GUESSELBODI FOREST:

ALTERNATIVE FRAMEWORKS

FOR SUSTAINED-YIELD MANAGEMENT

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EXECUTIVE SUMMARY

The GON-USAID Forestry and Land Use Planning Project proposes to manage the Guesselbodi State Forest, located just east of Niamey, on a sustained-yield basis. Main goals of the project are development of brushwood forest management techniques which will permit increased wood production within the forest; and encouragement of public participation in management of the forest as a multiple-use resource which will provide benefits for diverse communities of users, including area herders and farmers as well as woodcutters.

Various studies concerning technical aspects of the resource are now underway or nearing completion. Once provisional results of these studies are available, institutions to foster public participation will have to be established.

This report presents information necessary to adequate design of such popular management institutions. Included here are a brief review of: forest history; current and potential uses of the wood, pasture, arable land and secondary forest products which Guesselbodi does or could generate; and conditions which must be observed in the elaboration of successful participatory management institutions.

These latter include the need to develop:

1. brushwood management techniques which will enhance forest productivity;

2. methods of controlling user behavior so that resource use occurs on a basis compatible with sustained yield;

3. a locally acceptable set of regulations governing use;

4. incentives to users to respect these regulations;

5. means of rule enforcement to maintain integrity of

resource management regulations; and

6. a process of technique and rule modification sufficiently flexible so that users will actively seek new opportunities to upgrade resource productivity.

The report then outlines four possible management options, ranging from direct management and implementation of control measures by Forest Service personnel (Option 1.) through a series of "popular" management alternatives. These three include a single global forest jurisdiction managed, under Forest Service supervision, by a joint committee composed of user group representatives (Option 2); multiple local jurisdictions, each operating under direct Forest Service supervision (Option 3.): and a compound popular management system (again under Forest Service supervision) which would combine features of the joint management committee at the global forest level with multiple discrete geographic sub-jurisdictions established at the local level to implement management operations and enforce use regulations (Option 4.).

Option 4. is recommended as most likely to generate responsive and responsible resource management coupled with effective local participation in implementing management strategies.

I. INTRODUCTION

Guesselbodi State Forest covers 4,700 hectares situated astride RN 1 some 15 kilometers east of Niamey. At present it constitutes an under-utilized and simultaneously degraded natural resource. Currently, a single major user community derives benefits from the forest: animal owners whose herds graze in the area during part or all of the year. The forest could however meet a variety of other needs: fire and construction wood for local consumption and for sale in adjacent urban areas, and production of food, medicines and craft materials. Food production would involve opening part of the forest to farming, perhaps on a shifting cultivation basis.

If these needs are to be met, controls must be established and enforced (a) to prevent overstressing and further degrading this renewable resource and (b) to insure implementation of upgrading practices with a view to enhancing Guesselbodi Forest's overall value as a multiple-use natural resource potentially renewable in perpetuity. In addition to these institutional innovations, careful experiments must be conducted in care, feeding and management of brushwood forests. A new methodology to measure brushwood productivity must be developed as a tool to evaluate alternative management techniques.

This report focuses on alternative institutional designs which could be adopted as organizational frameworks by the Guesselbodi (a.k.a. G'bodi) foret classee sustained-yield management project. It suggests a variety of institutional

approaches and then evaluates them in light of perceived advantages and disadvantages. These alternative designs are presented as a set of working hypotheses: they are meant to be discussed, modified, tinkered with, rejected, scrapped, built upon. ~~They are not the final system~~. The investigation leading up to them was only a rapid, partial attempt to gather information. The purpose of the investigation was not to propose the best way of moving to sustained-yield management practices in G'bodi Forest. Instead, its purpose was to suggest initial starting points as bases for further research and institutional experimentation.

Report Contents

The report contains eight sections. After this introduction, underlying assumptions are sketched out. Then background is filled in concerning forest origins, evolution, management practices to date, etc. A fourth section canvasses actual and potential uses. The fifth section notes conditions of success in matters technical, institutional, legal and political. Next, alternative organizational frameworks for management practices are described, in light of jurisdictions already extant in the G'bodi Forest area. Probable difficulties and advantages associated with them are noted, and then special management districts designed to involve various user communities in G'bodi sustained-yield management practices are advocated. A seventh section specifies research which remains to be done, and the eighth and final one, the framework for rural extension and learning by user and controller groups

potentially involved in forest exploitation and regeneration efforts.

II. ASSUMPTIONS

1. The G'bodi project will deal with a potentially renewable, multiple-use natural resource, now evidently being wasted, both in terms of

   a. efficient exploitation of existing woodstock/pasture/agricultural/craft capital; and

   b. inadequate attempts to reconstitute or increase supply in face of fairly heavy and growing demands.

2. A mutually productive solution, i.e., one which preserves and/or enhances resource values for current user communities, will depend on creation of a series of controls. These must effectively reduce resource-wasting conduct and foster behavior promoting resource viability and productivity. The key word here is effectively: laws without enforcement are but paper promises, easily ripped, bent and broken when pressures are right.

3. Effective enforcement can theoretically be handled in two broadly different waysi

   a. by giving care and control of G'bodi to Forest Service personnel who are totally honest, highly motivated, capable extension workers, hard-nosed enforcers, technically competent and administratively reliable individuals...or to foresters who at least approximate this impossible standard of devoted

civil servant behavior and could adequately control the G'bodi multiple-use Woodstock resource; or by popular participation in rule-making, rule-enforcement and rule-modification, with or without the assistance of special forestry officials.

In effect, these two alternatives exemplify quite different assumptions or premises concerning institutional systems and their designs:

a. either institutions will always be manned by omniscient, good people who will always act in the public interest, thus rendering pointless design attention to feedback and correction mechanisms, since these will be by definition unnecessary; or

b. institutions will be manned by the ruck and run of humanity, some of whom will be highly intelligent, good people, and some of whom will be highly intelligent but less than good, or merely average or less in terms of ability, moral character, etc.

If one assumes the latter case is highly probable, then attention to safe-guards, scrutiny and feed-back to help the system work as designed is justified.

4. Those concerned with designing and implementing an adequate control system should consider possibilities - or rather the inevitability - of institutional failure through human weakness and failings, and provide for the eventuality by developing multiple channels of

a. input:

b. recourse: and

c. evaluation.

5. The whole process - putting a foret classee *on* a sustained-yield, multiple-use footing, with popular participation an important element in use patterns - is a new process in Niger. It means many Nigeriens will have to do some learning: peasants and herders about new approaches to resource management, and foresters (and other technical agents, perhaps) about new ways to approach people and new ways to help them increase productive potentials and values of a brushwood resource.

Learning is difficult. Some will almost certainly resist it, and accompanying implied changes in behavior. This will complicate the management job. Project design must be prepared to confront this issue, or risk seeing the whole experiment waste away - along with the Woodstock - in business as usual behavior which has brought G'bodi Forest to its current (and paradoxically) under-utilized and simultaneously degraded state.

III. BACKGROUND

G'bodi Forest was apparently created about 1955 [[interview, G'bodi headman, G'bodi, 7/13/81]. At the same time, the colonial army began cutting in the forest, and systematically destroyed large stands of Parkia biglobosa and Prosopis africana present when the forest was established. These logging operations may have supplied either army needs or the Niamey market. Evidently the army moved camp periodically within the forest area, successively denuding each site of its timber. Some of the cut wood was charcoaled. Soldiers farmed portions of the

of the cleared land. These practices continued for roughly twenty-five years - as the independent FAN (Forces Armees Nigeriennes) replaced the colonial army - and then terminated sometime between 1975 and 1980 when the FAN withdrew from Guesselbodi, leaving the area as a brushwood forest, partially regenerated.

A small portion of the area has been cleared and planted in Azadiracta indica (neem) by the Forest Service; this effort at reforestation using the exotic neem has not met with much success.

Another area of the forest was for a long time under Centre Technique de Foresterie Tropicale (CTFT) control as an experimental site. It is now under the jurisdiction of the Nigerien INRAN research organization.

