Chapter3 Present Conditions and Issues of Bounouna Forest Reserve

3. Present Conditions and Issues of Bounouna Forest Reserve

3.1. Bounouna Forest Reserve

3.1.1. History of the Reserve and Boundary Management

Table 3.1 shows the outline of Bounouna Forest Reserve. This was designated as a forest reserve in 1955 before independence according to a forest reserve order (Decree No. 4088/ SE/F). The reasons for the designation were not mentioned in the decree, however, they were said to be to protect riverbanks and to conserve biodiversity (Source: Regional Direction of Environment and Habitat of Cascades).

Table 3.1 Outline of Bounouna Forest Reserve

No. Of Decree	Date of Declaration **	Area* (Ha)	Place of Issue	Condition of the Boundary
No4.088/SE/F.	31 May 1955	1,300 (881)	Dakar	Boundary stones are set. Boundary has been surveyed.

* The upper figure is the area given in the decree. The figure in parentheses is calculated from GIS data.
** The date of the issue of the decree is shown as the date of establishment of the reserve.

According to the decree, the four items listed below are permitted as resource utilization rights for the local community, in addition to collecting dead trees, fruits, edible and medical plants as guaranteed in Article 14 of the former forest law.

- Traditional fishing in accordance with the Fisheries Law.
- Village hunting without starting fire.
- Honey collection without slashing and burning.
- Pasturage of livestock animals except goats.

By the way, the present Forest Law guarantees local people the rights of using forest resources, i.e. gathering of dead trees and branches, nuts and fruits, and medical plants (Article 56). Besides them, additional items of usage permitted for local people can be declared by a decree for each forest reserve (Article 58).

Boundary stones were set and boundary survey was carried out for the forest reserve in 1998 under the EU Mapping Project. At present, measures for maintaining the boundaries, such as patrolling and grass cutting, are not executed by the forestry office at all because of limited budget; nevertheless, local people around the forest reserve fairly recognise the location of the boundary.

3.1.2. Land Use/Vegetation and Forest Inventory

(1) Land use/ Vegetation

The land use/vegetation map of Bounouna Forest Reserve is shown in Figure3.4, and the surface area of each land use/vegetation type is shown in Table3.2. The land use/vegetation of this reserve mainly consists of sparse tree savannah (*Savane Arborée Claire*), accounting for 64.0% of the total area. Vegetation with comparatively high tree density such as wooded savannah (*Savane Boisée*) is thinly distributed along streamlines. Cultivated area (*Champ Cultive*) is distributed in the southwest part of the forest reserve.

Table 3.2 Areas by Land Use/Vegetation Types in Bounouna F.R.

Legend	Area (ha)	Ratio (%)
Wooded savannah (*Savane Boisée*)	24	2.7
Dense tree savannah (*Savane Arborée Dense*)	89	10.1
Sparse tree savannah (*Savane Arborée Claire*)	563	64.0
Dense shrub savannah (*Savane Arbustive Dense*)	3	0.3
Sparse shrub savannah (*Savane Arbustive Claire*)	9	1.0
Grass savannah (*Savane Herbeuse*)	77	8.7
Planted forest / Orchard (*Plantation/Verger*)	33	3.7
Cultivated area (*Champ Cultive*)	78	8.9
Fallow (*Champ non Cultive*)	1	0.1
Bare ground (*Zone Nue*)	4	0.5
Total	881	100.0

(2) Forest inventory

Table3.3 shows the number of trees per hectare by circumferences according to the inventory survey (See “Appendix” for methodology). The volume of wood per hectare is also calculated and shown in the table. The density of bigger trees with a circumference of 125cm or more is low in this reserve. The density of seedlings is rather high, however, those seedlings are not evenly distributed and the composition of species is not well balanced. The vegetation of the forest reserve has been highly degraded by intensive cutting and frequent bush fires. At the same time, regeneration is not progressing well.

Furthermore, the resources of some useful species are in poor condition. For example, the density of trees with circumference of 15cm or more is 6.2 trees/ha for karité, and 3.1 trees/ha for néré. Karité trees grow with high density in and around Plot No.9, which is located in the northwest part of the reserve. It is possible that this was cultivated land in the past. The density of karité trees in the reserve is only 1.0 tree/ha if Plot No.9 is excluded. The density of karité and néré in the reserve is obviously lower than the density of them in cultivated fields around the reserve.

According to the national forest inventory conducted in 1980, the tree volume of Cascade

region was estimated as 52.8 m^3/ha with annual production of 1.26 m^3/ha (*Inventaire Forestier National Haute-Volta; Food and Agriculture Organization of United Nations; FAO, 1982*). Using this result (the ratio of tree volume to annual production), the mean annual production of Bounouna Forest Reserve is calculated as 0.44m^3/ha (1.31 Stere/ha), which corresponds to the total production of 391.8m^3 (1,152.5 Stere) for the whole forest reserve. (0.34 m^3 in volume = 1 Stere)

Table 3.3 Number and Volume of Trees by Circumference in Bounouna F.R.

Class of trees (cm in circumference)	Number of trees (trees / ha)	Volume of wood (m^3/ha)
125 cm or more	5.2	7.1
31-124 cm	82.3	10.4
15-30 cm	88.5	1.1
Sub total	***176.0***	***18.6***
Seedlings (3-4 cm)	624.7	-
Seedlings (less than 3 cm)	359.7	-

Remarks: Data of plantations (3 plots) are excluded.

(3) Planted Forests

Artificial forests are concentrated in the western part of the forest reserve. The outlines of those plantations are shown in Table 3.4. *Tectona grandis* (Teak) has been planted along valleys for about 18ha. At present, *Tectona* trees are 8-12m in height and 10-20cm in diameter. *Eucalyptus camaldulensis* (Eucalyptus) has been planted on hillsides for about 15ha. They are 18m in height and 20-25cm in diameter on average. Both plantations of *Tectona grandis* and *Eucalyptus camaldulensis* are affected by cutting and bush fires. *Gmelina arborea* (Gmelina) has also been planted. However, it is difficult to determine its extent because the planted area is seriously damaged by cutting and burning.

Table 3.4 Conditions of Planted Forests in Bounouna F.R.

Species	Year of Plantation	Area	Planted Intervals	Survival Rate
Tectona grandis	1957 – 1964	18 ha	2m×2m	50 - 70%
Gmelina arborea	1985 – 1986	-	-	Low
Eucalyptus c.	1985 – 1986	15 ha	2.5m×4m	< 50%

Remark: Area is determined by photo interpretation and measured on maps.

Besides the plantations mentioned above, the forestry office has attempted agro-forestry in the south-western part of the reserve in cooperation with CACOSE as a countermeasure against illegal cultivation since 1996 (see Table 3.5 and Figure 3.5). The total area of the project was

around 55ha in December 2003. Tree species planted are *Khaya senegalensis*, which is the main species, *Anacardium occidentale* (Cashew), *Tectona grandis* (Teak), and *Parkia biglobosa* (Néré). Those were basically planted with an interval of 5m×5m. In the most successful area planted in 1996, *Khaya* trees have already grown up to 5-6m in height and 20cm in diameter at chest height.

The basic idea of this agro-forestry is that cultivating crops under the planted trees is permitted for about 5 years in the beginning until those trees grow large, and cultivation is stopped to allow forest to grow after this period. However, the cultivating of crops is still performed even in the area planted in the first year. And crown coverage of this plot is about 20% only, which is not sufficient to form continuous canopy.

The fact that the planted area has been allowed to grow without any clear indicators or goals concerning the type of forest desired is simply leading to expansion of cultivated land within the forest reserve, and this constitutes a problem from the viewpoint of conservation and rehabilitation of forest resources.

Table 3.5 Planting Activities by CACOSE in Bounouna F.R.

Year	Site No.	Area (ha)	Species, conditions
1996	1	10	*Khaya seneg.* (h5-6m, survival rate about 70%)
1997	2	10	*Khaya seneg.* (5ha) (h5-6m, survival rate about 50%) *Anacardium occi.*(5ha) (h3-4m, survival rate about 70%)
1998	3 , 4	(10)	(Burnt out)
1999	-	-	(No planting activities)
2000	5	10	*Khaya seneg.* (5ha) (h1m, survival rate more than 50%) *Tectona grandis* (5ha) (h1.5 - 4m, survival rate about 70%)
2001	3	5	(Replanting) *Khaya seneg.* (h0.5–1.0m, survival rate about 70–80%)
2002	4	5	(Replanting) *Tectona grandis* (1ha), *Anacardium occi.*(4ha)
	6	5	*Khaya seneg.* (5ha)
2003	7	10	*Parkia big.* & *Anacardium occi.* (3ha) (survival rate about 20%) *Khaya seneg.* (7ha) (h0.5m, survival rate about 80%)

Remark 1: Site Nos. are consistent with Figure3.5
Remark 2: Area is based on hearings, field visits, and topographic maps.

3.1.3. Usage of Forest Resources in and Around the Forest Reserve

(1) Fuel wood

Table 3.6 shows the results of the hearing on fuel wood gathering. In the survey of related villages, village representatives were asked about the average situation in village households. Also, since individual persons were interviewed about household conditions in the same villages during the survey of forest resources, both findings are shown.

Fuel wood is usually collected from bush and cultivated land around each village. However,

many interviewees admit to also collecting fuel wood from the forest reserve, which may reflect the scarcity of resources around the reserve. Based on the field observations, almost all parts of the reserve are used for fuel wood gathering (see Figure 3.5). However, reflecting the fact that fuel wood resources are scarce in the reserve, small trees of 5–10cm in diameter are mainly exploited in most of the areas. In addition to that, intensive exploitation of middle- and large-size trees of 15-30cm in diameter is carried out on a plateau in the south-eastern part of the forest reserve where the forest resources have remained in comparatively good condition.

Two main paths, which are accessible to vehicles and cross the reserve from east to west, and some branch paths are used as main access ways by illegal cutters. Considering the present state of the resources and the situation of resources usage (tree cutting), the amount of wood extracted in the forest reserve well exceeds the amount for sustainable use of the resources.

In addition to home consumption, many respondents said they collected fuel wood for selling. Apparently one fagot of fuel wood can be sold for around 400 FCFA. It seems that the forest reserve and surrounding area is an important source of fuel wood supply for Banfora City.

Table 3.6 Fuel Wood Gathering in and around Bounouna F.R.

Village Name	Distance (km)	Usage of F.R.	Period	Selling
Bounouna*	3	No	Dry season (6 months)	Yes
	3	Yes	Dry season (6 months)	Yes
	3	No	Dry season (6 months)	No
	3	Yes	All the year (12 months)	Yes
Bounouna**	1-2	Yes	Dec. - May	Yes
Labola**	4	Yes	Oct. - May	No

* Result from the “Forest resources survey”
* * Result from the “Related village survey”

(2) Other Forest Products

Table 3.7 and Figure 3.1 show the conditions of use of other forest products. (The maximum obtained answers are shown for “Distance” and “Period of collection,” while the frequency of each response is shown for “Usage of F.R.” and “Selling”).

The range of collection extends for 3 or 4km in most cases. In spite of the poor condition of resources, many interviewees admitted to collecting products in the forest reserve. Wood products are exploited mainly in the dry season, whereas non-timber products such as fruits are collected mainly in the first half of the rainy season according to the growing stage of each product. Forest products apart from timber are also collected for selling, providing an additional source of income for local residents.

Table 3.7 Harvesting of Other Forest Products in and around Bounouna F.R.

Forest products	Distance (km)	Usage of F.R.	Period of Collection	Selling
Pole, Timber	2	Yes: 1, No: 1	-	Yes: 0, No: 2
	0-4	Yes: 2, No: 0	All the year	Yes: 0, No: 2
Karité	0-3	Yes: 2, No: 1	May – Aug.	Yes: 3, No: 0
	0-4	Yes: 2, No: 0	Jun. – Jul.	Yes: 2, No: 0
Néré	0-2	Yes: 2, No: 0	Apr. – May	Yes: 2, No: 0
	0-4	Yes: 2, No: 0	Apr. – May	Yes: 2, No: 0
Honey	0-2	Yes: 0, No: 1	All the year	Yes: 1, No: 0
	0-4	Yes: 2, No: 0	All the year	Yes: 2, No: 0

Upper row : according to the "Forest resources survey"
Lower row: according to the "Related village survey"

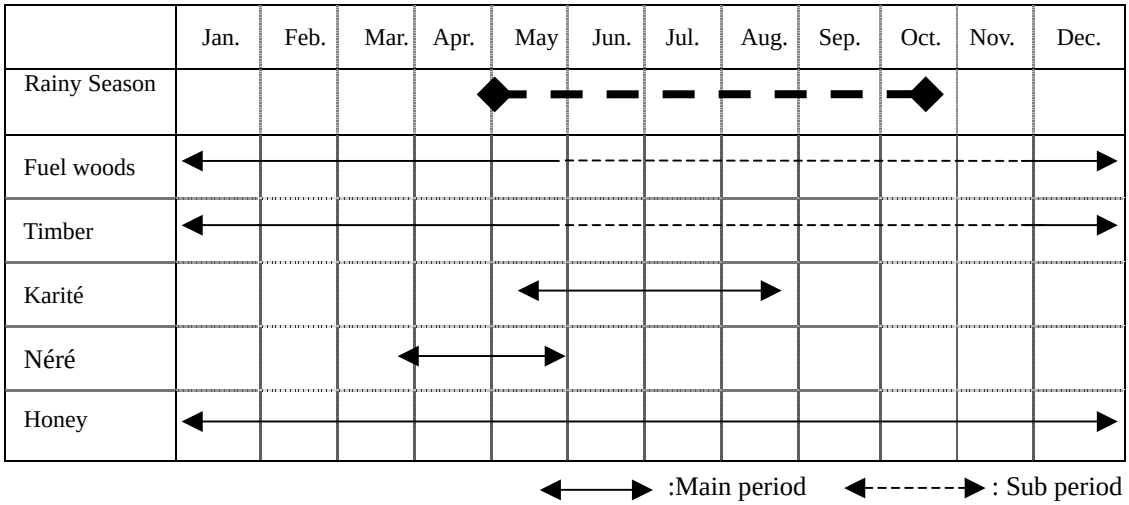

Figure 3.1 Harvest Calendar of Forest Products in Related Villages of Bounouna F.R

(3) Other topics on natural resources

1) Topographic features and water drainage

In the forest reserve, no steep slopes having risk of large-scale soil erosion or landslide were confirmed. Some bare ground suffering from erosion was observed along stream banks (most of which dry up during the dry season), but this is only on a small scale. On the other hand, rocks and earth for construction are exploited in eastern part of the reserve, and this is one cause of the devastation in the reserve (see Figure 3.5). Recently, a vein of gold was discovered in the forest reserve and illegal mining was carried out. Since the mining proceeds along a narrow vein, the present disturbance of the ground surface is not too large at around 200m long and 10m wide, (in January 2004, according to field observation and GPS survey); however, it will

be necessary to carefully monitor the mining activities from the viewpoint of forest conservation.

2) Bush Fires

Forest fire occurs all over the forest reserve, and almost all areas of the forest reserve are affected by fire annually. Since most of the areas in the forest reserve are covered with grass-dominant savannah, dried grasses burn violently in the dry season. As a result, all the leaves of shrubs up to 3m in height are burned brown. The impact of fire on the regeneration of forests seems to be large. Although the cause of bush fire is unclear, it is pointed out that some fires are set by gold diggers in order to improve visibility.

3) Sacred sites

The local communities maintain some traditional sacred sites in the forest reserve. In the hearings conducted in two related villages, the representatives admitted the existence of sacred places (Table 3.8). Some taboos and customs relating to forest conservation are shown in the table.

Table 3.8 Existence of Sacred Places in Bounouna F. R.

Village Name	Existence of sacred places	In the Reserve		Taboos related to forest conservation
		Existence of sacred places	Identification of the location	
Bounouna	Yes	2 places	Possible in some extent	-
Labola	Yes	1 place	Possible in some extent	Fire is set for protecting the holy place against dangerous animals

3.1.4. Present Situation of Fauna

Table 3.9 shows the present situation of fauna and fishery resources in Bounouna Forest Reserve.

Table 3.9 Fauna and Fishery Resources in Bounouna F.R.

	Fauna	Fishery
Present situation	There are hares and some partridges and monkeys still in the reserve	Protopteridae*, Mormyridae, Gymnarchidae, Ostéoglossidae, Charachidae, Distichodobtidae, Citharinadae, Chirrinidae, Bagridae, Schilbeidae, Claridae, Malapteridae, Mochokidae, Centropomidae, Cichlidae, Anabantidae, Channidae, Totraodontidae
Species disappeared	Elephants, lions, coba, hyenas, gorillas and crocodiles have disappeared from the reserve	Impossible to find data
Desired species to be recovered	Coba/hippotrague, bubales, cob de fassa, buffoon cob, redunca cob, grimm cephalophe, cephalophe with reddish side, orycterope	Heterotis niloticus**, Claria anguillaris Lates niloticus, Oreochromis niloticus
Remarks	Criteria for selecting species for restoration are as follows: - The capacity for receiving several fauna species - Some species needed essential vital resources for survival and opening out - Populating zones traditionally inhabited by animals - Ecological conditions - Social, economic and cultural requirements for neighbouring villages - Anthropogeny space possession - Five forest reserves - Biological requirements of each species - Spatial needs or requirement for each species - Ecological balance	* All the species of fish mentioned above are a family group of fish. Concerning other details, there are many more individual fish that exist in river waters of Comoe Province. ** The reproduction of these species of fish is based on economic reasons, because they can reproduce faster in rivers and ponds

(Source: DRE/CV Cascades 2004)

3.1.5. Actions of the Forest Service and External Structures

(1) Forestry Service

Forests reserves under government control are managed with participation of the population from related villages. The government Forest Service is involved with Bounouna Forest Reserve in the following ways:

- Control of illegal cutting, etc.
- Granting of authorization
- Establishment of forest management groups at the level of local communities, establishment of monitoring and management system (participatory management of forests)
- Provision of training for the population

The principal illegal activities taking place in Bounouna Forest Reserve are: illegal tree cutting, collection of stones for construction, grazing in the dry season, and gold digging. Grazing of domestic animals is authorized. Since the CACOSE implements controlled agroforestry, it maintains that no illegal cultivation is taking place in the forest. Except for gold digging, which is frequently conducted at nighttime, the Forest Service monitors other illegal activities rather closely because its Banfora office is situated near to the forest under its jurisdiction. As a result, these activities are in decline. However, bush fires caused by grazing and traditional apiculture, etc. are common, and it is essential to educate the population in fire prevention through grassroots activities.

The Forest Service supports the GGF for getting the official recognition and allowing CACOSE to conduct agroforestry. It also supports bolstering of the monitoring system by the GGF members. In the dry season, a group of four CGF members supervise the forest reserve from 08.00 am to 15.00~17.00 pm in three-day shifts. However, in the rainy season it is difficult to organize this monitoring system because the GGF members are very busy.

The Forest Service conducts training in fire fighting techniques and tree cutting for GGF members (40 to 70 persons) several times per year.

- Patrolling and supervision by the Forest Service

The Departmental Direction of the Forest Service of Banfora located in the Provincial Direction of Environment and Habitat is in charge of the patrolling, supervision and monitoring of the related villages of Bounouna Forest Reserve. In the western part of Bounouna Forest Reserve, CACOSE has conducted agroforestry since 1996 thanks to the financial support of sawmills and under the supervision of the Forest Service. A plantation was established in 1985 with the support of Forest Service. It is in this way that the Forest Service conducts various

authorized activities in the forest reserve.

The Departmental Direction of the Forest Service of Banfora is situated 3km from the village of Bounouna. Forest officers conduct ample supervision and patrolling, although not sufficiently in the village of Labola, because districts of this village are too far from one other, there is no village chief and the road going there is not good. In addition, the village is far from the Forest Office (around 13km) (see Table 3.10).

Table 3.10 Patrolling and Supervision of Bounouna F.R.

	Bounouna	**Labola**
Distance from the Forest Service	3km	13km
Frequency of supervision	Once/ week	Almost never
Objective of the supervision	10ha of reforestation in the forest reserve	
Utilization right mentioned in the forest Law	Aware	Aware
Radio broacasting of JICA project on FM radio	Content understood	Content not well understood

(2) External support agencies

Projects that have so far been implemented by external support agencies in the Bounouna Forest Reserve are as follows:

- Sawmills (1997)…Restoration
- EU Mapping Project…Reconstituting the limits of forests (1997)
- JICA Project…Study for the Forest Management Project in Comoé Province (2002~)

(3) Other agencies

CACOSE was created in 1996. It has around 3,000 members and its main objective is to protect nature through reforestation and fire fighting, etc. CACOSE has conducted agroforestry in Bounouna Forest Reserve thanks to the financial support of sawmills and under the supervision of the Regional Direction of Environment since 1996.

The citizens of Banfora do not participate directly in the management of the forest reserve, but this forest is anticipated as a potential recreation place for them. For this reason, their participation should be taken into account in the management plan.

3.1.6. Socioeconomic Interaction between Related Villages and the Forest Reserve

(1) Socio-economic interaction between related villages and the forest reserve

1) Relationship with the forest reserve

The villages of Labola and Bounouna are concerned with Bounouna Forest Reserve (see the Appendix for the selection criteria of these villages and Figure 3.2 for their location in relation to the forest reserve). The distance of each village from the forest reserve is estimated between 2.5~5 km, making the reserve easily accessible on foot.

According to the area of Bounouna Forest Reserve (1,300 ha) and the total population of these two villages (3,225 inhabitants), the demographic pressure per hectare is 2.4 persons. Moreover, Bounouna Forest Reserve is located near the city of Banfora (46,967 inhabitants), inhabitants of which utilize the forest reserve as recreation place. When the population of Banfora is also taken into account, the demographic pressure per hectare increases greatly to 38.6 persons.

2) History of the villages and market conditions

The villages of Bounouna and Labola were established before colonisation, and are thus very old. Since the boundary between the two villages is not clearly defined, there is a problem in that parts of their territories (terroir) are overlapping (see Figure 3.3 Terroir and Pasture).

In 1995, the village of Bounouna became District No. 9 of Banfora City, which has 15 districts in total. The village of Labola has no village chief, but the village is composed of five districts and the district chiefs jointly head the village.

Markets for the citizens of Bounouna and Labola exist within each village and also in Banfora, which is an important commercial centre. The national road going from Abidjan to Niamey passes near the village of Bounouna. Because this road is very convenient for transport, many villagers travel to work in the big factories of SUSUCO and SOFITEX. The road going to the village of Labola is in bad condition, which makes access to this village very difficult. In addition, the village is far from the main road that goes to Sideradougou. Because of the poor road conditions, it is difficult for administrative services to reach the village.

3) Ethnic groups

The majority native ethnic groups are respectively Gouin in Bounouna and Karaboro in Labola. In addition, other ethnic groups from the Center and Southwest of Burkina Faso are present in these two villages. Also, Fulani people have settled there. Most of these Fulani people are sedentary (see 2.2.2), and there are no big Fulani camps.

4) Village organisations

Since Bounouna has been incorporated into Banfora City, no CVGT has been established here under the PNGT 2. Instead, the village has independently established the UAD (Development Association Union). The GGF is affiliated to this Union.

Each district of the village of Labola has a village administrative delegate. It is an autonomous

village with its own CVGT but no village chief. Establishment of a GGF has only recently been reported.

Social condition of the related villages of Bounouna F.R. is shown in the following table.

Table 3.11 Social Condition of the Related Villages of Bounouna F.R..

