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MULTIPLE USES OF COMMON POOL RESOURCES IN SEMI-ARID WEST AFRICA: A SURVEY OF EXISTING PRACTICES AND OPTIONS FOR SUSTAINABLE RESOURCE MANAGEMENT

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Common pool resources such as rangeland, forests, fallow fields and ponds provide an array of social and economic benefits for a wide variety of users in semi-arid west Africa. However, poor definition and enforcement of the institutional arrangements governing the use of these resources sometimes lead to social conflicts and resource degradation. This paper examines why institutional arrangements are at times weak, and suggests what action can be taken.

Policy recommendations

- Stakeholders need to have a stronger say in the design of arrangements for managing common pool resources (CPRs); such arrangements necessarily vary according to local socio-economic and biophysical conditions.
- The handover of CPR management to users is in many cases desirable, but must be based on sound understanding of the heterogeneity of users' requirements and of the spatial and temporal aspects of formal and informal usufruct rights.
- The 'gestion de terroirs' approach has limitations: in particular, it tends to favour sedentarised resource users.
- Different levels of organisations have different roles to play in CPR management and clear understanding of these must precede policy initiatives.
- The state has important roles to play in resolution of disputes, monitoring the implementation of resource use agreements, providing technical and management support for local organisations and carrying out environmental assessments.

Introduction

Common pool resources are natural or man-made resources used simultaneously or sequentially by members of a community or a group of communities. In semi-arid west Africa, they include rangeland, uncultivable fields, fallow fields, crop residues, forests, inland waterways, seasonal ponds and low-lying wetlands. The wide dispersion of these resources within the landscape and the variety of resource units they produce make them particularly useful to a diverse set of users.

Common pool resources share two important characteristics: excludability and subtractability. The first attribute - difficulty of exclusion - arises from several factors including the cost of parcelling or fencing the resource and the cost of designing and enforcing property rights to control access to the resource. The second attribute - subtractability - creates rivalry between different users. The resource units (e.g. bundles of firewood or fodder) that one user extracts from a common pool resource are not available to others. Each user is thus capable of subtracting from the benefits that others derive from a common pool resource. Because of these characteristics, common pool resources are potentially subject to over-exploitation, depletion or degradation. A broad challenge in the management of common pool resources is how to co-ordinate use by individuals as population grows in order to prevent over-exploitation.

This paper presents an overview of common pool resources in semi-arid west Africa. In so doing, it is intended to highlight the multiple functions they perform, the complex interplay of interests which surround their use, and the institutional problems involved in improving their management. Across the region, common pool resources (CPRs) continue to be a significant component of the land resource base and are widely used by farmers, pastoralists and other rural dwellers. However, changing land use as a result of rapid population growth and declining rainfall has increased the pressure

of production on CPRs. Adaptation to increased resource pressure requires innovative institutional arrangements and policies to reconcile the different resource use priorities of heterogeneous users and to prevent resource degradation.

The next section of the paper describes the functions, rights and restrictions governing the utilisation of CPRs in semi-arid west Africa. The emerging problems in the use and management of CPRs are discussed in section 3. The types of institutional arrangements most likely to promote sustainable management of CPRs are examined in section 4. The paper concludes by suggesting ways through which institutions and organisations established at multiple levels can be co-ordinated to improve the management of CPRs in semi-arid west Africa.

Functions and management of common pool resources in the Sahel

Common pool resources provide food, fuel, fodder, herbs, construction materials and income to rural and urban dwellers across the region. In this dry zone where annual rainfall is low and its distribution erratic, the products obtained from CPRs have been critical elements in the livelihood and survival of many rural communities, particularly in times of drought (Bernus, 1988). The collection of leaves, fruits and twigs from forests has long been a method of assuring household subsistence during droughts and in resolving imbalances in the diets of rural households. In Niger, in dry years when the millet (Pennisetum glaucum) crop fails, fruits of trees e.g. Boscia senegalensis and Ziziphus mauritiana are collected and pounded into a flour that is used to prepare different kinds of food. Similarly, the leaves of Maerua crassifolia, a tree that remains green all year round, are often eaten to relieve hunger. The sale of products - stimulant leaves, fruits, fodder, and firewood - collected from CPRs provide an important contribution to household income.

