Local Knowledge and Food Security: The Experience of Magindu Village - Kibaha District - Coast Region

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1 INTRODUCTION

Local knowledge (LK) as it relates to food security, refers to a wide-rage of accumulated local experience about the ecosystem or natural resources use and how they are managed in the context of local organisational and institutional arrangements. It also includes belief and value systems of the people. All these dimensions need to be carefully evaluated for possible inclusion in the rural development process at both micro and macro levels.

Local knowledge (LK) can be enhanced with the infusion of outside knowledge and vice versa. The challenge is to come up with the right dosage of local knowledge to be mixed with other outside (scientific, modern) knowledge. This mixture is particularly useful where food security issues are being considered. Local knowledge as used in this paper does not only refer to knowledge of the local environment but also to the knowledge of people existing as a system of beliefs, concepts and ways of learning (Chambers 1983).

2 TYPOLOGY OF LOCAL KNOWLEDGE: IS LOCAL KNOWLEDGE NECESSARY OR DISCRETIONARY?

If knowledge is known to satisfy certain physiological needs, then, it may be considered necessary but if knowledge has been based on custom and habits but does not necessarily satisfy physiological needs, then, it is discretionary. But if knowledge satisfies both physiological needs and is based on custom and habits, then, it is necessary (Mararike, 1996).

It is worth remembering that the distinction between necessary and discretionary knowledge affects the following:

i. The form of participation in the accumulation, preservation, transmission and the methods used in gathering that knowledge.
ii. The intensity of participation, that is the total labour time which participants commit themselves in the process of accumulating that knowledge.
iii. The distribution, transmission or passing it over, value and sustainability of the knowledge.

3 WHY LATE REALIZATION OF THE IMPORTANCE OF LOCAL KNOWLEDGE?

Local people have a wealth of accumulated knowledge on the environment in which they have lived or spent all their lives since their ancestors. Researchers are not making adequate use of this abundant knowledge to advance social and economic development of the local people. There is now a growing awareness or realisation of the importance of local knowledge.

Late realisation of the importance of local knowledge is mainly due to the fact that:

a) Some people have the notion that anything imported is superior or is of more value than the locally developed or evolved one regardless of its incompatibility with the existing social, economic and environmental conditions.
b) The type of training that some of us received has had some great influence in what we believe, value and has had an impact in the way we think and do things.

c) Lack of appreciation of local people and their knowledge and superiority complex syndrome of researchers where they look down upon local people as individuals with little of no education at all and hence cannot understand scientific complexities of the surroundings or the environment in which they have lived for so long.
d) Researchers deceive themselves by thinking that they know more than the local people.

4 THE STUDY AREA

The experience of use of local knowledge in food production, storage and preservation is drawn from Magindu Village in Kibaha District of Coast Region. Magindu Village is located on the central railway line about 100 km from Dar es Salaam and 25 km from the junction on the main road (at Chalinze) from Dar es Salaam to Morogoro. The village has about 1639 people from 360 households. It has an area of about 100,000 acres of which less than 2000 acres are being farmed. The village is on the coastal plain with an elevation ranging from 100-200 m. above sea level. The climate is broadly semi-arid with an annual rainfall ranging from 700-800mm. The dominant soils types are categorised as: red soils, sandy soils and the black clay soils which carry more nutrients than the other soul types. The village experiences frequent droughts and rainfall is both low and highly variable. Magindu Village's qualification for inclusion in the study was that it often suffers from food shortage and in 1991 it experienced a very severe famine. Furthermore the village residents were said to be receptive and ready to learn new ideas.

The objectives of the study were:

a) To establish the main stress factors on food security in the agro-ecological zone under study and the coping strategies.
b) To facilitate in the dialogue between village residents on one side and agricultural extension workers and administrators on the other side with the aim of providing feasible solutions to the stress factors. The basic philosophy in the study was participation of the food insecure themselves in identifying their own problems and in suggesting feasible solutions. Participatory Rural Appraisal method was therefore, the main tool used for the study.
c) To identify coping strategies or mechanisms involving local knowledge in food production, accessibility, distribution, storage and preservation.

In this paper, only results pertaining to local knowledge, gender analysis and causes of food insecurity are discussed.

5 LOCAL KNOWLEDGE AND ITS APPLICATION

5.1 Local Knowledge of the Environment

The relationship between people and their environment is something which we take for granted. The crucial questions are: What exactly do people know about their environment? How do they learn about it or pass on information about it to others? How can such knowledge be used to solve current problems? How can such knowledge be blended with other forms (scientific, modern, outside) of knowledge?

These are extremely important questions if local knowledge is to be valued and used in solving problems related to food insecurity. An interview was made with some elders who have lived in Magindu Village since 1960. In the course of interview, they were asked to explain how the villagers determined soil fertility and also the types of crops to be grown in particular types of soils. The elders had this to say:

"The types of grass and trees which grow in a place indicate to us how fertile the soil is and what crops to grow".

