

DRAWING ON COLLECTIVE ARRANGEMENTS AND SOCIAL NETWORKS: A COPING STRATEGY FOR THE POOR HOUSEHOLDS IN THE GREAT RUAHA CATCHMENT, TANZANIA

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Abstract

Access to water and land resources underpins the socio-economic fabric of many societies in the Southern Africa region, which is characterized broadly as underdeveloped with widespread food insecurity, exacerbated by persistent droughts, erratic rainfalls and increasing human populations. The availability of land and water resources is increasingly diminishing and becoming a stumbling block to the development of the agrarian societies in the region. The poor households have in turn adopted new livelihood coping mechanisms but little research has been done to assess the effectiveness of these 'instruments'. Consequently, the concepts of sustainable water resources management and agricultural development have remained elusive and poorly understood by policy makers as well as by water resources planners and managers. Recognizing this, a study was conducted between 2002 and 2005 under the RIPARWIN (Raising Irrigation Productivity and Releasing Water for Intersectoral Needs) project to assess the spatial dynamics of livelihood capital, vulnerability and coping strategies for the poor agrarian households in the Upper Great Ruaha River Catchment (GRRC) in Tanzania. The results of analysis showed an array of livelihood platforms and institutional contexts that act to shape the existing livelihood typologies in the GRRC. In addition, the results showed a gradual increase in household vulnerability from upstream to downstream, particularly in terms of access to physical and natural assets. Vulnerability was found to be directly associated with the number of dependants. The female-headed households were relatively more likely to be vulnerable than the male-headed households (c.f. probabilities of 27% and 21% respectively). The value of collective arrangements and drawing on social networks crosscut all social strata and ranked as the most common livelihood strategy. This suggests that the scope for reducing vulnerability among the poor households in the GRRC critically depends on the existing institutional arrangements and mechanisms. Of paramount importance is perhaps the need to facilitate the establishment and empowerment of Water Use Associations and Apex bodies. This appears to be promising enough to build 'strong' institutional platforms through which water and land resources would be managed sustainably.

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Introduction

There is a growing evidence to show that as land and water resources are increasingly becoming scarce the poor households are in turn responding by adopting new livelihood coping mechanisms, including those which are based on expanding access to social capitals. Collective arrangements and social networks, for example, can have an impact on development outcomes such as growth, equity as well as poverty alleviation (Uphoff and Wijayaratna, 2000; Narayan, 1997; Ostrom, 1995). They provide an informal framework to organize co-ordination of active, information sharing and collective decision-making. Being based on mutual trust and reciprocity, these (social capitals) have direct impact on other types of capital. They can help increase in people's income and saving (financial capital). Social network facilitate innovations, the development and sharing of knowledge, giving a close relationship with human capital.

Social capital is highly associated with poverty (Narayan, 1997). As Narayan and Pritchett (1997) note the defining of feature of being poor is that one is not a member of – or may even be actively excluded from certain social networks and institutions that could be used to secure good jobs and decent housing. It is further argued that those communities endorsed with a diverse stock of good social networks and civic associations are in stronger position to confront poverty and vulnerability (Moser, 1996; Narayan, 1997) resolve conflicts (Ribeiro, 2004; Krishna and Uphoff, 1999), and take advantage of new opportunities (Uphoff and Wijayaratna, 2000; Knack and Keefer, 1996; Isham *et al.*, 1995).

The poor use social capital – networks of trust and reciprocity as an insurance mechanism, which enables them to survive day to day when individually cannot afford, such as feed their children during adverse season, pay school fees, access formal credit etc. Social capital among the poor can be critical to their short-term survival.

In 2002 – 2004 a study was conducted to evaluate livelihoods and economic benefits of water utilization in the GRRC. The purpose of the study was to enrich understanding and decision-making among stakeholders of the means and resources at the disposal of the rural households in the GRR catchment and the factors influencing access to these resources and determining the pattern of activities – livelihood strategies – that households undertake to survive and prosper.

Area descriptions and methodology

The study area

The study area (GRRC) covers an area of about 68,000 km² and it lies between longitude 34⁰ and 36⁰ E and latitude 6⁰ to 9⁰ S. The catchment is located within the Rufiji River Basin (178 000 km²), in the southwestern part of Tanzania (Figure 1).

