems little doubt that if villagers were pressed to give priorities to their main needs the first place would have gone to the supply of essential consumer goods' (ILO, 1982, p.205). Yet they were not explicitly part of the 1976 statement; in first environments, and in first thinking, supplies of soap, salt, matches, paraffin and the like, are assumed. The reality in some last conditions can be that basic goods are basic needs: as was said to the Zambia mission, 'Without goods, money is nothing' (ILO, 1981b, p.22).

Employment and livelihood

Employment is a first concept, derived from formal sector employment in a job, with a regular salary or wage, at a work-

place. The 1976 ILO conference was on world *employment*.[2] The Director-General of ILO wrote at the time that the basic-needs approach 'implies that each person available and willing to work should have an adequately remunerated *job*' (ILO, 1976, p.7). The Nigeria Constitution of 1978 included a statement that the State 'shall direct its policy towards ensuring . . . that . . . a reasonable national minimum living *wage* as well as social security benefits would be provided for all citizens'.[3]

Some limitations of these concepts have long been recognised. In his magisterial work on Asian poverty, Myrdal agonised thoroughly over the misleading preconceptions of Western economics when applied to Asian conditions:

> When new data are assembled, the conceptual categories used are inappropriate to the conditions existing: as, for example, when the underutilisation of the labour force in the South Asian countries is analysed according to Western concepts of unemployment, disguised unemployment, and underemployment. The resulting mountains of figures have either no meaning or a meaning other than that imputed to them . . . . The very fact that the researcher gets figures to play with tends to confirm his original, biased approach . . . the continuing collection of data under biased notions only postpones the day when reality can effectively challenge inherited preconceptions (Myrdal, 1968, pp.12-23).

And he called for behavioural studies founded on observations of the raw reality (Myrdal, 1968, vol.2, p.1027), which, for many of the rural poor, is very different. Their concern appears to be less with employment than with livelihood: a level of wealth and of stocks and flows of food and cash which provide for physical and social well-being and security against impoverishment. Most families of small and marginal farmers and of the landless are concerned not with a job or a work-place, but with sustaining and improving a repertoire of activities which will provide them with an adequate and secure level of living around the year. These may include cultivation, keeping livestock; collecting or catching and consuming or processing and selling, common property resources (firewood, charcoal, fish, grass, medicinal plants, wild animals, bamboos, reeds, tree fodders, etc.); casual labour; hawking; seasonal public relief works; seasonal migration; work as artisans (pottery, basket- and mat-making, earthenwork, blacksmithy, weaving, thatching and the like); and many other activities.

Starting from their stance, jobs or employment can make sense for one or more members of a large family if they can be

obtained, but the prime opportunity is to strengthen and add to their existing repertoire, raising the productivity of their labour and filling in seasonal gaps when there is little or nothing to do. To better their lot can involve measures quite different from the generation of conventional employment. These include improving the management and productivity of common property resources and of their access to them (forests, common grazing, ponds and lakes, etc.); organisation to raise casual wages or to get better prices and surer markets for produce; seasonal employment programmes which fill in slack periods; and technology to improve the productivity of whatever resources they command.

Poverty and vulnerability

Another pervasive bias in first perceptions of last needs is the stress on poverty to the neglect of vulnerability. Five dimensions of deprivation are poverty, physical weakness, isolation, vulnerability and powerlessness (Chambers, 1983, ch.5). Any of these can be attacked, but first biases stress poverty in the sense of lack of income, to the neglect of vulnerability in the sense of lack of assets which can be realised to handle contingencies.

In three respects, this emphasis on income fits badly with last realities. In the first place, a high proportion of the 'income' of poor rural people is often in kind, for subsistence – especially crops and livestock which they grow or herd themselves. Economists have tried to accommodate this by placing a cash value on subsistence flows. Second, the method fits best with a regular wage or salary income which does not vary round the year – a characteristic of urban, industrial, formal sector employment which contrasts with the variations of rural incomes year by year, and within years, season by season.

Third, the income definition of deprivation overlooks vulnerability to contingencies. This is easily neglected by first professionals. Shielded by state social security, by savings or by other means, they underestimate the importance of contingencies for others less fortunate. But for the rural poor the position is radically different. They are vulnerable to many sudden unforeseeable needs, which may be great or small, or needs which are foreseeable but large. These include social conventions, such as dowry, bridewealth, weddings, funerals and other ceremonies; disasters, such as floods, fires, the collapse of a hut, theft of animals or tools, the death of an animal, a bad year for crops; physical incapacity, such as sickness, accidents, the child-bearing sequence; unproductive expenditure, such as children's education,

bribes or investments, where these do not pay off; and exploitation by the rich and powerful.

