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PROBLEMS OF UNDERSTANDING AND COMMUNICATION
AT THE INTERFACE OF KNOWLEDGE SYSTEMS

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But conversations with farmers in areas where FSR/E teams have been working, convince me that farmers remain greatly puzzled by such things as why researchers insist fields or plots should be measured in certain ways and what those measurements tell them or, what it is in the logic of researchers' world that makes them value, for example, certain livelihood activities such as field cropping above other activities which seem to the farmers themselves equally necessary components of their livelihood. The breakdown of communication and understanding seems the greater between women - as farmers, food processors, traders and consumers - and male researchers, but not only because of the socio-cultural distances between them: male researchers may understand little of the rationality of the domestic domain in their own worlds. The researchers' lack of an implicit standard or frame of reference in this sphere - or a partial or biased one - influences, of course, their own set of mental constructs by which they perceive and interpret the world of women within farming systems. Communication difficulties thus are compounded.

There are a number of threads which might be disentangled here. I want to pull out and untwist only one: the logic of flexibility within the domestic domain, illustrated by examples from Lesotho and northern Zambia (!). The data are not complete from the FSR/E point of view, being collected for other purposes, but they do highlight a number of points which FSR/E theory and practice needs to take into account. The paper concludes with suggestions about how this might be done.

The data are drawn from areas of acute seasonal stress; in Lesotho, from an area in which a longitudinal study of energy flows suggests a

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bimodal pattern of stress (Huss-Ashmore 1982) and in northern Zambia from an area with a short period of moderately erratic within-season rainfall and a long dry, cool period of some 6 to 7 or even 7.5 months, with the time of acute hunger falling in the January-February period after weeks of heavy labour and declining food stocks (author's unpublished field notes, 1979-80).

Both are areas of high male outmigration and income insecurity. Risk and loss minimisation figure highly in farming system strategies. Women, as household heads and as farmers within male-headed enterprises, respond to climatic and income uncertainties by trying to maintain flexibility. Typically, they try to maintain flexibility in four areas of the domestic economy: (i) in production, by maintaining reserve crops and varieties in household gardens and in wild habitats; (ii) in the timing of operations, volume of product handled and technique used, in the spheres of food processing, storage and food preparation; (iii) by altering the mix, timing and quality of performance of their multiple roles; and (iv), by manipulating whatever room there might be for substitutability of labour and obligation between men and women. For reasons of space, the illustrations will be taken from only the first two areas.

Lesotho

In the peculiarly distorted economic situation of Lesotho, the day to day survival of rural households is largely a matter of how women maintain themselves and their children. The rationality of the farming system is not determined by physical and climatic features - these only set limits to what is possible. It is determined by the

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rationality of women's life, which is centred in (though by no means confined to) the domestic domain. And within that domain, there is one resource which is critical: fuel supply. It could be said to be the key both to cropping choices and household food availability.

Huss-Ashmore writes:

"Because fuel is essential for processing almost all foods, it can be considered a critical resource for the maintenance of health and nutritional status. In Mokhotlong the type of fuel used, and the time spent to procure it, vary according to the seasonal availability of dung" (Huss-Ashmore 1982:156).

The preferred fuel is compacted dung, readily available during the winter from the kraal close to the homestead, which, dried in uniform slabs, burn with the slow, even heat necessary for long cooking of dried grains and pulses. Women from kraal-less households have to purchase the dung or to manipulate kin relations to get it. When the cattle are moved in the summer to the high pastures, women must use horse and cattle dung, picked up from the fields and trails, which is less dense and takes more time to gather. Both sorts are kindled with resinous, woody shrubs which become scarcer as the summer passes but may be the only source of summer fuel if insufficient dung can be gathered. For a short period, kraal dung may be kindled with maize cobs as they are threshed in the winter. It is fuel availability rather than food availability which determines which foods are eaten at different seasons:

"The supply of slow-cooking protein sources is not used equally throughout the year but is depleted during the cold season when appropriate fuels are available. During the summer the population relies heavily on wild vegetable protein sources, which require more time to locate and gather but which can be rapidly cooked" (Huss-Ashmore 1982:157).