	Bounouna	**Labola**
Distance from major urban center	District No.9 of Banfora	13km from Banfora
Distance from the forest reserve	2.5km	5km
Market	Banfora and in the village	Banfora and in the village
Population	2,338	887
Natives	Gouin	Karaboro
Majority	Gouin	Karaboro
Fulani migrants	Exist	Exist
Other ethnic groups	Mossi, Samo, Sénoufo, Turka	Mossi, Gouin, Toussian, Lobi
Religion	Islam	Animism
Year of establishment	Before colonisation	Before colonisation
CVGT	No	Yes
GGF	Yes	Yes

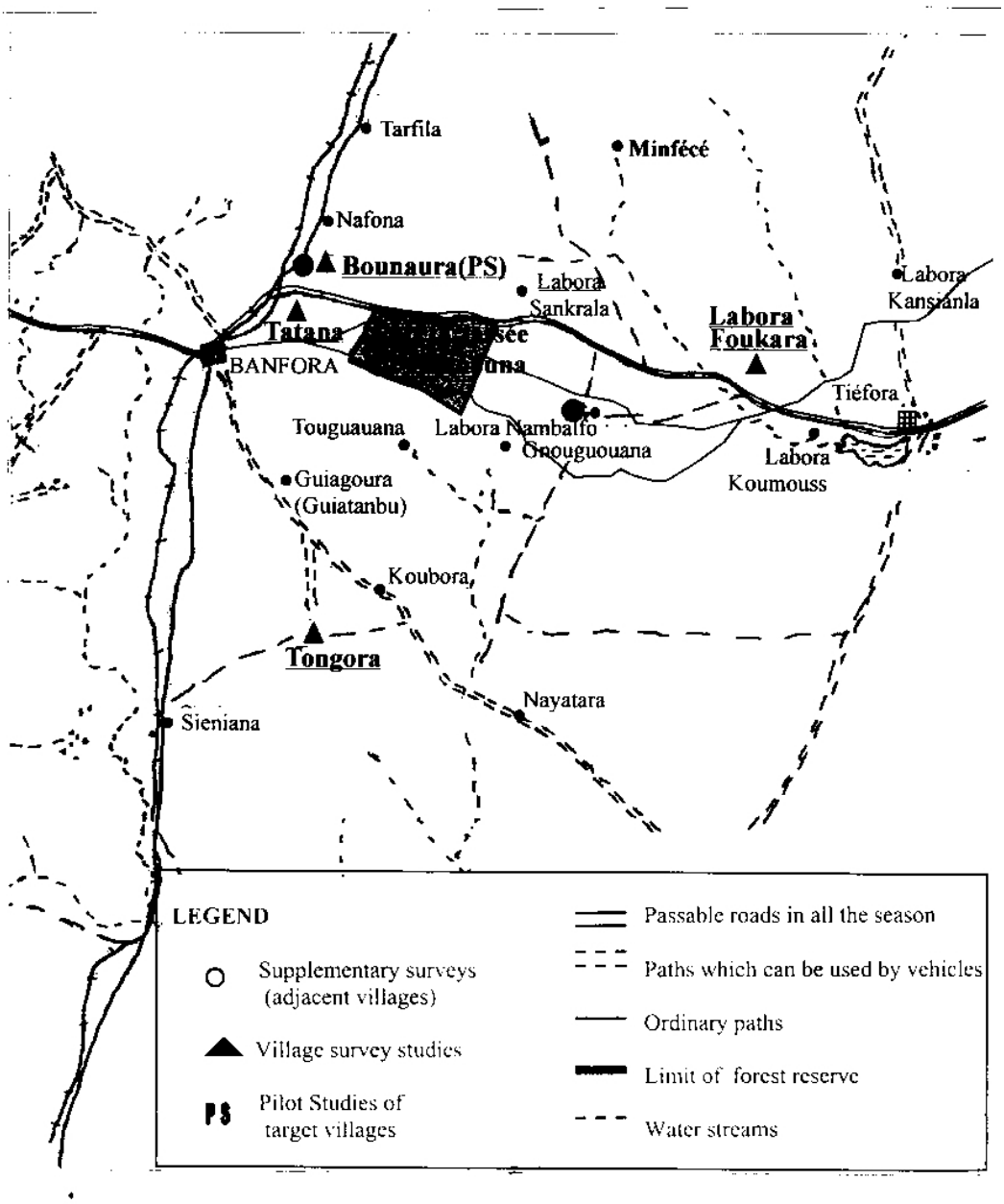

Figure 3.2 Location of the Related Villages of Bounouna F.R

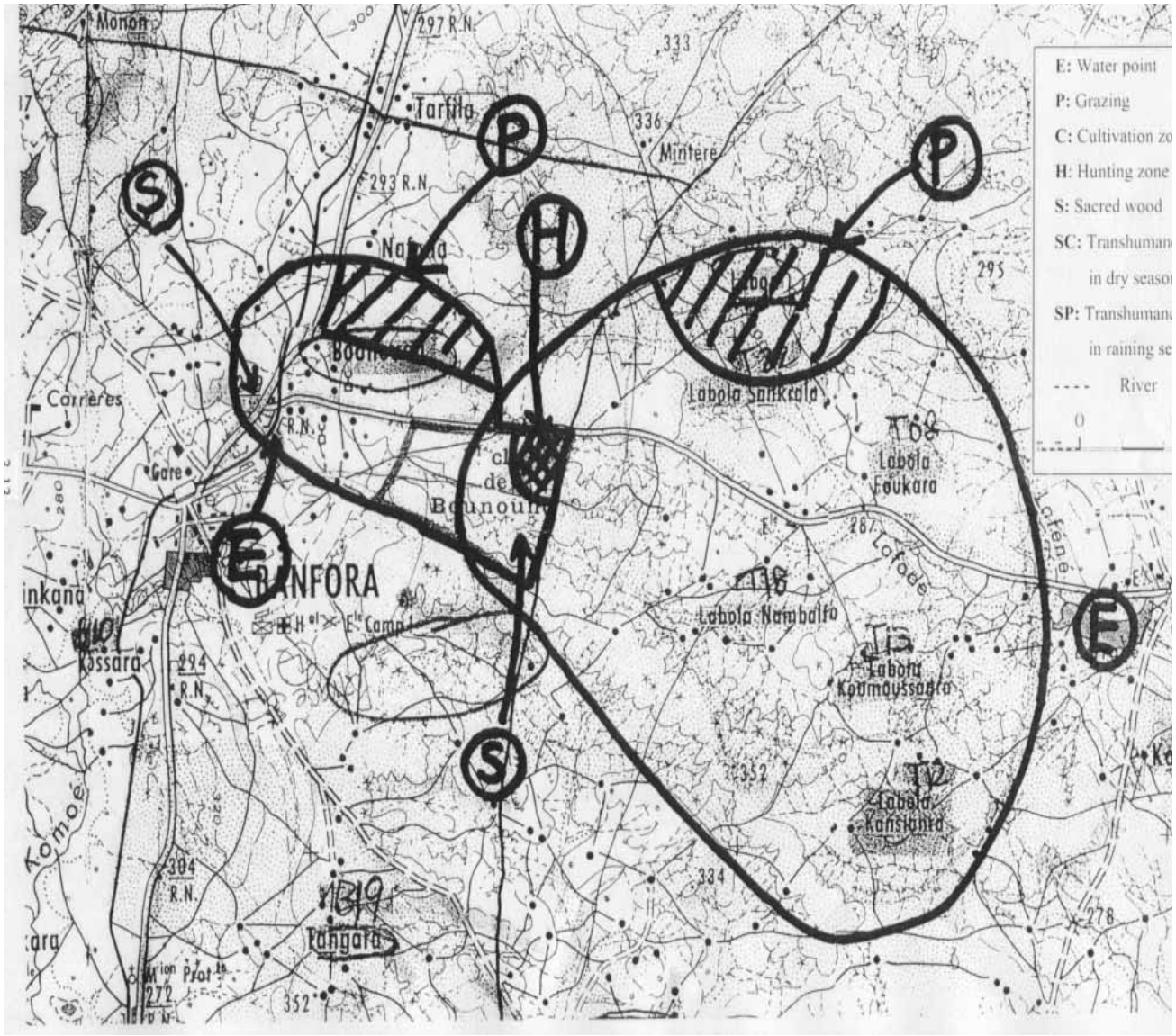

Figure 3.3 Terroir and Pasture Zones of the Related Villages of Bounouna F.R

(2) Utilization of the Forest Reserve

According to Section 3.1.3 (Usage of Forest Resources in and Around the Forest Reserve), all the Bounouna Forest Reserve is subject to the collection of fuel wood for selling. These resources are collected in a range of 1 to 4km. Despite the lack of existing resources, forest products such as karité nuts, néré seeds and honey etc. are collected in a range of 4 km inside the forest reserve for selling.

There are two sacred places belonging to the village of Bounouna in the forest reserve. And also, there is a sacred place belonging to the village of Labola. The populations of these villages hunt and put livestock out to pasture in the forest reserve.

(3) Village forests

Village forests have been established in Labola and Bounouna in line of the Government policy "8000 villages, 8000 forests"(see Table 3.12). However, these village forests have not been exploited after their establishment because of the ignorance of their utilisation right and management and also maintenance problems. Generally, local population collect daily fuel wood inside and outside the terroir without control.

The village of Bounouna and the village of Labola have sacred places in their villages since their creation. The sacred place of the village of Bounouna is located outside the forest reserve and that of Labola inside the forest reserve. Trees in these places are considered as sacred trees and it is forbidden to cut them. Location of the village forests, see Figure 3.3 terroir and pasture.

Table 3.12 Village Forests of the Related Villages of Bounouna F.R

	Bounouna	**Labola**
Village forest	Creation of this forest was supported by the Forest Service in 1985 Contains a sacred place dating back to before colonisation	Creation of this forest was supported by the Forest Service in 1985 Contains a sacred place inside the forest reserve and dating back to before colonisation

(4) Stockbreeding

Stockbreeding is practised traditionally on a small scale without supervision, using natural meadowland, fallow land and forests. The livestock consists of cattle, sheep, goats and poultry. During the dry season, residues of crops such as millet and sorghum are used as livestock feed. Moreover, because livestock are driven across the two villages on their way to the major consumer center of Banfora, disputes frequently arise between farmers and stockbreeders.

As may be gathered from the terroir and pasture map shown in Figure 3.3 and the grazing situation in Table 3.13, both villages are blessed with abundant water and feed resources. Accordingly, as a rule, livestock are bred within the terroir outside of the forest reserve. However, since there are some accessible water sources within the forest reserve, livestock are sometimes let out to pasture within the reserve for a limited spell before the harvest.

See below for data relating to each village.

Village of Bounouna: traditional extensive stockbreeding is manly practised, but intensive stockbreeding has been introduced in recent years due to proximity to the city and good road conditions.

Village of Labola: many cattle are kept as a source of cash income. Since breeders generally drive cattle through the forest reserve on their way to the market in Banfora, measures are needed to deal with this situation. This developed into a major conflict that caused numerous deaths and injuries between the natives of Labola (Karaboro) and Fulani breeders in 1986. In response, the government created a Pastoral Arrangement Zone (ZAP) in Sidéradougou in 1988.

Table 3.13 Situation of Pasture in the Related Villages of Bounouna F.R.

	Bounouna	Labola
Grazing and water places (dry season)	Usually done in the terroir but sometimes in the forest reserve too. Banfora has a dam reservoir.	Usually done in the terroir but sometimes in the forest reserve too. The five borings of the terroir and dam reservoirs of Tiéfora and Bounouna are used as drinking places.
Grazing and water places (rainy season)	Most of the time in the terroir and the water place near Labola Sankrala is used .	Done in the terroir. Puddles are used for watering.
Conflict between farmers and breeders	Exist	Exist

(5) Illegal activities carried out inside the forest reserve

According to the results of the supplementary surveys, the local communities of these two villages are aware of the existence of utilization rights for the forest reserves and follow them. However, it is estimated that every year, the forest reserve suffers degradation caused by illegal tree cutting and frequent bush fires. According to the survey reports, these fires occur accidentally, although the specific causes are unclear.

In the eastern part of Bounouna Forest Reserve located in the suburb of Banfora city, stones are extracted for construction materials according to the following table. Moreover, recently a gold mine was discovered in the forest reserve and is illegally exploited by gold diggers.

Table 3.14 Illegal Activities and Problems related to Bounouna F.R.

	Bounouna	Labola
Traditional utilisation rights	Aware	Aware
Hunting in the forest reserve	June - July	In dry season near the hills
Cultivation in the forest reserve	None	None
Causes of bush fire in the forest reserve	Accidents started by burning of pasture in the terroir	Accidents started by burning of pasture in the terroir, fires used to purify sacred places, and fires used in hunting, etc.

3.2. Characteristics and Problems of Bounouna Forest Reserve

3.2.1. Characteristics and Problems

(1) Characteristics and problems of the utilization of forest resources

Sparse tree savannah occupies about two third of the whole forest reserve with sporadic dense tree savannah and shrub savannah forming a mosaic. Forests with continuous canopy only remain along stream traversing the forest reserve from east to west. Because this forest reserve is located close to Banfora City, pressure from fuel wood cutting is very high. As a result, the forest resources are nearly exhausted. Moreover, the frequent occurrence of fire hinders forest renewal. These fires also have an adverse effect on the quality of planted forests.

Local people often use the forest reserve for collecting various forest products such as fuel wood. However, amounts of resources are very limited. Fuel woods are also frequently collected for the purpose of selling. Moreover, extraction of earth and stones and mining of gold cause the degradation of the forest reserve.

On the other hand, the agroforestry project proceeding in the western part of the forest reserve seems to lack long-term vision about how land use in the project area should be transformed.

The adjacent villages (situated 4 km from the forest reserve) have deep links with the forest reserve arising from their use of forest resources for home consumption and selling. However, considering the present condition of degradation of this forest, it is necessary to reinforce monitoring against illegal tree cutting and grazing.

(2) Characteristics and problems of forest administration and the Forest Service

The monitoring of illegal activities in Bounouna Forest Reserve is going smoothly except for gold digging. The Forest Service supports the establishment of organizations such as GGF and GGF Union in collaboration with JICA Study Team. At the same time, the monitoring system established by the villagers is being improved. In addition, the cooperation system between the

villagers and the Forest Service is being reinforced. However, besides training in fire fighting techniques and reforestation, it will be necessary to consider a long-term perspective in establishing an education system stressing the importance of the environment (environmental education).

Since Bounouna village is located close to the forest officer's office, the forest officer is able to conduct adequate patrols and guidance. Moreover, the villagers fully understood the significance of the radio broadcast (JICA Study Team) that was aired in order to educate about the meaning of the forest reserve and traditional utilization. In contrast, patrols and guidance by the forest officer in Labola are insufficient because of the poor access conditions, and the residents here did not fully comprehend the contents of the said radio broadcast.

(3) Characteristics and problems of socio-economic interaction between the related villages of the forest reserve

1) Related citizen groups

Bounouna village is a district of Banfora city and villagers groups including women's groups are very active. Concerning the Pilot Study implemented last year, the GGF actively participated in the planting activity and so on conducted inside the forest reserve of Bounouna. To confirm the intention of the local residents of Bounouna, the opinions of Fulani shepherds, who are less numerous and sedentary, should be taken into account.

On the other part, the village of Labola is widely spread and has poor access. As a result, it does not receive sufficient support from the Forest Service. Furthermore, the boundary between Bounouna and Labola is not clearly defined, and this is one of the issues currently facing management of Bounouna Forest Reserve.

2) Stockbreeding

In the period before the cereal harvest (August-October), Bounouna Forest Reserve is used as grazing place to prevent cattle from damaging the crops. At the beginning of the dry season (October-December), this forest reserve is also used as watering place and grazing zone. Accordingly, it is necessary to manage grazing in this zone.

3) Illegal activities and problems related to the forest reserve

In Bounouna Forest Reserve, illegal tree cutting and bush fires are frequent occurrences. Moreover, urgent measures are needed to deal with the collecting of stones and illegal digging, etc.

3.2.2. Major Issues in Bounouna Forest Reserve

(1) Problems arising from utilization of forest resources

Development pressures from Banfora city have been strong, particularly regarding fuel wood, and the forest resources have been degraded far more than in the other four forest reserves. Forest restoration is urgently required, and for this purpose it is necessary to maintain the planting of new trees.

It is also urgently necessary to establish education programs in consideration of forest fire countermeasures and the importance of forest resources, etc.

(2) Problems concerning administration and the Forest Service

Relatively active controls of illegal activities have led to reduction in illegal tree cutting and so on inside Bounouna Forest Reserve. In addition to the present controls, it is very important to continue to support the GGF and the GGF Union. It is also necessary to reinforce training in bush fire fighting techniques and also educate about the importance of forest resources (environmental education should be promoted), etc.

Presently, there is a forest officer in charge of the forest reserve. It is necessary to provide fine-tuned support to citizen groups such as the GGF and GGF Union, particularly after they are first established. However, if the workload in such areas increases, it will be even more difficult for present staff to cope.

(3) Socio-economic considerations regarding related villages

The GGF in Bounouna has so far conducted tree planting activities. In Labola too, it is necessary to build an active organisation such as a GGF for implementing forest management. At the same time as establishing and maintaining a GGF in Labola, a union of this Labola GGF and the Bounouna GGF Union should be created in order to implement participatory forest management over the entire Bounouna Forest Reserve.

The Forest Service monitors Bounouna Forest Reserve against illegal activities such as tree cutting and the exploitation of other forestry products, etc. Taking into account the limited number of staff, it is urgently necessary to involve the local communities in the monitoring of the forest reserve.

It is also necessary to take measures to cope with the degradation of forest resources caused by pasturage in Bounouna Forest Reserve.

Judging from the frequency of Forest Service patrols, it can be said that educational programs for forest management are implemented more in Bounouna village, but not so much in Labola village. Accordingly, it will be necessary to promote more education activities in Labola village.

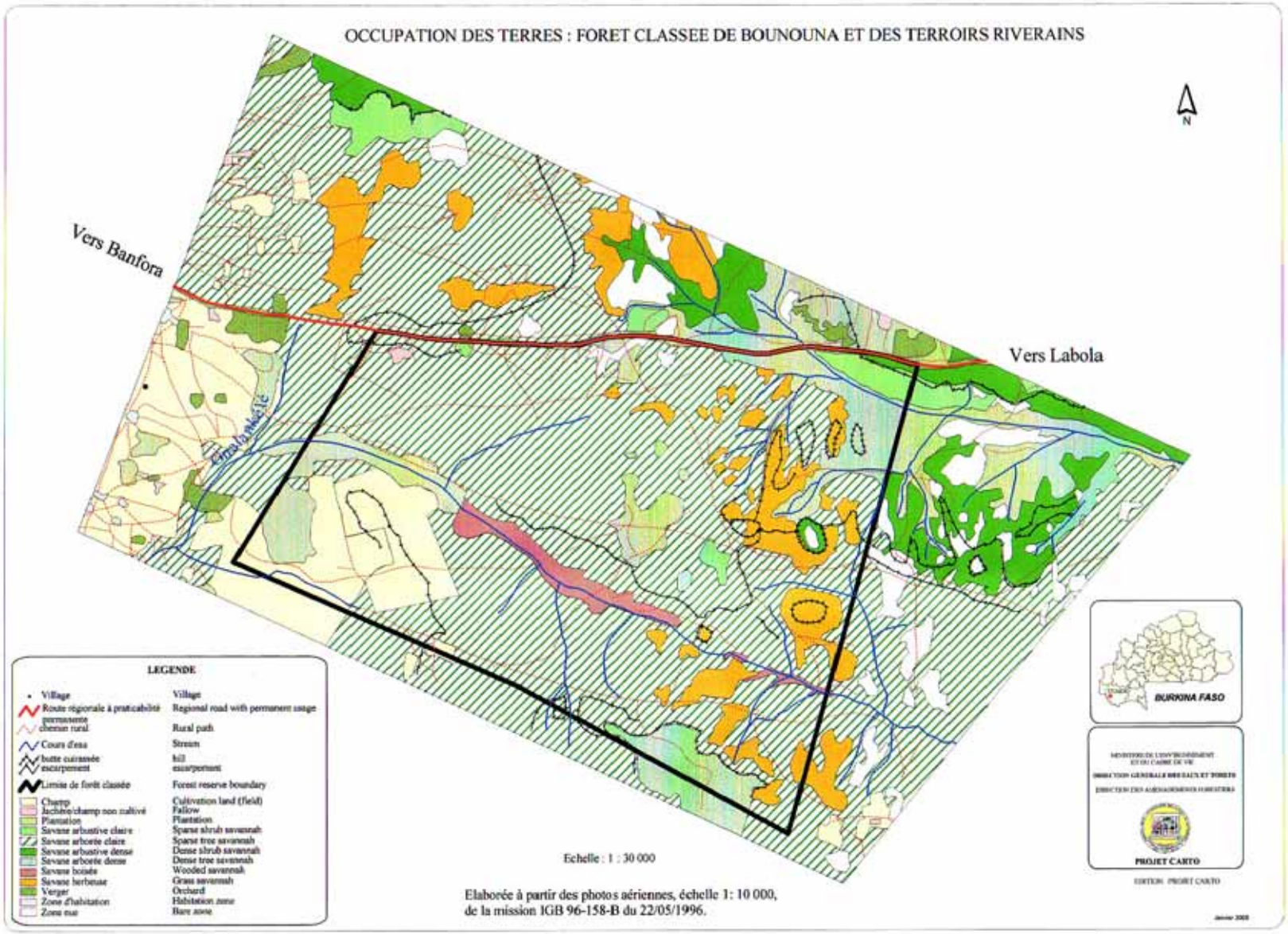

Figure 3.4 Land Use/Vegetation Map of Bounouna F.R

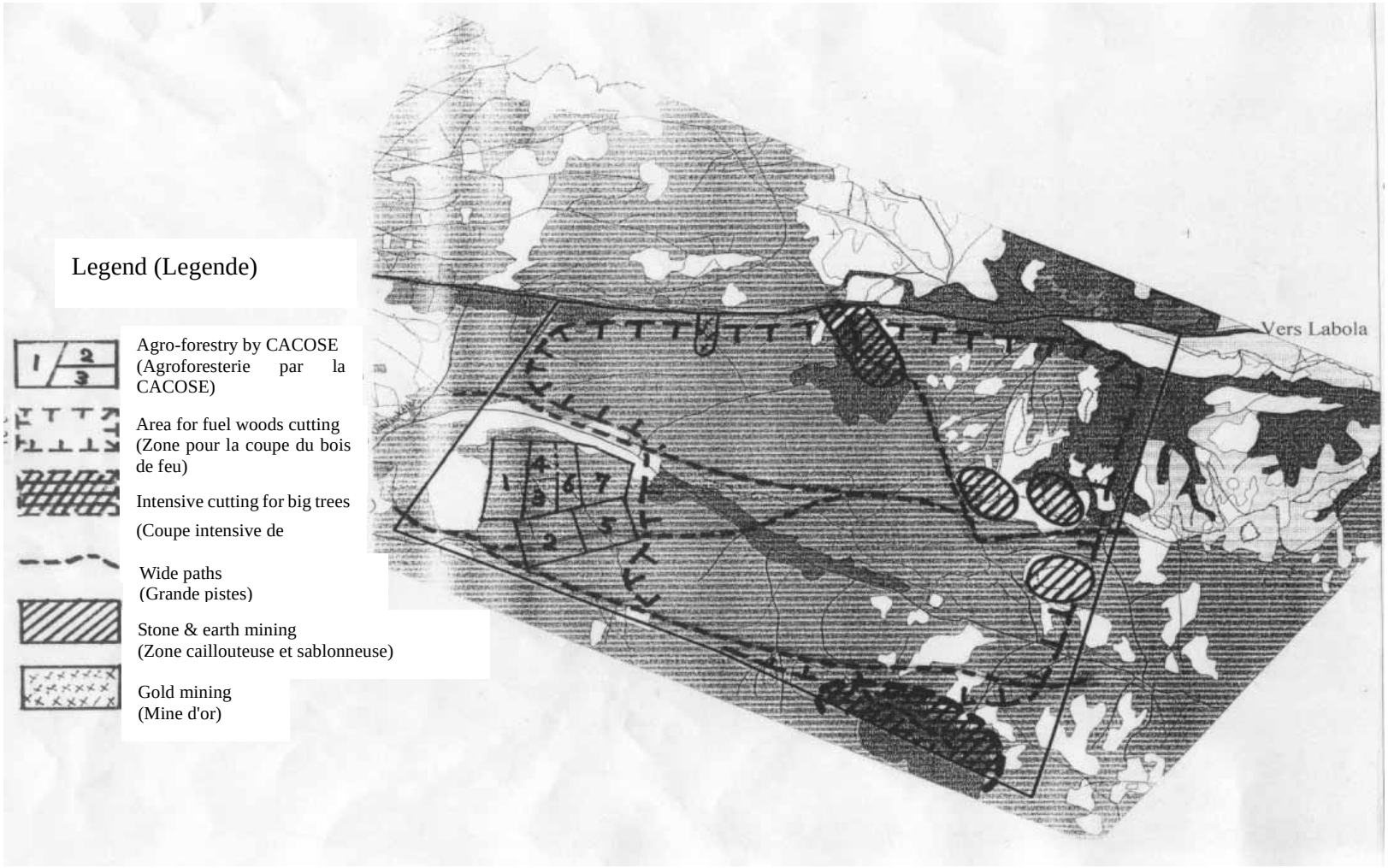

Figure 3.5 Range of Collection of Forest Products in Bounouna F.R.

Chapter 4 Present Conditions and Issues of Toumousséni Forest Reserve

4. Present Conditions and Issues of Toumousséni Forest Reserve

4.1. Toumousséni Forest Reserve

4.1.1. History of the Reserve and Boundary Management

Table 4.1 shows the outline of Toumousséni Forest Reserve. This was designated as a forest reserve in 1954 before independence according to a forest reserve order (Decree No 2.875/SE/F). The reasons for the designation were not mentioned in the decree, however, supplying fuel wood for Banfora City is considered to be one of the major purposes of the reserve these days (source: Regional Direction of Environment and Habitat of Cascades).

Table 4.1 Outline of Toumousséni Forest Reserve

No. of Decree	Date of Declaration **	Area (ha)*	Place of Issue	Condition of the Boundary
No2.875/SE/F	12 Apr. 1954	2,500 (2,523)	Dakar	Boundary stones are set. Boundary has been surveyed.

* The upper figure is the area given in the decree. The figure in parentheses is calculated from GIS data.

** The date of the issue of the decree is shown as the date of establishment of the reserve.

According to the decree, some rights of utilizing resources for local community are guaranteed under Article 14 of the former forest law: those are collecting dead trees, fruits, edible and medical plants. Meanwhile, the prohibition of hunting is described in a separate article of the decree.

The present Forest Law guarantees the rights of using forest resources for local people; those are gathering of dead trees and branches, nuts and fruits, and medical plants (Article 56). Besides them, additional items of usage permitted for local people can be declared by a decree for each forest reserve (Article 58).

Boundary stones were set and boundary survey was carried out for the forest reserve in 1998 under the Environmental Management Mapping Project (7 ACP) with financial assistance from the EU. At present, measures for maintaining the boundaries, such as patrolling and grass cutting, are not executed by the Forest Service at all because of limited budget; nevertheless, local people around the forest reserve fairly recognise the location of the boundary.

4.1.2. Land Use/Vegetation and Forest Inventory

(1) Land use/ Vegetation

The land use/vegetation map of Toumousséni Forest Reserve is shown in Figure.4.4, and the surface area of each land use/vegetation type is shown in Table 4.2. The forest resources of

the reserve are comparatively in good condition. Riverside forest (Forêt Galerie), open forest (Forêt Claire), and wooded savannah (Savane Boisée), which have high tree density, occupy a fairly high ratio of 23.3% of the reserve. The predominant vegetation of dense tree savannah (Savane Arborée Dense) occupies about half of the total area.

Table 4.2 Areas by Land Use/Vegetation Types in Toumousséni F.R.

Legend	Area (ha)	Ratio (%)
Riverside Forest (*Forêt Galerie*)	220	8.7
Open Forest (*Forêt Claire*)	14	0.6
Wooded savannah (*Savane Boisée*)	352	14.0
Dense tree savannah (*Savane Arborée Dense*)	1,320	52.2
Sparse tree savannah (*Savane Arborée Claire*)	168	6.7
Dense shrub savannah (*Savane Arbustive Dense*)	352	14.0
Sparse shrub savannah (*Savane Arbustive Claire*)	57	2.3
Grass land (*Prairie*)	6	0.2
Planted forest / Orchard (*Plantation/Verger*)	34	1.3
Total	2,523	100.0

(2) Forest Inventory

Table 4.3 shows the number of trees per hectare by circumferences based on the Forest Inventory Survey (See "Appendix" for methodology). The volume of wood per hectare is also calculated and shown in the table. The tree density of this reserve is high, and the number of trees among each circumference class is well balanced. Smaller circumference classes, which will form the next generation of the forest, have the larger number. In addition to that, the densities of some useful species are 61.4 trees/ha for karité, 3.0 trees/ha for néré, and 23.7 trees for detarium (the density of trees with circumference over 15cm).

According to the national forest inventory conducted in 1980, the tree volume of Cascade region was estimated as 52.8 m^3/ha with annual production of 1.26 m^3/ha. (Inventaire Forestier National Haute-Volta; FAO, 1982). Using this result (the ratio of the tree volume and the annual production), the mean annual product of Toumousséni Forest Reserve is calculated as 1.14m^3/ha (3.13 Steres/ha), which corresponds to the total product of 2,684.1m^3 (7,894.3 Steres) for the whole reserve. (0.34 m^3 in volume = 1 Stere) By the way, mean annual product was estimated as 2,250m^3 (7,200 steres) in another survey conducted before this study. (Contribution to the study of possibilities in the revival of planning and management activities of Toumousséni Forest Reserve; January 2000).