Land Tenure Questions

People in three communities bordering the forest area north of RN 1 - M'Booda, G'bodi I (hamlet on *RN* 1) and G'bodi II (hamlet two kilometers north of G'bodi I) - claim to have farmed and fallowed in the area before the State Forest was created. The G'bodi village headman asserts a well was constructed by farmers in the forest, and says the soil was fertile. Ke does not believe however that villagers coiild now retrace boundaries of their old fields and fallow lands within the forest [G'bodi headman, G'bodi I, 7/13/81].

The area of the forest south of RN 1 faces less demand by farmers. According to the N'Dounga Canton chief, administrative superior of many G'bodi users, most villagers on the

Niger River side of the forest are not now interested in its agricultural possibilities because they have committed themselves to full-time farming of irrigated lands in the river bottom (ONAHA project). He also notes M'Booda and G'bodi residents were offered ONAHA project parcels, but eventually relinquished them because of excessive commuting time to the irrigated sites from their home communities. This partially explains northern villagers' greater interest in forest farming.

According to the canton chief, unused fields now exist along the southern side of the forest, in addition to land we saw cultivated there by DelSoua village Peul and N'Dounga village Zarraa and Kourtey. The same source notes existence of uncultivated areas outside the forest north of RN 1 [interview, Canton Chief, N'Dounga, 7/l3/8lD - an assertion corroborated by our on-site observations. A question nonetheless remains: are these "unused" lands currently being fallowed by farmers who cultivated them, saw yields dropping and retired those fields to open new ones in accord with time-honored techniques of shifting fallow cultivation? If so, in light of soil conditions and current farming techniques, land around the forest limit may well be already exploited at close to, or even beyond its sustained yield production potential. Elizabeth Bouie's soil analysis investigations should shed some light on this issue. Along those lines, it would be extremely useful to have assessments of conditions outside, as well as inside, the forest perimeter.

The N'Dounga canton chief says that land litigation has largely ceased in his jurisdiction since the Kountché regime's

1975 proclamation declaring an individual who farms land for three years cannot be evicted by another person even though the plaintiff claims to own the field in question and to have mortgaged or loaned it to the current occupant. Disputes about field boundaries and inheritance cases do of course still occur, but otherwise land litigation is minimal. The chief says land sales no longer take place, although they did in pre-proclamation days. Land loans can be had, but they generally occur when someone with a comfortable land surplus transfers a field to a needy individual. In such cases, the chief asserts, the "lender" knows he's not going to get his field back under current arrangements, so he doesn't give it unless he can afford to give it forever. Among friends, however, temporary land loans are asked and accorded, with return of the field on the owner's demand being practically assured [interview, Canton Chief, N'Dounga, 7/ll/8l].

IV. ACTUAL AND POTENTIAL USES

Actual Uses

G'bodi Forest already functions in a small way as a multiple-use resource. It serves as a pasture reserve for area stock owners, a source of firewood for local residents and as a producer of certain medicinal substances used by traditional doctors. It seems reasonable to believe, however, that the resource is not being exploited to its full potential as a wood producer. It may also be possible to reclaim degraded parts of the forest through a system of rotating fields coupled

with soil conservation measures. Local people could play important roles in all of these activities, though at the moment grazing is the only high participation use.

Up to the present, there seems to have been no management policy concerning G'bodi State Forest, at least in any positive sense. Army activities destroyed the original trees; with the single exception of the neem plantation, natural regeneration produced the cover which now exists in the area. Contemporary Forest Service policy concerning the forest can be summed up as one of permitting grazing and gathering of fallen deadwood while prohibiting farming and woodcutting.

Grazing

G'bodi Forest currently provides temporary pasturage for Peul herders in the surrounding, three-canton area: N'Dounga, Kolo and Libore[1] Cantons [interview, Peul agro-pastoralist resident in Kolo Canton, Deleoua, 7/13/81; interview, Canton Chief, N'Dounga, 7/13/81]. Residents of Zarma and Kourtey villages adjacent to the forest also put stock into G'Jbodi, particularly during the rainy season, when fields are off limits and stock owners are liable for crop damage caused by their animals. Occasionally, transhumant pastoralists pasture their herds in the forest, but they do not constitute a major element in the herder user community. They can be accommodated apparently under norms currently prevailing in Nigerien pastoral societies, i.e., herders passing through an area are welcomed for a short period, and then move on unless special, longer-term arrangements are made with those who control the

pasture area [Thomson, "Nigerien Herder Associations: Institutional Analysis and Design," Niger Range and Livestock Project, Contract No. 683-A-1OOO2, Maradi, Niger, 6/69/81, p. 188].

Herding pressure varies from year to year and from season to season. Area herders use the forest intensively during the summer rainy season, but pressure during this period does not frequently strain carrying capacity: once adequate rains fall, herbaceous vegetation can easily support existing stock demands. During this period, taller trees are not lopped to provide stock fodder.[Interview, villagers, G'bodi II, 7/10/81, Tape Side A, 595-620].

According to three Peul agro-pastoralists resident in Del§oua (an N'Dounga Canton village located south-east of the county seat close to the G'bodi Forest perimeter), those who own animals take their herds to live in the forest during the summer months, particularly after the millet has reached the point where grazing animals could cause serious crop damage [interview, three Peul agro-pastoralist residents, Deleoua, 7/13/81]. Agro-pastoralists who live further from the forest use it less however. Typically, they take their animals and those they herd for Zarma residents of N'Dounga village (agriculturalists) across the Niger River toward Tamou and Tchirtachi [Interview, Canton Chief, N'Dounga, 7/13/81]. This information is corroborated by a Kolo Canton agro-pastoralisti for him, the distance to G'bodi Forest is too great except in exceptional years when rainy season forage elsewhere is insufficient [Interview, Peul agro-pastoralist resident in Kolo Canton, Deleoua, 7/13/81].

Dry season pasturage is another matter. G'bodi II residents indicate herbaceous and arboreal pasture in the forest lasts for up to nine months from the beginning of a good rainy season, but can be exhausted four months after the start of a bad *one* [Interview, villagers, G'bodi II, 7/10/81, Tape, Side A, 190-220]. Animals typically roam freely in the G'bodi Forest and surrounding countryside after the harvest is in, and they often consume crop residues [Interview, Canton Chief, N'Dounga, 7/13/81]. These are commonly left on the fields. Sorghum stalk ends, considered very nourishing for animals, form an exception here; increasingly since the drought they are collected and stored as dry season fodder. However, as little sorghum is produced in the region, amounts stocked are minimal [Interview, villagers, G'bodi II, 7/11/81].

According to G'bodi II villagers, their animals - family herds include cattle, owned mainly by men, and small ruminants, belonging principally to women - consume, during the dry season, leaves of almost all tree species commonly found in the forest. They cite in particular Guiera senegalensis. all varieties of Combretum. Acacia Senegal. A. macrostachva. A, ataxacantha. Balanites aegyptiaca. Ziziphus spina christi. Andropogen grass is also consumed. Zarma residents of G'bodi II say they do not often cut tree foliage as stock fodder. This seems to be for them a solution of last resort, to which they have recourse only when all ground-level fodder sources are exhausted.

Deleoua Peul agro-pastoralists note G'bodi Forest has "deteriorated" over the years, particularly through soldiers' logging operations. This "deterioration" however is not clearly

undesireable from their viewpoint. When the forest consisted mainly of large trees, foliage grew beyond reach of grazing/ browsing animals, and also shaded out most of the better varieties of grass. Regeneration since 1976 has produced the present cover of low bushes and small trees - which they consider "very good"[1] stock fodder - and permitted grasses to colonize the area, enhancing its pasture potential. They have observed little increase in Andropogen grass however [Interview, three Peul agro-pastoralist residents, Deleoua, 7/13/81].

In this respect it would be interesting to determine whether brushwood fodder quality is superior during the few years when trees are reaching maturity, or whether foliage values remain unchanged after trees mature and reach their wood production potential. Obviously if growing trees are superior fodder producers, the argument favoring frequent harvesting of G'bodi brushwood species is strengthened.

Firewood and Construction Materials

G'bodi informants report relatively small amounts of wood are (surreptitiously) cut in the forest itslef. Various uses are made of these products: construction materials (hut frameworks, sun shelters, silo supports, enclosures) and firewood predominate. Children collect fallen dead wood in the forest for family consumption, as they do in surrounding bush areas. A bit of this firewood finds its way to Niamey via wood merchants who buy in the immediate area of the forest [Interview, villagers, G'bodi II, Tape, Side A, 140-75, 7/10/81].

