Pastoral groups and cereal storage systems. Report on an exploratory visit to Nigeria (NRI report no. R1999(S))

PASTORAL GROUPS AND CEREAL STORAGE SYSTEMS

Report on an Exploratory Visit to Nigeria

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SUMMARY

Following an extensive literature review (Fowler and Moorehead, 1992) into grain storage and marketing by pastoralists, a first field study was conducted to look at the social and technical aspects of grain storage, marketing and production amongst Fulani pastoralists in Nigeria.

All categories of pastoralists identified are dependent upon grain and, with the exception of exclusive pastoralists and some transhumant pastoralists, many are engaged in grain cultivation. This is not primarily because of a decline in importance of cattle, but constitutes part of a strategy to increase the sustainability of herds at a time when access to land and sustaining of herding rights are problematic.

An extensive marketing system found throughout Nigeria and a long history of pastoralist interaction with the markets means that marketing is itself not a problem and, with high inflation over recent years, cattle have proved an inflation-proof investment. Unlike the situation reported in some other countries, drought was not given as a cause for long-term diminishing terms of trade between pastoralists and farmers and, although there are seasonal fluctuations in the terms of trade, it is not possible to conclude that pastoralists as a group are in a worse economic position than cultivators.

Many pastoralists have permanent storage facilities, and some have been practising storage for several generations. The technologies have largely been adopted from neighbouring cultivators who often build the cribs and are employed as farm labourers. There is low grain loss although respondents complained of some losses due to rodents, termites and storage insects. Those pastoralists who were either a long way from their permanent settlements or did not have permanent settlements, largely bought in small quantities which were stored in their temporary houses (*ruga*) or in some cases storage arrangements were made with local traders.

Although the size of the national herd and the prominent role of pastoralists in its management would suggest that pastoralists as a group are relatively prosperous, outbreaks

of rinderpest, faulty veterinary service delivery systems and conflict over land and resources with settled cultivators may be marginalising poorer members of the pastoralist community whose herd levels are falling to non-sustainable levels.

The hierarchical nature of Fulani society makes it difficult to access such people, and although storage interventions alone would not improve their situation they may be sufficiently neutral to provide an entry point to focus on the poor. Although there is a need for greater understanding of poor households and individuals in the pastoralist production system, supporting means that would allow them to remain within the system appears worthwhile given the stable real value of cattle, the cattle herd's importance to the national economy as a renewable natural resource, the growing shortage of arable land and the need to optimise diversity of economic activity for the poor. Unfortunately, while the Fulani as a group have a strong presence in northern Nigeria's political life, there are few initiatives working specifically with pastoralists who as a group are more often seen as a problem rather than an important contributor to national social and economic life.

INTRODUCTION

Objectives

1. The visit was designed to:

- Meet Nigerian government departments to discuss the NRI research project (A0267) `Storage of grains by pastoralists';
- Conduct a survey to identify pastoral groups for possible pilot projects on cereal storage systems, based upon socio-economic, technical and organizational considerations;
- Meet local organizations that are able to assist in the implementation of these pilot projects;
- Discuss the results of the field survey with local organizations through a workshop to be hosted by ODA Crop protection Training Project in Kaduna.

Methodology

Site Selection

2. There are a number of different ethnic groups engaged in pastoralist modes of production in Nigeria such as the Kongam, Shuwa and Uled Suliman. But the largest and most widespread are the Fulani (sometimes called FulBe) which have been estimated to own 80-90% of the cattle in Nigeria (Frantz). In order to minimise the possibility of inter-ethnic/cultural differences affecting the analysis of pastoralism and grain usage it was decided to study only one group. However, within this group there are numerous clans, and it may still be the case that inter-clan differences influence the production system.

3. Pastoralists are found throughout most of Nigeria and it was not possible to visit all areas. According to recent research, approximately 45% of the national cattle herd does not leave the middle belt[1] (Bourne, personal communication).

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[1] Roughly defined as the area above and below the courses of the rivers Niger and Benue.

As the research was conducted towards the end of the dry season, the sites selected were all within this middle belt.

4. Based on previous research and interviews with government and other parties involved in livestock and grain production, it was concluded that there were three main categories of pastoralist production system (see below), and the sites visited were of groups representing one or other of these categories.

Respondents

5. The Fulani have a hierarchical society and little information can be gathered upon first contact without the approval of the head of the group, the *ardo* or *jauro*. Therefore at each site the first respondents were these leaders often accompanied by other elders. Subsequently, interviews were held with representatives of large and small households, both men and women wherever possible.

6. Supplementary information was obtained from key respondents in the field from outside the Fulani such as grain and livestock traders. Prior and subsequent to the field research, interviews were held with government and bi-/multi-lateral project personnel working on either livestock or grain/storage issues. In addition the team had the opportunity to discuss livestock production in Nigeria with members of the ERGO-RIM team which had recently completed a national livestock resources survey for the Nigerian Government (FDLPCS, 1992).

7. At all times, data and information was checked against available secondary sources both in Nigeria and the UK, and a bibliography is provided in this report.

Data Collection

8. Primary data were obtained through open-ended interviews with respondents based upon prepared guidelines, field observation and market visits (see Annex 1). A variety of exploratory RRA techniques were used.

Constraints

9. The main constraint was time, with the visit to Nigeria limited to three weeks. Inevitably, there are different opinions as to which sites and groups can most profitably be visited in this limited timeframe, and the research team consulted many different authorities in the process of site selection. We appreciate their input, but ultimately responsibility for site selection and any shortcomings are our own.

10. The research took place during Ramadan which had some effect on the interviewing time available with predominantly Muslim respondents. It also took place during a prolonged strike by state civil servants affecting government services and access to some personnel, during a lassa fever emergency which precluded spending time in the Lafia region, and shortly after a period of conflict in Taraba state involving Jukun, Fulani and Tiv peoples which had led to outward migration by some Fulani and a general atmosphere of caution and suspicion.

PASTORALISM IN NIGERIA

A Background to Pastoralists in Nigeria

11. According to a 1992 study of livestock resources in Nigeria approximately 11,500,000 of the nation's almost fourteen million cattle are managed by pastoralists (FDLPCS, 1992). In common with other African pastoralists the different pastoralist groups tend to share the following characteristics (Frantz):

a. temporary settlements, or seasonal residence in permanent structures;
b. flexible and variable kinship composition of community;
c. nuclear family is minimal herding unit;
d. herd maintenance is mostly by men;
e. economic and social relations aim to maintain or increase the herds;
f. descent groups are patrilineal;
g. there is frequent divorce and remarriage;

h. the herding unit has seasonal political autonomy;
i. communities are relatively small.

12. Cattle are the most important livestock species in terms of economic value, animal protein and biomass, providing meat, milk, skins, bones, horns and traction, although there are also significant numbers of goats and sheep. Zebu are the most important breed, including the races of Bunaji, Rahaji, Adamawa Gudali, Azawak, Sokoto Gudali and Wadara Bunaji (White Fulani) (FDLPCS, 1992). The mean wet season price of cattle in 1991 was 2,284 naira, and the overall value of livestock resources is approximately 60 billion naira (ibid) representing a significant proportion of the country's renewable resources.

13. Pastoralist-managed cattle have in certain past studies been considered to have low levels of productivity, leading to an emphasis on ranching and commercialization. However, this attitude is beginning to change as the sustainability of pastoralist-managed herds comes to be appreciated even if there is little published material on their productivity. Table 1 presents production-related figures for the two main pastoralist races of cattle from a recent study. The major calving month for Bunaji is January (37% of calves) and for Rahaji April (23.2%) although calves are born throughout the year.

14. Using an admittedly limited sample, the herd structure for the predominant Bunaji herds as recorded in FDLPCS (ibid) is set out in Table 2. The mean age for selling Bunaji is 29.2 months, and the major cause of herd exits was death of calves (mean age seven months).