Table 4.3 Number and Volume of Trees by Circumference in Toumousséni F.R.

Class of trees (cm in circumference)	The number of trees (trees / ha)	The volume of the wood (m^3/ha)
125 cm or more	12.6	13.6
31-124 cm	229.6	26.6
15-30 cm	358.2	4.4
Sub total	***600.4***	***44.6***
Seedlings (3-4 cm)	609.6	-
Seedlings (less than 3 cm)	770.0	-

(3) Planted Forests

Artificial forests established in Toumousséni Forest Reserve are shown in Table 4.4. In the south-western part of the reserve, there are 29ha of Tectona grandis forest and 5ha of Gmelina arborea forest. Tectona trees are 6 - 12m in height and 10 - 15cm in diameter on average, and sometimes over 30cm for superior trees. Gmelina arborea forest is in similar condition. These plantations were established between 1958 and 1961 (project: TCP/UPV/2201/MD).

Table 4.4 Conditions of Planted Forests in Toumousséni F.R.

Species	Year of Plantation	Area (ha)	Plantation Intervals	Rate of survivors
Tectona grandis	1958 – 1961	29ha	2m×2m	50 - 80%
Gmelina arborea	1961	5 ha	2m×2m	50 - 80%

Remark: Area is determined by photo interpretation and measured on maps.

Besides these plantations mentioned above, reforestation has been tried in the reserve by GGFs of related villages (according to a hearing of the Forest Service and GGF members, see Table 4.5). Direct seeding of Detarium microcarpum (Detarium), which is one of the most preferred trees for fuel woods, and Parkia biglobosa (Néré) has been practiced by GGFs of Toumousséni and Soubaka since 2001. However, survival rates remain low because of the delay of seeding, feeding by animals, and so forth. Planting has also been carried out by the GGF of Tagnana village.

Table 4.5 Planting Activities by Four Related Villages in Toumousséni F.R.

Village Name	Year of Plantation	Name of Project	Species	Remarks
Toumousséni	2001	PCP	*Detarium microcarpum*	Direct seeding (1 sacs, 100kg)
	2002	PCP	*Detarium microcarpum*	Direct seeding (1.5 sacs, 150kg)
	2003	JICA	*Detarium microcarpum*	Direct seeding (2 sacs, 200kg)
Djongolo	-	-	-	(No planting activities)
Tagnana	1984	-	*Anacardium occidentale*	
	1955	-	*Tectona grandis*	Planting (1ha)
	1995	-	*Khaya senegalensis*	Direct seeding (1 tine)
Soubaka	2001	PCP	*Parkia biglobosa*	Direct seeding (1 tine)

* See glossary for PCP

4.1.3. Usage of Forest Resources in and Around the Forest Reserve

(1) Fuel wood

Table 4.6 shows the results of the hearing on fuel wood gathering. In the survey of related villages, village representatives were asked about the average situation in village households. Also, since individual persons were interviewed about household conditions in the same villages during the survey of forest resources, both findings are shown.

Fuel wood is usually gathered from bush and cultivated land around each village. However, some interviewees from Toumousséni village admitted to also gathering fuel woods from the forest reserve. The range of gathering usually extends for about 2km, but sometimes to 6km. In addition, local communities produce charcoal besides fuel wood. The local population of three villages except for Djongolo do not use the forest reserve for charcoal production.

Table 4.6 Fuel Wood Gathering in and around Toumousséni F.R

Village Name	Distance (Km)	Usage of F.R.	Period	Selling
Toumousséni *	2	No	Dry season (4 months)	No
	2	No	All the year (12 months)	No
	6	Yes	Dry season (4 months)	No
	4	Yes	All the year (12 months)	No
Toumousséni **	0-2	Yes	Jan. - Mar.	No
Djongolo **	1	No	All the year (12 months)	Yes
Tagnana **	0-2	No	All the year (12 months)	No
Soubaka **	2-3	No	Dec. - Mar.	No

* Result from the “Forest resources survey”

* * Result from the “Related village survey”

Besides collecting for domestic use as mentioned above, the GGFs of the four related villages collect fuel wood for selling in the reserve under the instruction of the Forest Service. The condition of fuel wood and charcoal production in recent years is shown in Table 4.7 and Figure 4.5 (hearing of Forest Service and GGFs, and field survey). It is said that fuel wood cutting was performed even before 2002. However, the system and scale of production are not clarified because no precise information is left in the Forest Service and the memory of local people on it is already vague. Training courses on fuel wood cutting have apparently been held in the reserve for villagers of the four related villages (Figure 4.5). The current fuel wood production has been performed by the GGF of the four villages since 2001. The operation areas are demarcated by the Forest Service, and they are shifted every year. There is no quantitative criterion for the extraction of fuel wood. Selective cutting with some qualitative criteria is practiced; for example, “sick trees can be cut,”and “a number of trees of the same species can be cut if they grow together in the same area,” “trees that produce useful products cannot be cut,” and “large trees cannot be cut.” Tree felling is carried out from January to March because this period is the off-season of cultivation, and regeneration is easier during this season.” 15-20 years are assumed for one rotation of cutting operations.

As a result, 427 steres of fuel woods and 100 sacs of charcoal were sold in 2003. (Forestry Management Groups of Toumousséni Forest Reserve: Organisation and functioning; January 2, see Table 4.7) One stere of fuel wood currently costs 1,650 FCFA.

Table 4.7 Fuel Wood Production in Toumousséni F.R

Village Name	Period of Production	Amount in 2001	Amount in 2002	Amount in 2002
Toumousséni	2001-2003 (Fuel woods)	314	420	412
Djongolo	2001 (Fuel woods), 2002-2003 (Charcoal)	108	*(200)	*(100)
Tagnana	1986-1990 (Fuel woods), 1995-2000 (Fuel woods), 2001-2003 (Fuel woods)	48	147	15
Soubaka	1980s, 1993-94, (Fuel woods) 2001-2003 (Fuel woods)	48	158	-
Total	-	518	725 (200)	427 (100)

* The unit of “amount” is Stere. Figures in parentheses ( ) show production of charcoal (unit is sack).

(2) Other Forest products

The conditions of use of other forest products are shown in Table 4.8 and Figure 4.1. The maximum obtained answers are shown for “Distance” and “Period of collection,” while the frequency of each response is shown for “Usage of F.R” and “Selling”). The range of

gathering extends for 6 or 7km in most cases. Many interviewees admitted to gathering products apart from timber in the forest reserve too. They also admitted to selling such forest products, which provide an additional source of income. Wood products are exploited mainly in the dry season, while non-wood products such as fruits are harvested mainly from the second half of dry season to the beginning of the rainy season, although the periods depend on the growing stage of each product.

Three Kenyan hives were introduced for demonstration of modern apiculture in Toumousséni village under the PCP project. According to the interviewees, the villagers still look after the hives and obtain about 1.5 liters of honey per year from them. They say that honey from Kenyan hives is superior to that from traditional apiculture in terms of both quality and quantity. Around the Study Area, trained local carpenters in Bobo-Dioulasso make and sell Kenyan hives for 25,000 FCFA each. There are also some carpenters who can imitate the hives at lower prices in Banfora. On the other hand, an apiculture project has taken place in Soubaka village for five years since 1982. 63 hives were supplied in the project, but those hives are not used for production any more. (Source: representative of Soubaka GGF.)

Table 4.8 Harvesting of Other Forest Products in and around Toumousséni F.R.

Forest products	Distance (km)	Usage of F.R.	Period of Collection	Selling
Timber	0-4	Yes: 0, No: 2	All the year	Yes: 1, No: 1
	0-7	Yes: 0, No: 4	Dec. - May	Yes: 0, No: 4
Karité	0-6	Yes: 2, No: 2	May - Aug.	Yes: 3, No: 0
	0-7	Yes: 3, No: 1	Apr. - Jun.	Yes: 4, No: 0
Néré	0-6	Yes: 1, No: 1	Mar. - May	Yes: 2, No: 0
	0-7	Yes: 3, No: 1	Mar. - Jun.	Yes: 4, No: 0
Baobab	0-6	Yes: 1, No: 1	Jun. - Sep.	Yes: 1, No: 1
	-	-	-	-
Honey	-	-	-	-
	0-10	Yes: 2, No: 1	Mar. - Jul.	Yes: 3, No: 0

Upper row : according to the “Forest resources survey”
Lower row: according to the “Related village survey”

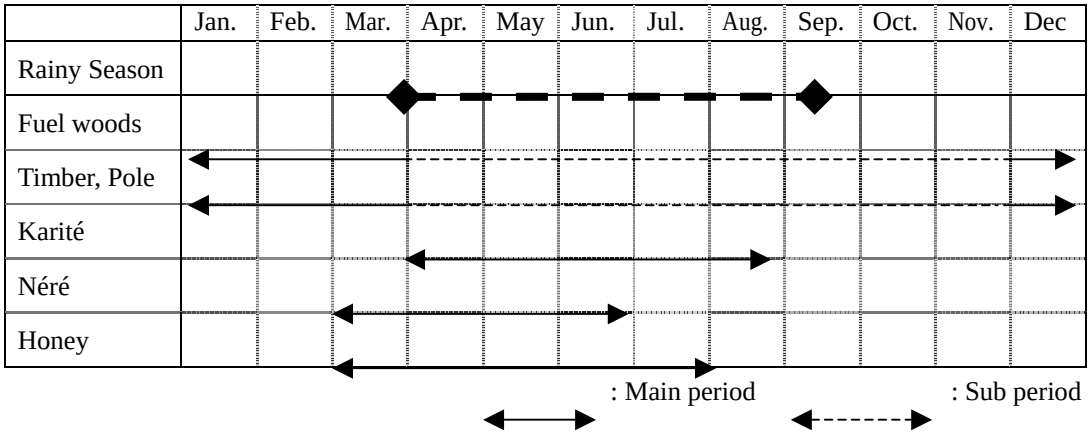

Figure 4.1 Harvest Calendar of Forest Products in Related Villages of Toumousséni F.R.

(3) Other topics on natural resources

1) Topographic features and water drainage

In the forest reserve, no steep slopes having risk of large-scale soil erosion or landslide were confirmed. Most of the stream bank is covered with comparatively thick forest. Some bare ground suffering from erosion was observed along stream banks, but this is only on a small scale. On the other hand, small hills with exposed rocks are sporadic in the reserve. However, there is very little possibility of the hills becoming sources of soil erosion and sedimentation, because the bedrock is stable and surface soil is very thin. Because these hills can be used as quarries, they must be carefully watched from the viewpoint of forest degradation. (During the field visits, the ruts of large lorries were confirmed stretching out toward one of the hills. See Figure 4.5)

2) Bush Fire

Forest fire occurs all over the reserve and certain areas are burnt yearly. Fires occur from the end of October, when the rainy season finishes, to April and May, when the dry season finishes. Although the damage of fire is rather small in the forest lots with high tree density where the ground coverage of grasses is low, damage by fire can be widely seen in other types of vegetation, especially smaller trees of under-layers.

3) Customs and activities by villagers in the reserve

According to the interviewees, the communities have no traditional sacred places in the forest reserve. However, care is still needed because such places may be discovered during the course of the forest management plan.

4.1.4. Present Situation of Fauna

Table 4.9 shows the present situation of fauna and fishery resources in Toumousséni Forest Reserve.

Table 4.9 Fauna and Fishery Resources in Toumousséni F.R.

	Fauna	Fishery
Present situation	Some animal species such as wild guinea fowls, hares, partridges, monkeys, hinds, jackals and porcupines still remain in this reserve.	Protopteridae*, Mormyridae, Gymnarchidae, Ostéoglossidae, Charachidae, Distichodobtidae, Citharinadae, Chirrinidae, Bagridae, Schilbeidae, Claridae, Malapteridae, Mochokidae, Centropomidae, Cichlidae, Anabantidae, Channidae, Totraodontidae
Species disappeared	Lions, panthers, hyenas, elephants, buffaloes, giraffes, zebras and gazelles no longer exist in this forest	Impossible to find data
Desired species to be recovered	Coba/hippotrague, bubales, cob de fassa, buffoon cob, redunca cob, grimm cephalophe, cephalophe with reddish side, orycterope	The same species of fish can be reintroduced in this reserve
Remarks	Criteria for selecting species for restoration are as follows: - The capacity for receiving several fauna species - Some species needed essential vital resources for survival and opening out - Populating zones traditionally inhabited by animals - Ecological conditions - Social, economic and cultural requirements for neighbouring villages - Anthropogeny space possession - Five forest reserves - Biological requirements of each species - Spatial needs or requirement for each species - Ecological balance	* All the species of fish mentioned above are a family group of fish. Concerning other details, there are many more individual fish that exist in river waters of Comoe Province. ** The reproduction of these species of fish is based on economic reasons, because they can reproduce faster in rivers and ponds

(Source: DRE/CV Cascade 2004)

4.1.5. Actions of the Forest Service and other External Structures

(1) Forest Service

Forests reserves under government control are managed with participation of citizens from related villages. The government Forest Service is involved with Toumousséni Forest Reserve in the following ways:

- Control of illegal cutting, etc.
- Granting of authorization
- Establishment of forest management groups at the level of local communities, establishment of monitoring and management system (participatory management of forests)
- Provision of training for villagers

The major illegal activities in Toumousséni Forest Reserve are the following; illegal grazing, poaching, illegal deforestation, and bush fire. Partly due to monitoring by the departmental service of Banfora (with one forest officer) and the departmental service of Soubakaniedougou (with two forest officers), there has been a decrease in these illegal activties.

The Forest Service authorizes the GGF of the village of Toumousséni to exploit and to sell fuel wood. It has also authorized GGFs in the villages of Soubaka and Tagnana to exploit and to sell fuel wood, and the GGF of Djongolo to produce charcoal. However, compared to the GGF of Toumousséni, the activities of the GGFs in these three villages are flagging.

The project has reactivated the GGFs of the villages of Soubaka, Djongolo, Tagnana, and reinforced the GGF Union of Toumousséni Forest Reserve. This activity was in the framework of the implementation of the Pilot Study supported by JICA with the participation of the Forest Service. The GGF of Toumousséni, which is a member of the GGF Union of Toumousséni, was not targeted by this activity. Concerning monitoring of the forest reserve by the villagers, the GGF members of Toumousséni monitor sites where they have planted trees. Furthermore, the GGF of this village has benefited from training in tree cutting and planting techniques, modern apiculture and so on.

- Patrolling and supervision by the Forestry Service

Concerning Toumousséni Forest Reserve, Forest Services of Banfora and Soubaka are in charge of the patrolling, supervision and monitoring of the related villages around the reserve. In Toumousséni village, patrols and supervision are well managed by the Forest Service because four projects have been implemented from 1986 to 2002 and it is today selected as the pilot village of JICA Project Study. Forest administration of the town of Soubaka is well

assured by the Forest Service because it is provided with a Forest Service and patrolling and education are well conducted. Concerning Djongolo village, charcoal is produced in the forest reserve and effectively distributed to markets to an extent. These activities are well organised because administrative supervision is assured by the Forest Service. However, concerning Tagnana village, which has poor access (paths in bad condition) for the Forest Service, patrols and supervision are insufficient (see Table 4.10).

Our mission implemented educational radio broadcasting about the importance of the forest reserve and traditional rights of usage of natural resources. Together with information provided formerly to the local partners in advance, all the concerned population in the four villages listened to these broadcastings. However, people in Djongolo village still lack full understanding of the traditional rights of utilization of forest resources.

Table 4.10 Patrolling and Supervision of Toumousséni F.R.

	Toumousséni	**Soubaka**	**Djongolo**	**Tagnana**
Traditional rights of usage mentioned in Forestry Code	Aware	Aware	Not aware	Aware
Radio broadcasting of JICA Project	Content not enough understood	Content understood	Content understood	Content understood
Frequency of patrols	2 times /week	Permanent existence of a Forest Service	5 times/month	2 times /year
Objectives of patrols	Arrangement of bank credit for GGF	Protection of environment	Sensitisation concerning forest management	Sensitisation concerning exploitation and forest management

(2) External agencies

Projects that have so far organised by external support agencies in the Toumousséni Forest Reserve are:

- FAO Project (1986～1989): To formulate and apply a rational management plan of forestry resources
  - Analysis of the socio-economic context
  - Pedologic study (study of chemical, physical and biological characteristics of soil)
  - Agrostologic study (study on trees)
  - Building of village organizations
  - Mapping of vegetation limits
- UNESCO Project (1990～1994): To improve the livelihood of the population
  - Building of village organizations

- Training of planting, etc.
- Establishment of firebreaks
- Opening of paths and zoning (plotting) of the forest reserve
- Managed cutting
- Plantation
- Introduction of modern apiculture

- EU Mapping Project…Reconstituting the limits of forests (1997)
- PCP (Program of the Participatory Communication, 2001～2002): Building of the village organizations of the neighbouring villages of the forest for participatory and sustainable management by the CILSS (Inter Government Community to Struggle against Desertification)
  - Organization of the fuel wood traders of Banfora
  - Strengthening the organization of the staff of the forestry management group
  - Organization of the GGF's Union
- JICA Development Study for the Forest Management Project in Comoe Province (2002~2005)

4.1.6. Socioeconomic Interaction between Related Villages and the Forest Reserve

(1) Socio-economic interaction between related villages and the forest reserve

1) Relationship with the forest reserve

The following four villages are concerned with the forest reserve: Toumousséni village, the town of Soubakanièdougou (hereinafter named Soubaka), Djongolo village and Tagnana village (see the Appendix for the selection criteria of these villages and Figure 4.2 for their location in relation to the forest reserve).

Distances from each village to the forest reserve are estimated between 0.7 and 7 km, making the reserve easily accessible on foot. On the basis of the surface area of the forest reserve of Toumousséni (2,500ha) and the population of the three villages and the town of Soubaka (22,087 inhabitants), the demographic pressure per ha is 8.8 inhabitants. So, the demographic pressure rate per hectare is high. This is due to the fact that the forest reserve is located near the town of Soubaka, which has a large population of 17,990 inhabitants.

2) History of the villages and market conditions

The town of Soubaka is the chief town of the administrative district of Soubaka. The village of Tagnana has been incorporated as a sub-village of Soubaka. Toumousséni and Djongolo are independent villages. The town of Soubaka has existed from around the 15th Century; Toumousséni village and Djongolo village were established before the colonisation period, whereas Tagnana village was established before independences and is relatively new.

The markets of Banfora and Soubaka serve Toumousséni, Djongolo and Tagnana villages. Fuel wood from Toumousséni village and charcoal from Djongolo village are supplied to Banfora. However, there is not enough collaboration of distribution with the Union of Fuel Wood Traders of Banfora. Since the town of Soubaka is well populated, most of the wood products, etc. produced in the town are sold in its market.

3) Ethnic groups

The majority native ethnic groups are respectively Turka in Toumousséni, Gouin in Soubaka, and Karaboro in Djongolo and Tagnana. In addition, other ethnic groups from the Center and Southwest of Burkina Faso are present in these two villages. Also, Fulani people have settled there. These Fulani people are sedentary (see 2.2.2), and there is also a large Fulani camp in Toumousséni village.

4) Village organisations

Toumousséni and Soubaka have been selected for the establishment of CVGT under the PNGT2. GGFs have been established in each of the four related villages under a FAO project. The GGFs of Toumousséni and Djongolo villages are very active, however the GGFs in Soubaka town (also under authority of the Union of GGFs) and Tagnana village ceased activities following completion of the said project. The zoning established in the forest reserve is not sufficiently used.

Table 4.11 shows social condition of related villages of Toumousseni F.R..

Table 4.11 Social Condition of the Related Villages of Toumousséni F.R.

	Toumousséni	**Soubaka**	**Djongolo**	**Tagnana**
Distance from major urban center	17km from Banfora	42km from Banfora	17km from Banfora	9km from Soubaka
Distance from the forest reserve	0.7km	7km	4km	5km
Market	Banfora, Soubaka	In the same town	Banfora, Soubaka	Banfora, Soubaka
Population	2,176	17,990	1,521	Around 400
Natives	Turka	Gouin	Karaboro	Karaboro
Majority	Turka	Gouin	Karaboro	Karaboro
Fulani migrants	Existing	Existing	Existing	Existing
Other ethnic groups	Gouin, Mossi, Karaboro	Turka, Mossi, Karaboro, Dioula, Sénoufo, Samo	Gouin, Mossi, Turka, Sénoufo, Dafing,, Lobi	Gouin, Mossi, Lobi
Religion	Animism	Animism	Islam	Animism
Year of establishment	Before colonisation	Around 15th Century	Before colonisation	Before independence
CVGT	Existing	Existing	Not existing	Not existing
GGF	Existing	Existing	Existing	Existing

The village of Toumousséni faces more serious problems than Djongolo village, Tagnana village and the town of Soubaka. These are as follows:

- The Fulani camp administratively belongs to Toumousséni village. However, the traditional organisation of this village and the Fulani camp are opposed. Administrative contacts dwell then in the village but do not sufficiently reach the camp.
- The traditional organisation and the modern organisation of this village are often opposed concerning its administration.
- The boundary between Toumousséni village and Djongolo village is not clearly defined; consequently parts of the terroir are overlapping. Moreover, a conflict occurred between the two villages concerning the terroir in 2002 (see Figure 4.3 Terroir and pasture zones).

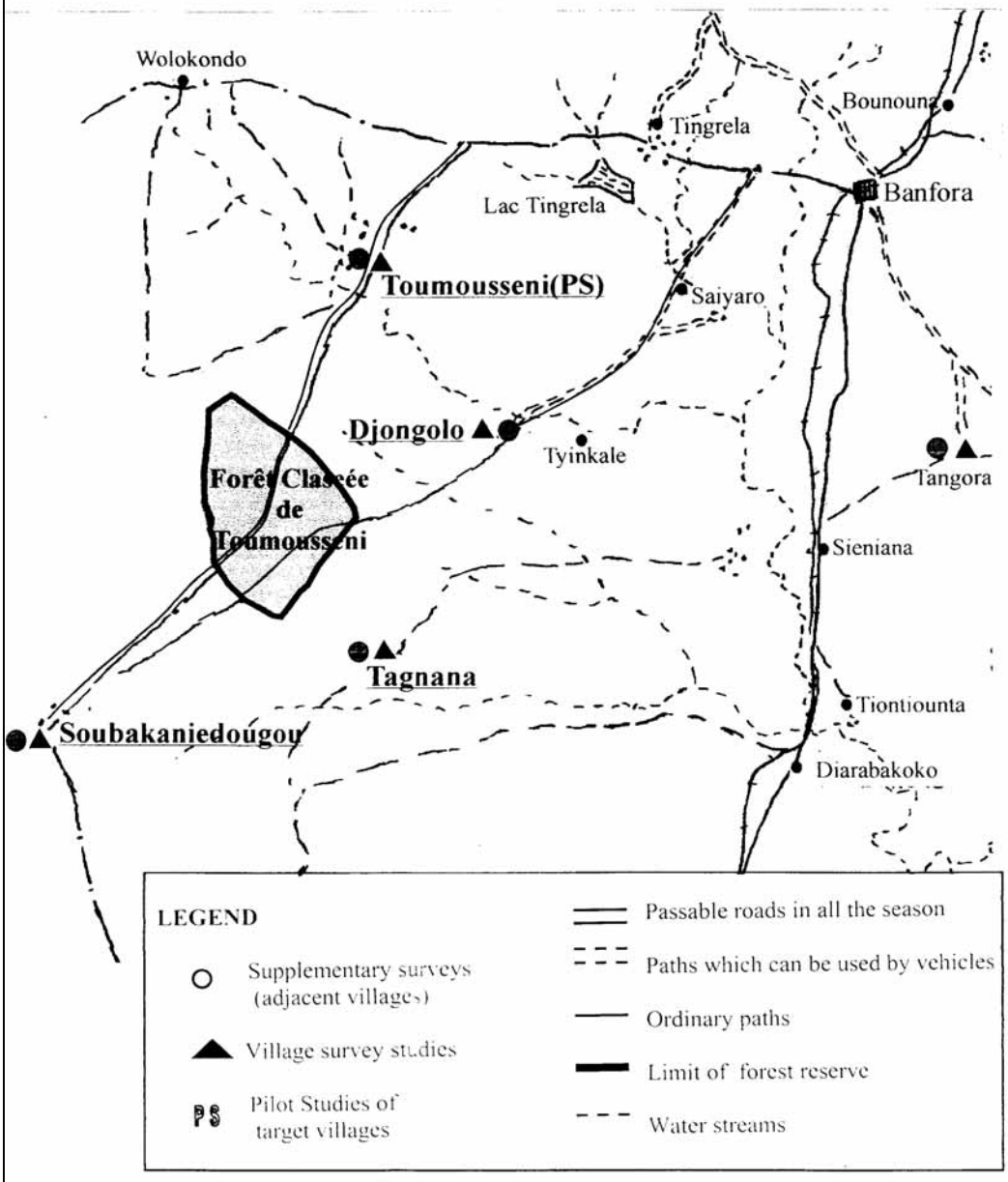

Figure 4.2 Location of the Related Villages of the Toumousséni F.R.