Most of the GRRC lies within the Iringa and Mbeya regions, while a smaller part of the northern portion of the catchment lies within the Dodoma and Singida regions.

The GRRC encompasses the Usangu area (the Upper GRRC), which has a total area of 20,811 km². The Usangu area is located at approximately latitudes 7°41' and 9°25' South, and longitudes 33°40' and 35°40' East. It encompasses the Usangu Plains in which the Usangu wetland (which has an area of about 1,800 km²) and the UGR (4 148 km²) are located.

<<<Figure 1>>>

Methodology

The conceptual framework for this study has drawn on a number of livelihood frameworks, models and approaches, including the Sustainable Livelihood Framework (SLF) by DFID (1999), CARE's Livelihood Model, the UNDP's approach to promoting Sustainable Livelihoods (SL), and the Oxfarm's SL framework.

The survey was conducted in ten sample villages (Inyala, Mahongole, Ihahi, Uturo, Ukwavila, Mwatenga, Kapunga, Ukwaheri, Madundasi, and Upagama) in the GRRC using both qualitative and quantitative approaches. The sample households for the study were taken randomly from the list of households (village register) after a participatory wealth ranking exercise. In each of the ten sample villages, 10% of the total households were selected from each of the wealth category as identified during the wealth ranking exercises. A total number of 580 sample households were covered (24 from the "very rich" category, 71 from the "rich" category, 226 from the "medium" category, 188 from the "poor" category and 71 from the "very poor" category). The livelihood analysis covered the evaluation of the vulnerability context, livelihood assets, existing hardware and software institutions, livelihood strategies and outcomes.

The analysis of vulnerability context considered the shocks, seasonality and trends in agricultural production (e.g. development of irrigation and types of farming system); emergence of new income generating activities; commodity marketing aspects (including access to commodity markets and trends of input and output prices); and water resources availability (e.g. river flows, rainfall patterns and water abstraction).

At the village level, the vulnerability indicators included the lack of infrastructure (e.g. year round passable roads and irrigation infrastructures); lack of community level institutions, and underprivileged access to the water resources. Household income levels; access to livelihood assets; household structure and dependency ratios were also used as indicators for household vulnerability.

The analysis of livelihood assets involved an evaluation of the basic material and social, intangible and tangible assets that people in the study area have in their possession. These assets were considered as the building blocks or 'capital' base from which livelihood is constructed. The study considered a wider range of asset portfolio (including water, land and livestock holdings, economic and financial assets), which is essential for the pursuit of any livelihood strategy. Access to financial capital was

assessed from the ability of household to save and borrow from formal organizations (e.g. banks) and informal structures (e.g. relatives, private money lenders) and ownership of liquid assets such as livestock, means of production (i.e. farm and non-farm equipment such as tractor, water pump, rice mill, workshop equipment and the like).

Access to social capital was evaluated using indicators such as membership to organizations, networks, social relations and associations that increase trust, ability to work together, access to opportunities, reciprocity and informal safety nets. The access to human capital was evaluated from the number of illiterate people, education level and the number of people employed in farming, off-farm and non-farm activities.

The analytical framework also considered the role of both software and hardware institutions which influence the access to benefits like land, money, or employment, of individuals and households. The underlining assumption was that access to all of these could affect the ability to make a living and achieve security. Institutions that are already in place (e.g. the Rufiji River Basin Water Office and other organizations dealing with water and land resources management in the GRRC; policies, laws and culture) play an important role in shaping the choices made by local people about their livelihoods.

The ability to pursue different livelihood strategies was considered as dependent on the basic material and social, tangible (e.g. stores and material resources) and intangible assets (e.g. claims and access) that people in the study area have in their possession. The assessment of nature and drivers for the different strategies adopted by households, therefore, formed a part of the livelihood analysis in this study.

The livelihood outcome and trade-offs were evaluated using different indicators, including value and benefits generated from water utilization; secured access to water; improved well being and capabilities, and reduced income inequality and poverty.