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Now, you might think that these interactions - and their further entwining with the water/fuel/grain seasonalities of sorghum beer-brewing, a source of income and wage work which is the more important for being one of the few available to women - are not so terribly difficult for a researcher to discover. However, one-off visits during the exploratory survey may fail to discover seasonalities which are both interdependent across disciplinary boundaries (fuel-forestry; cropping; postharvest domestic food technology) as well as across gender boundaries (cattle are men's business). The fact that, in this case, a critical key to the functioning of the farming system operates within the domestic domain, may well continue to conceal its significance during the verification phase too.

A further difficulty arises when researchers try to measure the quantities involved, for example, the cooking time of various foodstuffs using different fuels. An anthropological study of Sesotho measurement concepts points out:

"A woman knows how long to cook vegetables because she knows when they are ready. One woman, preparing bread, was asked how she would cook it: Until it is ready (bo butson). Pressed for precision, she thought carefully and then said: Five or six hours (li-hora - again the English word).

In fact, she cooked the bread for an hour and a quarter and saw that it was perfect when she took it from the steam oven. It was ready both in English terms and her own. At no time did she refer to any kind of time, not even the sun. It was not the time that made it ready. It was the cooking" (Wallman 1965: 240).

The researcher is concerned with the measurement of time but the woman is concerned with the measurement of "readiness" and there is no

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reason why the measurement process should not begin with readiness (what does it look like ? is it hard or stiff or does it run ? etc.). Instruments such as time allocation studies, useful as they are as indicators of the range of activities and claims on labour, make invisible whatever it is that women themselves see themselves as allocating or conserving. In Huss-Ashmore's case, women collect wild vegetable proteins not because they are a preference food nor because there is nothing else available but because women wish primarily to conserve fuel.

The difficulty does not lie in using the measurement units which make sense within the rationality of the referent user but in actually getting someone to do so. Researchers and extensionists alike are trained in the concepts of scientific agriculture and these concepts may have no equivalents in the knowledge system of the woman while the woman is trained in the concepts of her indigenous knowledge system and may have no way of apprehending the significance (even if the literal meaning can be translated) of the concepts used by the researcher and extensionist. This has little to do with any differences in the ethnic background of the actors and a great deal to do with the difficulty of articulating the rationality of one system in the terms of the rationality of another.

Northern Zambia

The fact that local vegetables and fruits form an important part of the diet is well-established and there are even a few research programmes investigating the more important species (MAWD 1983). What is not so readily accepted is that these may have characteristics

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The case is quite different in most dryland areas in developing countries. Except perhaps for the richest, producers are not organised nor politically powerful and have few if any links with researchers; the range of transformation processes occurs largely within the domestic domain using local technologies; wholesalers and retailers operate in fragmented and often non-competitive arenas in which the overall level of sales is depressed and quality carries no premium, and, consumers have weak purchasing power and few if any organised channels for expressing their preferences.

If the inherent yield potential of many dryland areas is judged to be low, with scant chance that the value of the marketed output will ever pay for or induce the kind of infrastructural developments witnessed in irrigated environments, then, presumably, it will be necessary to preserve a continuing capacity to derive benefits from the goods and services presently obtained from the biomass through transformation within the local community and the household economy. The challenge becomes that of raising capacity without displacing too many of the benefits presently obtained from within the micro-economy rather than in raising capacity by concentrating on only a few benefits (higher yield) and externalising the provision of the rest. Varietal characteristics must continue to an (unknown) extent to meet the demands of domestic transformation processes, technologies and end uses.

The following example describes just such a situation.

The local vegetables (fruits not included here for the sake of simplicity) produced on one farm (February 1980) at Sambwa in Mpika

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which yield benefits not provided by modern varieties of the main food crops, however abundant they might be. Interventions which make their production the more difficult - by switching labour or land use, for example - may also make the seasonal management of diets more difficult, unless the market provides substitutes at affordable prices.