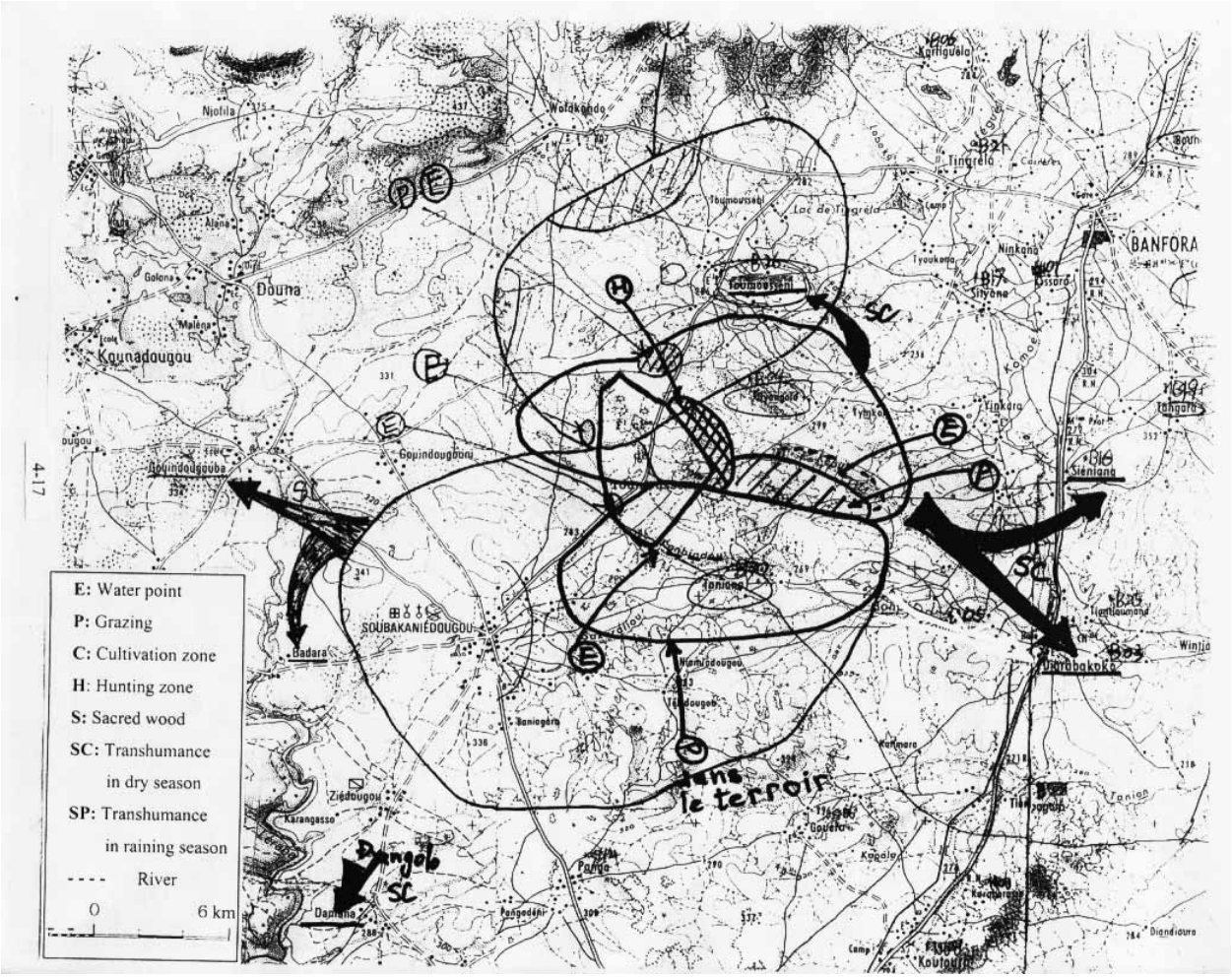

Figure 4.3 Terroir and Pasture Zones of Related Villages of Toumousséni F.R.

(2) Utilization of the forest reserve

According to Section 4.1.3 (Usage of Forest Resources in and Around the Forest Reserve), apart from the exploitation and selling of fuel wood and production of charcoal by the GGFs of the related villages, individuals and families collect forest resources outside the forest reserve for home consumption. Forest products such as karité nuts, néré seeds fruits, and honey are collected for selling over a range of 7 km inside the forest reserve.

None of the related villages of Toumousséni Forest Reserve have sacred places inside the forest reserve. Residents in all the related villages hunt inside the forest reserve, while breeders in the villages of Toumousséni and Djongolo their animals to graze inside the forest.

(3) Village forests and sacred places

Citizens in the villages concerned with Toumousséni Forest Reserve consider village forests to be forests managed under government initiative with the limited aims to reforesting or protecting sacred places. Generally, the local population routinely collect fuel wood from low shrub forest free from control.

The four villages do not have village forests inside the forest reserve. The actual situation regarding the village forests of each community is explained below. The village forest of Djongolo established under decision of the Forest Service after independence, and also that of Soubaka established under the government policy of “8,000 villages; 8,000 forests,” are located outside the forest reserve (see Table 4.12). However, because rights of usage and methods of preservation and management were not clarified following plantation, these forests have not been utilized for the past 20 years and only older village members are aware of the existence of utilization rights.

In Toumousséni village, the Study Team planted 300 cashew saplings over an area of 3 ha at the request of the local community as a plantation training exercise. Agreement was then reached with the GGF and the Forest Service concerning preservation and management after the reforestation and also about the rights of usage of the plantation. Since then, this village forest has been regularly managed by the GGF. Tagnana village has a village forest located outside the forest reserve, established with the purposes of collecting forest resources and conserving pasture.

The local communities of Toumousséni, Soubaka and Djongolo have possessed sacred places since their establishment, but these are located outside of the forest reserve. Trees within the grounds of these sacred places are considered as sacred trees and their felling is forbidden.

Table 4.12 Village Forests of Related Villeges of Toumousséni F.R.

	Toumousséni	Soubaka	Djongolo	Tagnana
Village forest	• One site supported by JICA in 2003 • One site representing a sacred place established before colonisation period	• One site supported by Forest Service in 1982 • One site representing a sacred place established before colonisation period	• One site supported by Forest Service in 1982 • One site representing a sacred place established before colonisation period	• One site created with the objectives of forest resources collection and conservation of pasture.

(4) Stockbreeding

Stockbreeding is practised traditionally on a small to medium scale without supervision, using natural meadowland, fallow land and forests. The livestock consists of cattle, sheep, goats and poultry. Fulani breeders of the camp neighbouring Toumousséni village practice migratory stockbreeding. After the rainy season, they migrate with the cattle towards Mangodara and Niangoloko or towards zones distant from cultivated plots. In some cases, they migrate towards neighbouring countries such as Côte d'Ivoire. Later, they come back around November after the harvest period in order to feed the cattle with the residues of agricultural plots.

Breeding is closely linked to farming in that residues of crops such as millet and sorghum are used as livestock feed in the dry season. For this reason, disputes frequently arise between farmers and stockbreeders during the harvest period. Within local communities of Toumousséni[1], Soubaka and Djongolo neighbouring the forest reserve, quarrels are frequent between stockbreeders and farmers. Stockbreeders of the Fulani camp of Toumousséni and of Djongolo practice illegal pasture inside the forest reserve according to Table 4.13..

[1] In 2000, cattle supervised by a young breeder of the Fulani camp went through a cultivated plot before the harvest period. This led to an altercation, during which the young breeder was stabbed and killed.

Table 4.13 Situation of Pasture in the Related Villages of Toumousséni F.R.

	Toumousséni	Soubaka	Djongolo	Tagnana
Pasture zones and drinking places (Dry season)	In the terroir particularly around the stream near Wolokonto. Animals drink water from rivers and wells. Fulani breeders migrate with their cattle towards Côte d'Ivoire and Mali.	In the terroir, animals drink from five wells and Leraba River. Fulani breeders migrate with their cattle towards the national border.	In the terroir, and also in the forest reserve in some cases, animals drink from wells. Fulani breeders migrate with their cattle towards Toumousséni and Léraba River.	In the terroir, animals drink from wells.
Pasture zones and drinking places (rainy season)	In the terroir, animals from puddles and rivers. Fulani breeders sometimes graze inside the forest reserve.	In the terroir, animals drink from puddles.	In the terroir, animals from puddles and rivers. Fulani breeders sometimes graze inside the forest reserve.	In the terroir, animals drink from puddles.
Conflict between farmers and breeders	Existing	Existing	Existing	Not existing

(5) Illegal activities carried out inside the forest reserve

According to the results of the supplementary surveys (see Table 4.14), the local communities of the three localities except for Djongolo village are aware of the existence of utilization rights for the forest reserves and follow them. However, it is estimated that every year, the forest reserve suffers degradation caused by illegal tree cutting and frequent bush fires. According to villagers, outsiders carry out these illegal activities, although this has not been confirmed.

Many fires happen in the forest reserve due to burning of the pasture zones located all around it. We consider that breeders intentionally use fire for regeneration of the grass coverage in these pasture zones.

Table 4.14 Illegal Activities and Problems related to Toumousséni F.R.

	Toumousséni	Soubaka	Djongolo	Tagnana
Traditional rights of usage mentioned in the Forestry Code	Aware	Aware	Not aware	Aware
Hunting in the forest reserve	June-July	December-May	December-May	December-May
Cultivation zones in the forest reserve	No cultivation	No cultivation	No cultivation	No cultivation
Causes of bush fires in the forest reserve	Accidental fires spread from burning for pasture zone regeneration	Accidental fires	Accidental fires spread from burning for pasture zone regeneration	Accidental fires

4.2. Characteristics and Problems of Toumousséni Forest Reserve

4.2.1. Characteristics and Problems

(1) Characteristics and problems of the utilization of forest resources

The condition of the forest resources of this forest reserve is comparatively good. Dense tree savannah occupies about half of the area, and wooded savannah and riverside forest which have high tree density cover about 20% altogether. Teak and Merina plantations are also in relatively good condition. However, bush savannah is sporadic and seems to be adversely affected by bush fire and so on.

Local people sometimes use the reserve for collecting forest products. On the other hand, the GGFs cut fuel wood and produce charcoal within certain lots of the reserve. Besides the controlling of fuel wood extraction, the GGFs try to manage the forest resources in sustainable way by planting local species, conducting modern apiculture and implementing early burning, although activities are still limited.

(2) Characteristics and problems of forest administration and the Forest Service

Out of the forest reserves targeted in the Study, Forest Service activities, in particular support for village organizations, are most pronounced in Toumousséni Forest Reserve. This is largely due to the fact that the abovementioned projects implemented by external organizations have continued in this area. However, apart from the GGF in Toumousséni village, GGF activities in the other three villages are stagnating, and the Forest Service needs to support these bodies as well as vitalize the GGF Union. Another issues concerns how Forest Service activities conducted in the past will be continued in the future.

Forest Service patrols and guidance are conducted relatively well in all the villages except for Tagnana. However, since some of these patrol activities are conducted as part of the project activities of other donors, it is doubtful whether the Forest Service can sustain these by itself.

(3) Characteristics and problems of socio-economic interaction between the related villages of the forest reserve

1) Village organizations,etc. in related villages

The GGF Union is composed of the GGFs of Toumousséni, Soubaka, Djongolo and Tagnana. However, the Union is not currently active. It is necessary to fully analyse the reasoning behind and the current condition of the zoning that was formulated in the past.

Fuel wood from Toumousséni and charcoal from Djongolo are supplied to Banfora. However, collaboration with the fuel wood traders association of Banfora, which holds the key to distribution and selling, is not sufficient. This situation needs to be improved.

In particular, disagreement between traditional villagers groups and modern formations such as the CVGT in Toumousséni village is a problem that needs to be considered when compiling a participatory management plan for the forest reserve.

2) Stockbreeding

At the beginning of the dry season, all the forest reserve is used as pasture because of the easy access to its water places; however, this should also be taken into account when compiling the participatory management plan for the forest reserve.

3) Illegal activities and problems related to the forest reserve

It seems that the forest reserve does not have any cultivation problems. However, some villagers carry out hunting activities inside it and use fire in order to assure the regeneration of herbaceous cover. Consequently, bush fires in the forest reserve constitute a problem.

4.2.2. Major Issues in Toumousséni Forest Reserve

(1) Problems arising from utilization of forest resources

Forest resources in Toumousséni Forest Reserve are in better condition than in the other four forest reserves, and it is important to remain the present condition. Therefore, it is necessary to systematically control tree cutting and to implement direct seeding based on local species in the parts of Toumousséni Forest Reserve that supply fuel wood.

There is little possibility of large soil erosion and landslides occurring in Toumousséni Forest Reserve, but there is a risk of stone quarrying. Moreover, since bush fires are frequent, it is also necessary to bolster the fire supervision setup in the reserve.

(2) Problems concerning administration and the Forest Service

As in the other forest reserves, the Forest Service supports the GGFs, particularly Toumousséni GGF, in the implementation of their activities. It is important that the Forest Service continues its support and at the same time shares the knowledge thereby obtained with other forest officers. However, considering the difficulty of securing sufficient budget to purchase fuel for these activities, it is necessary to build a smoother institutional system whereby part of the income from the sale of fuel wood and charcoal is allocated to fuel costs.

As with Bounouna Forest Reserve, it will be difficult for the Forest Service to support village organizations such as the GGFs and GGF Union as well as establish grazing zones inside Toumousséni Forest Reserve with its current personnel, especially at the outset of such activities.

(3) Socio-economic considerations regarding related villages

Considering the cutting of fuel wood implemented by the GGF of Toumousséni Forest Reserve, revitalization of the GGF Union introduced under the participatory communication program (supported by CILSS) is needed in order to sustain the reserve in its present condition. With respect to the revitalization, it is quite important to take into account the sustainable GGF activities of Soubaka city, Djongolo and Tagnana villages, particularly regarding economic sustainability. At the same time, the objectives, roles and management of the GGF Union, and measures to build up a closer connection with fuel wood marketing association in Banfora city should be empirically examined from the viewpoint of sustainability.

When planning management of Toumousséni Forest Reserve, consideration and countermeasure are also needed regarding discord between the native farming Turka people and stockbreeding Fulani, who have set up a camp near the village. There also seems to be disagreement between traditional leaders and CVGT leaders in Toumousséni village (the core village), and support is required in order to resolve this situation too.

It seems that Toumousséni, Soubaka, and Djongolo are regularly observed and supported as related villages by the Forest Service. However, it is necessary to examine a system for implementing patrols and guidance by the Forest Service on a sustained basis.

The zoning plan that was introduced in Toumousséni Forest Reserve under a past FAO project is not fully utilized. Accordingly, investigating the reasons for may be useful for formulating a participatory management plan for Toumousséni Forest Reserve.

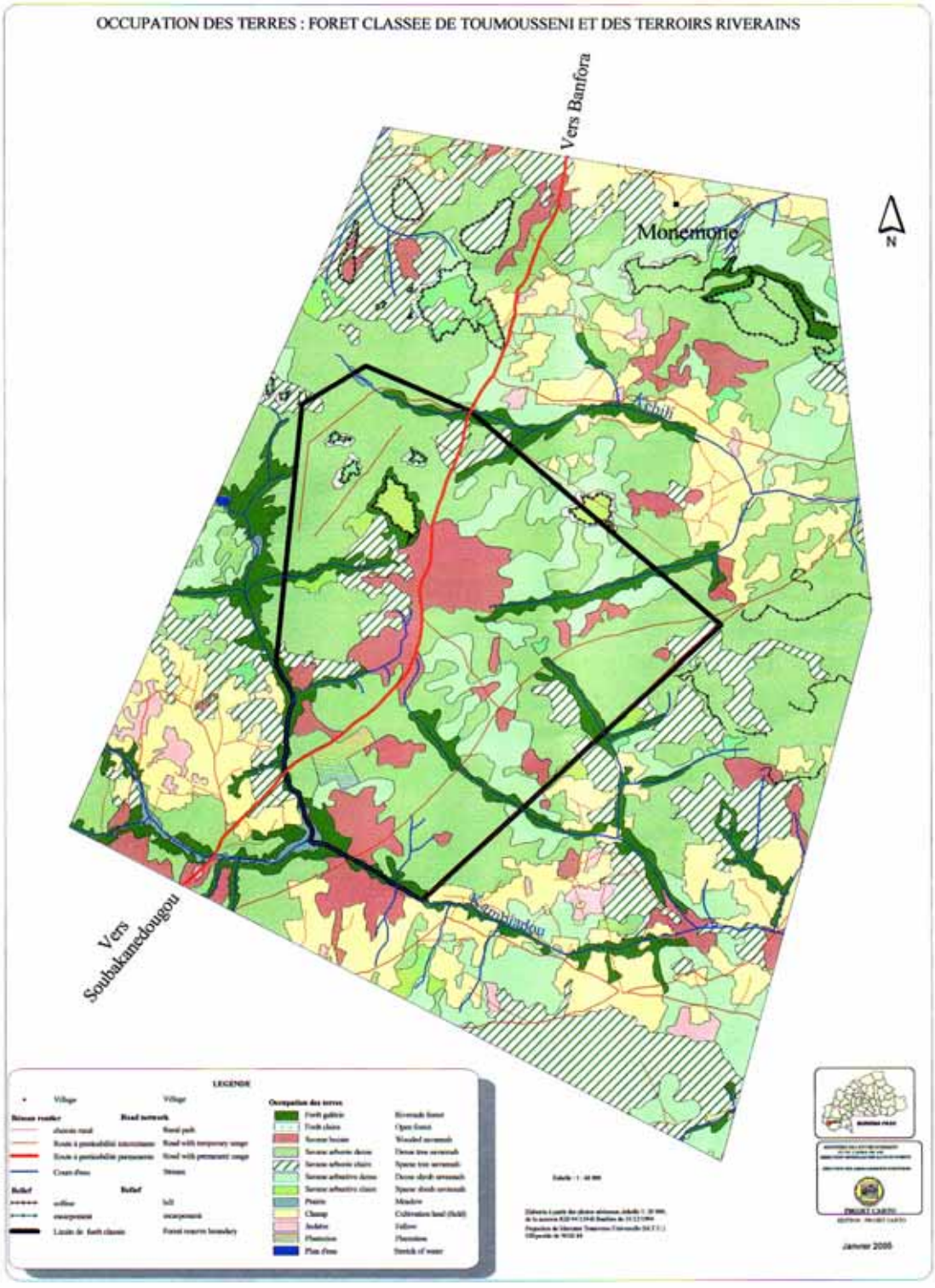

Figure 4.4 Land use/Vegetation Map of Toumousséni F.R.

Figure 4.5 Utilisation des ressources forestières de la Forêt Classée de Toumousséni

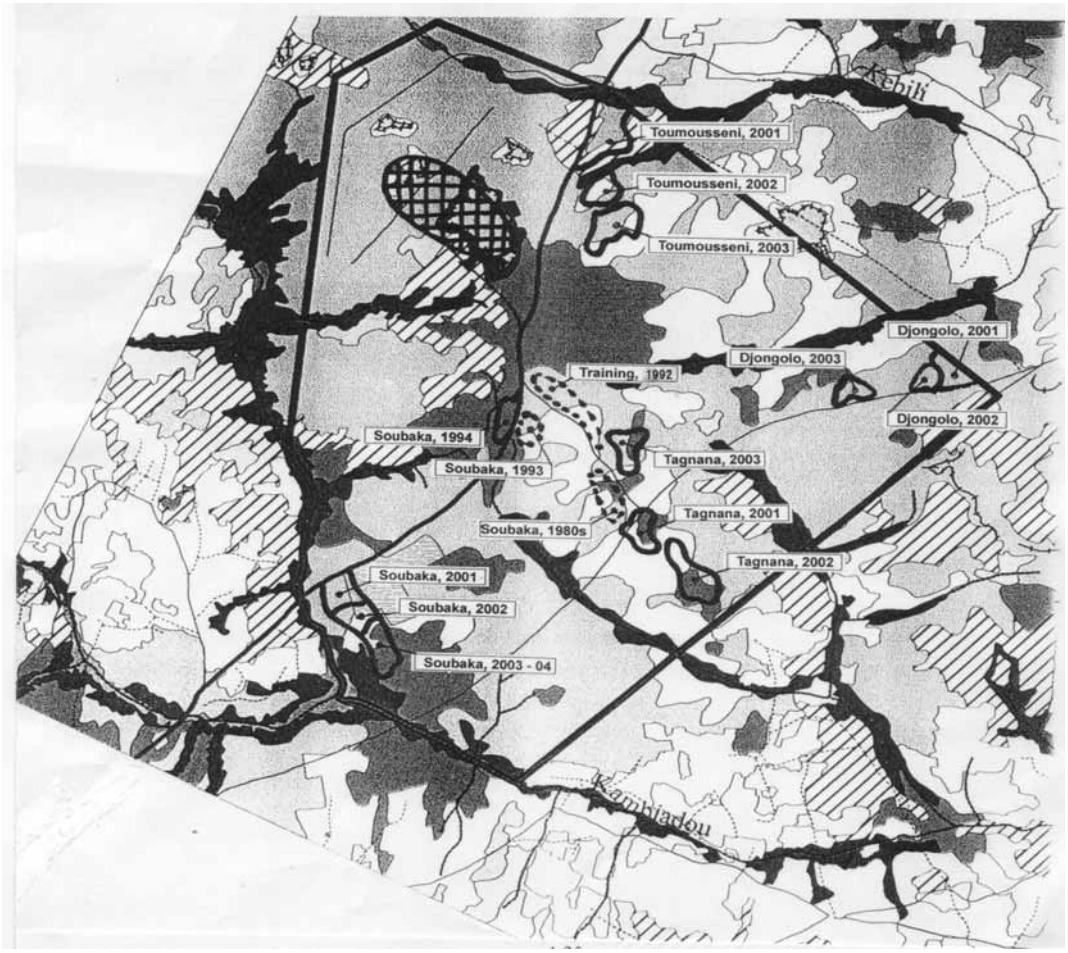

Figure 4.5 Range of Collection of Forest Products in Toumousséni F.R.

Chapter 5 Present Conditions and Issues of Gouandougou Forest Reserve

5. Present Conditions and Issues of Gouandougou Forest Reserve

5.1. Gouandougou Forest Reserve

5.1.1. History of the Reserve and Boundary Management

Table 5.1 shows the outline of Bounouna Forest Reserve. This was designated as a forest reserve in 1955 before independence according to a forest reserve order (Decree No. 4086/ SE/F). The reasons for the designation were not mentioned in the decree, however, they were said to be to protect the ecosystem and to conserve biodiversity (Source: Regional Direction of Environment and Habitat of Cascades).

Table 5.1 Outline of Gouandougou Forest Reserve

No. of Decree	Date of Declaration **	Area* (ha)	Place of Issue	Condition of the Boundary
No4.086/SE/F.	31 May 1955	9,500 (8,575)	Dakar	Boundary stones are set. Boundary has been surveyed.

* The upper figure is the area given in the decree. The figure in parentheses is calculated from GIS data.

** The date of the issue of the decree is shown as the date of establishment of the reserve.

According to the decree, the three items listed below are permitted as resource utilization rights for the local community, in addition to collecting dead trees, fruits, edible and medical plants as guaranteed in Article 14 of the former forest law.

- Village hunting without starting fire.
- Traditional fishing in accordance with the Fisheries Law.
- Honey collection without slashing and burning.

The present Forest Law guarantees local people the rights of using forest resources, i.e. gathering of dead trees and branches, nuts and fruits, and medical plants (Article 56). Besides them, additional items of usage permitted for local people can be declared by a decree for each forest reserve (Article 58).

Boundary stones were set and boundary survey was carried out for the forest reserve in 1998 under the EU Mapping Project. However, no proper boundary survey has been carried out and information about the location (longitude and latitude) of the boundary is not available in forestry office. Accordingly, boundary survey using GPS receivers was carried out in 2003 during this study in order to establish and share those data. The Study Team went out into the field accompanied by an examiner who was appointed by the minister. The results of the survey have already been approved by The Ministry of Environment. Now, the results are undergoing official procedure for approval by the ministry council, which normally takes a few years. However, there is no problem in using the data as official data in the framework of

activities planning because they have already received ministerial approval.

At present, activities for maintaining the boundaries, such as patrolling or cutting, are not executed by the Forest Service because of a strict budget; nevertheless the local people around the forest reserve seem to fairly recognize the location of the boundary.

5.1.2. Land Use/Vegetation and Forest Inventory

(1) Land use/ Vegetation

The land use/vegetation map of Gouandougou Forest Reserve is shown in Figure 5.4 and the surface area of each land use/vegetation type is shown in Table 5.2. This reserve mainly consists of dense tree savanna (Savane Arborée Dense) covering 59.7% of the total area. Riverside forest (Forêt Galerie) and riverside thick forest (Fourrée Ripicole) grow along streamlines, although the surface area of them is not large. Those forests with wooded savanna (Savane Boisée) form good forests with high tree density in the reserve.

On the other hand, cultivated land and fallow land are distributed along the boundary in the western part of the reserve. Small patches of cultivated area are also distributed in the eastern part of the reserve.

Table 5.2 Areas by Land Use/Vegetation Types in Gouandougou F. R.

Legend	Area (ha)	Ratio (%)
Riverside forest (*Forêt Galerie*)	110	1.3
Riverside thick forest (*Fourrée Ripicole*)	26	0.3
Wooded savanna (*Savane Boisée*)	602	7.0
Dense tree savanna (*Savane Arborée Dense*)	5,128	59.7
Sparse tree savanna (*Savane Arborée Claire*)	1,644	19.2
Dense shrub savanna (*Savane Arbustive Dense*)	197	2.3
Cultivation area and fallow (Champ Cultivé Champ non Cultivé)	100	1.2
Eroded area (*Sol Erode*)	230	2.7
Total	8,575	100.0

(2) Forest Inventory

Table 5.3 shows the number of trees per hectare by circumference according to the inventory survey (See “Appendix” for methodology). The volume of woods per hectare is also calculated and shown in the table. According to the national forest inventory conducted in 1980, the tree volume of Cascade region was estimated as 52.8 m3/ha with annual production of 1.26 m3/ha (Inventqire Forestier National Haute-Volta; FAO, 1982). Using this result (the ratio of the tree volume and the annual production), the mean annual production of

Gouandougou Forest Reserve is calculated as 0.96 m3/ha (2.82 Stere/ha), which corresponds to total production of 8,217.2 m3 (24,168.2 Stere) for the whole reserve. (0.34 m3 in volume = 1 Stere)

Table 5.3 Number and Volume of Trees by Circumference in Gouandougou F.R.

Class of trees (cm in circumference)	Number of trees (trees / ha)	Volume of wood (m^3/ha)
125 cm or more	12.0	16.4
31-124 cm	180.6	21.5
15-30 cm	170.3	2.3
Sub total	***362.9***	***40.2***
Seedlings (3-4 cm)	300.3	–
Seedlings (less than 3 cm)	405.5	–

The densities of some useful species are calculated by using the result of the forest inventory survey (see Table5.4). The density varies from species to species. Vitellaria paradoxa (Karité) and Detarium microcarpum (Detarium) grow with high density, but the densities of Parkia biglobosa (Néré) and others are low.

Table 5.4 Density of Useful Tree Species in Gouandougou F.R.

Species	Density (trees/ha)
Vitellaria paradoxa (Karité)	37.7
Parkia biglobosa (Néré)	0.8
Detarium microcarpum (Detarium)	31.1
Tamarindus indica (Tamarind)	5.5
Bombax costatum (Kapok tree)	0.8

5.1.3. Usage of Forest Resources in and Around the Forest Reserve

(1) Fuel wood

Table 5.5 shows the results of the hearing on fuel wood gathering. In the survey of related villages, village representatives were asked about the average situation in village households. Also, since individual persons were interviewed about household conditions in the same villages during the survey of forest resources, both findings are shown.