A Niamey wood merchant reports most of his purchases are made from woodcutters who work bush lands outside the forest [interview, Maiga Amadou, G'bodi I, 7/10/81, Tape, Side A, 100-125 (notes)].

According to G'bodi II informants, the best firewood is Acacia Senegal, Guiera senegalensis and three Combretumsa ghasalense. micranthum and nigricans.

Villagers report they also take construction wood from the forest and surrounding bush lands. They favor Prosopjs africana above all others for heavy work (e.g., beams for construction of adobe house ceilings), and also for millet mortars. The wood is both very strong and highly resistant to termites. Prosopis is used as well for uprights in simpler construction jobs such as huts and sun shelters. Unfortunately, the local supply has been nearly exhausted. In the absence of P. africana. Guiera senegalensis is commonly used for hut and silo frameworks, Bauhinia reticulata. C. ghasalense and Poupartia birrea for mortars. Acacia albida can be used for mortars, but is avoided both because it is difficult to find and not resistant to termites.

Tool handles are furnished principally by P. birrea and A. ataxacantha (long-handled hoe, iler). and Balanites aegyptica and A. Senegal (axes). Neems, which do exist in the villages, are used mainly for sun shelter materials. Tomb covers are provided largely by the various species of Combretum.

Secondary Forest Products

Fruits and medicinal extracts appear to be the main secon-

dary products derived from G'bodi Forest. Balanites aegyptiaca fruits are eaten and sold. Jujubier (Latin, name?) fruits are converted into cakes for sale and consumption, and Acacia Senegal produces gum, sometimes in sufficient quantities to warrant collecting it for sale.

Medicinal products are known to exist in G'bodi Forest, but local informants could not indicate what medicines are derived from particular tree sources. According to G'bodi II residents, those who extract medicinal products are Hausa who operate as traditional healers during the dry season. They reportedly do make use of the forest to get raw materials for medicines [[interview, villagers, G'bodi II, 7/10/81, Tape, Side A, 275-380].

Farming

As already indicated, parts of G'bodi Forest were cultivated prior to its classification, and villagers north of RN 1 declare themselves eager to begin farming forest lands again if given permission to do so. At the moment, however, very little if any farming is carried on within the forest.

Potential Uses

The productive potential of G'bodi Forest can possibly be enhanced along certain lines. Of the four major uses detailed above, grazing, wood production and farming appear to offer the most promise. Increasing productivity is however a delicate issue: the management problem is complicated because the extent to which any single use can be enhanced is

not clearly known, nor are long-term costs associated with stressing one use at the expense of others (grazing, for instance, without regard to farming or wood production possibilities), or indeed those associated with trying to move to some improved mix of uses.

Grazing and wood production may be complementary to some equilibrium point, Thereafter, intensification of one use may occur only to the detriment of the other(s). The same appears true of farming: cultivated forest areas will automatically be subtracted from the rainy season forest area pasture reserve, and under certain farming systems, wood production would also suffer. Cultivation may also degrade the forest ecology even further than it has been already by use patterns to date. Under certain circumstances, however, cul tivation might contribute to improving pasture and wood resources.

None of these three uses seems to fall automatically into a "higher use" category which makes it more desireable than the others. Extreme emphasis on any one could drive out the others. It would appear critically important to long-term feasibility of management operations that user communities which will be actively involved in exploiting the forest products (a) be satisfied with the particular mix of uses selected, and (b) have a sense components of the mix are being selected on a reasonable basis.

Herders who now have free run of the forest in the rainy season may not welcome new farming activities, and considerable attention will have to be paid to designing institutions which

will conciliate these two potentially competing interest groups. The same can be said for woodcutters and farmers: given the right structure, the two uses can conceivably act in mutually productive ways, but only if each group respects technical considerations conditioning feasibility of the other's actions. If cutting techniques can be devised which enhance soil rejuvenation while increasing wood production levels, both groups will be better served. Similarly, if farmers can be induced to adopt soil conservation techniques which enhance reforestation possibilities once cultivated land is returned to fallow, farming will augment G'bodi Forest's long-term wood production potential. Farming activities might conceivably upgrade pastures in the short-run while the Woodstock is being reconstituted.

Area residents at present may not see these possibilities in all their manifuold variations. However, conversations with them indicated many are open to suggestions about how the forest might be better used, and willing to contribute some effort to upgrading if they would stand to benefit personally from the investment of time and effort. Farmers, in particular, seem aware of the need to invest in maintaining soil fertility. Informants note that peasants who can, regularly pay herders to pasture animals on their fields, to manure the land. Compound sweepings are also transported from village to field by those who dispose of necessary manpower and/or can afford to hire it [interview, villagers, G'bodi II, 7/11/81], The N'Dounga canton chief admitted as well that villagers who express interest in farming forest

lands might well be doing so because they would prefer to be able to fallow fields they currently farm outside the forest, which they know to be overworked [interview, Canton Chief, N'Dounga, 7/13/81].

Herders seem likewise sharply aware of resource quality issues. Comments by three Deleoua Peul agro-pastoralists concerning improvement in forest forage quality - from the herders[1] viewpoint - which followed on destruction of the mature forest suggest they and other herder-users can and will have opinions on different strategies of resource management [interview, three Peul agro-pastoralist residents, DelSoua, 7/13/81].

Woodcutters as a distinct user group may pose a more difficult problem, if only because a Paul Bunyan mentality ('clear and move on') has long been the rational one in Sahelien regions of the G'bodi type. Presumably, however, there are ways in which this difficulty can be overcome.

V. TECHNICAL, INSTITUTIONAL, LEGAL AND POLITICAL CONDITIONS OF SUCCESS

Moving from the present system of under-utilization and simultaneous degradation to enhanced forest productivity will require attention to a certain number of problems. User communities may be able to work cooperatively with each other, but only if a certain set of conditions are satisfied.

Technical Conditions

Given current demand levels technical improvements in brushwood management are probably indispensable to preserve

G'bodi Forest as a renewable resource. Even if research shows the forest is not now threatened by destruction, assuming present exploitation strategies are continued into the future, technical improvements would help upgrade forest quality. Such improvements would include some or all of the following: coppicing, promoting natural and artificial regeneration, eventual genetic upgrading of existing species and upgrading of forest quality through culturing of locally rare but desireable brushwood species [Interview, Heermans, FLUP office, Niamey, 7/10/81].

Such improvements may constitute the incentive - greater output of forest products, fodder and farmland - indispensable to motivate participation by user group members in cooperative efforts to conserve and improve the resource. If users conclude G'bodi Forest is a shrinking, not an expanding natural resource, as far as their needs are concerned, their cooperation will be much more difficult to elicit, and their willing participation in management schemes unlikely. Each will try to secure what he can of what remains, in a competitive and finally sterile scramble to secure control over a piece of the disappearing common property resource. In the process, enforcement efforts to uphold use regulations will be rendered highly problematic, and management attempts will in all probability collapse.

Institutional Conditions

The institutions established to deal with G'bodi Forest management must satisfy certain conditions (already alluded to, above, pp. 3-5). Among these are:

1. Control over user groups behavior, both in terms of direct exploitation of forest products or the forest area, and in terms of impact of any user group on welfare of others insofar as forest exploitation is concerned.

2. Willing cooperation with regulations must become the norm in almost all cases: individuals must comply with controls because they either (a) are committed to them or (b) wish to avoid public but informal censure associated with ignoring them.

3. There must exist incentives adequate to promote such behavior on the part of the vast majority of users in the vast majority of situations. These can and probably should involve a series of rewards to be distributed among users on a quid pro quo basis, i.e., permission to farm, cut or herd granted to users contingent on their observation of rules limiting exploitation and ensuring investment in and reconstitution of the forest as a multi-purpose renewable natural resource.

4. There must be an adequate system of rule enforcement, most importantly to reduce probability of violations, then to resolve cases of confusion about rule interpretation and instances of rule violation by particular users or user groups.