The following mathematical expression was used to represent the relationship between individual components of the framework:

$$L_w = f(V_C, A_L, I_{HS}, S_L)$$

Where L_w = livelihood outcomes and economic benefits of water utilization by the household,

V_C = the vulnerability context within which the household operates,

A_L = a vector of assets that the household draws upon (natural, physical, financial, social and human capitals),

I_{HS} = a vector of hardware and software institutions which influence utilization of assets by the household in pursuit of different livelihood strategies, and

S_L = a vector of choices the household employs in pursuit of income, security, well-being and other productive as well as reproductive goals.

This paper presents results of analysis and discussion of the livelihood assets, relationship between family size, dependency and poverty as well as the dominant livelihood strategies/coping strategies in the GRRC.

Results and analyses

Livelihood assets

The results of quantitative analysis of the existing key livelihood assets as revealed from the household surveys are summarized in Table 1.

<<<Table 1>>>

As it can be seen from Table 1 there is a significant variation in terms of number of persons per households among the three areas of Usangu (Upper, Middle, and Lower Usangu). The average household sizes in Lower Usangu are the highest. This can largely be attributed to the socio-cultural characteristics of the agropastoral households living in this area. Most of these households, especially those owning huge livestock herds reported to be polygamists having more than one wife and many children. They value big family sizes because of their potential to provide manpower or family labour for various farm activities. It is, for example, not uncommon to find many agropastoral households in Lower Usangu using child labour instead of adult labour in some farm activities such as cattle herding, which are basically high labour demanding in terms of total mandays per year but can as well be done using a relatively cheaper labour (child labour). They do this as an additional strategy in trying to offset high labour demands and save labour for other farm activities especially during peak periods. Generally, the poorer households have less labour available and their labour resources for household farming activities are further reduced by the fact that they often sell-out labour, whereas the richer households can afford to hire labour.

The result of analysis in this study showed that access to suitable agricultural land is one of the major determinants of household livelihood in the Upper and Middle Usangu (Table 2). In the Upper Usangu, plots of land with moderate slopes are limited, whereas in the middle part, the same is true for land that has secure access to dry season irrigation water and land that is suitable for paddy cultivation. Often the access to land and access to water are inseparable: paddy cultivation requires both suitable soils, as well as sufficient access to water, irrigable land is only useful in combination with secure access to irrigation water. This suggests a high social value of water in terms of its contribution to household wealth.

<<<Table 2>>>

In the lower part, much more land is available due to a lower population density, but generally this land can be defined as of poor quality, mainly due to seasonal availability of water. However, the use of draught animal power enables the majority of the agro-pastoral farmers in this area to cultivate relatively large areas on heavy clay soils during the wet season.

About eighty percent of the households in the sample villages engage in livestock keeping, but livestock numbers in the Upper and Middle Usangu households are relatively smaller and they consist mainly of chicken, sheep and goats and sometimes one or two cattle. In Lower Usangu, livestock numbers are quite high and livestock keeping is an important source of livelihoods.

Collective labour arrangements, lending and borrowing mechanisms were ranked as the most important forms of social capital in the Upper Usangu (Table 3). In the Middle Usangu, cooperation and social interaction are primarily dependent on income generating clubs and livelihood associations, the membership of which is dominated by middle-income households. In Lower Usangu, the value of collective arrangements and drawing on social networks were strongly stressed. Collective action, good social relationships and traditional ceremonies are important mechanisms that support the local livelihood strategies. Collective labour arrangements, traditional ceremonies and informal groups such as drinking circles crosscut social strata and result in higher levels of social capital for poor households.

<<<Table 3>>>

Dependency and low-income probability

The association between large families and poverty is also an important indicator of vulnerability. Large families are generally expected to be far more common among the poorest households of the bottom quintile and family sizes to be smaller for households in the upper income quintiles. Small households, those with very young children and those dominated by older people are also more likely to be poor and vulnerable.

Table 4 presents a probability analysis, which provides an overview of the impact of family size and composition on vulnerability to poverty as reflected from the household survey conducted in the study area. The findings show that households made up of three or more adults and three to four children are more than twice as likely to be in the bottom quintile as households with a single adult and one to two children. The female-headed households are also more likely to be vulnerable than the male head-households (compare probability of 27% versus that of 21%).