CPRs are the main sources of fodder and water for livestock in semi-arid west Africa. The spatial dispersion of common pool grazing resources and the temporal fluctuations in their availability make them an important resource for livestock production in the region. During the rainy season, pastoralists move animals away from the cultivated zone into the drier areas of the semi-arid and arid zones to take advantage of the flush of high quality forage produced by annual grasses on rangelands and to prevent damage to food crops. At this time, animals make use of water available from surface ponds. During the dry season, animals are moved back to the cultivated zone to graze crop residues on harvested fields. As the dry season progresses further, the vegetation on fallow fields is used as temporary pasture.1 This seasonal and alternating use of CPRs by pastoralists is not an isolated example. The flood plains of the inner delta of the Niger River in central Mali are traditionally used by fishing communities during the flood season and by pastoralists and rice farmers in the dry season. These and other cases clearly demonstrate the ability of a set of users to appropriately time their use of a CPR to a period when others are not exploiting it.

The seasonal use of CPRs also creates opportunities for mutually beneficial exchange relationships between various user groups. The exchanges of grain, crop residue and water owned by farmers for the manure produced by pastoralists' livestock have linked crop and livestock production for many years in the Sahel and served to increase land productivity (Williams et al, 1995).

With respect to access, control and use rights, CPRs are held under a variety of property-rights regimes, including state property, communal property, private property and open-access (non-property) regimes. A few CPRs can be easily classified under a property-rights regime. For example, forests, lakes and river banks are often considered as state property and are administered through specialised government agencies. For this category of CPRs, various codes and legislative edicts prescribe in considerable detail usufruct rights for different users and penalties for infractions. For many other CPRs, a neat classification is not possible. Furthermore, a given resource may produce flows that are subject to two different property regimes seasonally or over the long term. For example, in areas of low population pressure, fields that are cultivated by individual households often revert to communal use after grain harvest or when they are left in fallow so that crop residues and natural vegetation on these fields can be freely grazed by the entire village herd or collected by those households who need them. This serves to mitigate inequality in land ownership and access to feeds in many villages.

Concerning inter-group relations in the utilisation of CPRs, communities that possess primary use rights often allocate rights of access to subsidiary groups. Groups holding secondary or tertiary rights may be women, other ethnic groups engaged in a different occupation or the poorest members of the community. For example, sedentary farmers may give concurrent or sequential rights for arabic gum collection or livestock grazing to migratory gum collectors and pastoralists. These rights may shift over time or from one resource to another leading to conflicts or renegotiation of access rights. Nonetheless, the heterogeneity of users and the multiple functions of CPRs in semi-arid west Africa suggest that at low population pressure, existing methods of utilising these resources permit an intensive use of land and complementary interactions that increase land productivity. Communal use of forests and rangelands allows the varied phenology and production dynamics of natural vegetation to be fully exploited and serves to minimise production