5. The management system must be sufficiently flexible to encourage modification of technical conservation and upgrading schemes and of rule interpretation and enforcement proceedings where such modifications seem likely to encourage increased productivity or better conservation on terms (more) acceptable to all users. This condition implies free-flowing

Legal Conditions

Those who are to exercise enforcement powers in implementing control regulations (1) must have authority to engage in such activities, and (2) must be able to avoid using such powers in all but extreme cases. Laws or rules which cannot be enforced are worthless, but maintenance of a rule system cannot depend, over the long run, on constant application of force to dissuade potential violators. These conditions will be considered separately.

1. It is a truism that unenforceable laws are worthless. People who face pressing needs, or who find themselves in competition with others for potentially scarce resources, will be tempted to ignore regulations and "get while the getting is good." Success with that sort of strategy by some breeds more of the same by others, and the controlled resource is, in very short order, decontrolled and exposed to eventually destructive - because unregulated - demands.

The critical goal here is maintenance of the agreed control system on an equitable basis: the more regulations are perceived to be equitably formulated and applied, the less user group members are likely to resist them.

2. But when violations occur, some set of officials must be empowered to handle cases and decide appropriate penalties. Enforcement of Forestry Code regulations has been, in Niger, the exclusive province of the Forest Service since at least the 1930s. Farmers and herders tend to think of forestry guards as the sole "proprietors" of state forests and the only ones authorized to identify and, punish violations of the code.

If it is decided to entrust management control of G'bodi Forest entirely to the Forest Service, these perceptions will pose no immediate problem: individual farmers, agro-pastoralists or herders will make no or little attempt to control each other's behavior and will probably obey forest guards' commands in the event they are arrested and/or fined in connection with some Forestry Code violation. Over the long-run, however, lack of self-control on the part of user communities may vitiate Forest Service management schemes.

If on the other hand the decision is made to decentralize rule application, or even to authorize local user communities to make and enforce their own regulations, popular perceptions that forest guards alone are authorized to regulate G'bodi Forest exploitation will have to be changed. If local people, either specially elected or already functioning in other official capacities (e.g., village headmen, canton chiefs) are to be accorded authority to regulate exploitation of part or all of the forest, and power to support their efforts to control use, then individual user groups will have to be specially informed of this fact. Otherwise, the old saw about "commoners cannot govern commoners" will be trotted out at critical points to justify violation of use regulations by hard-headed individuals among user communities. This problem therefore merits special attention.

If a system of decentralized, or coordinated but autonomous user group jurisdictions is to function efficiently - and this appears to be a viable possibility, which should not be rejected out of hand by either peasants or Forestry Service

officials - then it must, as noted above, function mainly on the basis of voluntary compliance with use regulations against a background of non-voluntary enforcement. The most appropriate units to carry off this sort of approach to regulation would be local user groups.

What exactly is understood by the term "local user groups"? It is defined here as groups whose members live and work together in close proximity, who are related to each other, perhaps by kinship ties but certainly by shared daily activities. They seem the most appropriate potential jurisdictions. If these can be mobilized, then prospects for productive participatory control of G'bodi Forest exploitation appear good.

Political Conditions

The term "political conditions" is used here in a special sense. It refers to the terms and processes by which existing use regulations might be modified, in order to enhance forest productivity. If, despite new knowledge (based in part on past mistakes) of changing use patterns and forest upgrading possibilities, regulations are perceived by participating users as difficult or impossible to modify, then many may conclude it is better to simply violate existing regulations rather than to attempt to change them. This point will be more fully discussed in the following section; in essence, the solution consists in providing a framework for changing forest use regulations which is responsive to popular perceptions and input concerning ways to improve management of renewable resources such as G'bodi Forest.

VI. G'BODI FOREST AREA: EXISTING JURISDICTIONS AND ALTERNATIVE MANAGEMENT FRAMEWORKS

Existing jurisdictions in the G'bodi Forest area are likely to be involved in and important to success of any forest management scheme which goes beyond the contemporary one of exclusive, passive control by the Forest Service.

Local Jurisdictions .

With the exception of Forest Service powers and officials, who constitute a separate hierarchy, existing jurisdictions fit into the overall Nigerien administrative hierarchy. The basic units are villages - Guesselbodi, with its two hamlets, M'Booda, likewise a Zarma village apparently, N'Dounga (Zarma and Kourtey peasants), Deleoua (Peul agro-pastoralists), etc. - and cantons - N'Dounga, Libore, Kolo. All these local and district jurisdictions are incorporated within Kolo Arrondissement, which in turn lies in Niamey Department's jurisdiction.

It is not clear to what extent local jurisdictions can be treated as corporate units whose members mutually support each other. Research elsewhere in Niger strongly suggests the unified village whose members act together to achieve a wide range of goals is more often myth than reality, even though it frequently crops up as an entity in administrative and technical service planning. Further research will be necessary to determine how villages which use G'bodi Forest rank on a scale of unity-disunity. For the moment, it would be wise to proceed on the assumption that sub-village units (or friendship circles) function more cohesively than do entire villages.

It seems clear from informants' reports in G'bodi II that

contact between the two G'bodi hamlets is highly limited, and that contact with the N'Dounga canton chief and his subordinates is even more restricted. Apparently the latter visit the village annually only to collect taxes during the late fall months. Their other visits are occasioned either by the need to announce and arrange special (GON-initiated) activities or to convoke litigants.

Insofar as legal jurisdictions are concerned - these are important since they may became involved in resolving disputes about forest exploitation - village headmen, canton chiefs and the Kolo sub-prefect all exercise quasi-legal conciliatory powers as well as administrative authority. According to the canton chief, village headmen do not administer Quranic oaths - a form of binding promise, sanctioned by supernatural powers associated with the Quran, in which the oath-taker agrees typically to desist from some conduct or to perform an action - but he does [interview, Canton Chief, N'Dounga, 7/13/81]. The power to administer Quranic oaths transforms a court from place of conciliation only into a forum which can, to a certain degree, impose a judgment. Not infrequently that power tends to enhance a court-holder's prestige, which in turn often helps him struct ture binding "conciliation" arrangements.

Appeals from the canton court lie to the subprefecture, and from there to the civil court system in Niamey. The civil system offers in effect the last recourse.

Village headmen and canton chiefs currently have formal authority over quarrels (with the exception of instances of assault and battery), animal damage disputes and such land cases

as still occur despite GON's general ban on land law litigation [Interview, Canton *Chief,* N'Dounga, 7/11/81]. The latter include division of family fields following death of the family head, division of fields prior to the family head's death, disputes over field boundary locations, etc.

According to the N'Dounga canton chief, he and his five counsellors and two traditional policemen resolve such disputes whenever possible if they arrive at the district level after an unsuccessful conciliation attempt within the local community. They also handle crop damage cases on appeal from village moots. In both sorts of cases, issues they cannot resolve satisfactorily are passed on appeal up to the subprefecture in Kolo. One assumes the same process exists in Libor§ and Kolo Cantons; this must be verified however.

Both the N'Dounga canton chief and G'bodi II informants report dispute resolutions do occur at the village level within the canton as a matter of course. Village headmen do their best to settle disagreements locally, say both sources. The canton chief notes village headmen inform him when they settle a dispute - which suggests a general oversight function is performed by the canton chief - but he seems comfortable with the decentralized, quasi-autonomous nature of trouble case treatment in his jurisdiction. This indicates villages are going concerns at least as far as litigation and local moots are concerned. This in turn suggests villagers may be relatively accustomed to sorting out their differences amongst themselves - a factor increasing feasibility of local participations in G'bodi Forest management.

Local and district marabouts may play a part in some dispute resolutions. District marabouts, appointed apparently with the concurrence of superior administrative authorities, operate family law courts in the canton seats (N'Dounga, Kolo, Libore"). They deliberate normally only about inheritance and marriage disputes, and any other matters which are commonly considered to be uniquely within the province of Quranic teachers skilled in areas governed by Maliki Muslim law. In general, one can say such officials would not likely be much involved in resolving trouble cases arising out of disputes over forest resources.

By contrast, village marabouts may play a much more general role in dispute resolution, by virtue of their prestige and authority within more restricted communities. Thus they may in some instances successfully conciliate parties to a crop damage dispute, relieving the plaintiff of the need to take the case before the village headman or even to the canton level. Whether or not they could play a significant role in any set of institutions designed to regulate forest use on the basis of popular participation will depend upon local conditions. Certainly there seems no reason to exclude them a priori from dispute resolution in such a context.