15. To the value of the livestock needs to be added the milk offtake which is also processed to make *nono* (a type of yoghurt), *kindirmo*, butter, *wara* (soft cheese) and ghee (ibid). The produce is used for own consumption, for gifts and for sale in the markets. In a study of central Nigerian Fulani, Waters-Bayer (1988) reported an average annual milk offtake of 0.7 litres per cow per day with an early wet season high of 1.4 litres per day. The mean yield for family use and sale was 3.7 kg, with an early wet season high of about 6 kg

Table 1: Productivity-related figures for Bunaji and Rahaji races 1991 (Source: FDLPCS, 1992)

Table 2: Herd structure for Bunaji race 1991 (Source: FDLPCS, 1992)

and a low of 2 kg in the late dry season.

16. Pastoralists also come from outside of Nigeria from neighbouring Cameroon, Chad and Niger, although there has been a decline since 1986 reflecting the slump in the Nigerian economy. Despite this slump and the high level of domestic inflation, the size of the national herd is increasing.

17. Cattle are traded mostly through the informal sector and there is a long marketing chain taking the cattle from north to south to the major urban markets (FDLPCS, 1992). Pastoralists sell to market traders or small-scale agents (*dilalai*) who travel between villages and encampments offering to acquire animals for brokers (*fartoma*) who then host the animals until the larger traders (*yan baranda*, *yan tugu*) buy them. The rural markets, apart from providing for local consumption, supply stock to the urban and entrepôt markets such as Kano, Kaduna and Mariga from where they are sold to larger traders in Lagos, Enugu and other large markets further south (ibid).

18. This long chain means that prices in the south are double those in the north, a situation that has been aggravated by the increasing cost of road transport and the decline of the railway system. Although the number of links means that capital is turned over slowly, it reduces the amount of credit and investment required by any individual, an important consideration given the high cost of credit and difficulties in obtaining it.

Overview of Fulani Pastoralists

19. The Fulani manage the majority of cattle in Nigeria (Frantz), although not all the animals are owned by the herders and there has for some time been a trend for other people (eg civil servants, traders and wealthy urban residents) to invest in cattle which Fulani herders then rear.

20. Most of the Fulani herds consist of *bunaji* cattle which are owned by families or individuals. The nuclear family forms the minimum herding unit, although often a number of families will live in the same compound, a number of compounds

making up an encampment. Typically, a household consists of a husband and his wife/wives and their children, to which may be added the husband's parents; other of the husband's relatives, spouses and children; adopted or fostered children; and employees (herders, cultivators and servants). The Fulani are patrilineal with patrilocality the norm. Marriage of paternal cousins is still common. Divorce is quite common and in such cases the woman will return to her own family, usually leaving the children with her husband's community. However, if a woman's husband dies she will often remarry his brother and remain with that community.

21. It has been commented that the extent of polygyny is causing single males to migrate to urban centres and to marry into other ethnic groups (Frantz). However, despite often being regarded as outsiders by settled populations, there has long been integration of the Fulani with other groups such as the Hausa with links existing between the Fulani and the urban-based *emirs*. A significant number of Fulani have long given up pastoralism to become urban traders. In some areas of the country such as the eastern part of the middle belt the Fulani language is the lingua franca.

22. Within each Fulani pastoralist community there is a strong social system which links the different households. Patronage is important both to win prestige for wealthier members and to guarantee the welfare of poorer households. Each community has its leader (*ardo*) and a number of elders (*maube*). In larger communities the *ardo* is the lineage head and the various *ardo* are headed by a community leader (*jauro*).

23. Some observers have described the *ardo* as an externally introduced device originally designed to ensure payment of cattle tax (Okali et al, 1981), although Frantz (ibid) holds that they are part of a traditional structure which in some communities was subsequently incorporated into the local government hierarchy. It was our observation that although the cattle tax was abolished over a decade ago, it was nonetheless impossible to approach most Fulani communities without prior agreement from the *ardo* or *jauro*, and that in many initial interviews the elders of the community were also present.

24. Of the Fulani who are pastoralists, a large number are not involved in significant seasonal migration. Although Fulani groups from the northern states and neighbouring countries bring their herds into the middle belt during the dry season, as mentioned earlier many cattle do not actually leave this belt. The growth in cattle numbers in the middle belt is partly due to increased cultivation in the north which has led to greater competition for land and has interfered with traditional herd routes, together with the gradual sedentarization of many Fulani in this region. This process was observed by Frantz in the 1970s who noted that it was being accompanied by increasing herd sizes "*because the cattle can be fed with greater regularity and at less cost by using residues from the Fulani's own farms*" (ibid, p 103).

25. Although many Fulani keep small ruminants, it is by their cattle that they judge their wealth. The number of cattle is important to a person's status and prestige, together with the number of wives, support of Islamic learning, political office, the employment of hired labour and the ability to provide patronage to one's kin and others (Frantz). However, accumulation of wealth by itself is not a motivation, and is important only insofar as it can then be used to generate enhanced prestige.

26. Although many Fulani complain of insufficient grazing and the amount of cultivated land is increasing, observers and Fulani alike do not feel the number of cattle is in decline. There is though a feeling that conflict between pastoralists and settled cultivators has increased in recent years. This has partly been caused by the gradual penetration of herders into new areas where they do not have established relations with the settled populations, and are unfamiliar with local customs and laws. It has also been blamed on the demise of traditional agreements over trekking routes (FDLPCS, 1992). In former times there were standard cattle routes (*burti*) with demarcated lines agreed upon by committees made up from pastoralists, farmers and local government. This helped minimise conflict, but by the early 1980s the system had largely broken down due mostly to lack of government support.

27. Nowadays, the increased need for farm land, the lack of

arbitration between cultivators and pastoralists, and perhaps also the growing number of fattening herds held by settled cultivators themselves, mean that farms are often planted across cattle routes. Payment for grazing on crop residues by the Fulani is now common, replacing the former principle of mutual benefit where farmers allowed grazing because the herds manured the soil. Farmers complain that Fulani herds damage crops, which in part seems to be due to the use of young, inexperienced herders. The Fulani complain that crop residues are burnt so that the cattle cannot graze, even sometimes after the farmer has been paid for the right to graze the land. There are also disputes over water resources, with farmers accusing the Fulani cattle of polluting the water, and Fulani complaining that water is poisoned by the farmers to catch fish (FDLPCS, 1992).

28. Such conflict has heightened the anxiety of the Fulani over land security, a concern raised by many of the Fulani we met. Although many complained about the actual conditions of grazing reserves, many approved of the theory as a way of guaranteeing them access to pasture at least for some of the year.

PASTORALIST CATEGORIES

29. Pastoralist production systems are highly varied and classification is often problematic. For the purposes of this study, the major consideration is the relationship between pastoralists and grain, and the categories used reflect this. Categorization concentrates on the homogeneity of groups or communities and definition has been accorded based on the predominant characteristics of the group (Figure 1). This is not to deny movement between categories nor the inter-household and intra-household differences which are discussed later. Rather it reflects the practical need of having to plan interventions around groups rather than individuals or households (see below).

Exclusive Pastoralists

30. Although it is a common perception that vast herds of cattle trekking long distances is what pastoralism is all

Figure 1: Pastoralist Categories

about, exclusive pastoralists do not represent the major pastoralist category in Nigeria in terms of either number of people or size of herd. Furthermore, those that are exclusive pastoralists within the sub-humid belt of the country often only migrate short distances between the wet and dry seasons, and use the same grazing areas and houses (*ruga*) each year (FDLPCS, 1992).

31. Their defining characteristics are:

a. They purchase the bulk of their grain, although individual households may be experimenting with cultivation of the land near their *ruga*.
b. They do not have permanent storage facilities.
c. All households have cattle herds.
d. The entire herd moves for the dry season.
e. No group members are left behind during seasonal migration.
f. They consume milk throughout the year.
g. The primary indicator of wealth is the size of the cattle herd.

32. Different groups within the category differ as regards the distance they travel between seasonal grazing areas.

Transhumant Pastoralists

33. This category probably represents the majority of people engaged in pastoralism in Nigeria today. All transhumant pastoralists have certain features in common, but they can be divided into two sub-categories:

a. Those that are cultivation-dependent.
b. Those that are not cultivation-dependent.