"We acquired such knowledge from our parents i.e. the older members of the village and that this knowledge is not documented anywhere but passed over to next generation verbally and through practices".

The elders gave examples of main types of soils and crop associations as follows:-

Table 1: Soil Types and Crops Grown

SOIL TYPES		SUITABLE CROPS TO GROW
Local Name	Description or English Name	Crops
Kiguzi	Redish soils	Cassava, sorghum, pigeon peas, cow peas and cotton
Nyachibu	Black clay soils	Maize, simsim and sorghum
Kisanga	Sandy soils	Cassava, pigeon peas and cowpeas
Kilongo	Loamy black soils or Black clay soils	Rice and sorghum

They said that sorghum was the most versatile crop in terms of adaptability to the various soil types and that the black soils are best for farming.

5.2 Local Knowledge on Timing of Farm Activities

Food production is one of the determinants of food availability. In order to ensure good crop production, farmers in Magindu Village emphasised proper timing of various farm activities or operations particularly preparation of the fields or seed bed and planting or sawing of seeds. They have got signals for on set of rain. To them, a certain position of the moon, the flowering of mango and cashewnut trees and the early morning sound made by certain birds are associated with the on set of the rains and hence the right time for the preparation of the fields. The elder members of the village commented that strict observance of these signals is the key to success in farming. Farming seasons are well understood. Timing of farm activities and food status in the village were given as shown in the table below.

Table 2: Timing of various Farm Operations and Food Status in the Village

PERIOD	ACTIVITY	FOOD STATUS
January – March	Cultivation	Little maize and sorghum available
March – April	Planting	Depletion of sorghum and maize Plenty of Cassava
April – May	Weeding	
May – June	Moving temporarily in the farm to protect crops against vermins	Plenty of sorghum rice and maize
July – August	Havesting	Plenty of sorghum, maize and rice
September - December	Land Clearing	Plenty of sorghum, maize and rice

5.3 Local Knowledge on Agricultural Practices

5.3.1 Shifting Cultivation

Villagers commented that cultivating the same piece of land and planting the same crops for more than three years consecutively had some detrimental effects to the land (depletion of soil fertility, accumulation of plant diseases and pests, etc.) and most important it decreased crop yields tremendously. They said that the solution to this problem was to give a rest to the field (KUPUMZISHA SHAMBA) to regain its fertility. Every three years a new piece of land was cultivated before going back to the old field. This practice is believed by farmers to increase crop yields. Technically this practice is what is called shifting cultivation, which is scientifically equivalent to rotational farming or cropping.

5.3.2 Intercropping

The types of crops grown in the area include maize, sorghum, cowpeas, cotton, pigeon peas, sweet potatoes, simsim and cassava. These are grown either as pure stand or intercropped. Villagers remarked that if maize or sorghum is intercropped with cowpeas or pigeon peas they get increased maize or sorghum yields, but when cassava is intercropped with maize or sorghum the cassava plant turns yellow or gets etiolated. It gets rather tall with very thin steams. They remarked that under such situations they do not get any increase in maize or sorghum yields. Instead, they get a reduction in cassava yields.

Scientifically these are results of the shading effects on cassava because maize and sorghum grow faster than cassava. The situation is even most serious with poor spacing (close) of plants.

5.4 Local Knowledge of Crop Storage

Available information indicates that there are several factors contributing to food insecurity problems. Some of these are pre or post-harvest losses. A greater proportion of the total food produced is lost after being harvested. Sources of such losses are associated with the process of handling the crop from the point of harvest to consumption. The most acceptable range of crop loss after harvest is between 15 to 45% of the total production (Ministry of Agriculture and Cooperatives, World Food summit Report, 1996). Local people in Magindu Village are aware of these losses and take precautions to prevent or minimise them using local storage knowledge of various crops.

5.4.1 Maize

After harvesting the maize is stored inside the house on elevated structures over the fire place so that it is in direct contact with heat and smoke which prevent it from insect attacks. Some of the maize is stored in tins bags or pots mixed with the ash in order to prevent it from rotting or attacks by insects.

5.4.2 Cassava

Villagers call cassava a problematic crop because of the difficulties encountered in maintaining or storing it in the field, in processing and storing it after harvesting. The crop is often attacked by vermins in the field, particularly by wild pigs and porcupines. When the crop is still in the field before harvesting, farmers dig deep trenches around cassava fields to prevent vermins from entering in the field and attacking the crop.