Existence of such jurisdictions in the G'bodi Forest area which deal with problems of these types suggests cases concerning maintenance of eventual subdivision boundaries within the forest itself and disputes over crop damages in fields located within the forest could be handled by existing personnel and procedures. Local people who now automatically take

their disputes for resolution to local or district authorities would probably find it reasonable to do so as well in regard to similar disputes within the forest, particularly were they to be informed that such were the appropriate course of action.

If this is the case, it means autonomous local jurisdictions could be established to control and coordinate forest exploitation at relatively low cost in training new personnel and establishing new institutions. In other words, such institutions appear theoretically feasible.

Feasibility is enhanced in part by the following considerations:

1. Local residents - the heavy user community - farmers, herders and agro-pastoralists, whether Zarma, Kourtey or Peul, are all administered by the same set of officials at the canton level. There is no "nomad" canton in the area which would exempt certain classes of taxpayers from control by the territorial official by putting them under the aegis of a non-territorial jurisdiction. There exists no special Peul 1'amido (emir) in the N'Dounga region. DelSoua residents - Peul - are all enrolled in N'Dounga Canton, under authority of the canton chief [Interview, three Peul agro-pastoralist residents, Deleoua, 7/13/81]. Herders and stock owners commonly have their disputes resolved by local marabouts, village headmen, and the N'Dounga canton chief [Interview, villagers, G'bodi II, 7/11/81, 7/12/81} interview, Peul agro-pastoralist resident in Kolo Canton, Deleoua, 7/13/81: interview, Canton Chief, N'Dounga, 7/11/81]. Most agro-pastoralists who regularly frequent G'bodi Forest with their animals then come under the N'Dounga canton chief's authority.

He thus represents a common appeal point, when local moots fail to resolve issues. Non-local herders who occasionally use the forest as a pasture reserve are highly likely to accept the N'Dounga canton chief's authority to resolve disputes concerning forest use, even if they are not willing to submit to rulings of local sedentary village headmen (many probably are).

Controlling Pasture Exploitation: The Role of Local Jurisdictions

Those who use G'bodi Forest as a dry season pasture source adopt two different strategies. Cowherds stay with their animals, and so keep them (or can keep them) under control. Small ruminant owners, primarily sedentary farmers, who allow their animals to roam freely once crops are harvested. The small ruminants, particularly goats, could cause problems if, in grazing or browsing, they destroy natural or artificial regeneration projects within the forest. During summer growing seasons however both small and large ruminants are closely watched by either family members or a hired herder. In g'bodi I, a herder was engaged to take care of village goats (sheep?) during the 1979 rainy season, at the rate of 250 CFA/goat or sheep, and a bundle of millet ears/cow. This is evidently the standard rate for the area. The arrangement was not repeated during the summer of 1980. G'bodi II residents rely on family members to keep animals out of growing crops, however ^Interview, villagers, G'bodi II, 7/ll/8l].

A great many stock owners who live in the immediate area send their animals into G'bodi Forest to graze once crops have

matured to the point where animal damage might become a problem [interview, villager, G'bodi II, 7/11/81; interview, three Peul agro-pastoralist residents, Deleoua, 7/13/81].

If fields are to be opened within the forest preimeter, some thought will have to be given to their siting, to reduce surveillance costs as much as possible. Presumably grouping fields together in small clusters would facilitate enclosing them (thorn fences, brush remains of field clearance, etc.). This would increase the likelihood of mutual protection against roaming ruminant: each farmer would supervise others' fields in addition to his own, so that all farmers would not have to be constantly present on their plots to protect crops and forest regeneration projects and experiments. It would also facilitate execution of soil conservation schemes requiring joint efforts by more than the members of a single family.

Another set of local, informal jurisdictions exists in at least some of the villages whose residents use the forest. G'bodi II for instance appears to be a largely self-governing unit. The hamlet contains a large number of marabouts and Quranic students, who appear able to resolve, within the framework of their religious principles, activities and relations, most local problems. During the two years preceding our interviews, they reported no cases were taken on appeal from the hamlet to the G'bodi village headman, much less any to the N'Dounga canton chief or his superiors [interview, villagers, G'bodi, 7/12/81]. The N'Dounga canton chief noted he had resolved two appeals brought by G'bodi litigants during the past year - one a marriage dispute, the other concerning crop

damage [interview, Canton Chief, N'Dounga, 7/13/81]. Other villages experience greater difficulties in settling disputes amicably, G'bodi II informants avere, and many cases are taken before the canton chief.

Given this local variation, planners should provide for a clear appeals process to handle resolution of trouble cases arising in the forest. Some local jurisdictions (formal or informal) may be able to function effectively without such institutional back-up, but others, lacking it, will likely fail through inability to uphold controls.

GON Agencies; Samaria

It should be noted that other GON agencies appear to have very little contact with G'bodi Forest communities north of RN 1. There is probably more contact between peasants south of G'bodi Forest and GON officials, but this may be largely focused on irrigated agriculture in the Niger River Valley (ONAHA). The Samaria organization is also described as being very limited in the extent of its activities in G'bodi I and II. Last year school classrooms were repaired,, but almost certainly at the instigation of outside officials. No other projects were undertaken, although the youth of the two hamlets occasionally got together for fun.

Alternative Management Frameworks

At least four possible frameworks for the G'bodi Forest sustained yield management project can be envisaged. The Forest Service would have a role to play in all of them. The main variation is the extent to which popular participation

would figure as a technique of resource management. The four are:

1. Exclusive control by the Forestry Service, with no more popular participation than exists at present in management decisions.

2. A joint management committee composed of representatives of all relevant user communities, working under Forestry Service supervision to manage G'bodi Forest as a single jurisdiction.

3. Subdivision of G'bodi Forest into sub-units, each managed separately by officials of distinct geographic jurisdictions working under Forestry Service supervision.

4. A compound system, relying on a joint management committee at the Forest level, to be composed of representatives of all relevant user communities (herders, wood cutters, farmers, wood collectors/users from local communities (e.g., for personal consumption, not sale), and, at the local level, jurisdiction committees to control sub-units in light of local needs and overall management plans, the whole again to be under Forest Service supervision.

1. Forest Service Exclusive Control

A sustained-yield management program for G'bodi Forest could be implemented and enforced by Forest Service personnel. This would permit central coordination. It would reduce decision-making costs associated with opening up decision-making about forest management to popular participation. If Forest Service personnel could be adequately supervised and controlled, such a management strategy could lead to controlled

brushwood harvesting experiments and possibly to increased sustained of brushwood and other forest products from the G'bodi Forest.

Certain difficulties attend such a solution however. First, contemporary passive forest management at G'bodi makes extremely few demands on Forest Service personnel time. Because adequate supplies of brushwood exist in the immediate area outside the forest, a small number of visits annually suffice to prevent almost all illegal harvesting of live wood within the state preserve, as well as farming. The Forest Service now makes no attempt to regulate herders' movements into and through the forest.

Shifting to an activist, sustained-yield management strategy will inevitably demand increased Forest Service personnel efforts and time, even with popular participation. If Forest Service personnel are to bear the entire burden of controlling forest exploitation, managing G'bodi may become a rather expensive venture as far as the Service is concerned. This is not to suggest additional demands for personnel at G'bodi Forest could not be met, It is rather to raise questions about the desirability of developing an active management strategy based on unrealistic assumptions concerning Forest Service manpower availability. If an important goal of the G'bodi experiment is to work out a brushwood management technique which can be replicated elsewhere in the country, it seems important to develop the technique on a realistic basis, i.e., by assuming from the start that large-scale replicability depends on popular participation.

A further difficulty may be associated with total reliance for forest management *on* Forest Service personnel: feedback will be minimal or non-existent because user communities (herders, woodcutters, farmers) are most likely to take foresters' statements and decisions as givens to which they must adapt, rather than as negotiable positions. G'bodi Forest has been established for a long time, and exists as a distinct jurisdiction in the minds of users. They recognize boundaries, respect them, and they respect, by and large, use restrictions. For all practical purposes forest control is presently out of their hands. The Forest Service permits limited use. That's nice. More would be better. But it's a Forest Service decisions, and one which the agency is evidently capable of enforcing.