Fuel wood is usually gathered from bush and cultivated land around each village. However, some interviewees from the related villages admitted to also gathering fuel woods from the forest reserves. Felled trees and stumps were also observed during field inspections. The range of gathering usually extends from 2 to 3km and is performed mainly in the dry season

(Figure5.5 shows the ranges of 3km from the center of each village). On the basis of these facts, it is estimated that the reserve, mainly in fringe areas, is often used for fuel wood collection. It seems that fuel wood is not collected for the purpose of selling since the local communities are located rather far from large markets.

Table 5.5 Fuel Wood Gathering in and around Gouandougou F.R.

Village Name	Distance (km)	Usage of F.R.	Period	Selling
Gouandougou *	3	Yes	Dry season (6 months)	No
	3	No	Dry season (6 months)	No
	2	No	Dry season (6 months)	No
	2	No	Dry season (4 months)	No
Gouara *	2	Yes	Dry season (6 months)	No
	2	No	Dry season (6 months)	No
	2	No	Dry season (6 months)	No
Gouandougou **	0-4	Yes	Jan.- Jul.	No
Dakié **	0-2	No	Oct. - May	No
Ouaratenga **	0-2	No	Feb. - Jun.	No
Wenga **	0-1	No	Jan. - Feb.	No
Tonga **	0-2	Yes	Jan. - Apr.	No
Gouara **	0-1	No	All the year (12 months)	No
Dandougou **	0-3	No	All the year (12 months)	No
Bougousso **	0-2	Yes	All the year (12 months)	No

* Result from the “Forest resources survey”
* * Result from the “Related village survey”

(2) Other forest products

The conditions of use of other forest products are shown in Table 5.6 and Figure 5.1. (The maximum obtained answers are shown for “Distance” and “Period of collection,” while the frequency of each response is shown for “Usage of F.R” and “Selling”).

The range of gathering extends for 3~6km. Many interviewees admitted to collecting timber and karité in the forest reserves, maybe reflecting an abundance of such resources in the reserve. Wood products are exploited mainly in the dry season, and non-wood products such as fruits are harvested mainly from the second half of the dry season to the beginning of the rainy season, although the periods depend on the growing stage of each product. Karité, néré, and honey are also collected for selling, providing an additional source of income for local residents.

Besides those product mentioned above, local people listed Detarium microcarpum (detarium), Tamarindus indica (Tamarind), Bombax costatum (Kapok tree), Saba senegalensis (Saba), Adansonis digitata (Baobab), thatching grasses, and others as useful forest species.

Some of the products from those species are also used for medicines. According to the interviewees, those products are mainly collected outside the reserve. On the other hand, many of them indicated the forest reserve as a potential production area although the amount of resources in the reserve is not abundant for all species.

Table 5.6 Situation of the Harvesting of Other Forest Products in and around Gouandougou F.R. by Local Communities

Forest products	Distance (km)	Usage of F.R.	Period of Collection	Selling
Timber	2-4	Yes: 1, No: 2	Nov.- Apr.	Yes: 0, No: 3
	0-3	Yes: 1, No: 7	All the year (12 months)	Yes: 0, No: 8
Karité	0-6	Yes: 1, No: 6	Jul. - Aug.	Yes: 4, No: 3
	0-5	Yes: 4, No: 4	May - Nov.	Yes: 6, No: 2
Néré	0-2	Yes: 0, No: 7	Mar. - Jun.	Yes: 0, No: 7
	0-3	Yes: 0, No: 5	Apr. - Jul.	Yes: 2, No: 3
Honey	-	-	-	-
	0-4	Yes: 1, No: 1	Feb.- Jul.	Yes: 2, No: 0

Upper row : according to the "Forest resources survey"
Lower row: according to the "Related village survey"

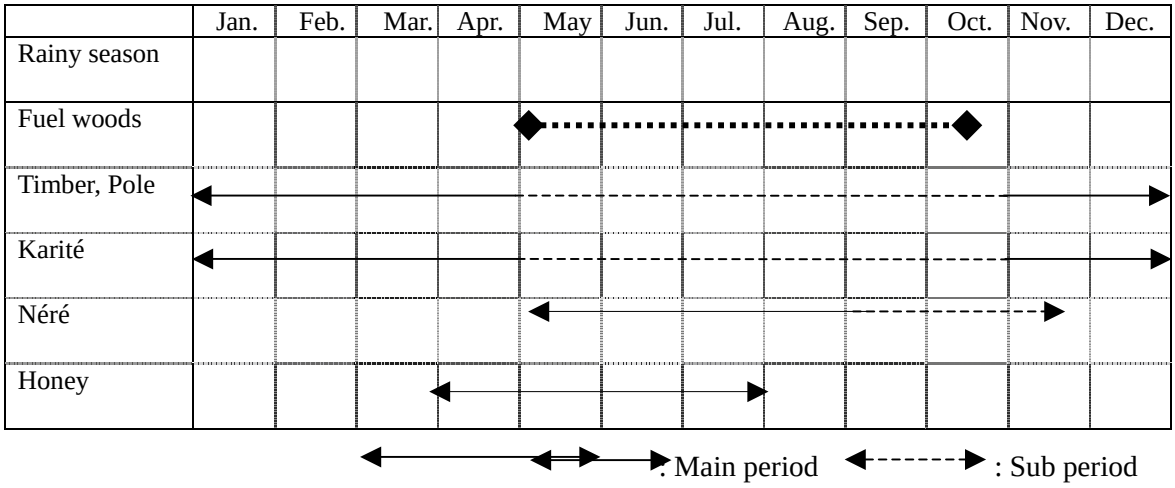

Figure 5.1 Harvest Calendar of Forest Products in Related Villages of Gouandougou F.R .

(3) Other topics on natural resources

1) Topographic features and water drainage

In the forest reserve, no steep slopes having risk of large-scale soil erosion or landslide were

confirmed. Some bare ground suffering from erosion was observed along stream banks, but this is only on a small scale.

Two rivers flowing along the northern and southeastern boundaries are comparatively large. Those rivers have flowing water between June and October (sometimes until December if there is much rain during the rainy season, see Figure 5.5). Only some ponds remain in depressions along streamlines before and after that period, but they dry up during the dry season.

2) Bush Fires

Forest fire occurs all over the forest reserve. The fire occurs from the end of October when the rainy season finishes, to April and May when the dry season ends. Burnt area was observed in the reserve during the field inspection in November and December. As a result, all the leaves of shrubs up to 2~3m in height are burned brown. The impact of fire on the regeneration of forests seems to be large.

3) Sacred sites

The local communities maintain some traditional sacred sites in the forest reserve. In the hearings conducted in three related villages, the representatives of two villages admitted the existence of sacred places (Table 5.7). Some taboos and customs relating to forest conservation are shown in the table. However, since the location of sacred places may be kept secret from outsiders, it will be necessary to remember the possibility of scared places when compiling the management plan.

Table 5.7 Existence of Sacred Places in Gouandougou F. R.

Village Name	Existence of sacred places	In the Reserve		Taboos related to forest conservation
		Existence of sacred places	Identification of the location	
Gouandougou	Yes	2 places	Not available	Tree cutting, hunting, and starting fires are prohibited.
Tonga	Yes	No	-	-
Dandougou	Yes	Yes	Not available	To be preserved.

5.1.4. Present Situation of Fauna

Table 5.8 shows the present situation of fauna and fishery resources in Gouandougou Forest Reserve.

Table 5.8 Fauna and Fishery Resources in Gouandougou F.R.

	Fauna	Fishery
Present situation	Animal species that exist in this reserve are: coba, guib (the two are scientific names), cephalopod, buffaloes, warthogs, porcupines, dog-faced baboons, aulacode (scientific name), hares, monkeys and wild guinea fowls	Protopteridae*, Mormyridae, Gymnarchidae, Ostéoglossidae, Charachidae, Distichodobtidae, Citharinadae, Chirrinidae, Bagridae, Schilbeidae, Claridae, Malapteridae, Mochokidae, Centropomidae, Cichlidae, Anabantidae, Channidae, Totraodontidae
Species disappeared	Elephants, lions, cobs, ourebis (scientific names), panthers and hyenas have disappeared from the reserve	Impossible to find data
Desired species to be recovered	Coba/hippotrague, bubales, cob dafasa, buffoon cob, redunca cob, grimm cephalophe, cephalophe with reddish side, orycterope	Heterotis niloticus**, Claria anguillaris Lates niloticus, Oreochromis niloticus
Remarks	Criteria for selecting species for restoration are as follows: - The capacity for receiving several fauna species - Some species needed essential vital resources for survival and opening out - Populating zones traditionally inhabited by animals - Ecological conditions - Social, economic and cultural requirements for neighbouring villages - Anthropogeny space possession - Five forest reserves - Biological requirements of each species - Spatial needs or requirement for each species - Ecological balance	* All the species of fish mentioned above are a family group of fish. Concerning other details, there are many more individual fish that exist in river waters of Comoe Province. ** The reproduction of these species of fish is based on economic reasons, because they can reproduce faster in rivers and ponds

(Source: DRE/CV Cascade 2004)

5.1.5. Actions of the Forest Service and External Structures

(1) Forest Service

Forests reserves under government control are managed with participation of citizens from related villages. The government Forest Service is involved with Gouandougou Forest Reserve in the following ways:

- Supervision of illegal actions
- Training on the conservation of forest resources

The EU Mapping Project set up the boundary of Gouandougou Forest Reserve in 1998. Before that, since the boundaries of the forest reserve were not clarified, there were frequent illeal activities within the reserve. The departmental service of environment of Sidéradougou (with three forest officers) is in charge of this forest reserve. Presently, the Supervision of illegal activities in the forest reserve is the major task of the Forest Service. There are some cultivated fields in the forest reserve tha were established many years ago; however, the shortage of personnel makes it difficult to provide guidance, and the service is fully stretched just trying to prevent further expansion of cultivation in the reserve.

Presently, training on traditional utilisation rights in the forest reserve is being implemented in cooperation with the JICA Study Team.

- Patrolling and supervision of the Forestry Service

Three forest officers of Sidéradougou department are in charge of patrol and supervision in Gouandougou Forest Reserve (9.500ha) and Kongouko Forest Reserve（27,000ha）. Since the road infrastructure is not yet established and villages are dispersed all around the forest reserves, these agents use off-road motorbikes to conduct their activities. However, they sometimes face breakdowns due to the bad state of roads, and it is only possible for them to patrol during a certain period in the dry season (January-May).

The only means of communication with the Departmental Forest Service of Sidéra is public telephone (private telephone center). Therefore, villagers directly visit the Forest Service office when they have information to convey. For example, the people of Bougousso used an entire day to inform the forestry post of Sidéra about incidents such as the crossing of the boundary of Mali Republic by herds of oxen or the cutting by mistake of big trees by sawmills in the forest reserve.

According to the results of the supplementary survey (see Table 5.9), the number of forest officers is not sufficient to cover such a wide area, and the officers are unable to conduct adequate patrols, which also include brief greetings with the locals. Numerous interviewees reported that they wish hold extensive discussions with the Forest Service concerning

conditions in the villages.

Table 5.9 Patrolling and Supervision of Gouandougou F.R.

	Dandougou	Gouandougou	Bougousso	Dakié	Gouara	Ouratenga	Tonga	Wenga
Frequency of patrols	Frequently	2times/ month	Once/ month	Once/ month	2times/ month	4times/ month	2times/ week	3times /month
Objectives of patrols	Patrol	Education about forest management	Education about forest management	Education about forest management	Patrol	Patrol	Patrol	Patrol
Traditional rights of utilisation mentioned in the forestry code	Aware	Not aware	Aware	Not aware	Aware	Not aware	Aware	Not aware
JICA FM broadcast	The content is understood	The content is understood	The content is understood	The content is not well understood	Don't listen to radio	The content is not well understood	The content is under-stood	The content is not well under-stood

(2) External structures

Projects that have so far been implemented by external support agencies in the Gouandougou Forest Reserve are as follows:

- EU Mapping Project (1997)
- JICA Development Study for the Forest Management Project in Comoé Province (2002~2005)

5.1.6. Socioeconomic Interaction between Related Villages and the Forest Reserve

(1) Socio-economic interaction between related villages and the forest reserve

1) Relationship with the forest reserve

The following eight villages are named as related village to Gouandougou forest reserve: Dandougou, Gouandougou, Bougousso, Dakié, Gouara, Ouratenga, Tonga and Wenga (see the Appendix for the selection criteria of these villages).

The distance of each village from the forest reserve is estimated between 1~4km, making the reserve easily accessible on foot. According to the surface area of Gouandougou Forest Reserve (9.500ha) and the total population of the eight villages (3,399 persons), the demographic pressure per hectare is 0.6 persons. Since the five villages of Dakié, Gouara,

Ouratenga, Tonga, and Wenga are sub-villages of Gouandougou village, the population of these five villages is included in that of Gouandougou village.

2) History of the villages and market conditions

Gouandougou village, one of the related villages of Gouandougou Forest Reserve, is the oldest in the department of Sidéradougou. The village of Dandougou separated itself from this village around the 16th Century and traditionally kept an autonomous organization including village chief. However, even today, the cultivating rights of each village are under the traditional control of Gouandougou village. Gouandougou village is composed of 13 districts. The five villages of Dakié, Gouara, Ouratenga, Tonga, and Wenga are regarded as sub-villages of Gouandougou village.

Bougousso village obtains a concession and is a sub-village of Dérégoué located about 10km to the north. Dérégoué also separated itself from Gouandougou village more or less at the same time as Dandougou village, however, its cultivating rights still remain under the traditional control of Gouandougou village.

Six of the villages except for Dandougou and Ouratenga market products in Sidéradougou city, which is home to the departmental seat of government. Dandougou products are sold in the village, while Ouratenga village markets its products in the mother village of Gouandougou.

3) Ethnic groups

The natives of Dandougou and Gouandougou villages are the Tiéfo; those of the other six (06) villages are Dogossé. Except in Dakié village, the Karaboro ethnic group, coming from the southwest of Burkina Faso is the majority population in Bougousso and Wenga. And the Mossi, originating from the central part of the country, represent the majority ethnic group in Dandougou, Gouandougou, Gouara, Ouratenga and Tonga villages. The village of Dakié is a rare case in the province of Comoé in that it has only natives (Dogossé) as inhabitants.

Except for the villages of Dakié, Tonga and Wenga, the five other villages accept immigrants for pasture, and many of them have settled themselves. (See 2.1.5)

4) Village organization

Dandougou and Gouandougou have benefited from CVGTs promoted by the PNGT2. Out of the eight related villages of Gouandougou Forest Reserve, a GGF has only been established in Dandougou. An application was made for its registration on the 15th of October 2004, and the authorities are currently advancing its approval procedure.

Table 5.10 Social Condition of Related Villages of Gouandougou F.R.

	Dandougou	Gouandougou	Bougousso	Dakié	Gouara	Ouratenga	Tonga	Wenga
Distance from the biggest agglomeration	27km from Sidera	15km from Sidera	28km from Sidera	26km from Sidera	36km from Sidera	18km from Sidera	33km from Sidera	21km from Sidera
Distance from the forest reserve	3km	2km	2km	1.5km	1km	4km	1.5km	2.5km
Market	In the village	Sidéra and in the village	Sidera	Sidera	Sidera	In the village	Sidera and Kouerè	Sidera
Demography	1,064	1,835	Around 500	Around 500	Around 400	Around 600	Around 85	Around 200
Natives	Tiefo	Tiefo	Dogossé	Dogossé	Dogossé	Dogossé	Dogossé	Dogossé
Majority	Mossi	Mossi	Karaboro	Dogossé	Mossi	Mossi	Mossi	Karaboro
Peuhl migrants	Existing	Existing	Existing	Existing	Existing	Existing	Nothing	Nothing
Other migrants	Karaboro, Lobi	Dogossé, Samo, Karaboro, Gouin, Dafing,Gourmantché ,Toussian,Noumouna ,Dioula	Lobi, Mossi, Dafing	None	Lobi, Dafing, Karaboro	Bobo, Samo	Karaboro,Samo	Dafing, Mossi, Dioula
Religion	Islam	Islam	Islam	Islam	Islam	Islam	Islam	Islam
Year of establishment	Before the colonisation	Before the colonisation	Before the indepen-dences	Before the indepen-dences	Before the indepen-dences	Before the indepen-dences	Before the indepen-dences	Before the indepen- dences
CVGT	Existing	Existing	Nothing	Nothing	Nothing	Nothing	Nothing	Nothing
GGF	Exist but not yet officially recognized	Nothing	Nothing	Nothing	Nothing	Nothing	Nothing	Nothing

NB：The demographic data of Dandougou and Gouandougou villages are based on the census of INSD, 1996. However, those of Bougousso, Dakié, Gouara, Ouratenga, Tonga and Wenga villages are based on hearings by the JICA Study Team, 2003-2004 since they are treated as sub-villages of Gouandougou in the INSD data

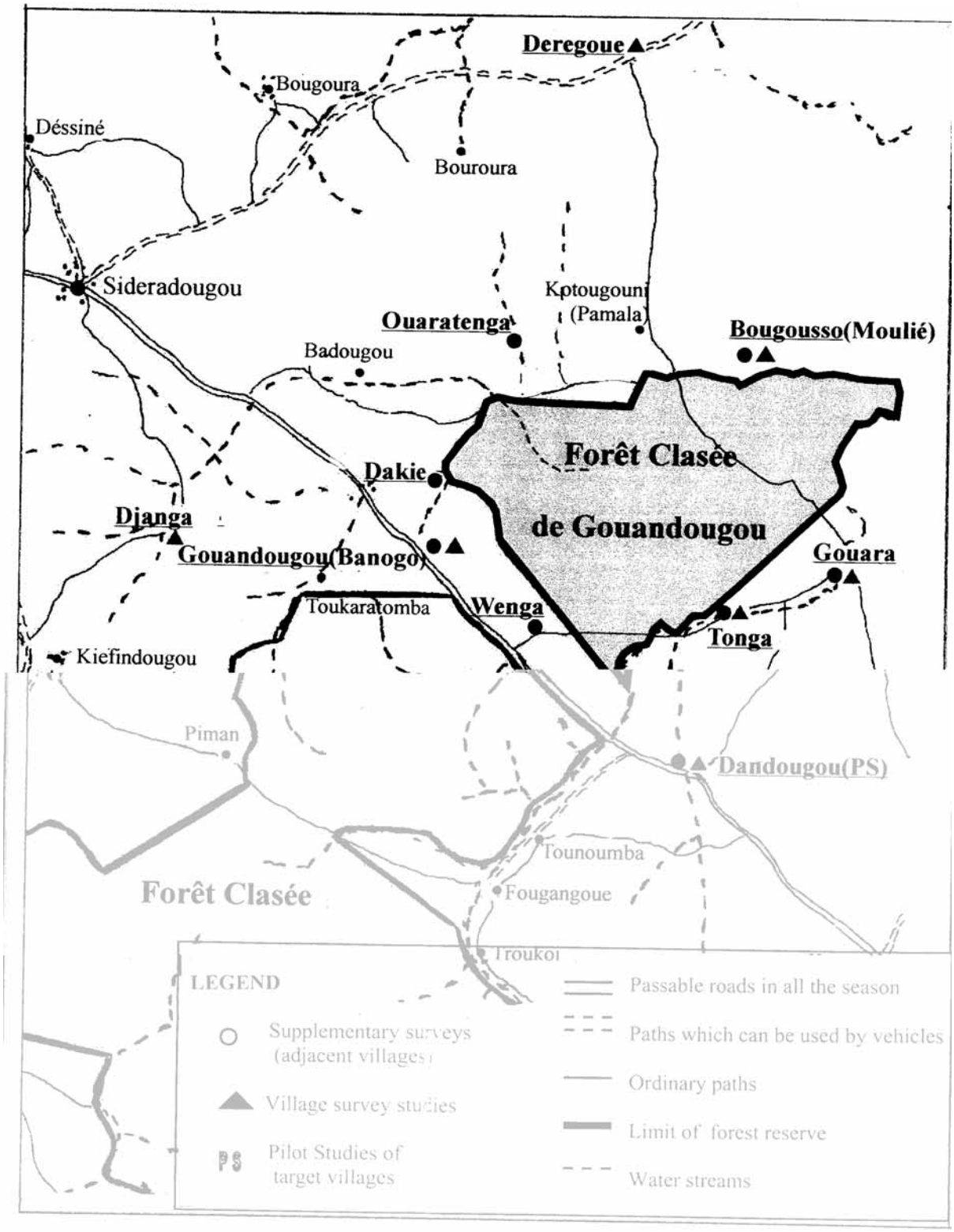

Figure 5.2 Location of Related Villages of Gouandougou F.R.

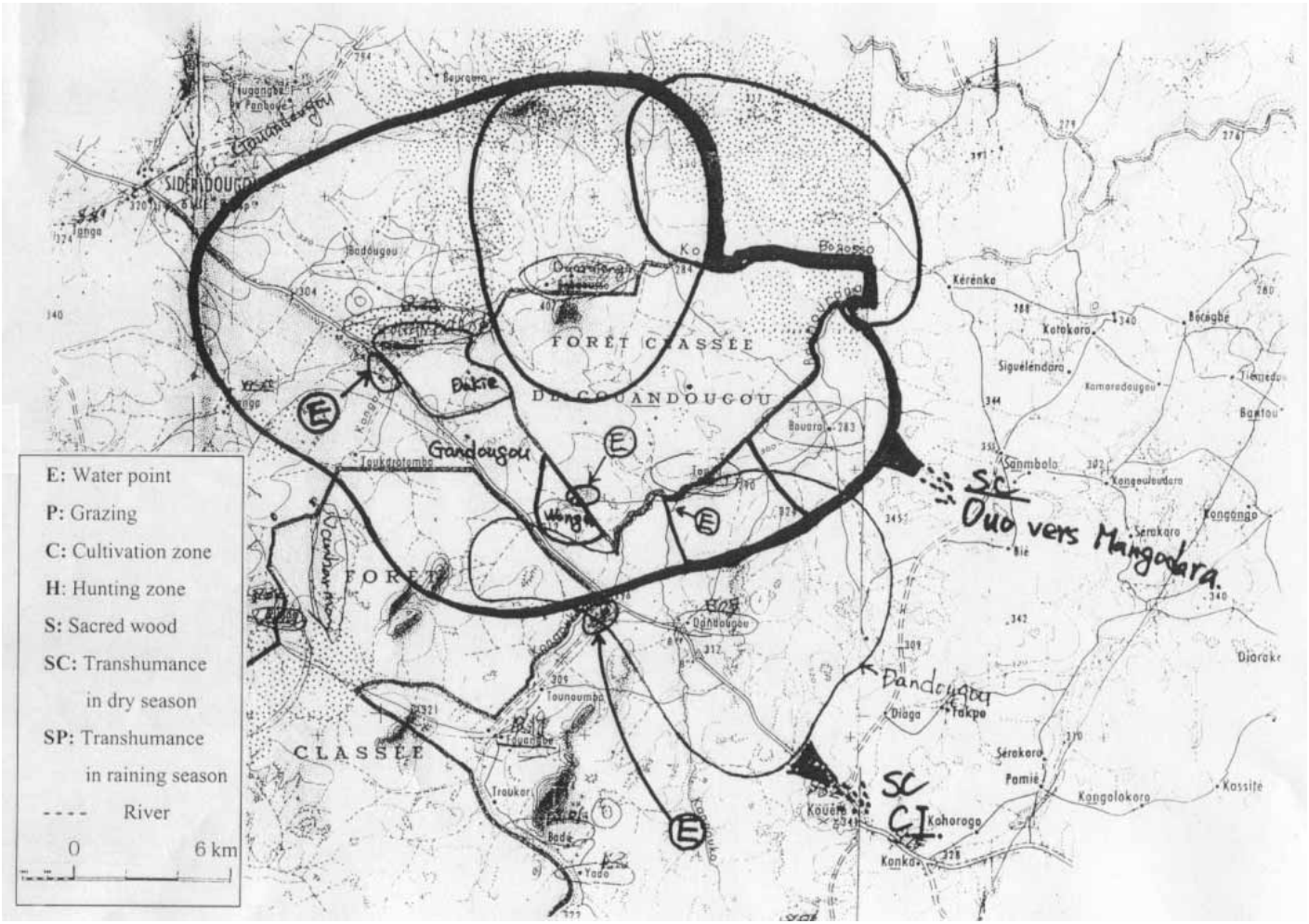

Figure 5.3 Terroir and Pasture Zones of Related Villages of Gouandougou F.R.

(2) Situation of the utilisation of resources of the forest reserve

According to Section 5.1.3 (Usage of Forest Resources in and Around the Forest Reserve), individuals and families in some related villages of Gouandougou Forest Reserve collect fuel wood for home consumption in a range of 4km in the forest reserve. Non-timber forest product like karité almonds, néré seeds, fruits and honey are collected in a range of 6 km outside the forest reserve for home consumption and selling.

Two related villages have sacred places inside Gouandougou Forest Reserve. About half of the related villages conduct hunting in the forest. Stockbreeders conduct grazing in the northern part of Gouandougou forest reserve.

(3) Village forests and sacred places

In the adjacent villages of Gouandougou Forest Reserve, local populations of seven villages except for Gouandougou village are unaware of village forests. Generally, the local population routinely collect fuel wood from low shrub forest free from control.

Gouandougou village still has a village forest that was established by the Forest Service outside of the forest reserve; however, as with other villages, this remains unused because the rights of usage and methods of preservation and management were not clarified following plantation (see Table 5.11).

Gouandougou village has possessed two sacred places outside the forest reserve since its establishment. Trees within the grounds of these sacred places are considered as sacred trees and their felling is forbidden.

Table 5.11 Villager Forests of Related Villages of Gouandougou F.R.

	Dandougou	Gouandougou	Bougousso	Dakié	Gouara	Ouratenga	Tonga	Wenga
Village forests	None	• One (01) site supported by forestry service in 1984 • Two (02) sites representing a sacred place, established before the colonisation	None	None	None	None	None	None

(4) Stockbreeding

Stockbreeding is practised traditionally on a small to medium scale without supervision, using natural meadowland, fallow land and forests. The livestock consists of cattle, sheep, goats and poultry. Stockbreeding is carried out in the terroir of Dandougou and Gouandougou,

Bougousso, Dakié and Wenga throughout the year. In Gouara, Ouratenga and Tonga villages, during the dry season, cattle move towards Mangodara and Gouandougou in search of pasture and water.