Cultivation-dependent Transhumant Pastoralists

34. Their defining characteristics are:

a. All members have a long-term base where cultivation is conducted in the wet season and some group members (especially the elderly) remain throughout the year.

b. This long-term base is primarily chosen using criteria based on its suitability for cattle rearing rather than farming.
c. The majority of households are involved in the cultivation of grain for the household's own consumption.
d. There are permanent storage facilities at the long-term base.
e. The majority of households have herds of cattle.
f. Households with small or no herds sell grain to local markets.
g. A proportion of the herd is taken away from the base during the dry season.[2]
h. Milk may not be available throughout the year to those at the long-term base.
i. The primary indicator of wealth is the size of the cattle herd.

35. Different groups within this sub-category differ as to the length of time in which they have been cultivating. They also differ as to the distance between their wet and dry season grazing areas which affects how members away from the home base acquire grain in the dry season.

Non Cultivation-dependent Transhumant Pastoralists

36. Their defining characteristics are:

a. All members have a long-term base to which members go in the wet season and some group members (especially the elderly) remain throughout the year.
b. This long-term base is primarily chosen using criteria based on its suitability for cattle rearing rather than farming.
c. The majority of households do not cultivate.
d. All households have herds of cattle.
e. Not all households have permanent storage facilities.
f. Those households that cultivate grain do so for their own consumption.

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[2] This may be either due to the need for better quality pasture or to avoid tsetse fly (FDLPCS, 1992).

g. The members consume milk throughout the year.
h. The primary indicator of wealth is the size of the cattle herd.

37. Different groups within this sub-category differ as to the distances covered during seasonal migration, and also the number of grazing areas used during the dry season.

Agro-pastoralists

38. This is a problematic category as there is a thin divide between some agro-pastoralists and some transhumant pastoralists. Agro-pastoralists have been defined as those who are semi-settled, cultivating "*sufficient areas to feed their families from their own cereal production*" (FDLPCS, 1992 p 71), a definition that would also include some transhumant groups. For the purposes of this study, agro-pastoralists are defined by the following characteristics:

a. They have a long-term base where cultivation is conducted and where a majority of group members remain throughout the year.
b. They have a long-term base chosen partly but *not solely* because of its suitability for cattle rearing.
c. All households are involved in cultivation.
d. Some households sell a grain surplus to local markets.
e. Some households do not have cattle herds.
f. Members more likely to engage in non cattle-related economic investment (e.g. milling machines, land purchases).

39. Groups within the category differ in how long they have been settled, which in turn can affect the grain output. Also some groups may not consider themselves to have settled permanently, and although exhibiting the characteristics of agro-pastoralists may decide to move their settlement elsewhere even after a number of years.

40. Common to all the categories is that the people consume grain, although how it is acquired varies both between categories and between households within a particular group.

Milk is rarely sold in the dry season.

PRODUCTION SYSTEMS

41. Although each of the aforementioned categories is distinct, their production systems share common features.

Major Factors of Production

Factors of Cattle Production

42. Cattle are important to all the categories as seen by the fact that all categories have herds, that the needs of these herds are a significant and often primary consideration in the selection of settlements, and that herd-size is often the primary measurement of wealth. Settlements are chosen because of their access to water and good grazing, the need to avoid animal diseases such as tsetse fly, and the ability to establish good relations with neighbouring populations which will facilitate cattle production. A further factor may be access to veterinary services and supplies, although at the present time these seem too sporadic to be a real consideration.

43. Cattle are inherited from both male and female relatives, primarily parents. Although herded together, cattle inherited from the mother and cattle from the father are distinguished by name and marking, and it is commonly held by Fulani that those from the mother will bring greater wealth than those from the father. However, women do not own as many cattle as men, and there are many more women without cattle than men.

44. The cattle require daily access to pasture and water, cows having been milked after any calves have fed, which limits the daily grazing range. Calves often remain at the settlement while the herds are taken to graze.

45. Cattle are sold for meat and used to produce dairy produce. The Fulani try and establish relations with agents who have access to markets to sell cattle, although they may also sell directly. Women sell the dairy produce. It has traditionally been held that the Fulani are resistant to

selling their cattle and that it is not the aim of Fulani pastoralists to maximise the commercial offtake because wealth is so closely linked to the size of an individual's herd (Kerven, 1992). However, it has also been argued that in both colonial and post-colonial eras the potential number of cattle available for marketing and the actual numbers sold were the same. Herd composition figures have consistently shown that those cattle sold tend to be bulls of four years old and upwards and non-productive heifers - i.e. those animals non-beneficial to herd sustainability. Furthermore, it has been shown that cattle offtake increases when external conditions are favourable (e.g. with veterinary interventions that reduce worry about cattle disease, and with favourable market prices such as were experienced during the 1970s oil boom) (ibid).

46. In the context of this report it is probably not important at this stage which of these theories is the more accurate, although it may be of significance at later stages. What seems clear is that the desire to maintain herd sustainability, whether to increase herd size or maximise offtake, is one reason Fulani take up cultivation, and alternative capital investment such as that undertaken by some agro-pastoralists is not done at the expense of long-term herd sustainability.

47. Money is required to maintain the cattle herd: to buy medicines and pay for veterinary services, to buy salt lick, to buy crop residue, to pay tribute to local land owners, to pay taxes[3], to pay fines (e.g. for encroaching on wildlife reserves). It is also necessary to pay for any hired herders, although most herding is done using family labour. However, it is more common that such herders are remunerated with cattle. For instance, the hired herder may receive a 1-2 year old bull for five months' work or a young cow for twelve months' work, although during this time the cattle owner is also responsible for providing food, clothes and shelter.

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[3] In one area, a Fulani community were still paying a cattle tax to local officials which was abolished nationally in the 1970s although selectively reintroduced in some areas.

48. In addition, where cattle production reduces or excludes grain cultivation, income is necessary to purchase and transport grain in addition to other non-dairy foodstuffs that cannot be found in the wild.

49. Apart from the sale of cattle and dairy produce, cash needs can be met from the sale of small ruminants, selling of own labour, and rearing cattle belonging to others such as urban dwellers and settled cultivators.

Factors of Grain Production

50. Cultivation of grain is common amongst all categories except exclusive pastoralists, and the two main factors of production required are land and labour. Except for the small minority cultivating on grazing reserves, land is acquired from local chiefs and landowners. The case of the community in Faluwa (Alkaleri local government near Bauchi) is illustrative. Jauro Ahmadu was one of the first three settlers, originating from Hadeija in Kano State, and coming to Faluwa from Potiskum in Yobe State because of over-grazing and conflict with Hausa cultivators. He knew about the Faluwa area because the community used to bring its herds here during the dry season, but when he decided to settle he came here alone spending about three months to approach the local chief to ask for land. Eventually they agreed on an area of uncultivated land. Jauro Ahmadu gave the chief a ram and other tribute, and in making this agreement established a channel for other members of his community to come to Faluwa. Subsequent settlers each pay tribute to the chief whom they approach with the jauro. Once the chief approves, the jauro then allocates the land to the new settler from the total area agreed upon between him and the chief. Over three years the number of households has risen from three to about 80, and each year the community pays the chief local taxes and tribute.

51. Land security is probably associated with length of residence, with long residence in turn being a sign of harmonious relations with neighbouring communities. Ownership of land is rarely formally acknowledged and the Fulani are concerned that their land rights are considered weaker than

settled cultivators, although this reflects wider problems of tenure in Nigeria as well as the problems specifically facing the Fulani relative to land security. Some communities in all categories have been using their current sites for a generation and often longer.

52. Because the selection of sites is primarily determined by the needs of the cattle, cultivation does not necessarily take place on the best soils. Although some observers remarked that the Fulani took quickly to cultivation techniques, it is noticeable that the Fulani use a lot of hired labour, sometimes from within their community but more often from neighbouring villages or migrants. Unlike most hired herders, these are paid in cash, although payment is often deferred until harvest time. But hired labour working over a continuous period of time are treated as members of the household, given food, shelter and clothing, and in some cases where they work for several years are considered adopted members of the family.