To date users have been told, not asked, what will happen in the forest. Thus those who wish to elicit feed-back from users are going to have overcome users' perceptions that it's not users' place (and perhaps even dangerous) to say how things should be run. If asked, users will probably respond with their opinions. It is unlikely however that they will aggressively contest a management plan, or move to checkmate a conservator who tries to manipulate his authority and power to his own ends.

These considerations make it unlikely, in turn, that management decisions and practices will be either debated publically or openly criticized if the Forest Service retains exclusive control over the resource. Once again, Forest Service manpower limitations pose a critical issue. Lack of public debate about G'bodi Forest activities will be a problem

but a less serious one because the site lies close to Niamey. FLUP or Forest Service personnel can easily supervise activities there and monitor developments by on-site observations. Such individuals can question area residents about difficulties they observe, reducing thus the need for a self-starting feedback process.

But in more remote areas such will not be the case. Communications difficulties will prevent it. Local foresters under such conditions may well abuse their sole authority over forest exploitation to further their own ends. If they do, active sustained-yield management programs may be side-tracked into exploitative operations which ruin natural resources as producers of future values, whether these be in the form of forest products, pasturage or good farmland.

2. Joint Management Committee of Users' Representatives

It would be possible to create a series of special user group jurisdictions, each exercising authority over some forest product(s) within G'bodi confines. Thus herders, farmers and woodcutters would each have an organization to regulate members activities throughout the forest reserve.

This would represent a step in the direction of popular participation, since controls on grazing, cultivation and wood harvesting could be decentralized to the leadership of the various user groups, rather than foresters having to bear the entire burden of regulation. Ostensibly then such a management scheme would reduce the need for constant supervision of G'bodi activities by Forest Service personnel. But several probable

difficulties would likely render such a scheme unworkable. These have to do with costs of decision making and difficulties of rule enforcement.

Decision-making concerning allocation of herd reductions in bad years, farmlands suitable for cultivation within the forest, wood harvesting quotas, labor inputs for reforestation and soil conservation activities and the like would require a series of fairly frequent meetings. User communities would have to assemble, so that members could thrash out these issues with each other, and approve necessary modifications during implementation of any particular work plan. While these meetings would not be impossible to organize, convening them would require development of a system of intra-group members communications. Somebody would have to support associated costs of calling meetings, whether they came in the form of travel time to inform group members of future meetings or whether they took the form of payments, for instance, to the N'Dounga canton chief's counsellors or traditional policemen for doing this job. Each group would therefore have to work out some system to support these costs - not an easy task especially where no such group already exists as a going concern.

Insofar as programs of different user groups could be expected to have an impact on each other, e.g., farming or reforestation activities in an area implying closer control of livestock grazing in the immediate vicinity, or coppicing experiments to be carried out by woodcutters temporarily removing certain forest areas altogether from the pasture

reserve, inter-group negotiations would be necessary. These might be carried out - indeed, probably would be carried out - by group representatives rather than by the entire membership of each group, but such meetings would represent an additional burden on participants' time.

Rule enforcement would in all likelihood fail to work efficiently in such large, undifferentiated user groups. Members of the same functional group might well not know each other, and certainly would be unfamiliar with the daily activities of many other members of their group. Informal controls would be much less effective than they would be in smaller, tighter-knit associations. One would expect more difficulties in resolving intra-group disputes, and greater recourse to litigation, with associated costs and the possibilities of misunderstanding and antagonism persisting among litigants. Lack of intra-group entente might foster rules violations (timber poaching, failure to respect arrangements to limit grazing pressure, non-fulfillment of obligations concerning reforestation or soil conservation activities, etc.). Forest Service personnel would thus face greater demands on their time, both to resolve disputes and to ensure users respect regulations and meet their obligations.

The upshot of a management scheme based *on* global user group organizations operating under control of a joint management committee of users' representatives might thus strain Forest Service resources, even within the G'bodi Forest area. It would probably not be subject to easy extension to other potentially productive brushwood areas, and the value of G'bodi

as a trial brushwood resource management program would thus be vitiated, in much the same way as would a centralized management system under direct Forest Service control.

3. Subdivision of G'bodi Forest into Distinct Geographic Jurisdictions under Direct Forest Service Control

G'bodi Forest could be subdivided into several exclusive, mutually autonomous geographic jurisdictions, each directly controlled by Forest Service personnel. This direct control feature would differentiate Option 3. from Option 2., in which foresters would deal with an interposed, joint management committee of users' representatives. These subunit jurisdictions could be established as a function of technical considerations and characteristics of particular user communities. Results of investigations of technical aspects of G'bodi Forest will reveal whether the area can be divided, practically, into jurisdictions, e.g., of high potential for brushwood production, degraded areas suitable for grazing, degraded/eroded areas useful for farming but requiring soil conservation work, etc.

Note: if these or similar physically-defined subdivisions are revealed by technical investigations currently underway to be infeasible, characteristics of user groups - herders, farmers, woodcutters, etc. - may turn out to be irrelevant and Option 3. infeasible. However if physically-defined subdivisions prove infeasible, it may still be possible to create smaller, sub-Forest jurisdictions, based on or structured exclusively by user group characteristics. <u>This point merits special discussion</u>.

Assuming for the moment subdivision feasibility, control over access to and use of these jurisdictions could be allocated to user groups which already exist as human communities or going concerns, e.g., the woodmerchant and his woodcutters, farmers from a single hamlet, herders from the same village, or sub-unit within a village. The goal should be to utilize existing control structures to cut costs of controlling G'bodi Forest exploitation by various user groups.

If authorized user communities are small enough, they may well be able to organize their own special intra-group control system to facilitate execution, within their sector, of sustained-yield management programs. This and related matters which bear on organization of woodcutters', herders' and farmers' user group jurisdictions are considered below.

Woodcutters. Forest Service personnel will face problems in attempting to structure jurisdictions adequate to control and regulate brushwood cutting within G'bodi Forest. Local informants concur most commercial woodcutters who operate in the area are not local residents enrolled on Kolo Arrondissement tax registers and subject to direct supervision by the N'Dounga canton chief or neighboring canton chiefs. Nor do those who work in N'Dounga Canton come to greet the canton chief before beginning work in the jurisdiction, which suggests they consider themselves to a certain extent as outsiders existing beyond the network of normal administrative relations in the area.[interview, villagers, G'bodi II, 7/12/81: interview, Canton Chief, R'Dounga, 7/13/81]. Current Forest Service policy simply excludes woodcutters from G'bodi Forest, and

except for a small amount of surreptitious cutting, this solution evidently works [interview, Heermans, FLUP office, 7/lO/8l].

Given certain brushwood cutting programs it may be possible to use the Forest Service's forest-wide jurisdiction as a control framework. Such programs would involve, e.g., clear-cutting in narrow, well-marked strips or small patches by specifically-authorized woodcutters. Some means of allocating authority to exploit these plots will have to be worked out, e.g., a first come, first served permit system, or a lottery drawing, plots to be distributed to winners on a choice or pre-numbered basis, etc. Whether such approaches will be feasible, to say nothing of desireable, depends not only on foresters' recommendations about most appropriate cutting programs in light of the projects experimental goals, but on possibilities of securing cooperation of commercial woodcutters, wood merchants, herders and villagers in respecting wood harvesting programs. It will be critically important to prevent unauthorized individuals from poaching on other people's brushwood concessions.

For this reason, it may be important to establish special jurisdictions, which subdivide the forest into a series of areas to be conserved or exploited in line with central aims of the control experiment. It is conceivable that geographi-cally-adjacent user communities could be given authority over certain sections of the forest, e.g., those immediately sur-rounding fields they would be authorized to create within the forest, and non-local woodcutters be given authority to organize themselves to control exploitation of the rest of the

forest, in conjunction with similar herder organizations.

In this regard note that a very small number of wood merchants - six or seven, according to one informant - frequent G'bodi Forest peripheral lands. Given such a small number, planners might envisage organizing the bulk of commercial woodcutting through them, with each individual merchant and the woodcutters who supply him authorized to exploit a certain area in the forest, subject to conditions specified in a user contract. Such conditions might include, e.g., clear delimitation of tract boundaries by users exploiting it, respect for cutting regulations (for instance, concerning attempts to induce coppicing), cooperation with any farmers or herders also authorized to exploit the same area, payment of user fees or taxes on wood taken out of the area, fulfillment of any commitments undertaken to promote natural or artificial reforestation, etc. Organization on this basis should largely prevent unregulated cutting in any part of the forest, because wood merchants found guilty of violating their contracts could be excluded from cutting operations on state lands.