<<<Table 4>>>

In a close analysis of the percentages shown in Table 4, one would argue that, vulnerability among households in the Upper GRR catchment, as in most other rural areas in the developing world, increases with the number of dependants. This is evidenced by the higher probability value for the households with 6 to 10 or more children.

Dominant livelihood strategies and coping mechanisms

The different livelihood platforms and institution contexts lead to different livelihood strategies and coping mechanisms in the three major parts of the Upper GRRC. In general, three major farming systems could be noted as characterizing the study area: a year round maize-mixed farming system in Upper Usangu, an intermediate paddy farming system in Middle Usangu, and an agropastoralist farming system in Lower Usangu. All the three farming systems suffer from dry season water scarcity and from pressures to release more water for downstream uses, but there are also considerable differences between them, as it will be explained below.

The favourable micro-climatic condition in the most upper parts is relatively temperate with higher and prolonged rainfall allowing the households to engage in year round rainfed agriculture. The cropping pattern is typically diversified, permitting households to engage in a multiple strategy: maize (as the major staple and household subsistence crop), Irish potato, onions and tomatoes (as primary cash crops), as well as other vegetables and pulses (for both subsistence and petty cash). The farming system in the upper villages, though dominated by rainfed agriculture, is mixed with livestock for supplementary income.

The Upper Usangu villages, which border the Middle Usangu, are however characterized by a somewhat less favourable climate than the uppermost higher altitude area, with slightly less rainfall over a more protracted period. Rainfed agriculture has to be restricted to the wet season, while the successful raising of crops during the dry season depends on irrigation. The predominant farming system in these villages is characterized by a diversified multiple cropping strategy, dominated by rainfed maize as the major household staple and subsistence crop, supplemented by limited rainfed horticulture (potatoes, onions, tomatoes) as cash crops, and irrigated cash crops during the dry season (green maize, onions, tomatoes).

Villages in the Middle Usangu are characterized by the wet season oriented paddy-farming system. Their geological features make the major parts of land in these villages suitable for paddy cultivation, as wet season peak flows flood the lands, and water can be easily retained on the fields as standing water.

Villages in the Lower Usangu are relatively scarcely populated and the area has the largest number of livestock in the Upper GRRC, owned mostly by immigrant pastoralists, the Sukuma people from Northern Tanzania. Livestock is the main source of income, accounting for almost 70% of the total household income in the Lower Usangu. There is also additional rainfed agriculture and in some parts of the wetland areas paddy is grown. There is no dry season irrigated agriculture, as the water in the streams does not reach this area during the dry season.

Seasonal and permanent migrations also serve as important coping mechanisms. As Mcdowell and de Haan (1997) and Swift (1989) argue, these need to be considered in terms of the context within which they are occurring. During the dry season, for example, cattle keepers with large herds (about forty cattle or more) in the Middle and Lower Usangu are forced to move their herds close to the permanent *Ihefu* swamp in the Usangu Eastern Wetland, as their own areas cannot provide enough pasture to sustain their herds during the dry season.

Until recently, livestock keepers in the Upper GRRC have grazed their livestock around the *Ihefu* swamp. Of recent, however, the Government of Tanzania has gazetted this area under the name of Usangu Game Reserve, which means that livestock is no longer permitted to enter this area for grazing, thus severely restricting the 'livestock carrying capacity' of the Upper GRRC.

Discussion and conclusion

In general, the results of analysis in this study showed that the livelihood platform of the poor households is less favourable in comparison to that of the better off

households. Specific bottlenecks included limited access to natural resources such as irrigable land and irrigation water, human capital and labour (especially at the peak of wet season), physical production capital such as agro-chemicals or livestock, and social capital such as the membership of local societies and associations. The value of collective arrangements and drawing on social networks were strongly stressed, particularly in the lower parts of the catchment. Collective actions, good social relationships and traditional ceremonies were reported as important mechanisms that support the local livelihood strategies. They crosscut all social strata and result in higher levels of social capital for poor households in the study area.