53. Although there is no apparent shortage of labour, access to money to pay for it is a constraint to how much cultivation is possible. The choice between allocating resources to cattle or cultivation needs to be understood, although all that can be tentatively said at this stage is that Fulani men seem reluctant to act to the short-term detriment of their herds (e.g. through the selling of cattle to buy grain when the grain price is low) even though this might result in longer-term negative impact on the herds (e.g. through the forced sale of cattle to buy grain when the terms of trade between cattle and grain are against the cattle-owner).

54. Family labour is used in cultivation - male and female, adult and child. There is a tendency amongst wealthier families to deny that women are involved in cultivation, or indeed work outside of the home, reflecting a perception of Islamic norms. But while relatively few households employ hired herders, using instead family labour, even many small households use hired labour for cultivation. This obviously reflects the greater demand for labour in cultivation at certain times of the year, but may also be related to the strong identification Fulani have with cattle-rearing, and the

sense that cultivation, although it may be necessary, nonetheless sits awkwardly amongst the societal norms and values.

Economic Differentiation Between Households

55. Wealth is relative and can be judged both between categories and within categories; between groups or communities and within them. Given the importance of family labour in the production systems and an economic system favouring wealth-giving rather than private accumulation, household economic status can be estimated by the number of household members, including husband, wives, children, other productive relatives, adopted members and employees. Those households with the largest number of productive members[4] will generally be the wealthiest, while those with the smallest number of members will be amongst the poorest.

56. Again, the case study of Jauro Ahmadu provides an example of a large household's composition:

Number of wives	4
Number of single daughters	10
Number of single sons	7
Single junior brothers living with respondent	4
Number of permanently resident labourers	3
Total	28
(NB: Respondent also had four daughters and four sons who had died.)	

57. In contrast the smallest household in the same agro-pastoral community consisted of a husband, a wife and two non-

[4] No attempt has been made in this study to develop a formula for assessing the dependency ratio within families and its impact on wealth.

productive age sons.

58. The characteristics of large and small households are shown in Table 3.

59. In theory, smaller families are not disadvantaged in groups where cattle rearing is the predominant production system because of the greater marginal productivity of labour in this system compared to grain cultivation, the same number of herders being required to look after one or 60 head of cattle. However, societal norms mean that as the herd grows so does a person's responsibilities, and through adoption and fostering-in of relatives and others a small household with a large herd will grow in size.

60. Smaller families are more disadvantaged where cultivation is more important to subsistence than cattle because of the greater demands cultivation places on labour. Where there are young children and/or unproductive adults, there is a strong likelihood that own-grain production will not be sufficient, and there may not be cattle to sell or any sale of cattle will affect the sustainability of the herd. To an extent, the shortfall in grain can be met by selling one's labour to wealthier farmers or activities such as gathering and selling sorghum stalks. The extended family may also serve to alleviate the problem through the provision of money or food.

61. There is no apparent relationship between the existence or otherwise of stores and the size/wealth of the household, although this needs to be looked into further.

62. At this stage, little is known about the impact of divorce, separation and outward migration, all of which have been reported elsewhere as common amongst the Fulani. Some attempt was made to estimate the levels of morbidity from the number of living and dead children in a household. These figures suggest that morbidity is high.

Gender and Age-Based Differentiation Within Households

63. The composition of a household is equally significant as its size in terms of production. Children become economically

Table 3: Economic Differentiation Between Households

productive at an early age with children of about ten years old or younger assisting with herding and cultivation as well as in household maintenance activities. Adolescent males in particular take a large responsibility for herding, especially away from the settlement, while adolescent females are active within the settlement and in some marketing, although it is likely that some are married at this age and become involved in reproduction.

64. Table 4 shows the different productive and reproductive tasks divided according to gender and adult-child age. The exact tasks performed vary from household to household according to economic status with wealthier families having a choice between hired rather than family labour for certain tasks.

65. Most fields are managed by men who organise the family labour and pay for the hired labour. Wives, children and other household dependents work in these fields as well as the man. But some women have their own fields in which the husband works in addition to other family members, although a question mark remains as to who pays for any hired labour used in these fields. It is possible that women are more likely to sell their grain than store it, although this needs further study. In such cases, the sale of grain partly compensates for the loss of income from milk sales which are commonly said to have declined in recent years. However, any income from this grain comes after the harvest when milk is also being sold, and it is unclear what the overall impact of this change of income source is on women's overall access to money.

66. Women also own small ruminants and poultry, although again to a lesser extent than men.

67. With reference to grain storage, it is important to note that in poorer households, women are less likely to control access to stores and to manage the use of the grain than in wealthier households. Whether there are special conditions relating to widows and/or divorcees is unknown. There are not separate male and female stores, and control of the store is particularly important where some of the grain is to be sold. However, in larger households at least, male family heads gave

Table 4: Gender and age-determined division of labour

Women		Men	
Adult	Child	Adult	Child
Reproduction & domestic: • child rearing • food preparation • cooking • provision of clothing • some provision of bride price & other social gifts • provision of ingredients for soup*	Reproduction & domestic: • help in food preparation • water collection • firewood collection • pounding of grain	Reproduction & domestic: • provision of clothing • primary provision of bride price & other social gifts • provision of grain for consumption	Reproduction & domestic: • firewood collection
Cattle rearing: • some ownership of cattle* • some milking • preparation & selling of dairy produce	Cattle rearing: • some herding of cattle near compound • some milking	Cattle rearing: • ownership of cattle • herd maintenance (health, grazing, water management, allocation of milk) • milking • herding of cattle • selling of cattle	Cattle rearing: • herding of cattle • milking
Other livestock: • some ownership of small ruminants & poultry • some maintenance of own smallstock • selling or other use of own smallstock	Other livestock: • some herding of smallstock	Other livestock: • ownership of small ruminants and poultry • maintenance of smallstock • selling or other use of smallstock	Other livestock: • herding of smallstock
Grain cultivation:* • planting • drying • cleaning • transportation • management of store by wives (especially in richer households)	Grain cultivation:* • weeding • shelling • pounding	Grain cultivation:* • land clearing & preparation • harvesting • storing • management of store	Grain cultivation:* • weeding • shelling
Other economic activities: (unknown)	Other economic activities:	Other economic activities:* • commercial grain milling • selling of labour (eg herding, blacksmithing, cultivating) • other income generation activities (eg collecting & selling sorghum stalks for thatch)	Other economic activities:

* Subject to economic status of household.

their wives free access to the stores. Furthermore, some wives admitted to taking grain without the knowledge of their husband, often for sale when he did not provide them with enough money for domestic expenditure.

68. Children's access to land, cattle and other resources is entirely dependent upon adult relatives. It is possibly a growing trend for inheritance of cattle to be delayed until the owner's death, perhaps to ensure family labour for cattle rearing, and perhaps to prevent maternal relatives gaining access to children's cattle in the case of divorce. However, as stated earlier, both men and women can own cattle. Women may inherit cattle from their parents, or may be given a heifer by the husband at marriage with the cow being reared within the husband's herd and any calves being the property of the woman. But the number of cattle owned by women is far less than that by men.

69. There seems to be little opportunity for schooling, even amongst the more settled agro-pastoralists, due to the emphasis placed on economic activity even in large households.

70. Except for hired labour, remuneration for different types of work is difficult to disaggregate. In general it appears that each resource is owned by an individual who has the right of disposal and controls any income, contrasting the Fulani with East African pastoralists, for instance, where ownership is a diffused system of rights within the kin/clan group. Adult males have the greatest amount of resources, and take decisions on how to dispose of these resources without an obligation to consult other household members. Although women's cattle are managed within the husband's or agnatic[5] kin member's herd, the right of disposal and any resulting income belongs to the owner. In the event of divorce or separation, a woman, who normally returns to her family, keeps her cattle. To what extent and under what circumstances women sell their cattle other than to contribute towards their children's marriages needs to be investigated further, but it is likely that women with young children and no husband will be under greater stress to dispose of their cattle to meet

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[5] father's

subsistence needs, especially if they come from a poor family.