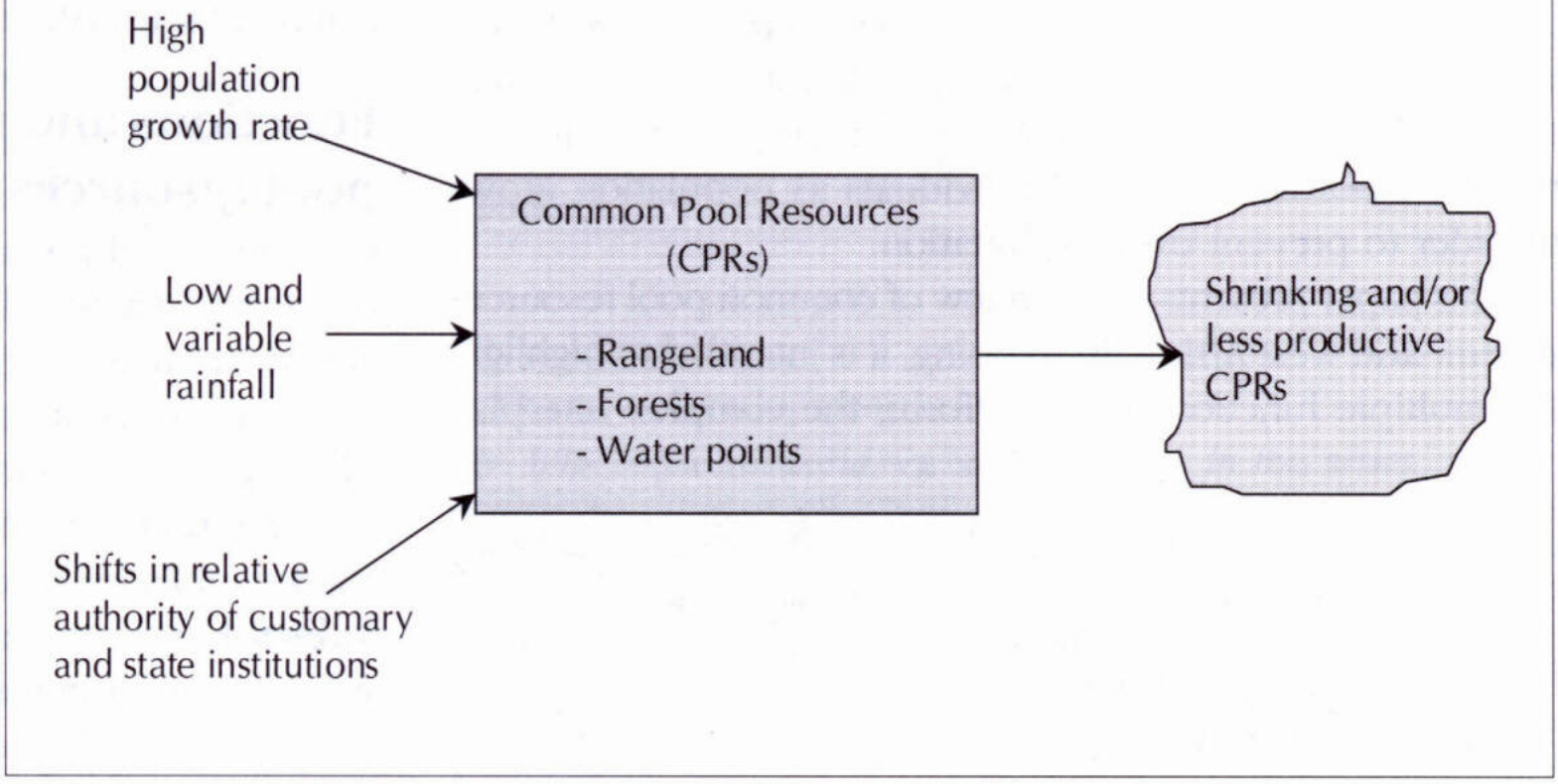
risk, especially for transhumant livestock producers whose production methods depend on having access to pastures in diverse locations.

Emerging problems in the use and management of CPRs

Climatic, demographic and economic changes are beginning to threaten the existence and long-term sustainability of CPRs in the region (Figure 1). Although the Sahel has always experienced wide variations in annual rainfall, available evidence indicates that rainfall has been consistently below the long-term average every year from 1969-1990. At the same time, the region has experienced a rapid population growth of about three per cent per annum. The combination of increasing aridity, drought and population pressure has resulted in substantial shifts in land use and put stress on CPRs. In the absence of sufficiently rapid and widespread technological change, population growth and declining rainfall have led to the expansion of area under cultivation. Since 1961, the area farmed in Chad, Burkina Faso, Mali, and Niger has increased by over four million hectares. This expansion has involved mainly the conversion of large areas of CPRs such as forests, wetlands and rangelands into cropland, with farmers overriding and ignoring the traditional use rights of other groups to these resources (Cleaver and Schreiber, 1994).

These changes have had devastating consequences on pastoralists whose mode of production make them particularly dependent on common pool resources. The long periods of low rainfall and severe droughts have accelerated the deterioration of rangelands. At the same time, arable land expansion has resulted in a reduction of natural rangeland and seasonal inaccessibility to remaining pastures due to fragmentation caused by cropping low-lying areas previously used for dry-season grazing (Cleaver and Schreiber, 1994). The net effect has been a restriction in the mobility of pastoralists' herds and the concentration of increasing numbers of livestock on smaller areas which destroys pasture vegetation and contributes to range degradation. The loss of rangeland through alienation and encroachment of farming has heightened conflicts between farmers and pastoralists.

