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RURAL PEOPLES' KNOWLEDGE, FARMER ORGANISATIONS AND REGIONAL DEVELOPMENT: IMPLICATIONS FOR AGRICULTURAL RESEARCH AND EXTENSION

(or from farming systems to food systems)

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ABSTRACT

The context within which rural people in Latin America farm and put together their livelihoods is changing rapidly: farmers are faced with increasingly competitive markets, input price rises and in some cases environmental degradation. It is also the case that these livelihoods have become ever more complex, and many rural families are not able to support themselves on agricultural activities alone. This implies that concentrating resources on agricultural technology development may not be the most effective response to the needs of many rural people whose livelihoods are more affected by other parts of the food system (such as agroindustry), or by other economic activities (such as migration). Insofar as training is part of a rural support programme, this interpretation also implies that assisting rural people in the development of new skills to help them deal with problems they currently cannot deal with may be more useful than agricultural technology training.

The experiences of Indian organisations in Ecuador and Bolivia also suggest that the most successful rural support programmes are those that acknowledge the need to enter non-agricultural training and to address off-farm income generation. Overall, the most successful organizations have promoted a bottom-up controlled process of agricultural modernization, rather than a traditional knowledge based strategy. Interestingly, the strongest organizations, and those that have had particular impact on rural poverty, are those that have first concentrated on the context rather than the content of rural livelihoods (by addressing issues of land rights, agroindustry, marketing, rural banking etc). They have then developed agricultural research and extension strategies on the basis of these other activities, not vice versa. There are general lessons to be

learnt regarding the organization of research and extension and the role that farmer organization can play in this. The paper concludes with a discussion of these lessons.

A. INTRODUCTION[1]

Much has been written about the virtues of indigenous, or rural peoples' knowledge (RPK). Rightly so. The rural poor are constantly engaged in the process of applying, adapting, reworking and updating their knowledge. They know their local environment better than do many, perhaps all others. And yet, for all their knowledge many remain poor - as one Ecuadorian farmer recently said to me - "it doesn't matter how much knowledge we have if we don't have the resources to use it."

While this paper also affirms the importance of rural peoples' knowledge, it questions some of the more static and at times idealised ways in which it has been discussed. Indeed, the paper is primarily about the limits of local knowledge, and about the ways in which rural people themselves use one strategy - organisation - to address those limits, and push back the borders of what they know, and what they can do with what they know.

In addition to being a paper about the limits of local knowledge, this is also a paper about the implications of those limitations for research and extension (R&E) strategies conceived within a food systems perspective that links its analysis of on-farm technological practice to the regional economy in which farmers operate.[1] That regional context is one characterised as much by change and uncertainty, as by pattern and predictability.

The paper begins by setting out some key elements of this changing context in Latin America. It then draws upon the experiences of several farmer organisations in the Andes to suggest some of the ways in which research and extension might be more effective in helping farmers deal with the regional context in which they compose their livelihoods. Indeed, this leads me to suggest that we must link our thinking about RPK and R&E closely to an analysis of the livelihood strategies people pursue. Furthermore, this R&E, I will argue, must be as concerned to affect change in the context in which people pursue their livelihoods as in the actual technical practices used on farm. R&E

[1] An earlier version of this paper was prepared for "Beyond Farmer First" Workshop, Brighton, 27-29th October, 1992.

support might then also pay closer attention to the wider concerns and information needs that rural people have but that are not directly related to production technology: it might also address factors that undermine the sustainability of rural livelihoods and the relevance of RPK to contemporary problems.

While the examples are based on farmers' organisations, it is my contention that many of the arguments have a wider relevance to the ways in which the research and extension activities of other organisations might be made more relevant and effective.

B. A REFLECTION ON RURAL PEOPLES' KNOWLEDGE

The problem with celebrating RPK

In having named something called RPK, or indigenous technical knowledge (ITK), and then discussing it with the particular purpose of promoting a more participatory form of agricultural research and extension that would build on farmer agronomic knowledge, the so-called farmer first literature has done the rural poor a great service. Within agricultural development institutions, it has helped change attitudes and behaviour towards farmer expertise and knowledgeability. It has also undoubtedly put back on the map rural peoples' capacity to do something and to affect change - a welcome antidote to some of the deterministic (and pessimistic) approaches of peasant studies and political economy that dominated much of the 1970s. The farmer firsters have promoted ideas of participation and social equity and have used an argument about the (very real) technological expertise of farmers as a means not only of promoting new approaches to technology development, but of questioning power relations between professionals and farmers that had been taken for granted.

All this is an extremely positive contribution. However, it seems to me that in making the case for RPK, the case has sometimes been oversold, and rural life has sometimes been presented in ways that do not reflect what is happening at the so-called grassroots. In particular, I want to suggest the following:

i) that the agricultural dimensions of rural life have been emphasised, creating the image that rural people are *ipso facto* farmers, that agricultural technology is central to solving rural poverty and that pre-modernised[2] resource management techniques hold keys to this solution;

ii) that in emphasising the creativity of rural people, the question of constraints on rural people, and the causes of constraint, have been somewhat lost from view;

iii) the emphasis on what rural people know about technology and ecology has diverted attention from the myriad things they do not know about markets, politics and the machinations of a world beyond the farmgate that has long since pushed that gate open and trampled over rural peoples' welfare;

iv) the emphasis on revalidating past resource management practices has understated the importance of changes in rural peoples' contemporary context and the implications that they have for rural livelihoods.