Villagers said that the timing of harvesting of cassava is very important as roots tend to rot easily depending on the variety and may become woody or turn spongey if harvested rather late. Processing of cassava depends on the variety also. Sweet varieties are uprooted, peeled, slashed, dried, bagged or pounded and stored in bags, tins or pots in dry places in the house. Bitter varieties are uprooted, peeled, soaked in water for three to four days without first slashing it, dried, bagged or pounded and stored like the sweet varieties. Farmers claim that soaking of bitter cassava roots reduces or removes its bitterness. They also said that another way of preventing vermin attacks on cassava is to plant or grow bitter varieties of cassava, which are not attacked or eaten by neither wild pigs nor porcupines.

It was also pointed out that bitterness of cassava may develop when some roots of a given plant remain in the ground after the rest have been uprooted. In addition, when cassava is harvested after it has shed its leaves, roots become bitter. The same bitterness develops when tender leaves are picked regularly for relish.

5.5 Local Knowledge of Livestock Keeping

Livestock keeping is the second important economic activity undertaken by Maasai pastoralists in Magindu Village who practice traditional livestock keeping. When they were asked as to why they used transhumance mode of livestock keeping, they gave several reasons some of them being:

i. they were searching for new pasture and water for their livestock
ii. They were avoiding livestock diseases in areas where they have been grazing their animals for a long time.
iii. They wanted to give time for the regeneration of pasture

All reasons given seem to have some scientific backing.

6 TYPES OF LOCAL KNOWLEDGE AND THEIR ACCESSIBILITY/TRANSMISSION

One method of passing on or transmitting knowledge to others in Magindu Village is said to be through questions and answers. The method is highly informal but once the right questions are asked, detailed responses are given.

Unlike written documents and texts, local agricultural knowledge like any other type of knowledge in Magindu Village, seems to be stored in people's minds. It appears that willingness to pass on knowledge from one person to another depends on the nature or type of knowledge. Knowledge about the weather, environment, types/varieties of crops to grow, types of wild fruits and insects to eat, knowledge about which animals to hunt for meat is generally regarded as public knowledge. Interested members of the village could get such knowledge from elders if they asked for it. On the contrary, knowledge about certain types of medicines is regarded or treated as secrete. The same observation was made by Mararike (1996) in Zimbabwe during the interview with village elders. Researchers, therefore, may not easily obtain such information/knowledge without having to pay for it.

7 LOCAL KNOWLEDGE ON FOOD SECURITY ISSUES

From the experience gained in the study of Magindu Village, it appears that in order to fully understand local people's knowledge on food security issues, the following questions among others seem to be very crucial or important.

a) What do villagers know about the crop varieties they grow and eat? How do they know this? Why do they grow it?
b) What wild plant varieties/species do they eat?
c) Which food (meals) have ritual significance? What is the significance? When do they eat it?
d) What is the impact of food production on e.g. water, land quality and the environment in general?
e) What knowledge do villagers have on:
   - Food production
   - Food storage
   - Food processing and preservation
   - Food preparation
   - Indicators of soil fertility and suitability for various crops
f) To what extend and in what ways do socio-economic, socio-political, environmental, technological factors influence food patterns.
g) What types of food cannot be consumed by children, pregnant mothers, adult males? etc.
h) What rules govern the gathering of wild food species? Who enforces them?

Such questions proved to be very useful in extracting information or local knowledge from villagers.

8 CAUSES OF FOOD INSECURITY IN MAGINDU VILLAGE

Food security in Magindu Village is determined by four elements - food availability, accessibility, stability and sustainability. Problems of food insecurity at household level is multifactorial (Kauzeni, et al, 1998). There are factors related to food availability, stability, accessibility and sustainability as well as those factors influencing food consumption and utilisation.

8.1 Availability

Food availability is determined by levels of household production and the extent of food transfer from one point to another.

In Magindu Village, food production levels are very low. On the average, one household cultivates about 1.79 acres of maize per year and gets about 4 bags (of 90 kg each) of maize per acre (Kauzeni, et al 1994). This level of production cannot sustain the family throughout the year.

Causes for low levels of agricultural production are many. Some of these include:

- Small areas put under cultivation
- Dependence on rain fed agriculture
- Non utilisation of agricultural inputs (e.g. fertilisers, insecticides, improved seed varieties etc.) mainly due to their non-availability or due to their high prices when these become available.
- Non retention of food after harvesting. Large amounts of food are consumed during prolonged festivals or traditional celebrations. The remaining amount is sold to middlemen at low prices leaving the villagers hungry.
- Young people from the village migrate to Dar es Salaam, Kibaha or Chalinze during cultivation period seeking for employment, so the labour forced is lost to the village.
- Poor storage facilities
- Droughts often cause crop failures
- Poor transportation facilities between Magindu Village and the rest of the District/Region.