71. An exception to the rule of owner's right of disposal is the sale of dairy produce. Men largely control how much milk is to be given to calves and how much to the family, but once this division has been made the milk from the entire herd is managed by women, and the income from milk that is sold is the right of the woman. It seems that the amount of milk being sold, especially in the dry season, is declining and the impact of this on women's access to income needs to be further studied.

72. Although children do not receive direct remuneration for their labour, they have the right to expect eventual remuneration through inheritance of the family resources, and will be supported by their parents in getting married and other social events. Other dependents within the household do not necessarily inherit, but the head of a large household has responsibilities towards such members and will assist with their marriages and other social events.

73. For adults, there are clear gender based responsibilities relating to the provision of food. The senior male of a household is responsible for providing grain, while the female is responsible for supplying the ingredients of the soup or sauce eaten with the grain. In some households, declining income from the sale of dairy produce are blamed for women being unable to meet this obligation, and in such cases men are responsible for providing all the cooking ingredients. But the division of responsibility still applies in many households.

Grain Storage

Production of Grain

74. The three most commonly grown crops are maize, millet and sorghum and these are often supplemented with others such as rice, yams and beans.

75. The cultivation cycle begins prior to the rainy season when predominantly men are involved in land clearing and

preparation. Seed is generally selected from the previous year's harvest with small amounts bought in from local markets (e.g. beans) or obtained from relatives or neighbours. If hired labour is not used, most of the planting is done by women and, during growth of the crop, children are often required to assist with weeding. Decisions about the time of harvest, and the harvest itself is the responsibility of the household head and crops are cut, left on the cob/head and tied in bundles. These bundles are either left in the field to "dry" for up to a few weeks or brought to the family compound where they are stacked on high platforms for further drying before being put into store. Only in one case did the owner say he had problems with grain not being dried thoroughly and consequent mould problems developed, although this may have been due to an unseasonal shower rather than poor drying.

76. Without hired labour, women provide most of the labour carrying the crop in from the field and whilst the men of the household claim to control filling the stores, in practice women do this also.

77. It is rare to find any crops stored in a shelled form and common to find stores filled with more than one commodity. Certainly amongst the smaller households, three or more commodities (e.g. bulrush millet, sorghum and maize) together will fill a store, with little or no attempt to provide dividing partitions.

78. Management and access to the stores, once filled, varies with the size and status of the household. Stores belonging to smaller households, who may not produce enough grain for the requirements, are controlled by the household head, even to the extent that stores are locked with a padlock and access to the key denied to the wife. Quotas of grain are given to the wives, for example, every four to five days. But in larger households women do have access to the stores and in the majority of places, stores are not locked and grain can easily be fetched.

79. Practical management of the stores involves monitoring of the condition of the store base, sides and especially the roof

which needs continuous repair to remain waterproof. Cursory examination of the grain seems to be the norm and rarely was chemical said to be used in the control of insect pests.

Types of store

80. The type and size of store varies considerably depending on the extent of cultivation practised and on personal design preferences by the owner. For example, this survey encountered families who bought one bag of grain from a local market at a time and simply kept it on the house floor, to those who had invested money in employing neighbouring (agricultural) communities to build more permanent mud stores. But by far the most common type seen during this survey were "basket" type stores frequently made from sorghum stover and kept off the ground on wooden pole bases. Grass roofs cover both basket and mud stores, although they may be left off during the dry season when there is no chance of rain. Basket stores vary in shape and size, the design and method of construction seems to be individual, within encampments.

81. In general, storage technology seems either to be borrowed from neighbouring communities in the case of newly settled groups, or brought in from former settlements in the case of the Fulani who have resettled. Transfer of technology therefore occurs both between group members, and between different communities, especially via hired storage builders from neighbouring communities, a situation similar to other pastoral areas (Donaldson, 1992).

82. The capacity of the mud and basket type stores seen during this survey ranged from 3-7m^3 for the mud stores and from 1-5m^3 for the basket stores, which could store approximately 1300 - 3100 kg and 450 - 2300 kg of maize on the cob inside each type respectively.

83. Mud stores have a longer life-span of up to 10 years (with regular maintenance) whereas the basket types were said to last on average 5 years and sometimes only 3 seasons. Typical stores are shown in Figures 2 and 3.

Figure 2 & 3: Types of crib

Storage problems

84. The three main storage problems frequently stated by respondents were, in order of importance, rodents, termites and storage insects.

85. No attempts to control rodent entry into stores were seen and, in most cases, stores built on wooden bases were less than 50 cm above ground level so would not be suitable for attaching rat guards. The wooden poles used to support the sides of bigger basket stores provide excellent entry points for rodents, and they would have little trouble getting into stores through the sides or through the open roof of the mud stores.

86. Termites are more of a threat to the store structure than the grain inside and obvious termite attack was seen on the wooden platforms that hold up stores. This may cause the structure to collapse within a season. Mud stores are usually held off the ground by stone stilts but these do not prevent termites attacking the walls. Only in one case was an attempt made to control termites using chemical treatment (dichlorvos). Chemicals are generally expensive, rarely available and sold in open packets of dubious purity. Building stores away from termite mounds does not provide control as many termite species living in tropical regions do not build mounds (Logan, personal communication).

87. In none of the interviews with the Fulani did any of the respondents feel that storage insects were a serious problem. This was confirmed by the study team during inspection of the grain in store which showed little visible insect damage in the three main commodities (except in one case where heavily damaged bulrush millet was said to have been in store for 3 years). Where insects were observed they were identified as *Sitophilus* spp.

88. A small number of maize samples were taken for an assessment of weight loss due to visible insect damage using the gravimetric method described by Boxall (1986). Results confirm field observations that weight loss caused by insects was negligible (<0.05%). Spot checks on moisture content

using the ISO 6540 standard gave a mean of 7.4% moisture content. This figure is some 5% below the recommended safe storage limit for maize in tropical areas and would reduce insect populations to low levels.

89. No respondents had felt the need to use either chemical or non-chemical methods to control insects and, whilst Actellic is available in some of the local markets visited, it is rarely used.

90. Only in one case was there evidence of any fungal attack on stored grain (due to an unseasonal shower).

Grain production and consumption levels

91. Based on respondent estimates of the number of bags (of shelled commodity) produced from their previous year's harvest and the length of time each bag lasted in feeding the family, it can be concluded that:

a. some households (generally smaller households) do not produce enough of their own grain to meet their requirements whilst others (generally larger households) produce an excess;

b. the range of grain consumption reported varies from below a recommended daily figure of 450 g/day/person to well above that figure;

c. some (smaller) families need to supplement their harvest by buying in extra grain from the markets.

92. Due to the small number of families interviewed across the range of pastoral groups described earlier, it is not feasible to draw any conclusions across the differentiation of households, gender or age.

93. In this study, the contribution made by meat and milk to the diet of Fulani families was not considered.

94. The long-term trend of cultivation by Fulani groups has increased in recent decades as they have become more settled

and less reliant on their herds. The harvest is held in stores developed by local technology transfer and generally successfully with minimal chemical control of insects.

INTERACTION WITH THE MARKETS

Terms of Trade

95. Grain prices are lowest after the new harvest, which is when the price of cattle is at its highest due to improved condition provided by wet season pasture and, in the middle belt, the reduced number of cattle in the market compared to the dry season when cattle move south. Cattle prices start to decline in the dry season due to poorer pasture and the increasing number of cattle coming from the north. At the same time grain prices begin to rise due to reduced availability and the demand from southern buyers.

96. As the wet season begins, cattle prices do not alter much because any advantage in quality due to better pasture is largely offset by the increased availability of cattle migrating from the north. Grain prices, however, continue to rise with the additional demand for seed. The grain price reaches a peak just before the new harvest when supplies are at their lowest. However, cattle prices at this time are also rising as the benefits of wet season pasture take effect.

97. It is not therefore true that when grain prices are highest, the terms of trade are most disadvantageous to pastoralists (see Figure 4). Looking solely at cattle and grain, the worst times for pastoralists to buy grain are late in the dry season and early in the wet season. Some transhumant pastoralists are aware of this and deliberately sell cattle after the new harvest. They may then either use the money to buy and store grain, taking advantage of the cheap post-harvest prices, or they may keep the money to buy grain later in the year.