In many places the costs of such contingencies have risen while the social supports which in the past helped the poor to meet them have weakened. Health treatment which once was cheap, through traditional remedies, increasingly opens up expensive options which impoverish those whose relatives are seriously sick. For those who are peripheral, the costs of transport add to the problems. While costs of contingencies have been rising, the mutual supports of patrons, the extended family, neighbours, and the community have generally been weakening.

Against this background, the income approach to poverty assessment, and the prescriptions and policies which follow from it, do not cover the needs of the last very well. The deprivation of a family is related to vulnerability as well as income. A family with a lower income but with more assets to meet contingencies may be better off than a family with a higher income but fewer assets. Families whose assets are mainly productive are especially vulnerable to impoverishment, since disposal of them to meet a contingency will reduce the family's productive or earning capacity. Government programmes, however, tend to overlook the implications of this point. The Integrated Rural Development Programme in India is an example. It is targeted to households below the poverty line and designed to raise them above it in income, usually through a subsidised loan to acquire an asset. But the asset itself may constitute an element of vulnerability. Milch buffaloes are often provided but they are large and indivisible, that is, they cannot be sold in less than single major units, and if they die all is lost.[4] Poverty, in income, may be reduced while vulnerability to impoverishment is increased. In contrast, recognition of the importance of assets which are small or divisible, which spread risks, and which can be disposed of readily without a conspicuously distress sale, points towards smallstock (goats, sheep, pigs, poultry, rabbits, guinea fowl and so on) and trees, which can usually be cut and sold at any time of the year. With these, income may be raised and vulnerability reduced at the same time.

First and last in agricultural technology

Agricultural research and extension present a case of applying first approaches to last conditions. Parallels could be found in engineering, medicine and other professions.

In the core, or first, model for agricultural research, high-

yielding technology is developed by scientists in controlled conditions in agricultural research stations, in laboratories and in greenhouses. The technology is then transferred to farmers through extension organisations. This model worked well in the United States, and was transferred internationally to other countries. The green revolution in wheat in North-west India is its most spectacular success, encouraging attempts to apply it to other conditions. In practice, however, this 'transfer-of-technology' (TOT) model works well only with resource-rich farmers, whose conditions resemble those of the research station. Resource-rich farmers typically have fertile soils, controlled irrigation, tractors or strong draught animals, and good access to credit and agricultural inputs like improved seed, fertiliser and pesticides. They also face relatively low risks, and they produce for the market. Conversely, the TOT model works badly with resource-poor farmers. Typically they have poor soils, either no irrigation or irrigation they cannot rely on, no draught animals, or only weak ones they have to hire, and poor access to credit and agricultural inputs; and they face high risks and give priority to assuring their subsistence food supply. For them the high-input technologies generated by the TOT approach not only do not fit; they may be positively dangerous. In consequence, they do not adopt the new practices, and are then labelled conservative and uneducated. 'We must educate the farmer' is still a common cry among first professionals.

The inappropriateness of the first technologies, such as mechanical cultivation, exotic cattle, purchased inputs including chemical fertiliser and pesticides, for resource-poor farmers has been increasingly recognised. New approaches to agricultural research have been evolved[5] which reverse the sequence of research and start with farmers and farm households and their needs. An attempt is then made to identify or evolve technologies which will satisfy those needs.

Collectively, these approaches put the farm family first, and have been described as the farmer-first-and-last model,[6] which involves four reversals from first to last: explanation, learning, location and evaluation.

1 Explanation of non-adoption of new technologies needs to shift from deficiencies of the farmer and the farm level to deficiencies in the technology and in the technology-generating process, that is, from blaming the last to blaming the first.
2 The reversal of learning entails the transfer of technology from farmer to scientists, with scientists systematically adopting the

role of students of farmers' needs and practices.

3 The reversal of location is from research station cores to farm-level peripheries, requiring research and development on-farm and with-farmer, sharing farmers' conditions, management practices and risks, with research stations and laboratories in a referral and consultancy role.

4 The reversal in evaluation is from judgment of technology by scientists' peers to judgment by farmers. The indicator of success is not the number of professional papers published but the number of farmer adopters. From being peer-oriented, research becomes client-oriented.