Figure 1 Major factors influencing the use and management of CPRs in semi-arid west Africa



There has also been an erosion and breakdown of customary laws and institutions that previously governed the use and management of CPRs (Lawry, 1989). This has occurred under the pressure of rapid population growth and has been exacerbated by large-scale inter-regional migrations in many countries and by changing social values and

power structures. Politically powerful groups and elites with preferential links to various organs of the state (e.g. civil servants, wealthy traders and religious leaders) have frequently appropriated CPRs for their own use and in the process introduced new use and management structures. In Senegal, there are several accounts dating back to the 1950s of how the powerful Mouride Islamic brotherhood has been able, with government backing, to convert large tracts of communal rangelands into peanut fields. In 1991 alone, the Senegalese government gave permission for 45,000 ha of forests to be converted to peanut fields (Freudenberger, 1991). Furthermore, shifts in the relative authority of customary and state institutions are evident in many countries.

The state has frequently undermined the capability of customary institutions and organisations to manage CPRs by transferring authority to government agencies and by imposing tight controls that conflict with traditional use patterns. This intervention is viewed as legitimate, and even necessary, to prevent the resource degradation that would result if users were left to their own devices. Thus in many countries, laws are established to redefine local users rights and duties with respect to forests, rangeland and fishing grounds. However, this intervention often arises from an insufficient understanding of the intricacies of customary institutions with their emphasis on differentiated access rights and the often subtle, but important, sanctions that are utilised to regulate resource use.

With this wrong perception, government's interventions have frequently resulted in unintended, but disastrous outcomes. For example, the installation of deep boreholes in pastoral areas in the 1960s served to open up remote pastures but created other problems as it destroyed the basis of the social and institutional structures that previously regulated access to pastures. Before the introduction of boreholes, shortage of water and tight control, by local herders, of water available from surface ponds prevented degradation of rangeland. With the introduction of boreholes, it was possible for animals to graze for longer periods as water was no longer a constraint. Outside herders attracted by the wells refused to abide by the old rules since the wells were considered as state property. Insufficient number of wells and free access to the few available ones led to situations where the number of animals congregating around available boreholes exceeded the carrying capacity of the surrounding rangeland causing rapid deterioration.

Another example is the decline of the effective and comprehensive customary institutional arrangements that were used in the 19th and early part of the 20th century to manage the CPRs of the inner Niger delta in central Mali. Once the colonial authorities nationalised the resources and the post-colonial governments provided all Malians equal use rights to these resources, the complex rules governing access began to unravel leading eventually to over-exploitation of the delta resources. Other examples, including unsuccessful grazing, forestry and fishery schemes in many parts of semi-arid west Africa, indicate that resources that were under effective communal management have, as a result of inappropriate state intervention, been converted into de facto open access resources (Vedeld, 1992). This conversion is often accelerated due to the inability of the responsible government agencies to provide effective management programmes because of poor staffing and inadequate technical and material provision by the government for the work of these agencies.

Creating appropriate institutions for the management of CPRs

The problems highlighted in the previous section indicate that new and effective institutional arrangements are needed to improve the long-term management of CPRs in semi-arid west Africa. A growing recognition of this need is evident in the region. In most countries, state property regimes in which government officials exercise exclusive decision making powers on resource use and management are being de-emphasised in favour of decentralised and participatory management of natural resources. The specific approach used to encourage active local participation varies from one country to another. In Niger, it has taken the form of a legislative reform of land tenure and natural resource management policy conducted over a ten-year period from 1985 to 1994. In Burkina Faso and Mali, land-use planning based on the concept of "village territories" has become very popular. In all cases, governments have sought to clarify tenure issues and reinforce the rights of local communities to manage their resources through granting of legal recognition and decision making authority. While experience with implementing these new programmes is still limited, they nevertheless represent a departure from the top-down, centralised resource management policy of the past. However, simply assigning authority to local users, without ascertaining the range of uses of a resource, the diversity of interests among users and the capability of existing local institutions to take on additional responsibilities, will only complicate rather than solve the problems associated with the appropriation and management of CPRs.