Traditional extensive stockbreeding is carried out on rich natural meadowland, fallow land and forests inside and outside of each terroir. Accordingly, except in Dandougou and Gouara villages where the breeding is important, no conflicts arise between stockbreeders and farmers during the harvesting period.

A lake located in the terroir of Dandaougou in the southern part of Gouandougou Forest Reserve is filled with water almost all year-round. This is an important livestock watering point in the area, and stockbreeders from neighbouring areas often use it for pasturage and also as a migratory route.

(5) Illegal activities carried out inside the forest reserve

According to the result of the supplementary surveys (see Table 5.13), half of the populations of the eight related villages of Gouandougou Forest Reserve are unaware of traditional rights of utilisation of forests reserves. Even though the said surveys showed that no cultivation is conducted inside the forest, it was confirmed that illegal cultivation is actually taking place. Stockbreeders in Gouara, Ouratenga and Tonga take their animals to enter the forest reserve in search of pasture and water during the dry season. Individuals from four of the villages carry out hunting in the forest reserve mainly during the dry season. Only in Gouara and Tonga villages do people seem to be aware of traditional utilization rights in the forest reserve.

As road infrastructure is not yet established around Gouandougou Forest Reserve, the network of paths connecting the different villages extends through the forest reserve, and it seems that the negligence of smokers passing through the zone is one of the causes of forest fires. In four villages, including Dandougou and Gouara where stockbreeding is popular, cases of bush fires have been noted in the forest reserve. Such fires are caused by the spread of uncontrolled burning of pastureland within the terroir (see Table 5.13).

Table 5.12 Situation of Pasture of Related Villages of Gouandougou F.R.

	Dandougou	Gouandougou	Bougousso	Dakié	Gouara	Ouratenga	Tonga	Wenga
Grazing zones and water points (Dry season)	In the terroir. When the water reserve is dried or when water is not available in the terroir, the breeders migrate towards Djigouè, Madouwélédaga and sometime in Côte d'Ivoire, Mali and Ghana.	In the terroir. At the level of borings and in the pond of Kongouko forest reserve	In the terroir. In the terroir, near water points such as wells	In the terroir. Animals are watered with water collected in borings with ustensils	In the terroir and sometime towards Ouo in the region of Mangodara. The inhabitants dig the bed of Koba river for keeping water for animal	In the forest reserve. In the water point near Gouandougou and in the forest reserve	There are no enough grasses in the terroir for animals. Sometime, animals graze in the forest reserve. The inhabitants dig the bed of Koba river for keeping water for animal	The livestock is not important. Only draught animals exist. So, they graze in the law ground, near the forest reserve. Animals are water in the water point of Kongouko forest reserve and also in pastoral wells of the terroir.
Grazing zones and water points (Rainy season)	In the terroir. The only one water point available in all the season is the water reserve of the village (see the map). In raining season cattle water in all the water points of the terroir	Water points of the terroir	Water points of the terroir	In the terroir. The small water streams are used as water places	In the terroir, the bed of Koba river is used as water place for animals. Animals of neighbouring villages water also their cattle but unfortunately the river water is not permanent.	In the terroir, the water point near Gouandougou	In the terroir, because animals found easily grasses. The bed of Koba river is used as water place for the cattle. Animals of neighbouring villages water also their cattle but unfortunately the river water is not permanent	Animals graze in the terroir. Small water points are enough sufficient to water the animals.
Conflict between Farmers and Breeders	Existing	None	None	None	Existing	None	None	None

Table 5.13 Illegal Activities and Problems related to Gouandougou F.R.

	Dandougou	Gouandougou	Bougousso	Dakié	Gouara	Ouratenga	Tonga	Wenga
Traditional rights of utilisation mentioned in forestry code	Conscious	Not conscious	Conscious	Not conscious	Conscious	Not conscious	Conscious	Not conscious
Hunting in the forest reserve	None	Dec.-May	None	None	Depend on the availability of the animals	None	Dry season	Dec.-May
Cultivation zones in the forest reserve	None	None	None	None	None	None	None	None
Causes of bush fire in the forest reserve	During the interview, one shepherd admitted that they are obliged to use fire for the regeneration of grasses in grazing zone.	We face sometime to accidental bush fires	We face sometime to accidental bush fires	We face sometime to accidental bush fires	During the interview, one shepherd admitted that they are obliged to use fire for the regeneration of grasses in grazing zone.	We face sometime to accidental bush fires	During the interview, one shepherd admitted that they are obliged to use fire for the regeneration of grasses in grazing zone.	During the interview, one shepherd admitted that they are obliged to use fire for the regeneration of grasses in grazing zone.

5.2. Characteristics and Problems of Gouandougou Forest Reserve

5.2.1. Characteristics and Problems

(1) Characteristics and problems of the utilisation of forest resources

Boundary surveying has been carried out and data on boundaries have been stocked in the forestry office.

Dense tree savanna occupies about 60 percent with sporadic sparse tree savanna and shrub savanna. The distribution of riverside forest and open forest having high tree density is limited. Bush fires seem to have a large impact on plant renewal.

Local people use the fringes of the forest reserve for the collection of fuel wood, even though resources are abundant around the villages. Fuel wood is not collected for selling much.

Dependency on the forest reserve is low for other forest products in general, although the situation differs according to species. Having said that, the fact that many local people pointed out the forest reserve as a potential area for obtaining forest products is mentioned. However, since growth density varies greatly according to species, care will be needed in setting utilization quotas and so on.

(2) Characteristics and problems of forest administration and the Forest Service

Presently the major activity of the Forest Service is the supervision of illegal activities in the forest reserve, mainly cultivation and grazing. Considering the abundance of forestry resources in the related villages, it seems that the illegal tree cutting inside the forest reserve is not frequent. But with the population growing, meaures should be considered to prevent possible illegal fuel wood exploitation in the forest reserve.

Since population growth will place greater pressure on the forest resources, it will be necessary for the Forest Service to continue to educate the population. A new role of the Forest Service in the medium and long term will be to support the establishment of GGF and so on, as is the case in Bounouna and Toumousséni forest reserves.

Many villagers wish to talk with forest officers, and education concerning utilization rights inside the forest reserve will continue to be important.

(3) Characteristics and problems of socio-economic interaction between the related villages of the forest reserve

1) Village organizations,etc. in related villages

Villages concerned with Gouandougou Forest Reserve are the eight villages of Dandougou, Gouandougou, Bougousso, Dakié, Gouara, Ouratenga, Tonga and Wenga (see the supplementary document explaining the criteria of the village selection).

Among these eight villages, only two, i.e.Dandougou village and Gouandougou village,

established the CVGT. Moreover, since none of the villages established a GGF, so their organized participation in the forest reserve was undeveloped.

2) Stockbreeding

Some grazing takes place in Gouandougou Forest Reserve, however, since abundant natural grazing zones for extensive traditional pasture still exist around each village terroir, forest depletion caused by grazing is not a major issue.

The degree of control over grazing around the lake situated to the south of Gouandougou Forest Reserve within the terroir of Dandougou village is an important factor in determining the impact of grazing in the reserve.

3) Illegal activities and problems related to the forest reserve

Lack of awareness of traditional rights of utilisation in the forest reserve continues to be a problem in the related villages. It is also necessary to educate people about the danger of bush fires caused by negligence of people passing through the forest.

5.2.2. Major Issues in Gouandougou Forest Reserve

(1) Problems arising from utilization of forest resources

70% of the vegetation in Gouandougou Forest Reserve is dense trees savanna, and the allocation of riverside thick forest and open forest is limited. Overall, it is necessary to maintain forest resources in their present state while at the same time sustaining and hopefully raising tree density in areas that are currently sparse.

It seems that development pressure caused by fuel wood collection in Gouandougou Forest Reserve is relatively low apart from fringe areas. Pressure caused by the collection of forest products is also low. However, it is forecast that pressure will increase in parallel with population growth. Attention should also be directed to the size of the impact of forest fres on vegetation and its regenration.

Education programs on traditional utilization rights, prevention of bush fires, and so on should be formulated in consideration of the above-mentioned conditions and villagers' expectations to utilize forest products in future.

(2) Problems concerning administration and the Forest Service

Three forest officers in Sidera Forest Service supervise Dandougou (9,500ha) and Kongouko (27,000ha) Forest Reserves. Moreover, Gouandougou and Dandougou villages, as mother villages, have traditionally influenced the related villages in Dandougou and Kongouko Forest Reserves. Thus, it is realistic for the participatory forest management to supervise the

two Forest Reserves together.

The Forest Service of Sidéradougou does not have sufficient transportation means and is overly busy monitoring illegal actions. The Forest Service will be unable to cover the large area of these two forest reserves using its current transportation means and personnel.

For the moment, in addition to the reinforcing of the supervision presently conducted, the Forest Service of Sidéradougou will surely continue education activities concerning traditional utilization rights. In the medium and long term, the support to the village organizations such as the GGFs and the GGF Union will also be an important role.

(3) Socio-economic considerations regarding related villages

Dandougou, and Gouandougou villages have benefited from CVGTs promoted by the PNGT2. Out of the eight related villages of Gouandougou Forest Reserve, only Dandougou has a GGF. Accordingly, in consideration of development pressures in the medium and long term, the Forest Service will need to place emphasis on the building of GGF organizations at the citizen level in addition to continuing education programs concerning traditional utilization rights.

Livestock grazing does not impact great pressure on Gouandougou Forest Reserve, however it will be necessary to control pasturage around the lake in the south of the reserve in the terroir of Dandougou.

Figure 5.4 Land Use/Vegetation Map of Gouandougou F.R. and Kongouko F. R.

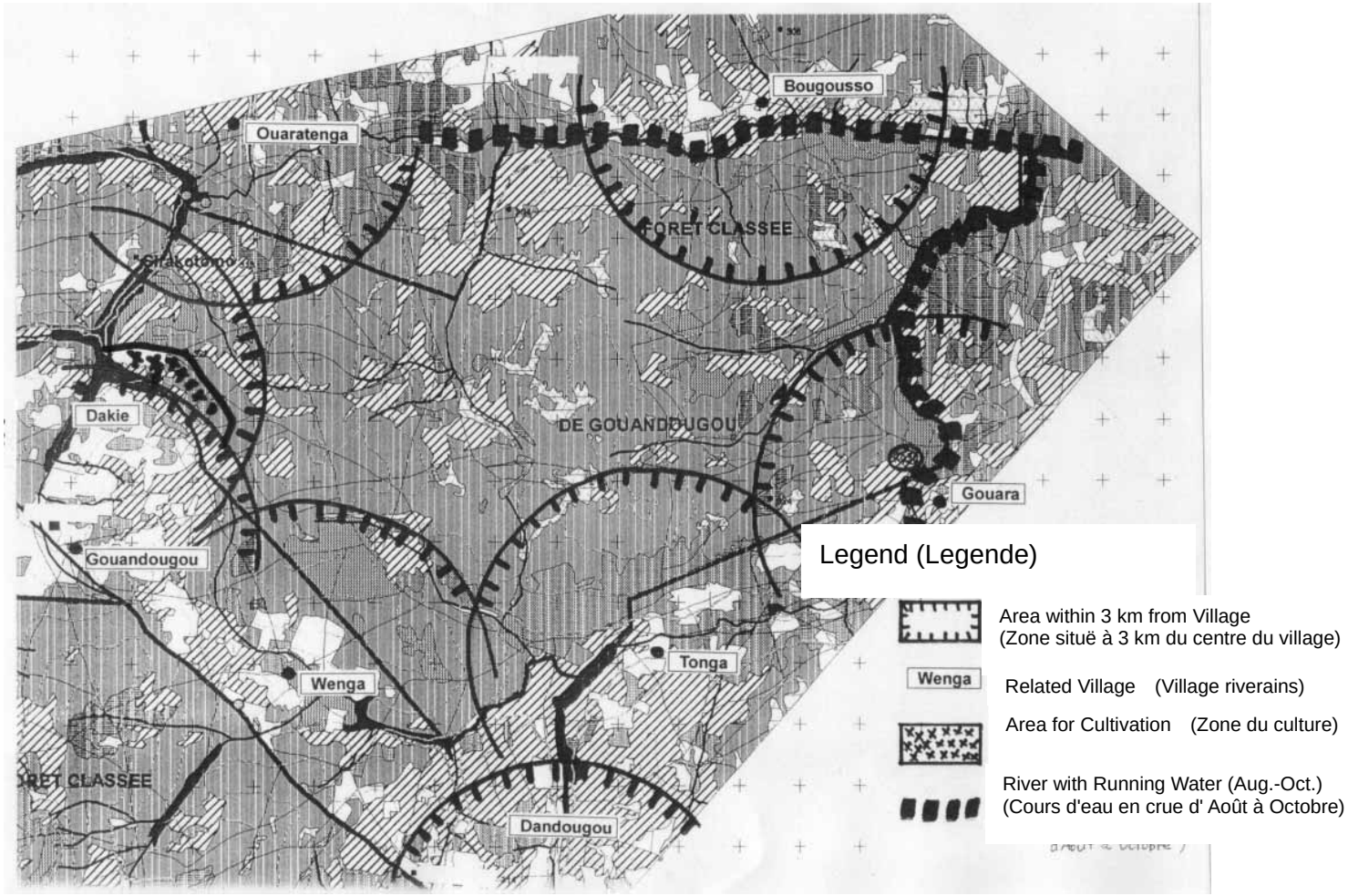

Figure 5.5 Range of Collection of Forest Products in Gouandougou F.R.

Chapter 6 Present Conditions and Issues of Kongouko Forest Reserve

6. Present Conditions and Issues of Kongouko Forest Reserve

6.1. Kongouko Forest Reserve

6.1.1. History of the Reserve and Boundary Management

Table 6.1 shows the outline of Kongouko Forest Reserve. This was designated as a forest reserve before independence according to a forest reserve order (Decree No. unknown). The reasons for the designation were not mentioned in the decree, however, they were said to be to protect the ecosystem and to conserve biodiversity (Source: Regional Direction of Environment and Habitat of Cascades).

Table 6.1 Outline of Kongouko Forest Reserve

No. of Decree	Date of Declaration**	Area (ha) *	Place of Issue	Condition of the Boundary
N.A.	1955	27,000 (21,841)	Dakar	Boundary stones are set. Boundary has been surveyed.

* The upper figure is the area given in the decree. The figure in parentheses is calculated from GIS data.
** The date of the issue of the decree is shown as the date of establishment of the reserve.

According to the decree, the three items listed below are permitted as resource utilization rights for the local community, in addition to collecting dead trees, fruits, edible and medical plants as guaranteed in Article 14 of the former forest law.

- Traditional fishing in accordance with the Fisheries Law.
- Village hunting without starting fire.
- Honey collection without slashing and burning.

The present Forest Law guarantees local people the rights of using forest resources, i.e. gathering of dead trees and branches, nuts and fruits, and medical plants (Article 56). Besides them, additional items of usage permitted for local people can be declared by a decree for each forest reserve (Article 58).

Boundary stones were set and undergrowth cutting was carried out to demnstrate the boundary of the forest reserve in 1998 under the EU Mapping Project. However, no proper boundary survey has been carried out and information about the location (longitude and latitude) of the boundary is not available in forestry office. Accordingly, boundary survey using GPS receivers was carried out in 2003 during this study in order to establish and share those data. The Study Team went out into the field accompanied by an examiner who was appointed by the minister. The results of the survey have already been approved by The Ministry of Environment. Now, the results are undergoing official procedure for approval by the ministry council, which normally takes a few years. However, there is no problem in using the data as official data in the framework of activities planning because they have already received ministerial approval.

At present, activities for maintaining the boundaries, such as patrolling or cutting, are not executed by the Forest Service because of a strict budget; nevertheless the local people around the forest reserve seem to fairly recognize the location of the boundary.

6.1.2. Land Use/Vegetation and Forest Inventory

(1) Land use/ Vegetation

The land use/vegetation map of Kongouko Forest Reserve is shown in Figure 5.4 and the surface area of each land use/vegetation type is shown in Table 6.2. This reserve mainly consists of dense tree savannah (*Savane Arborée Dense*) and sparse tree savannah (*Savane Arboéee Claire*) accounting for 67.0% of the total area. Riverside forest (*Foret Galerie*) and riverside thick forest (*Fourre Ripicole*) are distributed along stream lines, although the surface area of them is not large. Those forests, together with wooded savannah (*Savane Boisée*), form good forests with high tree density. On the other hand, cultivatedarea (*Champ Cultive*) and fallow land (*Champ non Cultive*) are distributed in the southeastern part of the forest reserve.

Table 6.2 Areas by Land Use/Vegetation Types in Kongouko F.R.

Legend	Area (ha)	Ratio (%)
Riverside forest (*Foret Galerie*)	1,559	7.1
Riverside thick forest (*Fourre Ripicole*)	43	0.2
Wooded savannah (*Savane Boisée*)	99	0.5
Dense tree savannah (*Savane Arborée Dense*)	7,908	36.1
Sparse tree savannah (*Savane Arborée Claire*)	6,746	30.9
Dense shrub savannah (*Savane Arbustive Dense*)	1,345	6.2
Sparse shrub savannah (*Savane Arbustive Claire*)	3,758	17.2
Grass savannah (*Savane Herbeuse*)	60	0.3
Cultivation area (*Champ Cultive*)	78	0.4
Fallow (*Champ non Cultive*)	9	0.0
Bare ground (*Zone Nue*)	12	0.1
Eroded area (*Sol Erode*)	224	1.0
Total	21,841	100.0

(2) Forest Inventory

Table 6.3 shows the number of trees per hectare by circumference according to the inventory survey (See "Appendix" for methodology). The volume of woods per hectare is also calculated and shown in the table. According to the national forest inventory conducted in 1980, the tree volume of Cascade region was estimated as 52.8 m3/ha with annual production of 1.26 m3/ha (Inventqire Forestier National Haute-Volta; FAO, 1982). Using this result (the ratio of the tree volume and the annual production), the mean annual production of Kongouko Forest Reserve is calculated as 1.51m3/ha (4.45 Stere/ha), which corresponds to the total production of 33,056.7 m3 (97,225.7 Stere) for the whole reserve. (0.34 m3 in volume = 1 Stere)

Table 6.3 Number and Volume of Trees by Circumference in Kongouko F.R.

Class of trees (cm in circumference)	Number of trees (trees / ha)	Volume of wood (m^3/ha)
125 cm or more	22.7	32.3
31-124 cm	210.5	29.0
15-30 cm	155.9	2.1
Sub total	***389.1***	***63.4***
Seedlings (3-4 cm)	504.5	–
Seedlings (less than 3 cm)	454.8	–

The densities of some useful species are calculated by using the result of the forest inventory survey (see Table 6.4). The density varies from species to species. *Vitellaria paradoxa* (karité) grow with high density, but the densities of *Parkia biglobosa* (néré) and others are not high. *Detarium microcarpum* (detarium) also grow with high density but they grow densely in shrub savannah (*Savane Arbustive*) and most of them are small trees with less than around 30cm in circumference.

Table 6.4 Density of Useful Tree Species in Konguko F.R.

Species	Density (trees/ha)
Vitellaria paradoxa (Karité)	16.9
Parkia biglobosa (Néré)	0.1
Detarium microcarpum (Detarium)	78.2
Tamarindus indica (Tamarind)	4.2
Bombax costatum (Kapok tree)	0.2

6.1.3. Usage of Forest Resources in and Around the Forest Reserve

(1) Fuel wood

Table 6.5 shows the results of the hearing on fuel wood gathering. In the survey of related villages, village representatives were asked about the average situation in village households. Also, since individual persons were interviewed about household conditions in the same villages during the survey of forest resources, both findings are shown.

Fuel wood is usually gathered from bush and cultivated land around each village, and it seems that collection in the forest reserve is not common. Only one interviewee admitted to gathering fuel wood from the forest reserve. The range of gathering usually extends from 1 to 2km (Figure 6.4 shows the ranges of 2km from the center of each village). It seems that fuel wood is not collected for the purpose of selling since the local communities are located rather far from large markets.

Table 6.5 Fuel Wood Gathering in and around Kongouko F.R.

Village Name	Distance (km)	Usage of F.R.	Period	Selling
Kadio*	1	No	Dry season (2 months)	No
	1	No	Dry season (7 months)	No
	3	No	Dry season (2 months)	No
	-	No	Dry season (-)	No
Kassande*	2	No	Dry season (4 months)	No
	2	No	Dry season (4 months)	No
	1-5	No	Dry season (6 months)	No
Pima*	-	No	All the year (12 months)	No
	-	No	Dry season (-)	No
	1	No	All the year (12 months)	No
Fougangoue**	0-1	No	Jan. - Apr.	No
Bade**	0-1	Yes	Jan. - Apr.	No
Faradjan**	0-4	No	Jan. - Apr.	No
Kadio**	0-1	No	All the year (12 months)	No
Bandakoro**	0-2	No	Feb. - Jun.	No
Kassandé**	0-2	No	Mar. - Jun.	No
Pima**	0-2	No	Feb. - Jul.	No
Djanga**	0-1	No	All the year (12 months)	No

* Result from the "Forest resources survey"

* * Result from the "Related village survey"

(2) Other Forest Products

The conditions of use of other forest products are shown in Table 6.6 and Figure 6.1. (The maximum obtained answers are shown for "Distance" and "Period of collection," while the frequency of each response is shown for "Usage of F.R" and "Selling"). The range of gathering extends for 2~3km., sometimes to 4~5km. Some interviewees admitted to using the reserve for

collecting products, however, this doesn't seem to be very intensive. Wood products are exploited mainly in the dry season, and non-wood products such as fruits are harvested mainly from the second half of the dry season to the beginning of the rainy season, although the periods depend on the growing stage of each product. Karité, Néré, and honey are also collected for selling, providing an additional source of income for local residents.

Besides those product mentioned above, local people listed *Detarium microcarpum* (detarium), *Tamarindus indica* (Tamarind), *Bombax costatum* (Kapok tree), *Saba senegalensis* (Saba), *Adansonis digitata* (Baobab), thatching grasses, and others as useful forest species. Some of the products from those species are also used for medicines. According to the interviewees, those products are mainly collected outside the reserve. On the other hand, many of them indicated the forest reserve as a potential production area although the amount of resources in the reserve is not abundant for all species.

Table 6.6 Harvesting of Other Forest Products in and around Kongouko F.R.

Forest products	Distance (km)	Usage of F.R.	Period of Collection	Selling
Timber	1-2	Yes: 1, No: 5	Dry season	Yes: 0, No: 6
	0-4	Yes: 1, No: 7	All the year (12 months)	Yes: 0, No: 8
Karité	0-4	Yes: 2, No: 6	May - Aug.	Yes: 8, No: 0
	0-5	Yes: 1, No: 7	May - Oct.	Yes: 8, No: 0
Néré	0-3	Yes: 1, No: 7	May - Jul.	Yes: 5, No: 3
	0-3	Yes: 2, No: 6	Apr. - Oct.	Yes: 8, No: 0
Honey	0-4	Yes: 0, No: 2	Mar. - May	Yes: 1, No: 1
	0-3	Yes: 1, No: 7	Mar. -Aug.	Yes: 8, No: 0

Upper row : according to the "Forest resources survey"
Lower row: according to the "Related village survey"

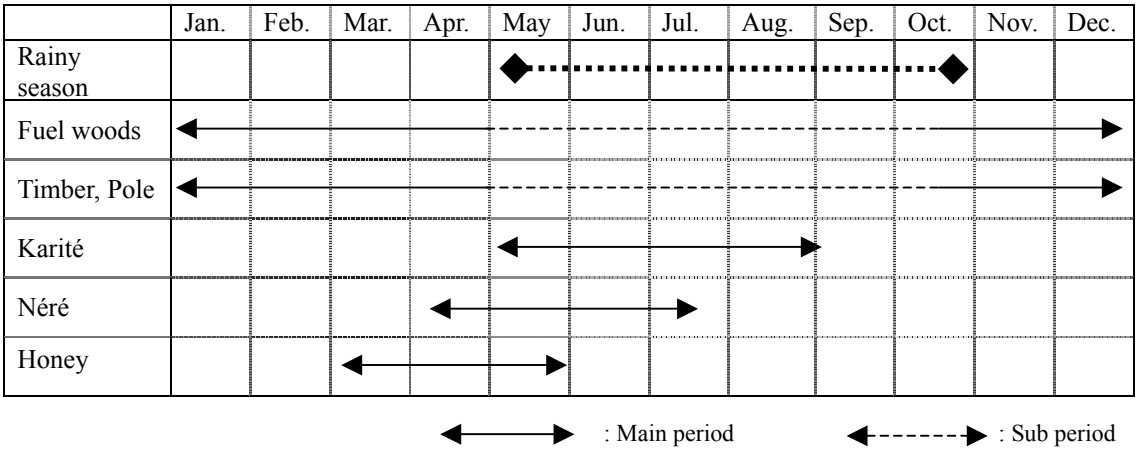

Figure 6.1 Harvest Calendar of Forest Products in Related Villages of Kongouko F. R.

(3) Other topics on natural resources

1) Topographic features and water drainage

In the forest reserve, no steep slopes having risk of large-scale soil erosion or landslide were confirmed. Some bare ground suffering from erosion was observed along stream banks, but this is only on a small scale.

A river flowing along the northeastern boundary has flowing water between August and October and dries up during the dry season (See Table 6.4). A reservoir exists at the lower stream of this river and is filled with water throughout the year. All other streams are so small that they only have temporary water flow during the rainy season.

2) Bush fires

Forest fire occurs all over the forest reserve. The fire occurs from the end of October when the rainy season finishes, to April and May when the dry season ends. Burnt area was observed in the reserve during the field inspection in November and December. As a result, all the leaves of shrubs up to 2~3m in height are burned brown. The impact of fire on the regeneration of forests seems to be large.

3) Sacred places

The local communities maintain some traditional sacred places in the forest reserve. In the hearings for eight related villages, the representatives of all villages except Kadio admitted the existence of sacred places, and three villages have such places in the reserve (Table 6.7). Some taboos and customs relating to forest conservation are shown in the table. However, since the location of sacred places are often kept secret from outsiders, it will be necessary to remember the possibility of scared places when compiling the management plan.

Table 6.7 Existence of Sacred Places in Kongouko F.R.