98. However, as earlier sections show, pastoralists are not wholly dependent on the sale of cattle if they need to buy grain. The household as a whole has access to income from dairy produce, the sale of small ruminants, and other income

Figure 4: Theoretical model of cattle and grain terms of trade

generation activities. The price of dairy produce is lowest after the new harvest. It rises with the dry season as availability declines, however this may be partly offset in the middle belt by the arrival of herds from the north. As pasture improves again, the price falls but actual incomes probably increase as individual households have more produce to sell.

99. Small ruminants are probably important sources of income for smaller households, although larger households pay little attention to their price, seeing them as more useful for feasts and ceremonies. The market price is fairly consistent throughout the year, but there are two peaks around the time of Idul Fitri and Idul Adha.

100. These seasonal differences will be exacerbated by such events as drought and outbreak of disease. Distress sales of cattle will be highest amongst exclusive pastoralists, and it is likely that individuals or households within other categories may be forced out of sustainable herding during such periods. Amongst our respondents, disease was the greatest concern especially at a time when veterinary services seem to be on the decline, and many cases were cited of people who lost their herds because of the rinderpest outbreak in the early 1980s.

Market Prices

101. The average seasonal prices for the three main grains consumed in the middle belt are listed in Table 5, and their relationship to the seasonal price for a two year-old bullock[6] can be seen from Figure 5. As there were localised differences in the market price for grain and cattle, these figures should only be used to identify overall patterns, and there is a need for more data before drawing too many firm conclusions.

102. The grain per bullock ratio is greatest just after the new harvest when one bullock is worth 1,150 kg of maize, 960 kg of sorghum and 920 kg of millet. The ratio is lowest in

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[6] The most frequently sold type of cattle.

Figure 5: Seasonal market price of grain and cattle

Figure 6: Grain-cattle price ratio

Table 5: Mean seasonal prices for major grains

Mean price (Naira) per 100 kg bag	New Harvest	Mid Dry Season	Early Wet Season
Maize	240	350	600
Sorghum	285	375	650
Millet	300	395	510

the late dry season and early wet season when one bullock is worth less than 400 kg of maize, 360 kg of sorghum and about 450 kg of millet (Figure 6).

103. For smaller households it is possible that it is not the ratio between cattle and grain but the ratio of small ruminants to grain which is most important, as the sale of a goat or sheep should be able to generate enough money to buy sufficient grain. This would need to be studied further. But in larger households, it is the cattle price which is important as it takes the sale of a young bullock to obtain sufficient money to buy enough grain and pay the cost of transporting this back to the stores.

CONCLUSIONS AND RECOMMENDATIONS

104. Although it is true that Fulani pastoralists of the middle belt experience negative terms of trade at certain times of the year, it is by no means clear that this is perceived as a problem or that shortages of grain are related to storage. Exclusive pastoralists do not store for long periods of time, buying only enough for about one month's requirements, and do not therefore have the option of buying grain when the terms of trade are favourable in order to store it for when the terms of trade are negative. Although facing problems in maintaining their way of life, exclusive pastoralists do not appear economically disadvantaged as a category. The head of a large household need only sell ten head of young bulls to meet his financial requirements for a year, an amount that makes no impact on the sustainability of a 400 head herd, and many households have far larger herds

than this.

105. Given that the national herd size is still increasing and most of this is managed by pastoralists, it is not possible to conclude that past disease outbreaks or recent droughts have forced more Fulani to abandon livestock production. Many Fulani do cultivate, but transhumant Fulani and many agro-pastoralist Fulani do not see themselves as being forced out of cattle production, indeed many see cultivation with its resultant land security and reduced dependence on the inflationary grain markets as a way of maintaining and expanding their herds.

106. The issue of inflation is important. Grain prices have undoubtedly risen with the general high rate of inflation experienced in Nigeria, and Fulani often cite the high price of grain in the markets as the reason for starting or expanding grain cultivation. Some observers say price increases have been exacerbated by the high prices southern traders and breweries are prepared to pay for grain, although this needs to be set against the impact of food imports.

107. But if grain prices have risen, so too have cattle prices. Although accurate data are not available at this stage, it was generally felt that the price of cattle has increased at least as much proportionately as grain and perhaps more. The exact correlation will be difficult to pin down as the cattle and grain prices differ from year to year, not simply because of inflation, but also with the rainfall. Thus many Fulani met were buoyant about the price of cattle remembering last year's good rains. None of the respondents regarded increased grain price as the main cause of a person losing a herd.

108. Rinderpest in the early 1980s resulted in some smaller households losing herds and it has proved difficult to rebuild them, with a consequent greater dependence on cultivation. The impact of this outbreak on exclusive pastoralists and whether it resulted in some turning more to cultivation cannot be determined as yet. But amongst the transhumant pastoralists it seems that some smaller households were being forced out of livestock production, cultivation proving an

inadequate spring-board for rebuilding a herd. Yet, in general, those who had cattle seem to have found a safe hedge against the rampant inflation which has affected Nigeria in the 1980s-1990s, and it is hard to say with any confidence that pastoralists as a group are more disadvantaged viz a viz the markets than farmers and farm labourers.

109. However, this does not necessarily mean that interventions involving the Fulani cannot be justified. Cattle are a good investment in the current Nigerian economic climate, and any intervention that allows people to maintain their herds can be justified on the grounds of increasing the nation's renewable resource base while assisting in poverty prevention and alleviation. Yet the common perception of the Fulani is as a problem. Cultivators and conservationists talk of the `Fulani problem' while pastoralists feel they are in too frequent conflict with other production systems. There is a real need for cooperation between groups from these different systems, and a move towards a situation where the Fulani are considered less of a problem and more of an asset to the national economy and society.

110. It seems that the people most likely to be forced out of cattle production are the smaller households, especially in the transhumant and agro-pastoralist categories. There is clear, although only superficially understood, economic differentiation within the communities in all the categories examined. In transhumant communities the poorer households are those most likely to have the least sustainable herds, although the sustainability of herds in exclusive pastoralist groups has not been sufficiently examined to date.

111. Storage is not the main issue with poor households because, although they have access to cribs, they are not producing enough grain to store throughout the year and, forced to buy grain, are either unwilling to sell cattle unless there is no other choice or do not have the cattle to sell to begin with. However, storage for poorer households, especially if linked to other interventions or generating them, would be of benefit. While Fulani communities operate an internal welfare system, there is a strong case for arguing that more needs to be understood about how these systems work

and what is the position of the poor within them in order to better design further interventions. Storage would provide an at worst neutral, possibly positive, benefit intervention that could be conducted without exciting either problematic external attention, or internal tensions or suspicion between different classes and genders. At the same time it would serve as an entry point for working with the communities, and particularly their most disadvantaged members, in building up further interventions amongst a group of Nigerian rural society that has largely been considered inaccessible or ignored in relation to project interventions in recent times.

112. A requirement for this type of approach would be the identification of a local organization able to build upon the contact made through the storage intervention. NRI would also need to use the data gathered to actively generate further interest in working with the Fulani, both amongst organizations in Nigeria and in the west. This might be linked with the recent discussions among NGOs in the UK on working with pastoralists.

113. To continue this line of work, NRI needs to collaborate with other organizations which are able to use NRI's technical expertise in conjunction with their own long-term field presence. It is therefore recommended that NRI's interest and capacity in this field be advertised through a peer-reviewed article (e.g. the ODI pastoralist network bulletin), and to invite response from other organizations working with pastoralists which are interested in collaboration.

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ANNEX 1: Visit Itinerary and List of People Contacted

17 February: London-Kano

18 February: Kano-Kaduna

19 February: Meetings with Doug Little and Rabi Isa of the International Livestock Centre for Africa (ILCA - sub humid programme) in Kaduna and the Deputy Director, Pest Control and Deputy Director, Livestock Development at the Federal Ministry of Agriculture and Water Resources - Livestock and Crop Protection Department (FLCPD) in Abuja

20 February: Meetings with Dr Junaidu Maina (Project Manager) and Dr Wilson Opeke (Deputy Project Manager - Field Services) of the National Livestock Projects Division (NLPD) in Kaduna.