V/ood merchants and associated cutters could be negotiated with on a collective basis. Forest Service goals, e.g., respect for and implementation of an experimental coppicing program, investment in natural or artificial regeneration of forest cover within the context of a cutting program or as a separate operation, generation of revenues through special taxes on G'bodi Forest products,could be presented. Woodcutters and merchant would then have to assess whether, from

their perspective, advantages of cutting in the forest in a domain reserved for their exclusive use outweighed disadvantages of additional labor inputs required by the regeneration program and/or costs of special taxes on wood products taken from the forest (to finance regeneration programs, in addition to other goals). If positions of the two parties were far apart, bargaining might produce an agreement, or it might simply indicate to both sides that there was no real possibility of mutually productive exchanges.

Assuming a deal could be struck, the woodcutters would then have an incentive to defend the area under their exclusive control, in order to increase their overall chances of making a profit on the contract. They would have to be informed of appropriate procedures by which they could initiate action against wood poachers; presumably they would be able to pass complaints through their wood merchants to the Forest Service, and then assist foresters assigned to control G'bodi operations in contacting the culprits. Failure to meet their obligations under the contract could be grounds for several types of sanctions, e.g., higher taxes, or reduction of area to be exploited, or, at the limit, expulsion from G'bodi Forest altogether.

Controls and operations within the group would be a function of intra-group relations; woodcutters could agree (or refuse) to admit other woodcutters, depending upon whether they felt the additional manpower was desireable or not.

Herders. Herder organizations could likewise be established to exploit and control certain parts of the forest. Here the point might be, from the Forest Service perspective, to arrive at sustained-yield use of G'bodi pastures, coupled with regulating grazing pressure to prevent interference with programs of natural or artificial regneration.

Several problems can be foreseen in this context. First, G'bodi Forest is now open to all herders on a common property basis. G'bodi II informants report, for instance, that they know of no attempt to exclude either livestock or individuals who, during the rainy season, enter the forest to harvest grass to fodder stock tethered in the villages [interview, villagers, G'bodi II, 7/10/81, Tape, Side A, 595-605; interview, villagers, G'bodi II, 7/11/81].

To regulate grazing pressure, a control structure capable of reducing stock numbers during bad years (and conversely increasing herd size during good years, to exploit abundant pasturage) is indispensable. On what basis should such groups be formed?

To cut down communication costs, existing structures should be used. Several potential "groups" come to mind. These include the Deleoua Peul agro-pastoralists who regularly use the forest en masse during the rainy season as a pasture reserve for their animals. Further inquiries would be necessary in Deleoua to determine whether smaller functional groups exist within the village (i.e., groups of approximately ten kinsmen or friends living in close proximity to eadh other). Each of these groups could be accorded a portion of the forest as its

exclusive pasture reserve, during both rainy season and dry season.

Similarly, groups of stockowners in the villages/hamlets adjacent to the forest could be accorded exclusive control over sub-sectors. G'bodi I and II and M'Booda should be prime candidates here. A third general group of herder-users would include any herders who come to the forest from non-adjacent regions on a semi-regular basis, i.e., Kolo Canton. Just how much time a herder would have to spend in the forest to merit inclusion in a herder group is a matter for future decision.

Such subdivisions might be technically inefficient however: rainfall probably is unevenly distributed over the forest area in any given year. Some subdivisions might face fodder shortages while others could not fully utilize their supply. The number of divisions might then have to be reduced, or the Forest treated as an undivided pasture reserve. This would resolve some problems, but raise others, i.e., concerning control of a much larger user group. Herders' opinions and suggestions concerning solutions to these problems must be solicited before decisions are taken on which options to choose.

In any case, some sort of contract would have to be worked out which would not only satisfy group members, but would also lead to inter-group harmony, in the sense that no group would be left feeling it had been short-changed or required to furnish an inordinant amount of work in return for grazing privileges. This particular problem might arise, e.g., concerning hamlets adjacent to the forest. If some villagers from these

communities were allowed to farm in the forest, stock owners might be compelled, by terms *of* the contract, to help construct and maintain barriers between field and pasture areas. To balance things out, other herding groups might then be compelled to contribute comparable amounts of labor, e.g., for artificial regeneration within their areas, in return for grazing privileges.

Each of the herding groups (or the undifferentiated herder group, if such an organization is deemed adviseable in terms of technical considerations and herder opinion) would then be responsible for regulating (reducing/increasing) herd size as a function of overall forage availability. One Peul herder who occasionally uses the forest indicated herd reduction would not be terribly difficult for Peul agro-pastoralists. He suggested two possible approaches.

1. Within the pasture jurisdiction, during a bad year requiring ten percent reduction in overall herd size, for example, one individual in ten - on a lottery basis? would be required to take his animals out of the forest to pasture them elsewhere.

2. Within a pasture jurisdiction, during a bad year requiring ten percent reduction in overall herd size, each individual would have to dispose of, or make other arrangements for, ten percent of his in-forest herd. It might well be possible that one herder could leave the forest with a composite herd composed of ten percent of all members' animals, leaving ninety percent of his own scattered among remaining forest herders in his jurisdiction until such time as it would be appropriate for him

to return to the forest, presumably at the end of the next dry season.

Farmers. If it is considered useful, in light of technical considerations, to allow farmers to cultivate forest lands in return for soil conservation activities, it seems likely much would be again gained by working through existing groups whenever possible. Such structures could handle land allocation and supervise fulfillment of farmers[1] obligations under the agreement authorizing access. If a leadership structure already exists within the group, those individuals might well organize access to forest lands within the group's jurisdiction on locally acceptable bases (on the other hand, the Forest Service might wish to structure the allocation process, by stipulating a supervised lottery among interested peasants, to prevent overt abuses of power on the part of locally important individuals).

In this context, it seems likely smaller user groups would facilitate resistance by those who feel themselves unfairly disadvantaged. Speaking out against a local individual whose methods or results in organizing control and exploitation of the resource are seen to be unfair should be easier than having to publically oppose unfair methods or decisions of a jurisdiction-wide committee representing considerably more people and power. There might even be a tendency within smaller groups to allocate lands more equitably among users in light of locally-known needs of applicants and feelings of intra-group solidarity (...though there is no guarantee such would be the case).

Coordination among user groups under this sort of highly decentralized/locally autonomous management system poses some problems, as well as offering advantages. The latter would include possibilities of simplified negotiations between user groups occupying specific jurisdictions and Forest Service personnel charged with organizing overall sustained-yield management of the forest. If foresters knew what they wanted from a particular group, they could bargain with members or leaders directly until some acceptable arrangement was worked out. This would, presumably, give foresters access to considerable feedback about program operations over time, if those doing the negotiating were prepared to be patient and to welcome peasant input and suggestions. Whether they would be in fact is problematic: in such bargaining situations it is often easier in the short run for the more powerful side - the forester - to simply impose conditions. Over the long run, however, such an approach obviously risks suppressing information and generating much resentment among user groups...which might then fail to function in a disciplined manner to control resource exploitation. If this were shown by events to be a reasonable fear concerning G'bodi Forest, it would be a much more severe disadvantage in terms of extending the brushwood management program to other, remoter areas.

Assume for the moment that negotiations could be simplified in many cases by making user group jurisdictions mutually exclusive, e.g., by declaring pasture areas off limits to farmers, woodcutting/coppicing and soil conservation areas off limits to herders, etc. Some minimum amount of coordination among

various user groups would still be required, e.g., between farmers doing soil conservation work and woodcutters, or between herders and woodcutters in areas where Forest Service personnel might wish to experiment with joint exploitation of the resource by two different user groups, or in situations where development of mutually exclusive jurisdictions was deemed impossible for technical reasons (see above, p. 43, discussion of possible necessity for forest-wide herder jurisdiction on efficiency grounds).