Given these observations, I want to suggest that we should always understand RPK as dynamic, something created by individual rural people as part of their livelihoods within changing, and often prejudicial contexts. Recognising this social context also makes explicit that rural livelihoods and knowledges are diverse and that their contexts are ever-changing. In recent times it also draws particular attention to the facts that:

- pressures on, and challenges to, agriculturally based livelihoods are intensifying and undermining the relevance of some earlier agricultural practices;

- rural people are far from being traditional, have many "modern" goals and ideas, and are constantly presented with new challenges for which locally generated knowledge may not hold much guidance;

- it is increasingly the case that agriculture is neither the only nor the main problem or income source for many rural people, and that different rural people have quite different needs.

Let us now take a closer look at some dimensions of this changing context within which the rural poor compose their livelihoods. We will then consider several important patterns in the responses of farmer organisations to these changing contexts. These responses hold lessons not only for R&E conducted by farmer organisations, but for the practice of R&E in general.

At this point I wish to focus my attention on the case of Latin America and particularly the Andean countries.[3]

Some elements of a changing context for rural producers

(a) *The "New Technological Agenda": Transforming Traditional and Green Revolution Agriculture*[4]

Entering the 1990s in Andean America a series of 'new' conditions and 'new' challenges to small farmer agriculture has become apparent: some of them genuinely reflect new changes, others, I suspect, are not so new for the people who live them, but are 'new' because analysts and policy makers have begun to recognise them. Either way, they have come together to set what David Kaimowitz (1991) has termed the "new technological agenda": a set of technological challenges for a changing world to which the Green Revolution package *per se* is unable to respond, and to which it has, in several regards, contributed.

The main changes forcing the new agenda have been (Kaimowitz, 1991):

1) the crisis of the 1980s, which led to reduced investment in research, extension and in the agricultural in general, leading to an ever weaker support system for the rural poor;

2) the rounds of currency devaluations which have led to rapid price increases in fossil-fuel based agrochemical inputs, making the Green Revolution packet less cost effective;

3) trade liberalisation and the creation of regional trading blocks, leading to the removal of tariff and other barriers, and thus opening small farmer agriculture up to many more competitive pressures;

4) the institutional recognition of environment and sustainable development.

The second and third of these changes have intensified the pressure on small farmers to increase productivity to lower costs, increase competitiveness, and use all inputs much more efficiently, in both technical and economic terms (Kaimowitz, 1991). If small farmer agriculture does not change in these ways, it will be increasingly displaced.

At the same time, there is new pressure to identify technologies that do not have noxious environmental impacts, and which indeed help recover degraded lands.

Rural peoples' knowledge of their land and crops will of course have important contributions to make to any technical responses to these new challenges, particularly in the identification of low external input and sustainable agricultural technologies (LEISA). Nonetheless the sort of economic efficiency that is demanded will also require capacities for numeracy, economic abstraction, market research (eg. to identify niche markets) and identification of cost controlling, productivity enhancing genetic material that the rural poor do not have (Byerlee, 1987). Indeed, a research project in Mexico, Brazil, Paraguay and Peru in the 1980s identified the very positive effects of formal and higher education on productivity and income in rural areas, precisely because it helped develop skills of abstraction and numeracy required to handle markets and new technical inputs (Figueroa and Bolliger, 1985; Cotlear, 1989). Derek Byerlee (1987) has similarly argued that formal education and human capital formation are essential if the momentum of the Green Revolution in Asia is to be maintained. The rural poor are, like it or not, firmly integrated into the market (Barsky, 1990). Their well-being and survival depends on how well they can handle and negotiate this integration.

This obviously has implications for R&E practices. Firstly, R&E will have to focus on management skill formation (and often formal skills) and local institutional development and not only on technologies. Secondly, the fall in investment in public sector R&E institutions means that this support will have to come in many cases from the private sector. Rarely will the commercial private sector respond to this, and consequently much of the task of farmer training and local institutional development will fall to NGOs and, where they exist and are strong, farmer organizations (see Farrington and Bebbington, 1992 for this workshop; and Bebbington and Farrington, 1993).

(b) *Regional development for rural people: linkages, surplus retention and labour markets*

A further, albeit intimately related, set of processes and changes to which a reorganised R&E practice, and a relevant concept of RPK, must respond are related to patterns of development and underdevelopment in the regions in which the rural poor piece together their livelihood strategies. Even if the political economic literature erred too far in its dependency perspectives, it was at least correct to stress that rural livelihoods depend as much on agrarian structure, land tenure and the relations of unequal exchange that lead to the transfer of surplus to urban and wealthier social sectors, as they do on agricultural technology.

Enhancing the rural poor's capacity to negotiate the market, is equally a question of increasing their ability to negotiate these social relationships.

The "situated" nature of rural livelihoods demands that we look more carefully at this regional context of the rural economy. If we do so, we often find that increasingly rural livelihoods depend on many non-agricultural, often non-rural income sources (Barsky 1990; Klein, 1992). Martinez (1991) reports a region in the Ecuadorian highlands where 40% of rural families have two jobs within the countryside, and Klein (1992) draws attention to the growing importance, particularly for women, of home-based work, either as a domestically owned cottage industry or in some form of contracting out relationship with urban manufacturers. This work is spatially and temporally combined with farm work. These studies also suggest that in order to better target R&E strategies we need to know much more about how, in different contexts, rural incomes are made up - for different social groups.