21 February: David Bourn (consultant to NRI) assembled the field team, Ebere Omekara (driver), Al Haji Nata'Ala Sambo (liaison) and Umaru M Nuhu (Hausa and Fufulde interpreter).

22 February till 9 March seven States were visited (Kaduna, Plateau, Bauchi, Adamawa, Taraba, Benue and Yobe) and 14 FulBe families representing transhumant and agro-pastoral groups interviewed.

Visits were also made to the North East Arid Zone Development Project (NEAZDP - EC funded) in Gashua, the Hadeja and Nguru Wetlands Conservation Project in Nguru (IUCN/RSPB funded) and the Yankari Initiative Project in Kwiambana.

10 March: visited the Kumuku game reserve near Birnin Gwari to discuss with personnel of the Yankari Initiative, a local NGO, which has experience of working with the Fulani.

11 March: Discussion group session at the ODA Project School of Crop Protection for ODA project staff with invited FLCPD, ILCA, Yankari Initiative and NLPD participation.

12 March: Attempt to see Dr Ajayi (ICRISAT) and the Director (Nigerian Stored Products Research Institute - NSPRI).

ANNEX 2: Study guidelines

PASTORALISTS AND GRAIN STORAGE
RESEARCH OUTLINE

GENERAL DATA

PURPOSE:

a. Gain an overview of pastoralist involvement in the grain markets.
b. Gain an impression of various agencies' understanding of pastoralist food security strategies and problems.
c. Establish demographic context.
d. Establish policy context.
e. Acquire secondary data for helping in site selection.

INFORMATION	TECHNIQUE
114. Grain and livestock/dairy markets	Semi-structured interviews
• Where are the main grain and livestock markets? • Which days do they operate?	
• When is grain being acquired by pastoralists? By whom?	
• When is livestock being sold/exchanged by pastoralists?	
• Data on terms of trade between grain and livestock/-dairy markets. • Identify patterns of stress-related sales.	
• Aside from larger formal (urban?) markets, are there other known markets used by pastoralists?	
115. General demographic data	
• Historical comparison of population size in potential sites.	
• Any data on livestock ownership.	
3. Policy environment	
• Privatisation of veterinary supplies. • Devaluation. • Economic liberalisation (general). • Meat imports. • Grain imports. • Fodder banks. • Grazing reserves.	

INFORMATION	TECHNIQUE
• Changes in land use - areas of increasing cultivation. • Land rights policy.	
116. Related activities	
• General information on other possibly related or conflicting initiatives.	

INITIAL GROUP IDENTIFICATION

PURPOSE:

a. Initial testing of site suitability assessing:
   - Age of settlement
   - Differences in technology
   - Location
   - Willingness of population to participate

INFORMATION	TECHNIQUE
1. Pastoralist population in settlement • Are there pastoralists in the settlement? • What ethnic group? • How many families? • How long have pastoralists used this settlement?	Observation Open-ended interview
2. Pastoralists and cultivation • How long have pastoralists cultivated in the settlement? • How many of the families are involved in cultivation?	Open-ended interview
3. Grain storage • How is grain acquired? • What techniques are used for storing grain?	
4. Markets • Where is grain bought and sold? • When is grain bought and sold?	

PRELIMINARY GROUP DISCUSSION

PURPOSE:

a. Obtain general information on settlement.
b. Site identification.
c. Identify directions for later research.
d. Identify sample frame for household interviews.

INFORMATION	TECHNIQUE
1. Demography of settlement • How many small and large families are there? • Which families have been settled the longest and shortest lengths of time? • Which of the families are permanent and which are temporary? • Why did people choose to settle here?	Transect/mapping Open-ended interview
2. Cultivation and consumption of grain • Who is involved in grain production? • Where are the farms? • When do people acquire grain? • When do people sell grain? • Who looks after the grain? • Where is grain stored? • Is grain more or less significant than in the past? Why?	Observation Transect/mapping Open-ended interview Seasonal calendar
3. Livestock production • What livestock are kept? • Where is livestock sold? • Where are herds moved to? • Which people are involved in herding? • Have there been changes in access to ranges (especially dry season ranges)? • Have there been changes in the diversity of the ranges? • Is there competition between cropping and pastoral resources?	Observation Transect/mapping Open-ended interview Seasonal calendar

HOUSEHOLD INTERVIEWS

PURPOSE:

a. Obtain specific data on individual members of the production system, concentrating on:
   - Spatial strategies of families;
   - Livelihood strategies of families;
   - Length and extent of grain cultivation;
   - Intra-family differences in production system;
   - Grain storage practices.

b. Site identification.

c. Identify directions for later research.

INFORMATION	TECHNIQUE
1. Domicile • How long have you been living in this settlement? • Did your father or mother live in this settlement? How long? • Did your grandfather or grandmother live in this settlement? How long? • Why did you choose this settlement?	Open-ended interview Pert chart
2. Family • How many sons do you have? • How many daughters do you have? • How many spouses do you have? • Were you married previously? How many times? • Where are your children now? • Where is your spouse(s) now? • Who else is living in the house at present?	
3. Cultivation • Have you ever been involved in cultivation? Where? When? Type? • What do you do with the harvest?	
4. Grain • Do you ever buy/exchange grain? Where? From whom? Price? • Who buys the grain in your household? • When do you buy grain? • Do you ever sell/exchange grain? Where? To whom? Price? • Who sells the grain in your household? • When do you sell grain? • Do you store grain in this settlement? Where? Who? How? • Do you store grain when taking herds to grazing areas? Where? Who? How? • Do you buy/exchange more grain now than in the past?	Seasonal calendar Open-ended interview
5. Livestock markets • Do you sell livestock and/or dairy produce? Where? To whom? Price? • When do you sell livestock and/or dairy produce? • Do you buy livestock and/or dairy produce? Where? From whom? Price?	

INFORMATION	TECHNIQUE
6. Livestock production • What livestock are kept? • Where are herds moved to? • Which members of your family are involved in herding? • Have there been changes in access to ranges (especially dry season ranges)? • Have there been changes in the diversity of the ranges? • Is there competition between cropping and pastoral resources?	Open-ended interview Maps

RECORD OF TIME WORKED - DIARY (optional)

PROJECT CODE	N/C	LTTC	Mon	Tue	Wed	Thu	Fri	Sat	Sun	TOTAL
TOTALS										

Concept note
Tree Resources, Farming Systems and the Environment: Stakeholders and Trade-offs - Phase 2 (PH2, 18.8.93)

An analytical review of this topic has been completed in Phase 1 of this research and a draft report is available. This concept note is an outline proposal for research to develop and test the conclusions contained in this report in field-level situations.

Background

This research arises out of long-standing concern for the problems of forest and land-resource degradation, and the enigma of why poor people appear at times to ignore their long term best interest by destroying natural forests and failing to invest in trees and conservation. To throw light on this question, the University of East Anglia was commissioned to undertake a desk study (*The Identification of Key Land Degradation Issues, 1990*) and, more recently, a further study has been undertaken by NRI. This latter work is written up in the form of a draft report entitled *Tree Resources, Farming Systems and the Environment: Stakeholders and Trade-offs (Phase 1), August 1993* which is available from NRI.

A central theme of the report is analysis of the different sets of interest of different groups or stakeholders in society, and the potential significance of these different interests to natural resources and the environment. The report works towards the development of a framework for understanding the way tree-resource decisions are made, and the need to treat forest conservation and farming issues in an integrated way as part of the same problem. It emphasises the need for policy-makers and planners to better understanding the perspectives and positions of different stakeholders concerned with tree resources, and the potential for conflicts between them. The report concludes that empirical research is required to test and develop this analytical framework, and improve its policy relevance, through field study of contrasting situations where trees are managed or utilised by local people.