The question of the timing of agricultural innovations with respect to the role of market provision of those goods and services previously supplied within domestic and local economies, merits a short digression here. In industrial country agriculture and, albeit to a lesser degree, in irrigated agriculture in developing countries, research organisations work within and for production and knowledge systems which are well-defined, well-organized and highly interactive. There are at least four main components: farmers, who are organised and able to contribute to research programming through a variety of channels; powerful industrial organisations engaged in the business of transforming primary production into a range of consumer and industrial goods, well able to signal to researchers their own technical requirements or even, by paying for research, to determine that crop characteristics meet the needs of their own technical processes; powerful commercial organisations engaged in the business of wholesaling and retailing produce and processed foodstuffs, which are able to insist on high quality standards in defence of existing and the acquisition of new sales; and, consumers, who, either through their purchasing power or through consumer organisations and lobbies, also signal their preferences to researchers.

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District, are set out in Appendix 1. The main food crops were: four cassava varieties (masanga uko, matutumushi, muntulunga, ucongo); three finger millet varieties (mwanqwe, mutubila, mwambe); two varieties of beans, groundnuts and local maize. Each has a very specific place in seasonal production and food management; for example, mwanqwe is a sweet, very early maturing finger millet which provides one of the first new food crops in the year and a sweet beer for working parties as the main harvesting period approaches. Two of the cassava varieties have palatable leaves (masanga uko and matutumushi - the latter much sought after by the wild pig) but these fall in the cold season (June, July) so some are dried early in the season for later consumption.

In addition to these main food crops, there were 5 distinct production sites around the compound (and one further away in the dambo or wide valley bottom) tended by the two adult resident women, on which were grown a mix of wild and semi-wild plants and plants recognised by the extension department as "crops" ie. those promoted and officially marketed by the government. A number of the wild plants, such as busoshi (*sesamum alatum*) and chimamba (*sphenostylis erecta*), also occur naturally (respectively on disturbed soil and around anthills) but on this farm could be considered as true crops, for they were deliberately planted on chosen sites, protected from chickens and weeds, fertilised with household rubbish and the product traded in Mpika market. Their utility is partly a reflection of the low and erratic yield of groundnuts but, whatever the yield of groundnuts, they have a utility as snack foods at a time of the year when women may cook only once a day or even once in two days; the perennial chimamba ensures that some kind of snack is always going to be available. It would only lose its utility if alternative snack foods were to become available at the critical time of the year when women are busiest and/or the preparation and cooking time of cassava and millet were to become less and/or women's cultivation labour were to be reduced.

Another example is provided by the great care the women took to maintain the balance between the availability of the staples (millet, cassava) and the availability of oily or slippery foods for the relish which is added to the nsima or thick, coarse porridge. The nsima is almost uneatable in sufficiently large quantities without such a relish to ease it down. In conditions of scarce and expensive commercial cooking oils, unreliable groundnut harvests in the face of erratic rains and, the time required for shelling and pounding groundnuts, the softness and slipperiness of some local vegetables were highly desired characteristics. Punwe (fagara chalydea) is an important dry season resource in this respect. Slippery local vegetables have the additional advantage of needing no blanching or treatment with potash when they are dried for preservation.

Both the men and the women had been experimenting with vegetable production, as the following examples illustrate. The male head of the compound had been trying white cabbage, tomatoes and cucumbers from seeds supplied through the Horticultural Marketing Board in Mpika, in a dambo garden at the end of the rainy season. He found that the cucumbers grew best but were the least needed for domestic use as they already grew a satisfactory range of cucurbits. The tomatoes were well-liked for their flavour and the softness of the flesh but were tiresome to eat because of their tough skins, the very characteristic which made them suitable for the rough marketing conditions. The women had been experimenting for many years with lubanga (cleome gynandra) selecting for larger leaf size without sacrificing any of the tenderness. They reported, too, that they could get a higher price in the local market for the larger-leaf variety.