In many areas and for many people, then, agriculture is not the only, nor the main, source of income: people therefore often need assistance with these other activities at least as much as they do with their agriculture. And of course, very many farmers also migrate seasonally to supplement their incomes: most of them would sooner not (Bebbington, 1992; Chambers, 1988).

In this sense, then, agriculture needs to be placed in a wider context. Strengthening other employment sources in rural areas can help take pressure off land, and thus perhaps address certain degradational tendencies (although this also depends on many other factors to do with land stewardship and markets). Also, if much of rural consumption depends on non-agrarian incomes and entitlements, to concentrate on nice, neat, photogenic soil conserving technologies, indigenous experimentation and farmer-to-farmer extension can miss the point. It runs the risk of, for instance, suggesting "success" when terraces and soil contours spring up across the landscape, but in fact the unnoticed nutritional status of the families and children involved remains chronically deficient as a consequence of other changes in the rural economy[5].

On the basis of such observations, de Janvry and Sadoulet (1988) have argued that a strategy to alleviate rural poverty should aim to promote rurally-based non-agrarian incomes. Such a strategy should do this, they say, primarily by finding ways of increasing agriculturally-derived incomes, in order to create a demand for non-agrarian products and services that could be provided locally (Klein, 1992). The essence of this 50% of strategy would be to find mechanisms facilitating the retention of profits within a region. Such

mechanisms might include new marketing arrangements and the incorporation of a processing stage to develop new forward and backward linkages within the regional food system. Aside from a direct creation of employment in processing, the resulting positive impact on farmer income would, de Janvry & Sadoulet (1988) suggest, create a derived demand for services and goods which could be generated locally. Of course, finding the institutional mechanisms to make this work is more complicated - but not, as we will see, necessarily impossible. Identifying and supporting these institutional arrangements, and helping develop the markets for the products being processed should be a central thrust of reorganised R&E (cf. Barsky, 1990) - R&E for a food systems approach cognizant of the realities of the regional economy.

Some of these observations are hardly new. We can turn to sourcebooks on agricultural development like Eicher and Staatz (1984) and find that both neo-classically minded and marxian economists were concerned about vertical linkages, surplus extraction (and retention) and social service provision (especially education) 20 years ago. The point is that for all our interest in technology and farmer expertise in resource management we cannot pretend the regional economy is not there: it is, with a vengeance. Certainly farmers can't afford the luxury of pretending it isn't there, and as we will discuss they have elaborated responses to it which may point to the rudiments of a relevant research and extension practice.

(c) *Rural aspirations: the new and the old*

This integration of rural economics into a far wider economy is one part of a whole series of life-style changes that have occurred in the Andean countryside, particularly since periods of agrarian reform in the 1960s. The modern has come, not only in the form of fertilizers, but in radios, new textiles, bicycles, vans, school notebooks, school uniforms. It has also come in the form of the clothes and cars in which extension agents, non-governmental and governmental, turn up in rural communities.

With these and other changes come new aspirations, access to many of which requires an increased income. Farmers look for technologies that serve this end. The provenance of the technology (old or new, traditional or modern) matters far less than its effectiveness.[6]

This is a very blunt assertion requiring two immediate caveats. On the one hand, when it leads to rapid abandonment of traditional practices, this

technological pragmatism can have detrimental effects with which we are all familiar. Observing these effects, many have argued for a recovery of those 'traditional' or 'indigenous' practices, to allow a more ecologically benign resource management, and to reassert traditional cultural identities.

On the other hand, the contrapositioning traditional/modern is not an either/or for the rural poor. Indeed, in the practices they hold most dear much of the traditional continues: in the Andes, for instance, the concern for family, community, fiestas and love of the countryside can continue at the same time as people farm with fertilizers. Indeed, many families may use such yield enhancing agrochemical technologies in order to try and avoid migration and so protect and continue to enjoy these other aspects of rural culture.

The point, however, is that rural people have their own good reasons for doing what they do. They therefore have good reasons for using the modern as well as for using the "traditional". Some of those reasons have less to do with the traditions that some NGOs and others suggest they ought to be interested in, and more to do with a desire for the modern facilities that NGOs themselves enjoy.

(d) *A reflection*

From these observations, we can make several points about RPK that have implications for R&E.

(i) Rural peoples' knowledge is not only technical. It also includes the range of aspirations, values and preferences rural people have.

(ii) RPK is not static. It is constructed through the socio-economic and cultural histories of the regions within which people live - histories composed by 'situated' rural people whose actions then change the conditions within which they live.

(iii) Finally, RPK is never enough. Rural people may know a lot, but they would like to know a lot more in order to be more powerful in their negotiations with political, economic and social forces that have long contributed more to their poverty than has the absence of relevant improved technology. Rural people, nonetheless learn, and from that learning process we too can learn very much.