The nature of these reversals is summarised in Table 13.3.

First defences: blame, distance and denial

Many professionals find reversals such as these threatening. Conditioned to learn from above and trapped in hierarchical organisations, their reflexes are to look upwards not downwards for authority, information, approval and priorities. But, again and again, the first technologies and categories which they seek to project and transfer do not fit and are rejected by the intended 'beneficiaries'. Faced with this failure, first professionals have three defences, used separately or together: blame, distance and denial.

Blaming the uneducated is the easiest and most automatic, of which many examples could be quoted.[7] Distance is the second defence. Avoiding direct contact prevents the embarrassment of facing discordant views and facts. Such avoidance may be deliberate or involuntary, or some combination of the two. Lack of contact with, and learning from, the rural poor is built into the spatial and other biases of rural development tourism, while the defence of distance from the poor has been reinforced by the poverty of Third World governments, which reduces rural travel by professionals. Denial is the third defence. Bunker Roy[8] has written about the inability of scientists to admit that they can be wrong, especially when a problem they have not foreseen is raised by someone they consider less intelligent than themselves.

Last thinking

The frequency and intensity with which first professionals defend themselves by blame, distance and denial reflects the depth of the threat presented by learning from the last. Part of the threat is the

Table 13.3 Contrasts in learning and location

	First approach *Transfer-of-Technology*	*Last approach* *Farmer-first-and-last*
Research priorities and conduct determined mainly by	needs, problems, perceptions and environment of scientists	needs, problems, perceptions and environment of farmers
Crucial learning is that of	farmers from scientists	scientists from farmers
Role of farmer	'beneficiary'	client and professional colleague
Role of scientist	generator of technology	consultant and collaborator
Main R and D location	experiment station, laboratory, greenhouse	farmers' fields and conditions
Physical features of R and D mainly determined by	scientists' needs and preferences, including statistics and experimental design research station resources	farmers needs and preferences farm-level resources
Non-adoption of innovations explained by	farm level constraints failure of farmer to learn from scientist	research station constraints failure of scientist to learn from farmer
Evaluation	by publications by scientists' peers	by adoption by farmers

paradigm of 'last thinking'. To adopt last thinking, first professionals have to suspend much that makes them feel secure. They have to do a 'flip' and see things from the stance of those who are last, taking hold of the other end of the stick, as psychologists sometimes call it. They have to learn from below

instead of from above. They have to accept as teachers those whom they have been conditioned to regard as ignorant and inferior. Instead of working with and for the high-status rich, they have to work with and for the low-status poor. Instead of standing and lecturing, they have to sit down, listen and learn.

More, they have to accept the priorities of the last. These often differ from those of the first. Sadgopal[9] recounts how officials in a dry and barren area in rural India had planned an expensive (first) programme involving exotic cattle and an artificial insemination network. But local landless people, when consulted, suggested afforestation of barren land, and the allocation of contracts for minor forest produce to local small contractors instead of to large outside contractors who took most of the wealth. None of them mentioned a cattle programme, which it turned out was desired only by a few large farmers who would benefit. As so often, first values in a programme meant that the better-off would gain. The priorities of the poor were quite other.

Poor or not, farmers' priorities often differ from those of scientists. In a fertiliser programme in Colombia reported by Ashby,[10] scientists wanted on-farm trials to test the yield-response to different doses of phosphate rock. Farmers wanted to know responses to combinations of phosphate rock with the established last (indigenous, small, dirty, smelly) technology of chicken manure. The resulting research design took and tested the farmers' (last) questions using a conventional (first) statistical method.

There is a clue in this example. It was not a question of either first or last, but of a combination. It would be as foolish to place indigenous technical knowledge on a pedestal, as inherently always superior, as it is to consider modern scientific knowledge the only knowledge. The key is to get the best of both. But because modern scientific knowledge is so powerful, and so profoundly linked with the status and self-importance of first professionals, a major and often traumatic effort is involved in making the reversals needed for balance.

Last thinking entails:

1 Putting first what those who are last want and need;
2 Understanding their situation, resources and problems;
3 Combining these to determine programme and research priorities.

First knowledge can then be used in a referral role, to be tapped and adapted where it will be useful to the last. Putting the last first, and putting last thinking before first thinking, changes the agenda of research and action.