This is because CPRs in the region have multiple functions and are exploited by a wide variety of user groups. These heterogeneous users have different objectives, production strategies and priorities in resource use. In general, differing scales of exploitation, overlapping rights, and frequent contestation and negotiation of access rules characterise the use of CPRs. In this situation, devolution of power must be conducted cognisant of the spatial and temporal aspects of existing formal and informal usufruct rights. Failure to recognise the rights of all existing users will lead to the appropriation of key resources by the more powerful groups or those practising a particular system of production, which

may eventually result in social conflicts or inefficient utilisation of the diverse set of CPRs. This is one reason why the village territory approach has come under criticism. Because the concept is more applicable to settled farming villages with a clearly defined territory and set of resources, it has been argued that there is a danger that the approach may empower sedentary farmers to exclude transhumant pastoralists from grazing resources they previously had access to, especially where the farmers themselves are beginning to manage their own animals (Lane and Moorehead, 1994). This implies that the specific attributes of the resource and the resource sharing arrangements that exist between users need to be considered in the devolution process. Devolution of power, if it is to be effective and equitable, needs to take into account the multiple functions and heterogeneity of users of CPRs.

More importantly, governance arrangements for complex, multiple-use CPRs need to recognise and make use of institutions and organisations available at different levels (Ostrom, 1995). Both local-level and wider-scale institutions have important roles to fulfil. Local-level institutions have a comparative advantage in dealing with issues related to resource use and preservation at the community level. Thus, detailed provisions for access, use and management of CPRs are best handled by mixed associations of local user groups (e.g. farmer-pastoralist associations). However, local associations vary widely in their organisational and management capabilities. Given that some potential local organisations may not form at all even when given formal authority, state institutions will be needed to provide support for the formation or strengthening of local organisations where they are non-existent or are weak. Institutional strengthening and training can be provided by government agencies in such areas as management and leadership skills and programme planning.

Also, given the wide variety of users and the complex set of overlapping rights that are continuously contested, the need for conflict mediation will be fairly constant. Governmental institutions will be important in resolving disputes, reconciling the different interests of various user groups, and providing an appropriate legal framework to support and enforce resource use agreements worked out by different local groups.

With respect to the management of CPRs, local users generally possess inadequate scientific knowledge to complement their own indigenous knowledge. Yet, access to reliable information on resource conditions and the effects of different resource use patterns is essential for the long-term management of CPRs and the sustenance of livelihoods that depend on them. State institutions can assist local users by carrying out environmental assessments of resource use patterns and determining resources which are being degraded or at risk, and providing training on improved management techniques. Considering these various functions, it is clear that the state has a continuing and facilitative role to play in the management of CPRs.

Conclusion

The wide variety of users and the multiple functions of CPRs attest to the vital importance of these resources in semi-arid west Africa. Sustaining the productivity of CPRs remains an essential task given the growing scarcity and increasing demand for these resources. The challenge is to devise governance arrangements that are supportive of the diverse needs of heterogeneous users, yet protective of the long-term productive capacity of these resources. Institutional arrangements for governance must take into account the multiple ownership, use and management structures of CPRs in semi-arid west Africa. Past experience has shown that centralised governance units, with an ethic of regulation and control, are ill-equipped to regulate and manage multi-product, multi-participant resource systems with fluctuating benefit streams. Effective management of CPRs requires an appropriate mix of local and state institutions and organisations. The exact mix will vary according to particular circumstances, but the emphasis and focus would need to remain on the revitalisation of local institutions and organisations. The variety of response capabilities needed to manage complex, multiple use resource systems can only be provided through institutional arrangements developed at multiple levels and made to function in a complementary fashion.

Endnotes

1. It has been observed in many parts of west Africa that fallow fields produce as much forage as natural range. In the semi-arid zone of Mali, vegetation yields from fallows were equal or greater than from range and include more legumes which provide more nutritious forage than grasses. In the sub-humid zone of Nigeria fallows provide more forage dry matter per unit area than natural savannah.

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