(iv) The use that rural people can make at any one time of the locally generated and introduced knowledge they possess, and the advantage they can gain from this depends on "contextual" factors in the regional political economy (land distribution, marketing relations, vertical linkages, etc). Any enhancement of the contributions that technology can make to their livelihoods will therefore depend greatly on interventions to influence these "contextual" factors. Similarly R&E support will be most effective when it integrates knowledge of these contexts with the type of technical support given to farmers, and when it strengthens peasant capacity to negotiate some of these technical factors.

C. ENHANCING RURAL LIVELIHOODS

Responding to these challenges is beyond the capacities of most formal research and extension organisations as they are currently organised: their focus on production technology and "messages" is quite different from the need to look at processing technologies, local institutional development and skill formation. Similarly, the focus of many private organisations on recovering traditional techniques will be insufficient in meeting current problems. However, some illustrative experiences can be identified in the trajectories of agricultural development work in several farmer organisations. I will consider these here.[7] In doing so, however, it is not my purpose to suggest that only farmer organisations can perform these roles of creating on-farm/off-farm linkages, and inter-institutional linkages. Indeed, the arguments about what needs to be done apply equally to other areas where farmer organisations are weak or absent.

Federations and the farm: the limits of farmer to farmer extension

In the central province of Chimborazo in the highlands of Ecuador a long history of everyday peasant politics on feudal estates spilled over into a more strategic and organised struggle for land in the 1950s and 60s.[8] One of the fruits of this peasant activity has been the steady formation of indigenous (Indian) farmer federations, of which there are now over thirty in the province.[9]

These federations link together base organisations (communities, cooperatives etc), generally at a parish or county level, and in Chimborazo can unite up to forty organisations. Much of their activity has revolved around bi-lingual literacy training, in which issues of social and cultural rights and the revalidation of ethnic identities were addressed as part of educational programmes. Much

effort was expended in strengthening the internal management and negotiating capacities of base organizations, by forming leaders and providing basic training in land and community legislation, accounting and administration. In this they generally worked with the support of the local church and NGOs.

This politico-cultural action was combined with attempts to negotiate better public services for communities. Some such negotiation was direct with the state: the federations essentially absorbing administrative costs and facilitating the access of member communities to public resources. Over time, federations began to negotiate funds, and began to deliver services to their members on the federations' own account (Bebbington, 1992).

Agricultural development projects grounded in farmer to farmer extension activities were central to these project activities. These constitute the federations' own attempt to identify a regional resource management strategy, and had to respond to a situation of demographic increase on fragile sloping lands ranging from 3,200 meters to over 4,000 meters above sea level. Agriculture on these slopes is rainfed, with periods of summer drought; climatic risks are high, and topsoils are easily disturbed.

Although some federations initially aimed to promote native, traditional technologies, the increasing inability of traditional practices to respond to higher pressures on resources in this environment, led federations to chose to promote knowledge of modern agricultural technologies among their members (new crop varieties, fertilizers, pesticides). The reasoning behind this strategy was largely that out-migration is the principal cause of cultural erosion and weakened social ties in communities, and that therefore the main concern of local R&E intervention ought be to reduce migration by increasing farm incomes. The federations provided technical assistance and subsidised inputs to members, largely following the administrative models of public sector rural development and agricultural extension programmes. Their coverage and distribution of inputs was impressive in comparison with formal R&E services although it still showed biases to some areas, and specific communities. Federations have thus moved towards the incorporation of modern technologies as opposed to indigenous technologies, as part of a programme aimed at sustaining other intrinsically Indian practices that depend largely on more stable presence in rural areas - such as festivals, family ties, language etc (Bebbington, 1992).

Yet the strategy appears to have been economically and ecologically unsustainable. With currency devaluations, the cost of agrochemicals at the farmgate has risen dramatically.[10] At the same time, in this particularly eroded

environment, soil loss on unterraced slopes means the pay-off to use of fertilisers has fallen, and will continue to be so until such erosion problems are addressed - and indeed until there are sufficient incentives to encourage this. Finally, farm units are very small, and for most families yield increases from applying fertilizers do not generate sufficient income to reverse migration pressures. Federations, and farmers, are thus faced with a situation in which neither traditional nor agrochemical technologies provide a viable basis to local livelihood strategies.

This in turn has implications for the organisational sustainability of the federations as vehicles for local R&E. Initially, the delivery of subsidised inputs and free technical assistance enhanced the legitimacy of the federations among their members. Over time, however, it became apparent that the income impacts of this assistance at a family level was negligible: a federation of, say, 37 member communities with an average of 40 families per community could not attend the needs of all these families. This, coupled with the tendency of certain communities and families to exercise disproportional influence over federations, has led to a concentration of service delivery in favoured communities. At the same time, the federations are unable to continue funding the strategy of delivering subsidised services to their members, which makes their *raison d'etre* before the bases seem increasingly tenuous - all the more so when those services seem biased to some communities and not others.

These weaknesses have led to some splintering within the popular organizations in this region of the highlands. Member organizations of the federations break away to negotiate their own projects. This loss of interest undermines the coordination of activities among local groups. Obviously, this weakens the possibility of coordinated participation of Indian populations in regional and agricultural development strategies - it also weakens the possibility of the federation coordinating its work with those of other R&E institutions. For these federations to be a vehicle of locally managed agricultural development they have, then, to respond to the challenge of making an economic difference, as well as an institutional difference.[11]

El Ceibo and FUNORSAL: federations and food systems

The challenge to Chimborazo's federations is in some respects no different from that of formal research and extension services. They too have had little success in making significant impacts on rural livelihoods; they too are financially

dependent on other paymasters; and their legitimacy is questioned, often far more so, at the grassroots.