An agenda for research and action

To consult those who are last is the first step in seeking an agenda. In a sense, therefore, this paper should end at this point. To go further is, for me, as a first person, to project. Nevertheless, the argument points towards areas to explore, and these are presented here with the qualification that those who are last in any environment will generate their own, no doubt different, agenda.

Subjects for research neglected because of the structure and biases of first thinking include:

First bias	*Neglected last subjects*
Growth and spread	Economic decline and retraction from peripheries and their effects on last people
	Processes of impoverishment
Science and quantification	Indigenous technical knowledge
	Non-quantifiable qualities
	Individual household case studies
Learning from above	Methods of learning from the last
	Psychotherapeutic techniques for introspective insights and making 'last-first' flips
Employment thinking	Strategies for gaining rural livelihoods, including seasonal activities, migration, the use of common property resources, etc.
Poverty defined as low income	Vulnerability, contingencies, and the value and use of assets as buffers, including their characteristics, classification, usefulness, and sequences and manner of use by last people

Last thinking also identifies gaps where technology has not yet been developed between disciplines, professions, and government departments. Existing disciplines, professions and departments have often generated and disseminated technologies which have fitted the capacities of the less poor and have been appropriated by them. The opportunities presented by gaps may also be opportunities for those who are last, since they are as yet unappropriated. New energy technologies are one domain. Another is agro-forestry, involving the interaction of crops, trees and/or livestock. Agro-forestry relationships are familiar to many small farmers but have been neglected by the specialisations of agronomy concerned with crops, forestry with trees, and animal husbandry with animals. In many environments, agro-forestry may present a major opportunity for resource-poor families.[11]

Other research needs are presented by the 'last realities' list on p.307. They suggest many topics such as the unpaid tasks of women, subsistence crops, smallstock, organic manure, and non-timber forest produce, where sensitive research and development should benefit the poor.

These areas of ignorance or former low priority also indicate opportunities for action. There are programmes already designed to put the rural last first. Over the past two decades India has initiated a series of large-scale administered programmes intended for target groups of last people: small and marginal farmers, landless labourers, those who are seasonally unemployed, those in resource-poor areas, harijans, tribals, women and children. There have been successes, such as the Maharashtra Employment Guarantee Scheme, and also many disappointments. For the future, such programmes, in all countries, will be more successful if their design and priorities reflect more accurately the perceived needs and actual resources and capabilities of the poorer.

NOTES

1 This is an edited version of the article 'Putting last thinking first: a professional revolution', published in *Third World Affairs 1985*, Third World Foundation for Social and Economic Studies, London, pp.78-94. The paper was presented to TOES and is reproduced here by kind permission of Third World Affairs.

2 All emphases in this paragraph are Chambers'.

3 Clause 16(2), quoted in ILO, 1981b, q.v.

4 There is, however, an insurance policy as part of the IRDP.

5 Michael Collinson, 'A low-cost approach to understanding small farmers', *Agricultural Administration*, 8(6), November 1981, pp.433-50. Robert E. Rhoades and Robert H. Booth, 'Farmer-back-to-farmer: a model for generating acceptable agricultural technology', *Agricultural Administration*, 11, 1982, pp.127-37 (also available as Social Science Department Working Paper 1982-1, International Potato Center, Aptdo. 5969, Lima, Peru). J.B. Raintree and Anthony Young, 'Guidelines for agroforestry diagnosis and design', ICRAF Working Paper No.6, International Council for Research in Agroforestry, PO Box 30677, Nairobi, Kenya, November 1983.

6 Robert Chambers and B.P. Ghildyal, 'Agricultural Research for Resource-Poor Farmers: the Farmer-First-and-Last Model', *Ford Foundation Discussion Paper*, Ford Foundation, New Delhi, 1984.

7 Anil Sadgopal, 'Between question and clarity: the place of science in a People's Movement', Vikram Sarabhai Memorial Lecture, 12 August 1981, Indian Council of Social Science Research, New Delhi.

8 Bunker Roy, 'Science and the rural poor', *Indian Express*, Delhi, 1 November 1983.

9 Sadgopal, op. cit.

10 Jacqueline A. Ashby, 'Participation of small farmers in technology assessment', Report on a Special Project of the International Fertiliser Development Center, A.A. 6713, Cali, Columbia, 1984.

11 W.R. Bentley *et al.*, 'Agroforestry: a complex system for resource-poor farmers', Paper given at the Indian Society of Tree Scientists' Satellite Session on Agroforestry, Birla Institute of Technology, Ranchi, Bihar, January 1984.