Village Name	Existence of sacred places	In the Reserve		Taboos related to forest conservation
		Existence of sacred places	Identification of the location	
Fougangoué	Yes	Yes	Not Available	(It was used before, however, it was abandoned after the area was included in the forest reserve.)
Badé	Yes	No	-	-
Faradjan	Yes	No	-	-
Kadio	No	No	-	-
Bandakoro	Yes	No	-	-
Kassandé	Yes	1 place	Not Available	- Tree cutting and hunting are prohibited.
Pima	Yes	4 places	Maybe Yes	- Tree cutting, fire, and hunting are prohibited.
Djanga	Yes	No	-	-

6.1.4. Present Situation of Fauna

Table 6.8 shows the present situation of fauna and fishery resources in Kongouko Forest Reserve.

Table 6.8 Fauna and Fishery Resources in Kongouko F.R.

	Fauna	Fishery
Present situation	Animal species that exist in this reserve are: hinds, jackals, coba, hares, partridges, wild guinea fowls, porcupines, monkeys, small antelopes.	Protopteridae*, Mormyridae, Gymnarchidae, Ostéoglossidae, Charachidae, Distichodobtidae, Citharinadae, Chirrinidae, Bagridae, Schilbeidae, Claridae, Malapteridae, Mochokidae, Centropomidae, Cichlidae, Anabantidae, Channidae, Totraodontidae
Species disappeared	Elephants, hyenas, lions, panthers and zebras	Impossible to find data
Desired species to be recovered	Coba/hippotrague, bubales, cob de fassa, buffoon cob, redunca cob, grimm cephalophe, cephalophe with reddish side, orycterope	Heterotis niloticus**, Claria anguillaris Lates niloticus, Oreochromis niloticus
Remarks	Criteria for selecting species for restoration are as follows: - The capacity for receiving several fauna species - Some species needed essential vital resources for survival and opening out - Populating zones traditionally inhabited by animals - Ecological conditions - Social, economic and cultural requirements for neighbouring villages - Anthropogeny space possession - Five forest reserves - Biological requirements of each species - Spatial needs or requirement for each species - Ecological balance	* All the species of fish mentioned above are a family group of fish. Concerning other details, there are many more individual fish that exist in river waters of Comoe Province. ** The reproduction of these species of fish is based on economic reasons, because they can reproduce faster in rivers and ponds

(Source: DRE/ CV Cascade 2004)

6.1.5. Actions of the Forest Service and External Structures

(1) Forest Service

Forests reserves under government control are managed with participation of citizens from related villages. The government Forest Service is involved with Kongouko Forest Reserve in the following ways:

- controlling of illegal actions
- Training on the conservation of forest resources

As is also the case in Gouandougou Forest Reserve, the EU Mapping Project set up the boundary of Kongouko Forest Reserve in 1998. Before that, since the boundaries of the forest reserve were not clarified, there were frequent illeal activities within the reserve. Presently, the controlling of illegal activities in the forest reserve is the major task of the Forest Service. There are some cultivated fields in the forest reserve tha were established many years ago; however, the shortage of personnel makes it difficult to provide guidance, and the service is fully stretched just trying to prevent further expansion of cultivation in the reserve.

Presently, training on traditional utilisation rights in the forest reserve is being implemented in cooperation with the JICA Study Team.

- Patrolling and supervision by the Forest Service

Three forest officers of the department of Sidéradougou are in charge of the patrolling and supervision of the neighbouring villages of Kongouko Forest Reserve (27,000 ha). Since the road infrastructure is not yet established and villages are dispersed all around the forest reserves, these agents use off-road motorbikes to conduct their activities. However, they sometimes face breakdowns due to the bad state of roads, and it is only possible for them to patrol during a certain period in the dry season (January-May).

The only means of communication with the Departmental Forest Service of Sidéra is public telephone (private telephone center). Therefore, villagers directly visit the Forest Service office when they have information to convey.

According to the results of the supplementary survey (see Table 6.9), the number of forest officers is not sufficient to cover such a wide area, and the agents are unable to conduct adequate patrols, which also include brief greetings with the locals. Numerous interviewees reported that they wish hold extensive discussions with the Forest Service concerning conditions in the villages.

Table 6.9 Patrolling and Supervision of Kongouko F.R.

	Badé	Banakoro	Fougangouè	Faradjan	Kassande	Kadio	Pima	Djanga
Frequency of patrols	1/week	2/week	3/ week	Frequently	1/week	2/week	Almost never	3/ week
Objectives of patrols	Patrolling	Patrolling	Education on forest management	Patrolling	Education on forest management	Patrolling	−	Patrolling
Traditional rights of utilisation mentioned in the forestry code	Aware	Not aware	Aware	Aware	Not aware	Aware	Aware	Aware
JICA FM broadcast	Content under-stood	Content under-stood	Content understood	Content understood	Content understood	Content understood	Content under-stood	Content under-stood

(2) External structures

Projects that have so far been implemented by external support agencies in the Kongouko Forest Reserve are as follows:

- EU Mapping Project (1997)
- JICA Development Study for the Forest Management Project in Comoe Province (2002~2005)

6.1.6. Socioeconomic Interaction between Related Villages and the Forest Reserve

(1) Socio-economic interaction between related villages and the forest reserve

1) Relationship with the forest reserve

The following eight villages are named as related village to Kongouko forest reserve: Badé, Banakoro, Fougangouè, Faradjan, Kassandé, Kadio, Pima and Djanga (see the Appendix for the selection criteria of these villages). The distance of each village from the forest reserve is estimated between 0.3~9km, making the reserve easily accessible on foot. According to the surface area of Kongouko forest reserve (27,000 ha) and the total population of the eight villages (5,453), the human pressure per hectare is 0.2 persons.

According to the area of Kongouko forest reserve (27000 ha) and the total population of the eight (08) villages (5453), the human pressure per hectare is 0.2 person.

2) History of the villages and market conditions

The neighbouring villages of Kongouko forest reserve can be classified into three categories: villages under the influence of the village of Gouandougou, villages under the influence of the village of Dandougou, and localities created by immigrants from Mali.

The village of Gouandougou, which is one of the related villages of Gouandougou Forest Reserve, was founded between the 16th and the 18th Century and is the oldest village in the area. The villages of Fougangouè, Pima and Djanga secured independence from Gouandougou. These villages have traditional organisations including village chiefs. However, even today, the cultivating rights of each village are under the traditional control of Gouandougou village. The village of Badé is gained autonomy from the village of Fougangouè.

The village of Dandougou, one of the related villages of Gouandougou forest reserve, became autonomous almost at the same time as the villages of Fougangouè, Pima, and Djanga. The village of Faradjan gained autonomy from Dandougou; then the villages of Kadio and Banakoro became independent of Faradjan. These three villages have traditional organisations including village chiefs. However, even nowadays, the land ownership of each village is under the traditional influence of the village of Gouandougou through the intermediary of Dandougou.

The village of Kassandé was created around the 18th Century by immigrants from Mali.

Forest products of the villages of Badé, Banakoro, Fougangouè, Faradjan and Kassandé are sold within the villages. However, the city of Sidéradougou is the biggest market for the villages of Kadio, Pima and Djanga.

3) Ethnic groups

The natives of the villages of Badé and Banakoro are Dogossè, while those of the six other villages are Tiéfo. Mossi from the central part of Burkina Faso constitute the majority ethnic group of the villages of Fougangouè and Badé. Karaboro from the southwest region represent the majority ethnic group of the six other villages.

4) Village organisation

Badé has been selected for establishing CVGT under the PNGT2. This structure has already been established in the village of Fougangouè in the framework of the activities of the Pilot Study.

Apart from Badé, the other seven related villages of Kongouko Forest Reserve do not have a GGF.

Table 6.10 Social Condition of the Related Villages of Kongouko F.R.

	Badé	Banakoro	Fougangouè	Faradjan	Kassandé	Kadio	Pima	Djanga
Distance from the biggest city	40km from Sidera	42km from Sidera	35km from Sidera	43km from Sidera	20km from Sidera	37km from Sidera	18km from Sidera	12km from Sidera
Distance from the forest reserve	0.3km	3km	1km	9km	4km	4km	4km	4km
Market	In the village	In the village	In the village	In the village	In the village	Faradjan Sidera Banfora	Sidera	In the village and Sidera
Population	162	705	173	1960	1,286	354	396	417
Natives	Dogossé	Dogossé	Tiefo	Tiefo	Tiefo	Tiefo	Tiefo	Tiefo
Majority	Mossi	Karaboro	Mossi	Karaboro	Karaboro	Karaboro	Karaboro	Karaboro
Fulani migrants	Exist	Exist	Exist	Exist	Exist	Exist	Exist	Exist
Other migrants	Dioula, Karaboro, Gouin, Samo	Bobo,Mossi, Lobi	Dioula, Karaboro, Gouin,Samo, Dafing, Dogossé	Dioula, Gouin,Samo, Dafing, Bobo, Lobi,Dogossé, Mossi,Toussian	Gouin, Samo,Lobi, Mossi, Gourounssi, Bobo	Bobo, Dogossé, Mossi, Toussian	Gouin, Lobi, Mossi, Birifor, Dogosse	Lobi,Mossi, Birifor, Dogosse, Siamou,Samo, Birifor,Dafing
Religion	Islam	Islam	Islam	Islam	Islam	Islam	Islam	Islam
Date of creation	Before colonisation	Before colonisation	Before colonisation	Before colonisation	Before colonisation	After colonisation	Before colonisation	After colonisation
Conflict between breeders and farmers	N.A	N.A	Between Breeder and Cultivator	Between Breeder and Cultivator	N.A	Between Breeder and Cultivator	N.A	Between Breeder and Cultivator
CVGT	Exist	N.A	Exist	N.A	N.A	N.A	N.A	N.A
GGF	Exist	N.A	Exist but not yet officially recognised	N.A	N.A	N.A	N.A	N.A

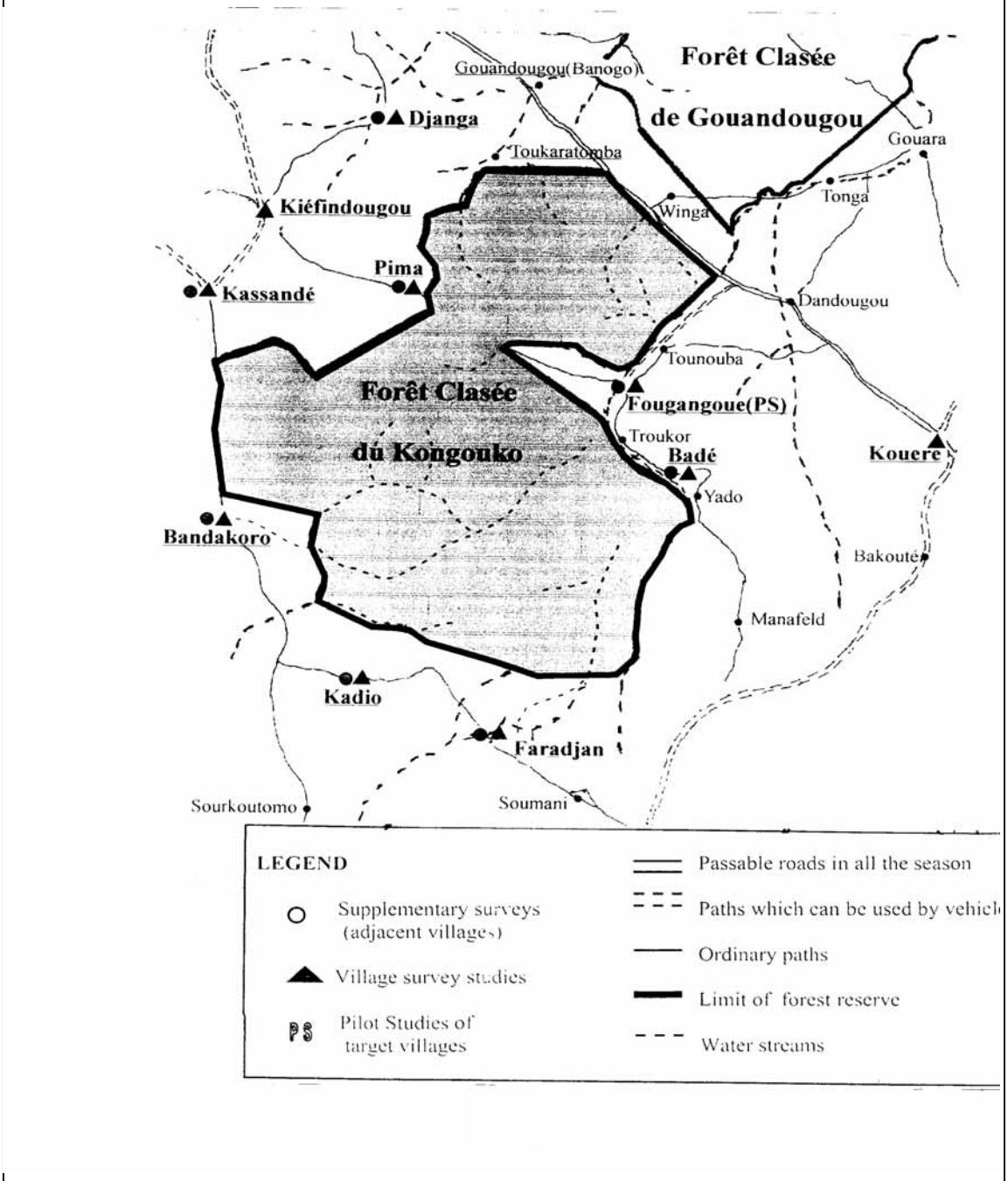

Figure 6.2 Location of the Related Villages of Kongouko F.R.

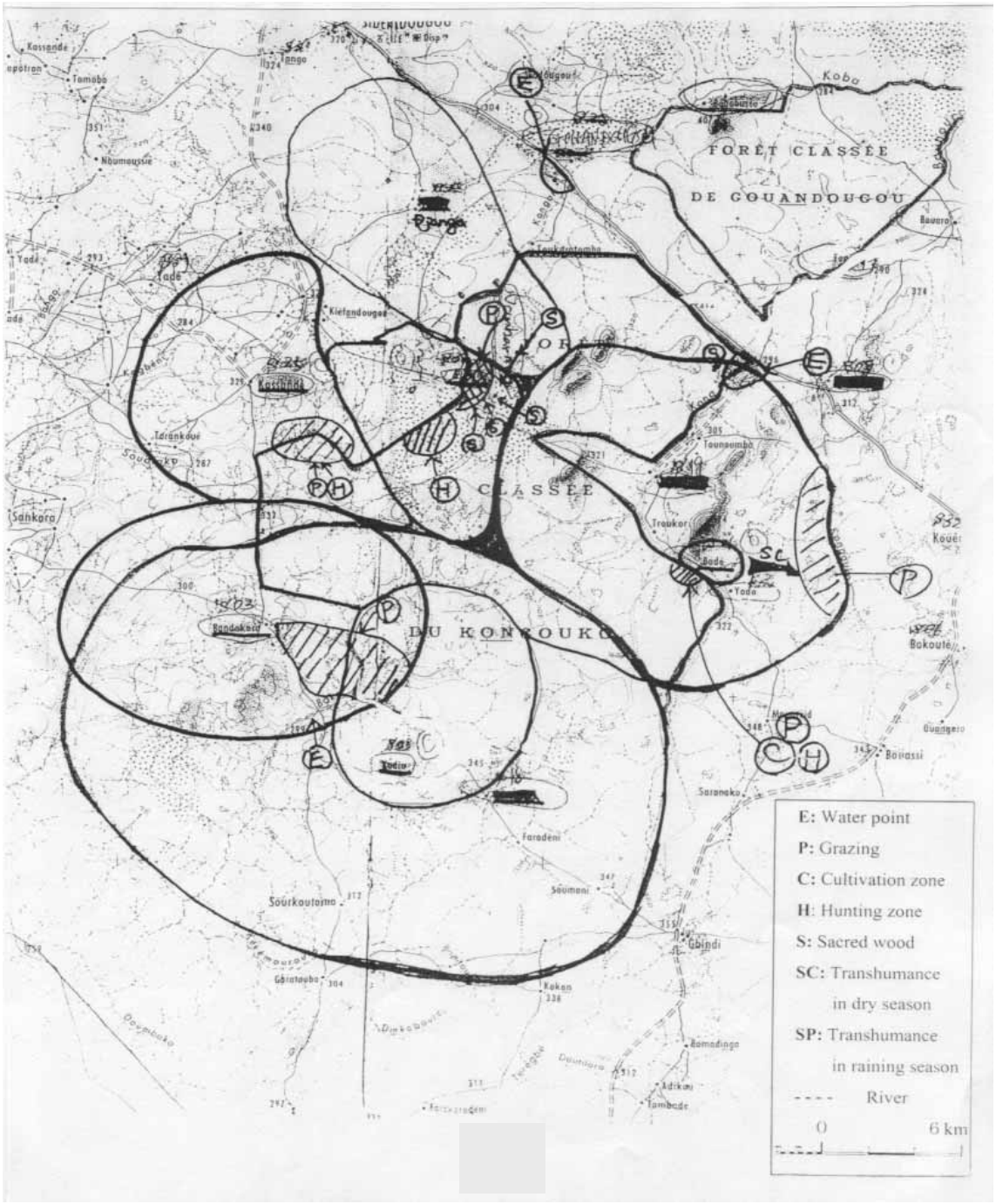

Figure 6.3 Terroir and Pasture Zones of the Related Villages of Kongouko F.R.

(2) Situation of the utilisation of resources of the forest reserve

According to Section 6.1.3 (Usage of Forest Resources in and Around the Forest Reserve), individuals and families in some related villages of Kongouko Forest Reserve collect fuel wood for home consumption with a range of 4km in the forest reserve. Non-timber forest product like karité almonds, néré seeds, fruits and honey are collected in a range of 4~5 km mainly outside the forest reserve for home consumption and selling.

Some related villages have sacred places inside Kongouko Forest Reserve. About half of the related villages conduct grazing and hunting in the forest. Badé village has been conducting cultivation inside the forest reserve for 11 years.

(3) Village forests and sacred places

Out of the eight related villages of Kongouko Forest Reserve, while the inhabitants of Kadio declare having no idea concerning village forest, the inhabitants of the seven other villages considered these village forests to be forest planted on government initiative or forest containing sacred sites. Generally, the local population routinely collect fuel wood from low shrub forest free from control.

The villages of Badé, Banakoro, Faradjan, Kassandé and Pima have retained village forests that were planted under the government policy of "8,000 villages; 8,000 forests" 20 years ago. However, as with other villages, these remain unused because the rights of usage and methods of preservation and management were not clarified following plantation (see Table 6.11).

The village of Pima has four sacred places inside the forest reserve as compared to the village of Djanga, which has one outside the forest reserve. Trees within the grounds of these sacred places are considered as sacred trees and their felling is forbidden.

In the village of Fougangouè, the Study Team planted 10 mango seedlings and around 1 ha of cashew nut and detarium[1] as a plantation training exercise upon discussing the mtter with the Forest Service. Agreement was then reached with the GVGT and the Forest Service concerning preservation and management after the reforestation and also about the rights of usage of the plantation. Since then, this village forest has been properly managed by the CVGT.

[1] Detarium (Detarium microcarpus) is a rapid growing species; it can be useful as fuel wood in five years after plantation and is resistant to grazing and bush fires.

Table 6.11 Village Forests of the Related Villages of Kongouko F.R.

	Badé	Banakoro	Fougangouè	Faradjan	Kassandé	Kadio	Pima	Djanga
Village forest	Plantation supported by the forest service in the 1980s	Plantation supported by the forest service in the 1980s	Plantation supported by JICA project 2003	Plantation supported by the forest service in the 1980s	Plantation supported by the forest service in the 1980s	None	Plantation supported by the forest service in 1984 4sites representing a sacred place in the forest reserve	A site representing a sacred place established before colonisation

(4) Stockbreeding

Stockbreeding is practised traditionally on a small to medium scale without supervision, using natural meadowland, fallow land and forests. The livestock consists of cattle, sheep, goats and poultry. Stockbreeding is carried out in the terroir of each of the eight villages during all the year. However, some villagers of Badé, looking for pasture zones and water places, allow stock to graze in the forest reserve throughout the year, while some villagers of Banakoro, Fougangouè and Kassandé do this in dry season.

Since traditional extensive stockbreeding is carried out on rich natural meadowland, fallow land and forests inside and outside of the terroir of each village, disputes tend to arise between stockbreeders and farmers during the harvest period in the four villages of Fougangouè, Faradjan, Kadio and Djanga, where stockbreeding is prosperous (see Table 6.12).

A lake located in the terroir of Dandaougou in the northeast part of Kongouko Forest Reserve is filled with water almost all year-round. Since this is an important livestock watering point adjacent to the forest reserve, the quality of grazing management around it is an important issue.

(5) Illegal activities carried out inside the forest reserve

According to the result of the supplementary surveys (see Table 6.13), the local population of the villages of Banakoro and Kassandé have no idea concerning traditional utilisation rights of forest reserves. Some inhabitants of Badé have conducted farming in the forest reserve since 1993. Also four villages hunt inside the forest reserve mainly in the dry season.

As road infrastructure is not yet established around Kongouko Forest Reserve, the network of paths connecting the different villages extends through the forest reserve, and it seems that the negligence of smokers passing through the zone is one of the causes of forest fires. Moreover, natural meadowlands in the terroir are burned in order to promote the sprouting of new feed

shoots for livestock pasture; however, this burning sometimes goes out of control and leads to bush fires within the forest reserve.

In the village of Pima, there are four sacred places inside the forest reserve, and there have been cases where fire used for traditional rites have caused forest fires due to careless handling.

Table 6.12 Situation of Pasture in the Related Villages of Kongouko F.R.

	Badé	Banakoro	Fougangouè	Faradjan	Kassandé	Kadio	Pima	Djanga
Grazing and water places (dry season)	Animals graze in the forest reserve during all the season. Animals drink in Kongouko river	Animals graze in the terroir and in the forest reserve. They drink from the water place of the terroir, from the wells and from the river Toussamako	The grazing zone is located in the terroir near the lake which constitutes a natural boundary with the forest reserve. Sometime, animals illegally graze in the forest reserve.	In the terroir, some pounds keep water which is insufficient because of overgrazing.	Animals graze in the terroir and in the forest reserve Animals also graze around water place in the forest reserve.	Animals graze in the terroir. Water places of the terroir become insufficient as well as borings. Wells and some pools are used by livestock	Animals graze in the terroir and in the forest reserve. They drink from wells and also from the river Konga.	Animals graze near the water place of Gouandougou. They drink all along the river konga.
Grazing and water places (rainy season)	Animals graze near the river Kongouko and in the forest reserve all the year. There is no water problem because the area is well irrigated.	Animals drink from water places of the terroir	The terroir is sufficient for grazing. Breeders do no need to move in other regions.b Small pounds of the terroir keep water. The lake is still used.	Animals graze in the terroir. Livestock drink from water places of the terroir.	Animals graze in the terroir. Livestock drink from water places of the terroir and the pool.	Animals graze in the terroir. Livestock drink from water places of the terroir.	Animals graze in the terroir. They drink from wells and also from the river Konga.	Animals graze in the terroir. Livestock drink from water places of the terroir and the pool.
Conflict between breeders and farmers	N.A	N.A	Exist	Exist	N.A	Exist	N.A	Exist

Table 6.13 Illegal Activities and Problems Related to the Kongouko F.R.

	Badé	Banakoro	Fougangouè	Faradjan	Kassandé	Kadio	Pima	Djanga
Traditional utilisation right mentioned in the forest Law	Aware	Not aware	Aware	Aware	Not Aware	Aware	Aware	Aware
Hunting in the forest reserve	Depend on the availability of games	N.A	N.A	N.A	Dec.- May	N.A	February	Depend on the availability in games
Farming lands in the forest reserve	Since 1993	N.A	N.A	N.A	N.A	N.A	N.A	N.A
Causes of bush fire in forest reserve	Accidental bush fire sometime happen	Accidental bush fire sometime happen	Accidental bush fire sometime happen	Accidental bush fire sometime happen	Accidental bush fire sometime happen	Accidental bush fire sometime happen	During the interviews with the villagers, a Fulani shepherd affirm that they are obliged to use fire for pasture regeneration. Fire is also used during ceremonies in sacred places.	Accidental bush fire sometime happen

6.2. Characteristics and Problems of Kongouko Forest Reserve

6.2.1. Characteristics and Problems

(1) Characteristics and problems of the utilisation of forest

Boundary surveying has been carried out and data on boundaries have been stocked in the forestry office.

Dense tree savannah occupies 36.1% and sparse tree savannah occupies 30.9% of the forest reserve respectively. Riverside forest, riverside thick forest, and open forest, which have high tree density, are limited. Bush fires seem to have a large impact on plant renewal.

Since fuel wood is still relatively abundant around the villages, collection by local people within the forest reserve is considered to be small. Moreover, there is hardly any collection of fuel wood for selling. Dependency on the forest reserve is low for other forest products too. Having said that, the fact that many local people pointed out the forest reserve as a potential area for obtaining forest products is suggestive. However, since growth density varies greatly according to species, care will be needed in setting utilization quotas and so on.

(2) Characteristics and problems of the Administration / the Forestry Service

Presently the major activity of the Forest Service is the monitoring of illegal activities in the forest reserve, mainly cultivation and grazing. Considering the abundance of forestry resources in the related villages, it seems that the illegal tree cutting inside the forest reserve is not frequent. But with the population growing, meaures should be considered to prevent possible illegal fuel wood exploitation in the forest reserve.

Since population growth will place greater pressure on the forest resources, it will be necessary for the Forest Service to continue to educate the population. A new role of the Forest Service in the medium and long term will be to support the establishment of GGF and so on. Numerous villages have stated their desire to have good discussions with forest officers, and residents in all the related villages were aware of the contents of the JICA educational radio broadcast on traditional utilization rights. However, follow-up will need to be implemented with respect to residents until they are able to actually utilize forest products, etc. inside the forest reserve.

(3) Characteristics and problems of socio-economic interaction between the related villages of the forest reserve

1) Social situation of the related villages

Among the eight related villages of Kongouko Forest Reserve, only two have CVGT: that is the villages of Badé and Fougangouè. Moreover, since seven of the villages have no GGF, so their

organized participation in the forest reserve is undeveloped.

2) Stockbreeding

Traditional extensive stockbreeding utilizes natural meadowland, fallow land and forestland, however, since pastureland is relatively abundant, livestock are basically kept inside the terroir throughout the year. However, some of the local stockbreeders conduct breeding Kongouko Forest Reserve, in search of fodder and water places, mainly during the dry season. The degree of control over grazing around the lake situated to the northeast of Kongouko Forest Reserve is an important factor in determining the impact of grazing in the reserve.