In responding to this challenge, something can be learnt from those few farmer federations who have succeeded in moving further along the food system into processing and marketing activities. In doing so, these federations have begun to institutionalise vertical linkages within the food system in two senses:

(i) vertical economic linkages: linking farm production to marketing and processing activities within the region, and indeed to markets outside the region;

(ii) vertical technology development linkages: linking research and extension activities and institutions with farmers' own choice and adaptation of technical practices, and with information on the demands and nature of final product markets.

As a consequence of these activities the federations have assumed critical roles in local livelihood development, and in integrating local and non-local knowledge and information systems. At a nitty-gritty level, they have also generated income and jobs, two of the criteria by which any technology development institution perhaps ought ultimately be judged.

(i) The **Foundation of Organizations of Salinas** (FUNORSAL), in the highland province of Bolivar, is a case of a successful, federation pursuing a resource management strategy that has improved incomes, strengthened the federation of 23 base organizations and rendered local development administration more participatory and more coordinated.[12] As in Chimborazo, its challenge has been to develop a regional resource management strategy for high altitude (over 3,500 meters), sloping, windswept, cold and dry lands.

This success, however, reflects special historical factors in the zone. Salinas is marked less by local political conflicts than is Chimborazo and so the church and NGOs who played important roles in the creation of FUNORSAL did not have to dedicate much time and effort to resolving these conflicts. Instead from the early 1970s they committed theinselves to identifying an economically and technically viable programme of grassroots development.

Secondly, demographic pressure at the time when large rural estates were subdivided was less than in Chimborazo. On average, families received lots of 15-20 hectares. Although local income levels were still extremely low, and (as in Chimborazo) periodic out-migration was perceived as a serious social problem, the larger farm size offered greater potential for profitable agriculture and accumulation than in Chimborazo. This potential began to be realised after an international organization did a study of the dairy sector in the 1970s, and identified Salinas as a potential area for development. From this information, local organizations and the church (which played an important role in forming and consolidating the regional federation of base organizations in Salinas) hatched a vision and strategy for a grassroots development based on the modernization of the dairy sector. The church facilitated access to technical assistance and to resources to finance this process. The fact that the harsh conditions and geographic isolation of Salinas apparently discouraged multinational dairy companies from entering the region to capture and process local milk production increased the possibility of a locally controlled process of development.[13]

Once again, this was a resource management strategy aimed as much at a social problem (out-migration) and a social goal (to strengthen regional organization and social cohesion by reducing migration), as at a simple concern for sustainable development (Soria and Illingworth, 1989). The programme revolved around centralized collection of peasant milk production, and its processing into quality cheese. The factories producing cheese are joint property of the families in the base organizations, but are coordinated and administered by the federation of base organizations. The federation is also responsible for the subsequent marketing of the cheese. This has provided families with an assured, and significant income source, as an above market price is paid for the milk. Factory profits are not divided directly among members, but are distributed indirectly through the higher price paid for milk, and through subsidisation of loans to members for the improvement of the quality of their livestock. The federation provides for technical assistance to families in cattle and pasture management. Off-farm activities (processing) and market demands for high quality products are thus fed directly into the design and contents of an extension and credit programme.

This model of the federation as the axis coordinating the collection and processing of locally produced inputs has since been reproduced in other

activities (textiles, processed meats, timber processing etc). Each represents a deliberate attempt to take advantage of the market through producing processed, quality local products and negotiating higher prices through the federation. The federation also takes an active role in looking for markets (in conjunction with specialised marketing NGOs) and then trying to adapt local production to meet the demands of those markets. In one case, the federation took 3 years to identify a market for mushrooms that grow in Salinas. Once a Swiss export demand was found, the federation then sought to improve the quality of the product supplied, by advising on farm and federation level handling and processing techniques.

The net effect of these different activities has been to create new income sources, increase demand for on-farm labour, and directly generate almost 300 new jobs in factories that process the products of the region and that are administered by the federation and its member organizations.

Indeed, the strength and legitimacy of the federation with its members stems from their recognition that it has a very positive impact on their family economies. In Salinas there is little tendency for base organizations to separate from the federation (unlike in Chimborazo). All negotiations with external agencies, including the state, are conducted via the federation. This facilitates a locally controlled coordination of regional development activities. It also facilitates institutional linkages as the federation is a point of contact and coordination for the activities of public sector and non-governmental agencies.

Such management capacities do not emerge overnight. Indeed, one of the most important elements of FUNORSAL's ability to move into marketing and processing activities and link them into farmers' own management decisions appears to have been its long-term commitment to a human capital formation at all levels. Much effort has been expended in seeking support for accounting, numeracy and administration courses as well as technical assistance for agricultural production. These are given not only to administrators but also to families in the base organisations that make up FUNORSAL. At all levels, then, the effort has been made to strengthen capacity to manage and respond to the market. In turn, this broad based training increases the likelihood that families are able to monitor the administration of the federation as a whole.