Funding has been obtained from the ACS/NRED research programme to continue this research until the end of the current financial year, 1993/94. The purpose of this intermediate phase, called Phase 1b, is broadly to establish links with suitable overseas research institutes and, with them, develop an empirical research programme on the lines indicated in this note. The immediate objectives of this intermediate phase are to:

- identify and establish links with suitable local institutes and researchers
- select suitable areas or catchments for study according to the criteria set out below

- develop a detailed methodology and research plan given the overall focus established in this paper
- review current developments in research approaches and data collection methods suitable for field use
- undertake initial fieldwork, and prepare a report on progress up to March 1994, in preparation for Phase 2
- identify sources and arrange funding for a further period of research, covering the years 1994 and 1995.

Frame of reference

The proposed study will have an overall analytical perspective with a micro level focus. It is designed to assist in the analysis of environmental problems and assess the significance of these findings for policy and intervention. The implicit hypothesis of the study is that there is a need in policy-making to better consider the perspectives of different stakeholders who affect, and are affected by, environmental policy, and that conventional cost-benefit analysis is not a sufficient basis for policy formulation and planning. The overlapping focii of study will be:

1. Local people and government planners have different perspectives of the environment and environmental change. The research will examine how different groups of people perceive, handle and are affected by environmental change, and the extent to which macro and micro interests differ or coincide. This will include examination of the meaning of degradation in ecological and economic senses, and to different sets of people.

2. Governments normally have both environmental and developmental objectives and policies which may or may not be mutually compatible. The research will examine how these different objectives and policies work through to local level in the locations chosen and assess how they conflict and coincide.

3. There is debate in the literature between the neo-Malthusian and Boserupian schools concerning the environmental significance of population growth and economic development. There is no doubt that local people spontaneousely modify their farming systems over time to new sets of circumstance, including population pressure, and can develop sustainable systems of land use. The research will examine how people have reacted to changing structural pressures, what environmental changes are now underway, and the extent to which adaptation represents a movement from one low-level equilibrium to another.

4. Considerable advances have been made in recent years in methods for valuing the environment but these are measured from the viewpoint of society as a whole and do not centrally consider the positions of local people. To complement these advances, the research will develop and test methodologies for assessing the perceived costs and

benefits of environmental change from the perspectives of different stakeholders and society as a whole.

Target beneficiaries

The research is designed to benefit the public agencies concerned with development and the environment, and particularly the mitigation of environmental degradation. The main immediate customers and beneficiaries of the research will be the planning and policy making departments of national governments, and to a lesser extent, local line ministries. Donor agencies concerned with the dual problems of economic developmental and environmental protection will also benefit. The indirect or ultimate beneficiaries, whos perspectives will be addressed, will be the local stakeholders, ranging from the indigenous forest dwellers, forest fringe farmers, nomadic livestock herders, as well a downstream communities. Local agencies and researchers will also benefit indirectly through the provision of training and finance and by obtaining research experience.

Research locations

Preliminary contacts have been made with institutions in Thailand, India and Ghana. Contrasting catchments will be selected for study in two of these countries, at least one where forest degradation and tree loss predominate and another where trees are being spontaneously planted and there is a net gain in tree numbers. Provisional selection criteria include:

i) the importance of trees to local livelihood systems and environmental protection, either as natural forests or communal and privately planted trees

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iii) the presence of under-researched trade-offs between environmental and economic objectives and interests

iv) the establishment of partnerships in, or close to, the localities with professional institutions and researchers with relevant skills.

The size of research areas has yet to be determined but will represent a compromise between holistic coverage and researchability.

Approach and method

A review of research approaches and methods applicable to area-based and participatory studies, and the development of a detailed methodology for the proposed research, is to be carried out in the present intermediary period and thus will not be detailed here. However some of the

approaches and techniques provisionally expected to use are indicated below:

- The starting point of research will be records of environmental, structural, economic and policy changes that have occurred in recent years (eg tree loss or gain, population growth, forestry programmes) that have taken place in the areas studied. The specifics of the questions to be investigated will be firmed up at this time.

- these changes will be examined at three levels, with i) general studies of the overall catchment and system ii) more detailed studies of representative sites and villages iii) in-depth studies of households and individuals. Explicit attention will be paid to different perceptions of change, and the question of externalities (or benefits and costs not born by the decision makers themselves).

- the two main disciplines involved in the research will be forest/field ecology and socio/natural resource economics, and their findings will be closely compared and contrasted. It is anticipated that other disciplines will be represented locally.

- Participatory methods of data collection, involving key informants and group interviews mostly of older people, will be central to the research. Study will also be made of tree cover, species, age, composition and diversity, and other physical changes which may be occurring such as erosion, siltation, and losses of bio-diversity. Where available, air photos and satelite imagery will be examined to assess change over time, and where possible will be used in discussion with villagers.

- the research will be holistic and systems based, and consider how environmental and tree resource decisions can be understood in the context of farming and livelihood systems. Depending on local circumstances, the systems examined could include settled and migratory farmers, forest dwellers, the landless and part-time farmers, pastoralist and other tree resource users. The research would expect to examine the actions of households, individuals, kinship groups, local power holders and representatives of indiginous and official institutions.

Inputs and cost

The research will be led by a Thai speaking socio-economist (Dr Grimble) with long experience of data collection and field research, and will take place over a two year period. Funding will be required at four levels (1) for NRI staff time, including a socio-economist (six

months per year) and forest ecologist (three months per year), overseas travel and subsistence (2) for local research management, including honorariums, equipment, travel and subsistence (3) for training local researchers, both in the field and on longer courses in the country concerned (4) in addition to the principal empirical studies proposed, some resources may be used for obtaining supplementary evidence from a wider range of cases. Budgets have yet to be determined but will be completed by the end of September 1993.

Outputs

Phase 2 research will build on progress made during the present intermediate phase and the progress report produced by March 1994. Outputs produced under Phase 2 are expected to be:

- brief inception reports on the research areas selected, and the wider environmental and economic backgrounds
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Next Steps

Contacts are now being established and arrangements made with suitable researchers and institutional partners in the developing countries concerned. Funding agencies have also to be contacted and a detailed research proposal prepared.

Robin Grimble, NRI
18.8.93

Concept note
Tree Resources, Farming Systems and the Environment: Stakeholders and Trade-offs - Phase 2 (PH2, 18.8.93)

An analytical review of this topic has been completed in Phase 1 of this research and a draft report is available. This concept note is an outline proposal for research to develop and test the conclusions contained in this report in field-level situations.

Background

This research arises out of long-standing concern for the problems of forest and land-resource degradation, and the enigma of why poor people appear at times to ignore their long term best interest by destroying natural forests and failing to invest in trees and conservation. To throw light on this question, the University of East Anglia was commissioned to undertake a desk study (*The Identification of Key Land Degradation Issues, 1990*) and, more recently, a further study has been undertaken by NRI. This latter work is written up in the form of a draft report entitled *Tree Resources, Farming Systems and the Environment: Stakeholders and Trade-offs (Phase 1), August 1993* which is available from NRI.

A central theme of the report is analysis of the different sets of interest of different groups or stakeholders in society, and the potential significance of these different interests to natural resources and the environment. The report works towards the development of a framework for understanding the way tree-resource decisions are made, and the need to treat forest conservation and farming issues in an integrated way as part of the same problem. It emphasises the need for policy-makers and planners to better understanding the perspectives and positions of different stakeholders concerned with tree resources, and the potential for conflicts between them. The report concludes that empirical research is required to test and develop this analytical framework, and improve its policy relevance, through field study of contrasting situations where trees are managed or utilised by local people.

Funding has been obtained from the ACS/NRED research programme to continue this research until the end of the current financial year, 1993/94. The purpose of this intermediate phase, called Phase 1b, is broadly to establish links with suitable overseas research institutes and, with them, develop an empirical research programme on the lines indicated in this note. The immediate objectives of this intermediate phase are to:

- identify and establish links with suitable local institutes and researchers
- select suitable areas or catchments for study according to the criteria set out below

- develop a detailed methodology and research plan given the overall focus established in this paper
- review current developments in research approaches and data collection methods suitable for field use
- undertake initial fieldwork, and prepare a report on progress up to March 1994, in preparation for Phase 2
- identify sources and arrange funding for a further period of research, covering the years 1994 and 1995.

Frame of reference

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