8.2 Stability

Lack of stability in food supply in Magindu Village is considered by villagers as one of the elements causing food insecurity in their village. This is partly due to government policy changes on agricultural marketing and pricing. There have been many changes in agricultural marketing and pricing systems between 1961 and 11990/91 including the suppression of the private sector and expansion of parastatals, followed by the promotion of the private sector and diminishing role for parastatals from the mid-1980s, the abolition of cooperative unions and societies in 1976 and their reintroduction in 1984, and the introduction and later phasing out of pan-territorial pricing. Since the adoption of the Economic Recovery Programme in 1987, there has been major reform in the food grain marketing system from government controlled, three-tier single channel system (Primary Society - Regional Cooperative Union - National Milling Corporation) to a multi-channel system comprising of both government and private institutions. Finally, since 1990/91 marketing season, the system of fixing producer prices has been replaced by one of indicative prices which provides a guide to farmers to negotiate prices with buyers (Ministry of Agriculture and Cooperatives, 1996). In most of these changes Magindu Village farmers were adversely affected and very often had no market for their crops. As a result of all this, villagers were discouraged from increasing agricultural production thus affecting food supply in the village.

8.3 Accessibility to Food

The incidence of poverty is high for Magindu Village residents. Food is always available 25 km away at Chalinze but it is not accessible and affordable due to poor communication system (impassable roads) and due to lack of financial capability to buy it. Sometimes food is brought to the village on bicycles or carried on the head because of lack of transport to ferry food to the village

8.4 Sustainability of Food Supply

Food supply in Magindu Village is not sustainable due to the little amount produced resulting from small areas put under cultivation among the other things and fast depletion of the little food produced as mentioned above.

9 GENDER ANALYSIS IN RELATION TO FOOD SECURITY

Gender dimension has a considerable impact on food availability of an area. Gender analysis in the context of food security is a systematic attempt to document and understand differences in roles and opportunities between men and women within a given context.

The gender survey and analysis which was carried out in Magindu Village involved the assembling of villagers into socio-economic groups in order to capture various gender related information or issues. Issues that formed the basis of analysis were:

a) Division of labour for various activities
b) Access to and control over resources and benefits
c) Decision making role/capacity
d) Total work load for women, men and children.

The results of the analysis are shown in the table below. Some questions asked to the villagers in order to capture the information were:

a) What resources do men and women require for their work/task?
b) Who has access to these resources?
c) Who has control over resources?
d) Who makes the final decisions on issues affecting the whole household?
e) How can changes of access to and control over resources be effected by an intervention?

Table 3: Survey of Who Does What, Who Owns what and Who Makes the Decision

SOCIO-ECONOMIC GROUPS	WHO IS RESPONSIBLE FOR WHAT?	WHO USES WHAT?	WHO OWNS WHAT?	WHO MAKES MAIN DECISION?
Employees and Businessmen Men: 12 Women: 9	Women have more responsibilities than men	Both men and women have access to family assets	Joint ownership is in the farm, and the house. The rest is owned by man.	Man decides on all family matters without consulting the wife. Occasionally she may be consulted on house building, marriage of their daughter or selling of crops.
Livestock keepers Men: 13 Women: 0	Most work is done by women and girls - Except looking after livestock	Everybody in household has access to every asset	Man owns everything in the house except a house which is jointly owned and the women own milk and kitchen utensils	Man makes all decisions except for the purchasing of food which is made jointly.
Youth Men: 16 Girls: 7	Girls do most of the work. Boys occasionally hunt	Boys and Girls use available resources equally	As usual girls own kitchen utensils only, the rest is owned by boys.	Most decisions are made by boys except those related to the farm, house, decision on when to send children to school and projects which are done jointly.
Old men and women Men: 22 Women: 10	As above cases most jobs are done by women except farming which is done jointly.	All assets are used equally by man.	House and farm are owned jointly own kitchen utensils. The rest is owned by men.	All decisions are made by men according to K were culture
Joint village Response	Participants jointly concluded that women carry a heavier workload than men.	Assets are accessible to both men and women.	Women own mainly kitchen utensils or milk in the case of Maasai.	Men make important decisions

10 CONCLUSIONS

Local knowledge related to agricultural production although not documented and valued, enhances food security because it contributes to food availability and stability at household level. Food insecurity at household level in the rural areas could partly be solved by proper blending of local agricultural knowledge with scientific or modern knowledge.

Lack of involvement of women in decision making, in control of resources and the heavier women's workload contribute to food insecurity. The most vulnerable groups of people with respect to food insecurity at household level are pregnant women and children under five years.

Causes of food insecurity are multifactorial. They are social, environmental, technical and economic in nature. The most affected groups at village level are households with holdings too small to provide sufficient subsistence food, households earning income below the absolute poverty line and food growers living in "drought prone pockets."

There is an urgent need for research that will blend local knowledge with scientific or modern knowledge in order to improve agricultural production, biodiversity conservation and gender awareness/sensitivity in the rural setting.

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