(ii) **El Ceibo**[14]: Strikingly similar patterns can be seen in the case of a second federation of co-operatives, El Ceibo. El Ceibo was formed in 1977, growing out of a cooperative marketing programme among farmers settling the high jungle of the Alto Beni in Bolivia. The principal cash crop of these farmers was cocoa. In 1976 a committee linking a group of cooperatives tried to export cocoa bean to the US (Trujillo, 1991). While initially successful in generating income, this arrangement quickly foundered for several reasons: (1) export markets were soon dissatisfied with uneven quality of beans supplied; (2) the committee lacked operating capital to buy sufficient quantities of beans up-front from farmers, and so could not guarantee quantity; and (3) the rapid infusion of money into an administratively young committee led to management problems (Healey, 1988).

To facilitate access to the technical, management and financial support to address some of these problems, in 1977 the cooperatives created El Ceibo as a formal federation to link, service and represent its member coops. It now unites 36 separate co-operatives (Trujillo, 1991), and in 1988 sold $1.5 million worth of cocoa and cocoa derivatives (Healey, 1988). Among the federation's early actions was the negotiation of financial support. This allowed them to become more fully involved in marketing activities (removing problems of operating capital) and processing. Processing cocoa beans allowed regional retention of more of the value added in the final product. It also allowed a certain control of quality, although El Ceibo focused its attention until 1986 on the Bolivian market.

At the same time, partly in response to the need to meet market demands on quality, El Ceibo sought support from the local government research and extension services (of the Bolivian Institute for Agricultural Technology - IBTA),[15] and indeed benefitted from the knowledge and new planting material that came from government and foreign researchers (Trujillo, 1991). El Ceibo staff and IBTA agronomists visited farmers together and there emerged some sort of research/extension linkage which also linked farmers' and researchers' ideas. From the early 1980s, however, IBTA went into financial decline, lacking resources to give full support to farmers - in the Beni and elsewhere. As it was, it tended to have a tarmac bias and didn't reach the places where most farmers lived (cf. Chambers, 1983). Furthermore, its use of agronomists from different parts of Bolivia who stayed only short periods in the Beni and so developed neither a regional commitment nor the trust of farmers led El

Ceibo to see the need for an extension service based on local people. El Ceibo's response was to seek more overseas financial support to begin its own technical assistance programme, Coopeagro, in 1982.

This was also an institutional response to the urgent problem of Witches Broom - cocoa blight. Indeed, one of Coopeagro's first actions was to send 7 paratechnicians on intensive courses with public sector research and extension institutions in Brazil, Colombia and Ecuador. This training (and genetic material) they brought back served as the base of their extension work.

Coopeagro thus had a team of paratechnicians who gave extension advice to producers. They work in conjunction with other promoters involved in formal education and accountancy training with families that are members of the cooperatives. Positive results have attracted further NGO and bilateral funding and a resident volunteer agronomist. It also led El Ceibo to pay a percentage of the income from marketed cocoa direct to Coopeagro. It now pays 1% on the value of every hundredweight of cocoa it sells, and 5% of annual profits into Coopeagro (notwithstanding this, 60% of Coopeagro's costs are still, however, paid for by Swiss Technical Cooperation). Thus, as in FUNORSAL, some of the profit from processing activities was channelled into farmer administered research and extension.

A second link between the processing and marketing activities of El Ceibo and its farmer to farmer research and extension operations is that market information influences the contents of extension programmes: the federation thus serves as a mechanism for relaying distant information to farmers, and giving assistance in how to respond to it. In 1986/87 El Ceibo began exporting cocoa once again, for the organic market in Europe, gaining a 100% increase in price received for cocoa (Healey, 1988; Milz, 1990). Organic techniques have led to greater crop management problems, but Coopeagro has responded with research and extension assistance to its members, 472 of whom were producing organic cocoa in 1991 (Trujillo, 1991). This assistance has been based on Coopeagro's own system of a central research plot and on-farm trials, and two collaborative agreements with Bolivian institutions involved in agroecological research who have supported El Ceibo in this new activity. Among other things, these institutions have collaborated in trials on the use of organic, legume and rock phosphate fertilization techniques.

Having an R&E team within the federation also enhances responsiveness to problems as they arise. The initial creation and training of paratechnicians in 1983 was one example of such responsiveness. Another came in 1988, as problems emerged with the degeneration of local cocoa varieties. Coopeagro responded with a programme in which it has acquired new 5 varieties from other Latin American countries, screened them on its station and then initiated a programme of co-operative nurseries for the distribution of this new stock.

The strength of Coopeagro's work depends considerably on the administrative and financial strength of El Ceibo as a whole, to the extent that this:

(1) helps generate income for the federation to support some of its technical assistance costs;

(2) helps generate income for farmers, facilitating their ability to make use of Coopeagro's extension service, and more generally strengthening the legitimacy of the federation vis-à-vis the producers;

(3) helps identify and obtain funding and technical support for on-going work.

The administrative capacity of El Ceibo is thus vital, and again it is interesting to see that Ceibo (and its donors) have dedicated much effort and resources to this training. In Coopeagro itself, aside from educational work at the grassroots, eight of its paratechnicians are currently receiving university courses, and among the organisations from which Coopeagro has received training and genetic material are ICA (the Colombian Agricultural Research Institute), IICA (the Inter-American Institute for Agricultural Cooperation) and CATIE (the Tropical Agronomy Research and Teaching Centre in Costa Rica); and in the administrative and marketing divisions of El Ceibo, several are studying for degrees in business, economics and engineering.