The limitations in the livelihood platforms of the poor mean that the poor households are most likely to be hit by production problems such as labour shortages, pests and low soil fertility problems and droughts. In addition, when such problems occur, the poor households are also the ones that are most likely to be hit hardest, as they do not have the resource base to cope with shocks or to overcome short periods of crisis. Poor households often experience a critical period at the peak of the rainy season, when they have fully exhausted their household reserves and when labour shortages, food shortages, disease prevalence and cash demands are high. These bottlenecks lead to increased level of vulnerability among the poor households.

Vulnerability can generally be said to be increasing gradually from upstream to downstream, particularly in terms of access to physical and natural resources. Villages in the lower parts of Usangu (e.g. in Ukwaheri and Madundasi), suffer the most severe water shortage problems, as no water reaches these villages during the dry season. Furthermore, these villages have less favourable conditions for agriculture with suitable land widely scattered, and there is poor or limited local infrastructure (e.g. roads are not passable during the wet season and irrigation infrastructure is generally lacking). However, related to other livelihood aspects, the agropastoral farming community in the lower villages is less vulnerable as the households in this area own more livestock and larger pieces of land compared to households in the upper and middle villages.

In conclusion, it is argued in this paper that if the livelihoods of poor people in the GRRC are to be improved, then the introduction of low-cost labour saving technologies - that can reduce the impact of labour shortages and credit-schemes - that increase the access to financial resources is critical. This is about making the existing livelihood platforms and income levels allow the poor households to change their patterns and to make some short-term investments for long-term benefits. Most poor households lack the resources to overcome transition periods, they are underrepresented in credit facility groups and livelihood associations, they are less likely to benefit from improved marketing opportunities as they already have troubles in producing enough for themselves.

The dependency on collective arrangements and drawing on social networks, which crosscuts all social strata, suggests that the scope for reducing vulnerability among the poor households in the GRRC critically depends on the existing institutional arrangements and mechanisms. Of prime importance is perhaps the need to facilitate the establishment and empowerment of Water Use Associations and Apex bodies. This appears to be promising enough to build 'strong' institutional platforms through which water and land resources would be managed sustainably.

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Tables

Table 1: Household assets for the sample villages in the GRRC

Capital (Assets)	Upper Usangu			Middle Usangu			Lower Usangu		
	Poor	Medium	Rich	Poor	Medium	Rich	Poor	Medium	Rich
Average household size (persons)	4.3	5.2	4.9	5.1	5.4	6.3	7.3	7.7	8.1
Adult labour equivalent (%) of hh size	62	69	73	52	59	60	50	53	53
Area of land owned (ha)	1.4	2.4	3.2	2.1	3.6	4.8	3.6	5.8	7.4
Land under rainfed cultivation (ha)	0.2	0.8	1.4	0.9	0.2	0.3	2.0	5.1	6.2
Land under paddy cultivation (ha)				0.6	2.5	3.3	1.5	0.5	1.1
Land under dry season irrigation (ha)	1.4	1.2	1.0	0.4	0.9	1.2			
Livestock per household owning Livestock (TLU)		4.1	5.2	1.4	8.7	10	3.4	31.4	131.8

The “very poor” and “poor” categories are combined and grouped as “poor” and the “rich” and “very rich” categories grouped as “rich.”

Table 2: Major indicators of household wealth in different parts of the study area

	Upper Usangu	Middle Usangu	Lower Usangu
Main indicators	Access to land with moderate slopes and dry season irrigable land and secure water	Access to land for paddy cultivation and/or access to dry season irrigable land (water)	Size of livestock herd

Table 3: Weighted percentages for the common social assets in the study area (%)

Type	Upper Usangu	Middle Usangu	Lower Usangu	Usangu Total
Collective labour arrangements	39	16	46	34
Income generating clubs and livelihood associations	12	44	5	20
Lending and borrowing	31	13	3	16
Traditional ceremonies	4	10	18	11
Drinking circles	6	5	13	8
Kin arrangements	1	2	12	5
Membership to political parties	4	5	1	3
Religious meetings	2	3	1	2
Village meetings	1	2	1	1
Total	100	100	100	100

Table 4: Probability analysis of low-income households in the study area

Family type	% in the lowest quintile
Female headed household	27
Male headed households	21
Single adult 1-2 children	12
Single adult more than 2 children	32
2 adults 3 – 4 children	30
2 adults with 6 –10 children	35
Household with 11+ people	38