Where coordination is necessary, Option 3 offers small help in any formal sense. Some such problems might resolve themselves on the basis of informal negotiations/interaction between relevant user groups. Whatever was left in terms of indispensable levels of coordination would have to be provided for by the Forest Service. This would prevent popular participation in what is, finally, a very important aspect of organization for sustained-yield management activities. This issue is dealt with more effectively by Option 4.

4. Compound System: Joint Management Committee and Local Jurisdictions

The major drawback of Option 2. is lack of local committees or organizations to deal with the day-to-day aspects of program implementation among different user groups. Conversely, as has just been noted, Option 3. fails to provide an adequate framework for inter-group negotiations. Some sort of overriding assembly must be envisaged, along lines sketched out in Option 2. It should be composed of representatives of all user groups, whether they be drawn from discrete local geographic subdivisions

(based either on technical considerations, group characteristics, or a combination of the two [see above, p. *37*~]) or from general functional associations of users which regulate their type of activity throughout G'bodi Forest (e.g., a general herder association). Deliberations in this assembly would turn *on* mutually satisfactory ways in which groups could coordinate their activities. Communications costs between Forest Service personnel and user group members would also be reduced by the existence of such a general assembly of user groups.

The assembly format should generate incentives for user group representatives to actively voice problems of the groups they represent. Such debates would provide an extremely valuable form of feedback to both group members in attendance and foresters frequenting the assembly meetings. Issues, once raised, would tend to be thoroughly discussed. If group representatives realized the opportunities available to them to negotiate favorable arrangements for their members, the assembly interchanges might well foster some public entrepreneurship on the part of users: representatives might give time, even outside the assembly, to figuring out ways in which the joint management efforts to ensure sustained-yield of forest products within G'bodi could be made more productive for their members.

If this result were to be achieved, it would at one and the same time justify the somewhat higher decision-making costs involved in inviting user group participation in forest management planning and provide a somewhat stronger guarantee that group members' real interests would not be suppressed or forgotten by officials concerned more about their own economic

welfare than that of user group members.

Recommendation: Management Option

In light of foregoing discussion, Option 4 is provisionally recommended. Technical findings may subsequently reveal such an approach to be impractical. In the meantime, of the four options presented, No. 4 appears to deal most adequately with relevant institutional design criteria (noted above, pp. 18-19). Among these the most important are: development and maintenance of an equitable system of regulations organizing sustained-yield exploitation and reconstitution of G'bodi Forest by diverse user groups? popular participation in maintenance and enforcement of agreed regulations; steady feedback from user groups about system operation and encouragement of technique and rule modification to enhance resource productivity.

Tthe combination of discrete, local geographic user group jurisdictions (and perhaps some forest-wide ones, e.g., herders), and a joint management committee at the forest level provides an institutional beginning to address all these issues, and a format where adaptation is possible in terms of feedback from user group representatives.

Judicial Process: A Recommendation

Discussion above (pp. 24-28) suggests the issue of rule enforcement might be handled, at least initially, through the existing dispute-resolution system, i.e., local moots and the cantonal courts. This would relieve Forest Service personnel of a potentially substantial amount of work and would foster a perception on the part of users that the management program is

something about which they can have a say...and a day in court. Public discussion of disputes in local courts should not be underestimated as a teaching teahnique concerning reasons for and methods of sustained-yield resource management. If plaintiffs and defendants are called upon to justify their assertions in terms of G'bodi Forest use rules, those rules will come in for repeated public debate. Such debates should increase popular awareness of the program and its rationale...and stimulate critiques of its operation. Such developments can strongly encourage popular participation in the program, as users begin to feel themselves publically concerned.

Reliance on a Forest Service,administratively-based system of rule enforcement will forego these considerable benefits (a) because most enforcement proceedings are not public in the sense that village moot discussions are, but one-on-one interactions involving a user and a much more powerful official, the forester (with whose commands one is typically wise to comply...) and (b) because Forest Service enforcement reinforces in users' minds the conviction (belief?) that the resource and the management program are not theirs, and therefore not objects about which they have any legitimate say.

VII. REMAINING RESEARCH

At present, five issues clearly require additional investigation. Some can be examined now; others not until certain decisions about approaches to management have been taken.

These issues are:

1. the character of local groups in those user communities

where local jurisdictions are technically feasible, i.e., what are the most appropriate units for local organization in terms of cutting enforcement costs by mobilizing meaningful informal social pressure?

2. the character of the judicial process most appropriate to handling rule enforcement proceedings (assuming local and cantonal courts do become involved in enforcing management rules, their performance should be closely monitored with a view to correcting it where necessary to bring it into line with program goals)?

3. terms and conditions under which various user groups might be organized to (a) control exploitation rates and (b) participate in reconstituting the G'bodi Forest renewable resource, i.e., on what basis - what quid pro quo - will users be authorized access to the forest, and under what circumstances might their access be limited or terminated?

4. a closely related issue concerns the extent to which labor is effectively available for soil conservation, reforestation projects and other activities envisaged, i.e., will access to the resource be sufficient incentive to users to perform required reconstitution activities, or will they have to be paid to lure them away from otherwise more attractive opportunities elsewhere (to put this problem another way, will imposing labor service or user taxes/fees simply drive users away??

5. to what extent should FLUP or the Forest Service hire individuals to perform resource reconstitution/enforcement activities; if hired, how will they be paid: and what are the implications for replicability of brushwood management efforts elsewhere?

VIII. RURAL EXTENSION FRAMEWORK

The G'bodi Forest sustained-yield management project lies at this point uncomfortably between research and extension phases. The two are intertwined: as far as institutional design is concerned, research cannot be completed until extension work is initiated, but extension work depends on research findings. Furthermore, the kind of "animation" required in the G'bodi case is not the standard extension problem in Niger, i.e., the communication to peasants of a program of action and skills necessary to undertake it. Instead, project planners are dependent in part on peasants (G'bodi users and potential users) to tell them what should be done. Preferred policies in this context are a subset of what can be done - possible ' policies. Here again users have vital information.

Organizing Research/Extension

Simple logic suggests starting with heavy users and working out to those individuals who will infrequently exploit G'bodi resources. Groups which should be targeted for intensive discussions first are those thus most likely to function as intensive forest area users. If the N'Dounga canton chief is correct in suggesting most of his administres resident in the Niger River Valley are engaged full-time with irrigated bottomland agriculture, and have no real interest in exploiting the forest, communities which appear to be critical are: the sedentary hamlets of Guesselbodi I (on RN 1, residence of G'bodi headman) and Guesselbodi II (roughly two km north of G'bodi I) and M'Booda (north of the forest); herders from N'Dounga Canton (particularly those residing in Deleoua), but also, later on,

those from Kolo and Liboré (and other?) Cantons who use the forest as a pasture reserve on a fairly frequent basis; and woodcutters and Niamey wood merchants.

As a preliminary step, target groups must be informed by normal hierarchical administrative channels that the project is GON-authorized and that they are liberty to discuss alternative proposals, and to make suggestions. The Kolo subprefect and the various canton chiefs, particularly the N'Dounga canton chief must be contacted about the project, and requested to let their administres know meetings will be organized concerning G'bodi Forest management.

Animation officials should be contacted at Niamey headquarters, and their assistance and advice solicited. Especially if Option 4, (above, pp. 47-49) is selected, initial large-scale discussions with farmers, herders and woodcutters will be critical points at which public attitudes towards the project will be shaped. It is indispensable at this stage that users realize (a) that their interests are at stake and (b) that *their* input is vital to defending those interests.

Initial meetings should be carefully planned to deal with the critical groups outlined above (p. 52). Group responses (and individual suggestions) should be carefully recorded to establish at least a crude ranking of preferences concerning institutional options for the management program. Topics to be discussed cannot possibl be covered in the space of a single meeting. A realistic approach to fostering public participation will begin from the assumption that it is better to spend time preparing and opening up the discussion in the first critical

stages with ample time for exposition a£ and debate about alternative solutions than to do a superficial canvassing of public opinion and then try to hold users to arrangements and regulations that they may neither fully understand nor clearly support. It is terribly important that users who might eventually participate in an active fashion in implementing management programs realize from the beginning that proposed solutions are experiments, subject to revision on the basis of experience, rather than the "final word". Such a realization will do more to open up public debate and draw users into the discussion of management alternatives than will any number of pleas for participation once a die of top-down control has been cast.