As administrators of El Ceibo themselves express, this managerial and technical competence is also important in order for El Ceibo to remain competitive in the increasingly open market resulting from trade liberalization in the region. As pressure on prices increases, so El Ceibo

tries to protect its market share by increasing the quality of its members' production (G. Condori, pers. com., 1990)

D. CONCLUSIONS

Lessons from the federations

The successes of FUNORSAL and El Ceibo in improving family income, in helping introduce economically significant technological innovations and in sustaining their paratechnician-based extension systems have doubtless been due to a series of especially favourable circumstances. Among these are:

(1) occupation of agroecological zones that fortuitously favour the production of high value goods for niche markets;

(2) geographic isolation reducing both the intensity of competition from other traders, and the likelihood of commercial capital taking over the processing activities;

(3) sustained financial and technical support from other institutions.

Thus it is not my intention to suggest that such experiences are easily replicable across the Andes or outside Latin America. Nonetheless, it seems to me that the experiences of farmer federations suggest a range of lessons, or points for reflection, regarding research and extension practices and rural peoples' knowledge.

As regards our thinking about rural peoples' knowledge, the following points seem important.

1) There is little dogmatism about pursuing strategies based only on 'traditional' technologies (and where there has been, organizations have been unable to sustain such strategies). Instead, federations are concerned to draw on outside knowledge wherever this is effective.

2) Local knowledge is valued in a more general sense than its specifically technical context. It is this value that leads federations to prefer farmer paratechnicians over extension agents who come from elsewhere and who do not stay long, with the result that their general knowledge of local

agroecology is weak and that farmers feel unable to trust them or hold them accountable.

3) Local knowledge is thus merely the starting point: 'modern' or external knowledge is then drawn down to meet challenges as they rise (land degradation, migration etc.).

4) The external knowledge and skills sought out are not merely technological; great effort has been made to gain mastery of 'modern' administrative skills and formal education.

5) The aspirations implicit in rural peoples' thoughts are to find means (technological, economic, income generating) to sustain more general qualities of social life. Avoiding and reversing migration, and so enhancing the cohesiveness of local society and family, seem particularly important, as is the generation of a locally controlled surplus that can be invested in the betterment of local livelihoods.

As regards our thinking about the organization of R&E practice, the following seem evident but important implications. Let us divide them in two parts, (a) general implications for R&E and (b) specific implications for role of federations in R&E.

(a) R&E: general observations.

(i) an R&E system needs to make a difference, and generally an economic difference, in order to gain legitimacy with farmers.

(ii) in order to make a difference, R&E systems will benefit from taking non-agricultural or off-farm income sources into consideration. This not only opens the possibility of generating rural incomes, but in some cases, new jobs. As such, this focus addresses the fundamental concerns of the rural poor. This does not mean that Ministry of Agriculture technicians need to become specialists in rural industrialization - but it may mean they should build links with these other specialists and line agencies if local circumstances, and farmers, suggest that they are needed.

(iii) In very impoverished areas such as Chimborazo, it is highly questionable whether agriculture is the place to start if one is to address the felt needs of the rural poor. In such areas extension

programmes seem little more than means of distributing small subsidies to farmers. They become social welfare programmes (with little impact) rather than development actions.

(iv) Federations have shown particular concern to combine R&E with general educational activities at the grassroots - apparently reflecting a grassroot belief that the two ought to be more closely linked (and results suggest some support for this idea), and endorsing the claims of studies such as Byerlee (1987) and Cotlear (1986).

(v) A food systems perspective, bringing on- and off-farm elements of rural livelihoods under the same strategy, and linking production, R&E, processing and marketing seems far more likely to meet these challenges. Of course, bringing all these themes under one institution at a national level would create a bureaucratic nightmare. Once again, this suggest the importance of decentralization and work; through local institutions with support to develop their capacity to 'draw down' resources as needed.

(vi) A food systems perspective can begin to link R&E with questions of poverty alleviation and regional development, as per de Janvry and Sadoulet's (1988) proposals voiced earlier, that any poverty alleviation programme must be based on the retention of regional surplus and the creation of greater demand for rural labour.

(b) Federations

(i) When given financial and training support, federation have been able to establish formalised farmer-to-farmer extension and give as much, and often more support than do public sector services. On the other hand, as in Chimborazo, they are not intrinsically any more able to achieve a significant impact on rural poverty than are State services.

(ii) In some cases, federations have been able to internalize a food systems approach to rural development. The federation has been able to make non-local, especially market and technical, information available to farmers and extensionists in such a way as

to adapt extension advice and farmer practice to the demands of richer markets.

(iii) The federation is a mechanism that, when strong, is able to draw down resources from the State and from funding agencies in ways individual farmers would be unable to. The federation is not, however, the only institutional mechanism that could do this.

(iv) The federation also appears as an institutional mechanism that favours the retention of regional surplus and its reinvestment in activities (such as R&E, job creation) that have a broad (rather than narrow) impact, benefitting significant numbers of poor people.