The men in the compound scored consistently lower than the women on the following tests: identification by sight; recall of the main physical descriptors and husbandry; processing techniques and length of storage; preparation for eating. Zambian and expatriate members of the nearby Agricultural College who were engaged in conducting and supervising trainee extension workers in farm surveys, were asked to share their views of the role of local vegetables in the farming system. They all referred the question to the Home Economics staff who, trained to work with "western" vegetables, with few resources to work in the field, knew only those local vegetables which had been used in the household in their own home areas.

There are further problems of communicating knowledge between distinct knowledge systems. The production sites where the local vegetables were grown changed shape and area as the women took advantage of rainfall patterns as the season advanced to make additional sowings while neither the market value of the product traded nor the opportunity cost of female labour (based on market wage rate) would seem adequate measures of the value of either women's labour time or of the local vegetables to the farming system. The women themselves used a notion of convenience which appeared to be a compound of characteristics such as: easy to grow near the house, availability (fresh or dried) at moments critical from the point of view of diet management, ease of processing and preparation, timing of labour inputs, substitutability for other crops. The notion encompassed the principle of flexibility - in this respect, they were reluctant to choose paramount characteristics either for any one crop or between the range of crops; local vegetables were viewed as a bundle of biomass which enabled them to manage their resources and responsibilities to the best advantage.

The Implications for FSR/E

There are a number of important "lessons" which could be drawn from this brief review. In sum, these could be reduced to two:

- the need to develop methodologies for establishing the key field-household interactions at an early stage of the diagnostic process
- the need to develop methodologies for mutual communication of key concepts across the boundaries of researchers' and female producers' distinct knowledge systems.

Two techniques which might prove useful diagnostic instruments, usable by researchers of any background, are: Situation Analysis based on the critical incident technique; Peer Group workshops.

The former is widely used in diagnostic sessions between researchers and carefully drawn panels of users in industrial and commercial practice. It involves informal but structured interviewing which, as users identify problem areas and describe the boundary conditions, focusses on a 'critical incident' which exemplifies one of the problems. The incident is then analysed in depth, leading into discussion of desirable ways to deal with it. Each of the problems is similarly treated in turn.

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Peer Group workshops are widely used - for example, throughout the ESCAP region in the development of local, self-managing groups and income-generating projects and by the FAO's Marketing and Credit division in the promotion of female entrepreneurship - and are based on the understanding that knowledge and expertise exists also among local communities, together with a diagnostic capacity attuned to local realities. They draw on the expertise of those who are locally recognised as knowledgeable within the problem area which is the subject of interest, by facilitating the preparation of case studies of their successes, which are exchanged and analysed at workshop sessions, leading to identification of interventions which would allow these successes to be replicated. A great deal of experience now exists to guide the preparation and implementation of workshops with those who have little formal education and to facilitate the participation of service officers (agricultural researchers, extension officers etc.).

Both these techniques have the added advantage that they eliminate some of the stages of 'translation' of knowledge concepts and, with careful preparation it is not too difficult to identify those items which, though denominated differently, refer to a standard unit. (For example, in the case of the cake that is ready, the researcher can measure the hours it takes to cook and the baker the cooking that is needed to make it ready: both are referring to a standard referent, although the baker might be interested in the number of mouths it feeds and the researcher in its unit weight and composition). The difficulty comes when one is using a knowledge concept that has no referent in the knowledge system of the other. The difficulty is in a sense a one-sided one. Researchers are often keen to learn about and understand the concepts of producers but have little awareness of the constructs and values inherent in their own knowledge system. Where the knowledge system of male agricultural researchers/does not encompass either an experiential and extension officers nor trained understanding of the domestic economy, the problem seriously undermines FSR/E practitioners' claims to be conducting systems-based technology development,

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NOTES

1. The research was carried out between January 1979 and September 1980 in the Central, Northern and Luapula Provinces of Zambia by members of the Rural Development Studies Bureau, UNZA, Zambia.

14. LOCAL VEGETABLES IDENTIFIED ON A FARM NEAR SAMBWA, MAIKA DISTRICT, NORTHERN PROVINCE, ZAMBIA¹

APPENDIX 1.

IDENTIFICATION	SITE	SOIL CONDITIONS	PLANTING	HARVESTING	PROCESSING	SEASONAL USE	PREPARATION	REMARKS	COMPANION CROPS
Mumungu cucurbitaceae edible gourd	1	Humus-rich	2-3 seeds per hole; annual	Leaves as needed toward end of rains	Fruits sun-dried	Dried fruits as snack Aug-Oct.	Roasted		short-mature sweet maize
Chibwabwa cucumeropsis edulis pumpkin	1	Humus-rich	2-3 seeds per hole at start of rains; annual	Leaves 5-7 wks. after sowing, as needed Fruits after 5-6 mths.	Leaves, flowers, fruits sun-dried. Stalks peeled, treated with salt, before drying. Seeds sun-dried.	Wet season: fresh Up to March: dried	Young leaves/stalks; fruits with oil or water as relish	Seeds used as snacks. Fruits, leaves, flowers convenience food during the rains	
Kubanga cleome gynandra cat's whiskers	2	Sandy loam/ Old rubbish heap.	Broadcast seed on hoe bed after first heavy rains; annual	tender shoots, leaves, flowers 4-5 wks. after sowing. Thinning 4 wks after sowing.		Wet season fresh vegetable	cooked with oil or groundnuts as relish	High in protein, ascorbic acid	
Chimamba sphenostylis erecta	2	Sandy loam/old rubbish heap	Low, shrubby perennial; grown from seed	Flowers June-Oct; mature green pods	Flowers parboiled + sun-dried	End of Dry season, at onset of rains	Flowers cooked with groundnuts, as relish. Fresh pods boiled, and bran eaten as snack		
Impwa * Solanum macrocarpon African eggplant	2	Loose Sandy loam/old rubbish heap	Annual. Dry planted Aug-Sept; broadcast seed germinates with the rains; transplanted 4 weeks	3-4 mths. after sowing whilst fruits still green and unripe		January onwards over long fruiting period	Cut into pieces; roasted; cooked with water/oil/groundnuts as relish	Bitter and non-bitter varieties; latter eaten raw as snack. Not as productive as bitter variety	
Mankolobwe cucumis sp. wild cucumber	3	Loose, humus-rich	Broadcast seed after first heavy rains; annual	Leaves 2 wks. after sowing, as needed Fruits when yellow	Leaves and fruits sun-dried	Dried leaves, fruits during Dec-March	Fresh leaves with groundnuts as relish Dried fruits as snack		rounded cassava
Mutaha amaranthus sp. Amaranth	3	Loose, humus-rich	Broadcast seed during rains; annual	Thinnings 4-5 wks after sowing; topping as required until flowering established		Wet season	Cooked with oil or groundnuts or with water and potash	Flowers after short period of acute water stress. No seedling required due to rapid, dense growth	
Busoshi * segetum alatum	4	Sandy loam	Broadcast seed in Nov-Dec; annual	After flowering late in the rains as pods mature in April-June	Seeds left to dry	Some always reserved for use before following year's groundnut harvest	Seeds roasted and eaten as snack or relish. Pounded with salt, substituted in groundnuts		groundnuts; ridged
Mumba coleus esculentus Livingstone potatoes	4	Sandy loam	tubers, on ridges, in July-early Sept.	April-July; soil redug as tubers harvested		end of rains into dry season	Raw as snack; boiled or roasted as staple or relish; peeled or unpeeled.	Convenient over harvesting period.	
Pupwe fagara chalydea	5	Around Anthill	Perennial; naturally-occurring tree	fresh green leaves toward end of dry season	Leaves dried, pounded	Dry season vegetable. Dried leaves throughout cultivation period	As relish, cooked with potash	important late dry season green leaf. Shippery	
Malamu crassocephalum rubens	6	Moist, dambo soil	seeds planted on suitable sites; annual	Young leaves, through to middle dry season			fresh; boiled or with groundnuts, as relish	provides fresh greens as others finish	

Notes: * Drought resistant

Adulula: not identified; grown on site 4

1. A ciBemba-speaking area; 28.2.1980.