(v) The strength of federations is directly related to their human capital resources, and to the social distribution of these resources. Federations require strong administrative capacity in their managers, but they can be weakened if the bulk of their members receive no training and are therefore less able to respond to market demands, and less able to understand the actions of their administrators and thus hold them accountable.

(vi) Strong federations that can address rural poverty require far more than traditional knowledge.

A closing general comment

As in the case of farmer first approaches to RPK, an image of complex rural livelihood systems suggests that solutions to local problems (including technologies) cannot be transferred from central sources. Instead, it implies that we need decentralized R&E institutions, and that rural people should have an important role in deciding the nature of R&E programmes. However, it also suggests that concentrating resources on agricultural technology development alone may not be the most effective response to the needs of many rural people whose livelihoods are more affected by other parts of the food system (such as agroindustry), or by other economic activities (such as migration). Insofar as training is part of a rural support programme, this interpretation also implies that assisting rural people in the development of new skills to help them deal with problems they currently cannot deal with may be more useful than agricultural training.

The experiences of farmer organisations in Ecuador and Bolivia also suggest that the most successful rural support programmes are those that acknowledge the need to enter non-agricultural training and to address off-farm income generation. Overall, the most successful organisations have promoted a bottom-up controlled process of modernisation, rather than a traditional knowledge based strategy. Interestingly, the strongest organisations, and those that have had particular impact on rural poverty, are those that have first concentrated on the context rather than the content of rural livelihoods (by addressing issues of land rights, organization, agroindustry, marketing, rural banking, education, etc). They have then developed agricultural research and extension strategies on the basis of these other activities, not vice versa. There are general research and extension lessons here to be learnt from both their content (e.g. practices of farmer-farmer extension and hiring in of technical expertise) and the contextualisation (within a regional economic system) in farmer organisations.

However, strong and sustainable farmer organisations are more the exception than the norm - again, contextual factors are important in influencing the likelihood of a strong organisation emerging. In addition, some organisations construct images of RPK, assuming grassroots interest in traditional technologies where often there is none. Many act as if agricultural technology development is a prime element in reducing rural poverty when it is not. The fact that many operate with misperceptions of grassroots concerns is indicative that mechanisms of accountability within these organisations do not always operate well.

Diversity at the grassroots implies that little should be assumed about the types of support most suited to peoples' desires, circumstances and abilities. This in turn implies that research and extension systems must be demand led and decentralised, and must be equipped to go well beyond the farmgate. The issue of how rural people are best able to exercise such demand is less clear. Rural membership organisations offer some lessons, but are far from ideal. In general it seems important to develop channels for the effective exercise of rural demand over a variety of institutions whose services are relevant to the enhancement of rural livelihoods.

ENDNOTES

1. In this sense it is an empirical argument to substantiate some of the more conceptual arguments of recent network papers (Berdegue, 1992; Baker, 1992).

2. I use the term "pre-modern" not to suggest that the "modern" is necessarily any better than the pre-modern - it is rather a statement describing what came first.

3. "Andean" is something of a misnomer - they all have mid-slope and lowland regions, some dry, some humid cloud and rainforest. Large parts of them are indeed Amazonian.

4. The title is a deliberate play on Schultz's classic of 1964, "Transforming Traditional Agriculture", that argued for the internal efficiency and efficiency of traditional farming but also its need for new skills and new technologies. It became a sort of pocket bible for the Green Revolution. Today the same argument can be applied to peasant agriculture that has incorporated Green Revolution technologies. Again, it needs new skills, new knowledge and new techniques (Byerlee, 1987).

5. This appears to have been the case with the famous World Neighbours' work in Central America (Bunch, 1982; King-Dagan, pers. com.).

6. Thanks to Mary Tiffen for this turn of phrase. See also Tiffen and Mortimore (1992) which makes similar points to this paper for the case of Machakos in Kenya.

7. The fact that several NGOs and farmer organisations have had these experiences is not meant to imply that only they could have the sensitivity to meet current challenges, nor that R&E work should therefore be passed over to them. Rather they are experiences from which formal R&E institutions can learn.

8. Information is drawn from federations in the cantones of Colta, Guamote and Riobamba.

9. This section draws on research supported by the Inter-American Foundation, FUNDAGRO (Ecuador) and the International Potato Centre.

10. A phenomenon also seen in Peru (Bebbington, 1990).

11. Talking of El Ceibo, Trujillo (1991) is quite frank about this farmer pragmatism in their commitment ot their organizations. He says: "In El Ceibo, the production levels for cacao are the determining factor. When the harvests are good, and prices high, the co-operatives and their members show enthusiasm and dynamism. When production declines the discontent is clear and people begin to engage in other activities."

12. This section draws on information from an Inter-American Foundation sponsored evaluation of federations in Ecuador. It thus draws on the work of colleagues: see Bebbington *et al*, 1992.

13. In other regions of the Ecuadorian and Peruvian Andes, Nestle and Carnation have dominated the dairy sector, and have served to channel local surplus accumulation out of the regions in which they operate.

14. Information from this section is based on interviews with El Ceibo staff and institutions with whom they have cooperated. It also draws heavily on a paper prepared by German Trujillo (1991) and of El Ceibo's farmer extensionists.

15. IBTA is the Bolivian NARS - the Bolivian Institute for Agricultural Technology. This section draws heavily on a paper written by, and discussions with, German Trujillo, El Ceibo's agronomist.

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