3) Illegal activities and problems related to the forest reserve

It is necessary to educate the population concerning the different problems of bush fire in the forest reserve (negligence of smokers, fire control in grazing zones in the terroir and during the performance of traditional ceremonies in sacred places.)

It is also necessary to take measures against cultivation in the forest reserve by some villagers of Badé.

6.2.2. Major Issues in Kongouko Forest Reserve

(1) Problems arising from utilization of forest resources

Dense tree savannah (36.1%) and sparse tree savannah (30.9%) are respectively located in Kongouko Forest Reserve. Thus, the allocation of riverside forest, riverside thick forest, and open forest is limited. It is quite necessary to maintain present condition of the forest resources in the Forest Reserve as a whole policy. Overall, it is necessary to maintain forest resources in their present state while at the same time sustaining and hopefully raising tree density in areas that are currently sparse.

As is also the case in Gouandougou Forest Reserve, it seems that development pressure caused by fuel wood collection in Kongouko Forest Reserve is relatively low apart from fringe areas. Pressure caused by the collection of forest products is also low. However, it is forecast that pressure will increase in line with population growth. Attention should also be directed to the size of the impact of forest fres on vegetation and its regenration.

Education programs on traditional utilization rights, prevention of bush fires, and so on should be formulated in consideration of the above-mentioned conditions and villagers' expectations to utilize forest products in future.

(2) Problems concerning administration and the Forest Service

Three forest officers in Sidera Forest Service supervise Dandougou (9,500ha) and Kongouko (27,000ha) Forest Reserves. Moreover, Gouandougou and Dandougou villages, as mother villages, have traditionally influenced the related villages in Dandougou and Kongouko Forest Reserves. Thus, it is realistic for the participatory forest management to supervise the two Forest Reserves together.

The Forest Service of Sidéradougou does not have sufficient transportation means and is overly busy monitoring illegal actions. The Forest Service will be unable to cover the large area of these two forest reserves using its current transportation means and personnel.

For the moment, in addition to the reinforcing of the monitoring presently conducted, the Forest Service of Sidéradougou will surely continue education activities concerning traditional utilization rights. In the medium and long term, the support to the village organizations such as the GGFs and the GGF Union will also be an important role.

(3) Socio-economic considerations regarding related villages

Out of the eight related villages of Kongouko Forest Reserve, only Badé has a GGF. Accordingly, in consideration of development pressures in the medium and long term, the Forest Service will need to place emphasis on the building of GGF organizations at the citizen level in addition to continuing education programs concerning traditional utilization rights.

Livestock grazing does not impact great pressure on Kongouko Forest Reserve, however it will be necessary to control pasturage around the lake in the north of the reserve in the terroir of Dandougou. Also, measures will be needed to deal with land cultivation inside the forest reserve by some of the villagers of Badé village.

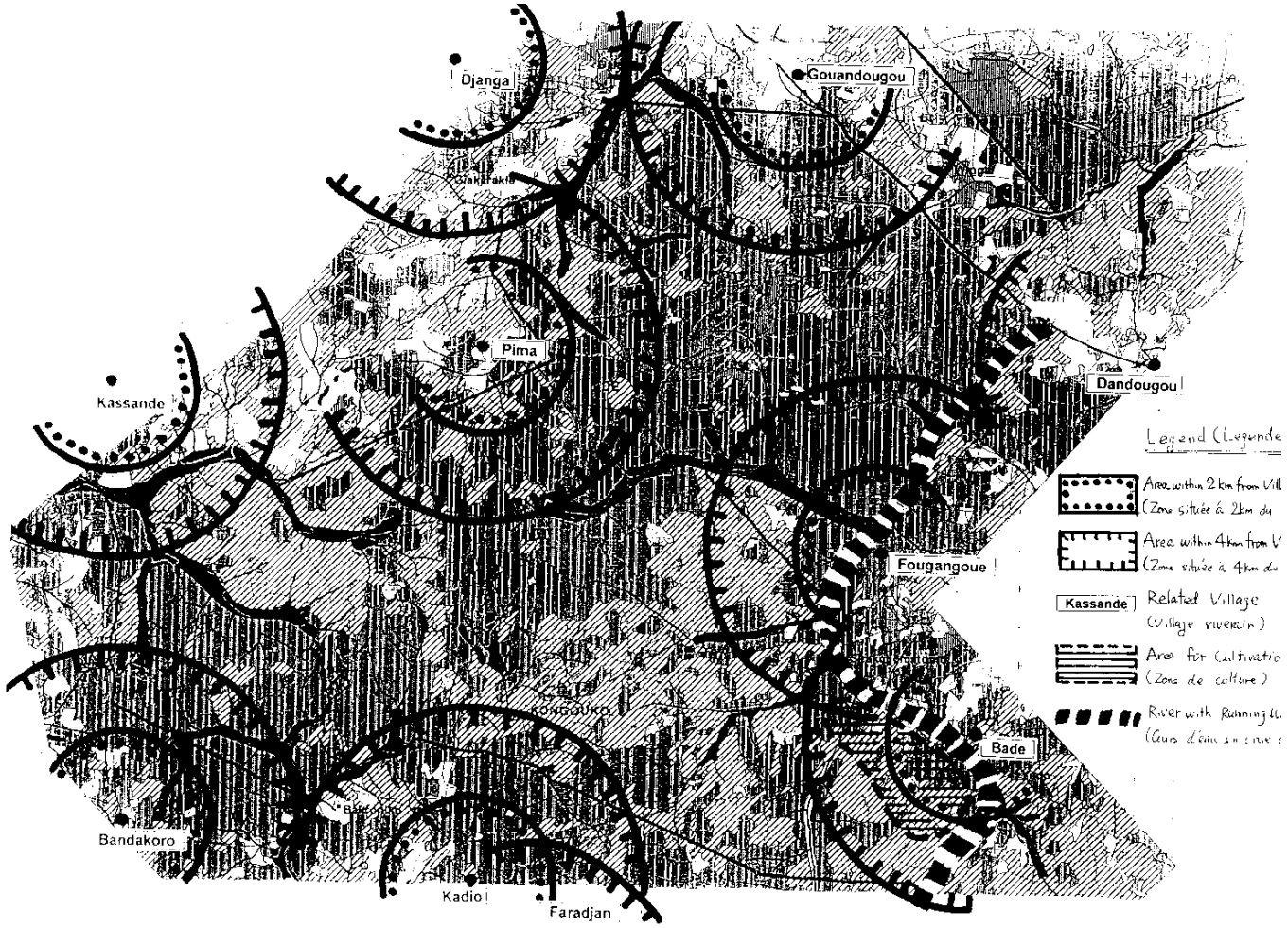

Figure 6.4 Range of Collection of Forest Products in Kongouko F.R.

Chapter 7 Present Conditions of Dida Forest Reserve

7. Present Conditions of Dida Forest Reserve

7.1. Dida Forest Reserve

7.1.1. History of the Reserve and Boundary Management

Table 7.1 shows the outline of Dida Forest Reserve. This was designated as a forest reserve in 1955 before independence according to a forest reserve order (Decree No. 40861/ SE/F). The reasons for the designation were not mentioned in the decree, however, they were said to be to protect the ecosystem and to conserve biodiversity (Source: Regional Direction of Environment and Habitat of Cascades).

Table 7.1 Outline of Dida Forest Reserve

No. of Decree	Date of Declaration **	Area (ha) *	Place of Issue	Condition of the Boundary
N.A.	1955	75,000 (80,576)	Dakar	Boundary stones were set. Boundary is being surveyed.

* The upper figure is the area given in the decree. The figure in parentheses is calculated from GIS data.

** The date of the issue of the decree is shown as the date of establishment of the reserve.

According to the decree, the four items listed below are permitted as resource utilization rights for the local community. On the contrary, the prohibition of hunting is declared in a separate article in the decree.

- Collecting dead trees
- Collecting fruits and medical plants
- Honey collection without slashing and burning.
- Traditional fishing in accordance with Fishery Law.

By the way, the present Forest Law guarantees local people the rights of using forest resources, i.e. gathering of dead trees and branches, nuts and fruits, and medical plants (Article 56). Besides them, additional items of usage permitted for local people can be declared by a decree for each forest reserve (Article 58).

Boundary stones have not yet been set nor has a boundary survey been carried out because of the strict budget of the Forest Service. The location of the boundary was only explained in the decree in writing and drawn on maps without field survey. During the Study, boundary setting was carried out and boundary markers were put in place.

7.1.2. Land Use/Vegetation and Forest Inventory

(1) Land use/ Vegetation

The land use/vegetation map of Dida Forest Reserve is shown in Figure 7.3 and the surface area of each land use/vegetation type is shown in Table 7.2. Dense tree savannah (Savane Arborée Dense) and sparse tree savannah (Savane Arborée Claire) occupy large parts accounting for 41.2% of the total area. Many cultivated areas are also distributed in the reserve. Cultivated area (Champ Cultivé) has been identified for 5,695ha (7.1% of the total area) by photo interpretation.

Table 7.2 Areas by Land Use/Vegetation Types in Dida F.R.

Legend	Area (ha)	Ratio (%)
Riverside forest (*Forêt Galerie*)	3,593	4,5
Riverside thick forest (*Fourre Ripicole*)	275	0.3
Open forest (*Forêt Claire*)	2,589	3.2
Wooded savannah (*Savane Boisée*)	4,101	5.1
Dense tree savannah (*Savane Arborée Dense*)	16,072	19,9
Sparse tree savannah (*Savane Arborée Claire*)	25,588	31,7
Dense shrub savannah (*Savane Arbustive Dense*)	12,004	14.9
Sparse shrub savannah (*Savane Arbustive Claire*)	8,510	10.6
Grass savannah (*Savane Herbeuse*)	1,712	2.1
Planted forest / Orchard (*Plantation/Verger*)	291	0.4
Cultivated area (*Champ Cultivé*)	5,695	7.1
Eroded area (Sol Erodé, Sol Degradé)	146	0.2
Total	80,576	100.0

(2) Forest Inventory

Table7.3 shows the number of trees per hectare by circumference according to the inventory survey (See “Appendix” for methodology). The volume of woods per hectare is also calculated and shown in the table. According to the national forest inventory conducted in 1980, the tree volume of Cascade region was estimated as 52.8 m^3/ha with annual production of 1.26 m^3/ha (Inventqire Forestier National Haute-Volta; FAO, 1982).

Using this result (the ratio of the tree volume and the annual production), the mean annual production of Dida forest reserve is calculated as 1.22 m^3/ha (3.60 Steres/ha). (0.34 m^3 in volume = 1 Stere)

Table 7.3 Number and Volume of Trees by Circumference in Dida F.R.

Class of trees (cm in circumference)	The number of trees (trees / ha)	The volume of the wood (m^3/ha)
125 cm or more	11.6	15.1
31-124 cm	231.4	35.1
15-30 cm	85.1	1.1
Sub total	***328.1***	***51.3***
Seedlings (3-4 cm)	254.7	–
Seedlings (less than 3 cm)	373.5	–

7.1.3. Usage of Forest Resources in and Around the Forest Reserve

(1) Fuel wood

Table 7.4 shows the results of the hearing on fuel wood gathering conducted in the neighbouring villages (during the survey of forest resources). Also, since individual persons were interviewed about household conditions in the same villages during the survey of forest resources, both findings are shown. No interviewees admitted to collecting fuel wood in the reserve. The range of gathering usually extends from 1 to 3km.

Table 7.4 Fuel Wood Gathering in and around Dida F.R.

Village Name	Distance (km)	Usage of F.R.	Period	Selling
Niambrigo*	1	No	All the year (12 months)	No
	3	No	Dry season (4 months)	No
	2	No	Mar. – Jun. (4 months)	No
	2-5	No	Mar. – Jun. (4 months)	No
Diarakorosso*	1	No	Dry season (3 months)	No
	1	No	Dry season (4 months)	No
	3	No	All the year (12 months)	No
	1-2	No	All the year (12 months)	No
Noumoukièdougou*	3	No	All the year (12 months)	No
	3	No	All the year (12 months)	No
	2	No	Dry season (-)	No
	2-3	No	All the year (12 months)	No

* Result from the “Forest resources survey”

(2) Other Forest Products

The conditions of use of other forest products are shown in Table 7.5 and Figure 7.1. (The maximum obtained answers are shown for “Distance” and “Period of collection,” while the

frequency of each response is shown for “Usage of F.R” and “Selling”). The range of gathering is longer than that for fuel wood at around 5km. Some interviewees admitted to collecting inside the forest reserve. Wood products are exploited mainly in the dry season, and non-wood products such as fruits are harvested mainly from the second half of the dry season to the beginning of the rainy season, although the periods depend on the growing stage of each product. Some people sell forest products, thereby obtaining an additional source of income.

Table 7.5 Harvesting of Other Forest Products in and around Dida F.R.

Forest products	Distance (km)	Usage of F.R.	Period of Collection	Selling
Timber	2-5	Yes: 2, No: 4	All the year (Mainly in dry season)	Yes: 0, No: 6
Karité	0-5	Yes: 5, No: 7	Mar. – Jul.	Yes: 12, No: 0
Néré	0-5	Yes: 1, No: 5	Mar. – Jun.	Yes: 5, No: 1
Baobab	0-5	Yes: 3, No: 7	Apr. – Aug.	Yes: 4, No: 6
Honey	0-3	Yes: 1, No: 0	Dry season	Yes: 1, No: 0

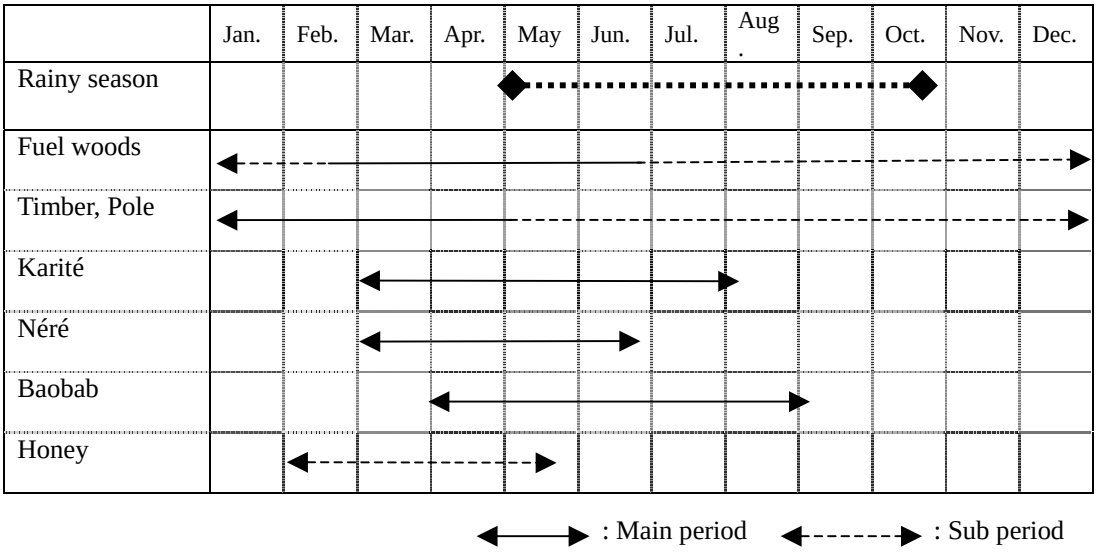

Figure 7.1 Harvest Calendar of Forest Products in Related Villages of Dida F. R.

7.1.4. Present Situation of Fauna

Table 7.6 shows the present situation of fauna and fishery resources in Dida Forest Reserve.

Table 7.6 Fauna and Fishery Resources of Dida Forest Reserve

	Fauna	Fishery
Present situation	Animal species that exist in this reserve are: warthogs, harnessed guibs, hares, squirrels, rats, red and black monkeys, wild guinea fowls, francolin (scientific name) and rock chickens	Protopteridae*, Mormyridae, Gymnarchidae, Ostéoglossidae, Charachidae, Distichodobtidae, Citharinadae, Chirrinidae, Bagridae, Schilbeidae, Claridae, Malapteridae, Mochokidae, Centropomidae, Cichlidae, Anabantidae, Channidae, Totraodontidae
Species disappeared	Elephants, buffaloes, bubals, hypotragues and cobs (the three are scientific names), lions and panthers	Impossible to find data
Desired species to be recovered	Coba / hypotragues, bubals, cob defasa, buffoon cob, redunca cob, grimm cephalophe, cephalophe with reddish side, orycterope	Heterotis niloticus**, Claria anguillaris Lates niloticus, Oreochromis niloticus
Remarks	Criteria for selecting species for restoration are as follows: - The capacity for receiving several fauna species - Some species needed essential vital resources for survival and opening out - Populating zones traditionally inhabited by animals - Ecological conditions - Social, economic and cultural requirements for neighbouring villages - Anthropogeny space possession - Five forest reserves - Biological requirements of each species - Spatial needs or requirement for each species - Ecological balance	* All the species of fish mentioned above are a family group of fish. Concerning other details, there are many more individual fish that exist in river waters of Comoe Province. ** The reproduction of these species of fish is based on economic reasons, because they can reproduce faster in rivers and ponds

7.1.5. Actions of the Forest Service and other External Structures

(1) Forest Service

Forests reserves under government control are managed with participation of citizens from related villages. The government Forest Service is involved with Dida Forest Reserve in the following ways:

- Controlling of illegal actions
- Authorizations
- Conservation of forest resources,
- Restoration of forest resources, etc.

(2) External structures

Projects that have so far been implemented by external support agencies in the Gouandougou Forest Reserve are as follows:

- EU Mapping Project (1997)
- JICA Development Study for the Forest Management Project in Comoe Province (2002~)

7.1.6. Socioeconomic Condition of Neighboring Villages

The following points are a result of the neighboring villages survey conducted in December 2004 related to Dida Forest Reserve (see Table 7.8). While six villages were explored in the village profile survey of 2002, 38 villages were identified as neighboring villages. Eight of these are located outside of the forest reserve; 24 of them are inside the reserve, and six are adjacent to the reserve (see Figure 7.2).

1) Population

The largest population in the neighboring villages is Noumoukiedougou (outside of the forest reserve) village with 2,625 inhabitants. This is an old mother village covering many sub-villages. On the other hand, the smallest population is Lenguemourgou Hamlet village with 77 habitants. There are 700~800 habitants in Dorpow Hamlet village. The female population is greater than the male population in the villages.

2) History and relations of the villages

The neighboring villages have varied histories. Noumoukiedougou village was established 120 years ago and Magagom Hamlet village (in the forest reserve) was established more that 50 years ago; whereas Berredo village (in the forest reserve) was only established in 1991.

The relationship between mother-village and sub-village in the neighboring villages is crucial regarding land rights, mediation of disputes, various ceremonies, and so on, the same as in other villages in the other forest reserves. The relationships are as follows:

Table 7.7 Mother villagers and sub villagers in Dida F.R.

Mother villages	Sub-villages
Noumoukiédougou	Mangorotou, Kouélégom, Magagom
Konhorgo	Lenguémourgou, Wonkoro, Kpalan, Tatakoalé
Korbgo	Pelbo, Kouélégom, Mado,
Djatakoro	Bérédo, Ibibouré
Diarrakorosso	Dorpow, Goyandougou, Goté, Mossokantou, Mourkoudougou Birré I, Birré II, Kambélékorodougou
Farakoro	Gwehoun, Balgogo, Bourgou,
Gnambrigo	Onpincé, Laafia
Babousso	Sitouré, Pokamboulo, Hélintira

When it comes to identifying the related villages, the relationship between mother and sub villages is quite important.

3) Structure of ethnic groups

There are Komono, Karaboro, Lobi, and Dogosse groups as the aborigines, while Mossi, Bobo, and Toussian groups are named as later migration groups. Peulhs, as a breeder group, live in different villages, although the number is small.

4) Village organizations

There are village chiefs in most of the neighboring villages. Moreover, men's groups and women's groups are established for farming activities in the villages, and some of these have been officially authorized. Administrative representatives (Delege) are not appointed in the villages in the forest reserve, although Chiefs of Land are appointed. However, Chiefs of Land in sub-villages and hamlet villages are strongly influenced by the Chiefs of Land in mother-villages. Some of them jointly hold the post in mother-villages and sub-villages.

5) Interaction with the forest reserve

Before the official establishment of Dida Forest Reserve in August 1955, many villagers earned their livelihoods in the forest reserve. In addition, since signboards for demarcation in Dida Forest Reserve were not built until 2003, the local citizens have low awareness of the forest as a conservation area. Moreover, the neighboring villages use many forest resources and are deeply connected to the forest reserve.

Table 7.8 Socioeconomic Condition of the Neighboring Villages

Village / Hamlet	Population	Number of households	Ethnic groups	Village organizations
B(D)abousso			Native: Dogossè Others: Lobi, Birifor, Peulh	
Balgogo	558	56	Native: Dogossè Others: Mossi, Bobo, Lobi, Peulh, Gourounsi	1 Hunters' association, 1 GVH,
Bérédo	143		Native: Lobi Others:	No
Birré I	400		Native: Lobi Others: Birifor, Mossi, Samo	No
Birré II	700		Native: Lobi Others: Birifor, Gan	No
Bourgou	700		Native: Dogossè Others: Mossi, Bobo, Lobi, Gourounsi	1 GVF
Diarradougou	1548	221	Native: Dogossè Others: Peulh, Birifor, Dagari, Mossi, Karaboro	GVH (officially recognised) 1 GVF (not officially recognised)
Diarakorosso	1572	222	Native: Komono Others: Karaboro, Mossi, Peulh, Nounouma, Dafin Bwaba, Toussian	2 Men Association, 2 women association. They are recognised officially
Dorpow H	700 to 800		Native: Mossi Others: Lobi, Karaboro, Toussian	1 GVH
Farakoro	430	66	Native: Dogossè Others: Lobi, Karaboro, Peulh, Bobo	2 GVH, 1 GVF, 1 Hunters' associations
Goyandougou	1100		Native: Dogossè Others: Lobi, Karaboro, Peulh, Toussian, Mossi	3 GVH, 2 GVF (all the groups are officially recognised in 2000 except one men's group). Main activity is agriculture
Goté	1800		Native: Dogossè Others: Mossi, Lobi, Dafing, Samo, Bobo, Toussian, Dagari	1 Hunters' association, 1 Young men's group, 1 GVH, 2 women association, 2 GVF. All these associations and groups are not officially recognised
Djatakoro	100		Native: Lobi Others: Mossi, Peulh	No
Gnambrigbo	964	162	Native: Komono Others: Lobi, Mossi, Peulh	4 GVH (Hakilimaya, Windsongre, Faso Bara, Tabital) 3 GVF (Benkady, Lanaya, Pègd Wendé). Main activity is agriculture
Gwéhoun H		45	Native: Dogossè Others: Karaboro, Mossi, Dogossè-fing, Peulh, Bobo, Marka	1 GPC (officially recognised in 2004), 1 GVH, 1 GVF

Hélintira	100		Native: Lobi Others: Mossi, Lobi, Peulh, Gourounsi, Mauritnéen	4 GVH (men's group officially recognised) (women's group reco
Ibibouré	200		Native: Lobi Others:	No
Kambélékorodougou	800		Native: Lobi Others: Mossi, Samo, Dogon	No
Konorgho	90	09	Native: Dogossè Others: Mossi, Lobi	No
Korgbo	2200		Native: Dogossè Others: Karaboro, Lobi, Toussian, Bobo, Dafing	1 GPC (officially recognised), 1 Young men's group (officially recognised) 3 Women association (not officially recognised)
Koulégom	600		Native: Komono Others: Mossi, Lobi, Karaboro	2 GVH (Faso Dèmè, FASO Yantanga) 2 GVF (Benkady, Béwignè). Main activity is agriculture. They are all officially recognised
Kpalan H	500		Native: Dogossè Others: Mossi, Lobi, Karaboro, Bobo, Forgerons, Peulh, Toussian, Sénoufo, Samo	2 GPC (only one is recognised) 1 Youth association (not recognised), 1 Women association (not recognised), 1 Old persons' association (not recognised)
Laafia H		30	Native: Mossi Others: Tiéfo, Lobi	2 GVH (officially recognised) main activity agriculture, 1 GVF (also officially recognised)
Lenguémourgou H	77		Native: Dogossè Others: Mossi, Lobi	No
Mado	193	28	Native: Dogossè Others: Mossi, Lobi	1 GVH (Benkady), 1 GVF (Dienladi). Not officially recognised
Magagom H	Included in the population of Noumoukiédougou		Native: Komono Others: Mossi, Lobi, Peulh, Toussian	Included in the village organisation of Noumoukiédougou
Mangorotou H	Included in the population of Noumoukiédougou		Native: Komono Others: Mossi, Peulh	1 Stockbreeders' group (officially recognised), Producers' group based in Noumoukiédougou

Mourkoudougou	704	117	Native: Komono Others: Mossi, Samo, Dagari, Karaboro, Dioula, Toussian	2 GPC (cotton producers' group only one group is officially recognised) 1 GVF, 2 GVH (officially recognised), stockbreeders' association (officially recognised), 1Young men's group, 1 farmer group
Mossokantou	1000		Native: Lobi Others: Birifor, Peulh	No
Noumoukiédougou	2625	363	Native: Komono Others: Lobi, Dioula, Dagara, Mossi, Karaboro, Toussian, Peulh	CVGT, 5 GVH (men's group) 4 GVF (women's group), 1 Hunters' association
Onpincé		35	Native: Dogossè Others: Lobi, Mossi, Peulh	No
Pelbo	400		Native: Komono, Others: Mossi, Karaboro, Toussian, Dagara, Peulh, Lobi	1 GVH, 1 GVF, GPC (all these group are not officially recognised)
Pokamboulo H	350	13	Native: Lobi Others: Mossi, Peulh, Dafing	No
Sansemba H	719	71	Native: Dogossè Others: Mossi, Koo, Karaboro, Lobi, Bobo	1 GPC (officially recognised), 1 GVH, 2 GVF
Sitouré H		59	Native: Lobi Others:	No
Tatakoualé H	400	36	Native: Dogossè Others: Karaboro, Lobi, Mossi, Bobo	1 Young men's association (agriculture), GPC
Tiébata	949	123	Native: Komono Others: Lobi, Karaboro, Dogossè, Gourounsi, Djan, Peulh	1 Hunters' group, 1 Stockbreeders' group (officially recognised), 1 GVF, 2 GPC (one is officially recognised), 1 GVH
Wonkoro H	1500		Native: Dogossè Others: Mossi, Lobi, Dagari, Dogossèfing, Toussian	1 GPC, 1 GVF

NB: H means hamlet village
GVH: Men's group
GVF: Women's group
GPC: Cotton group

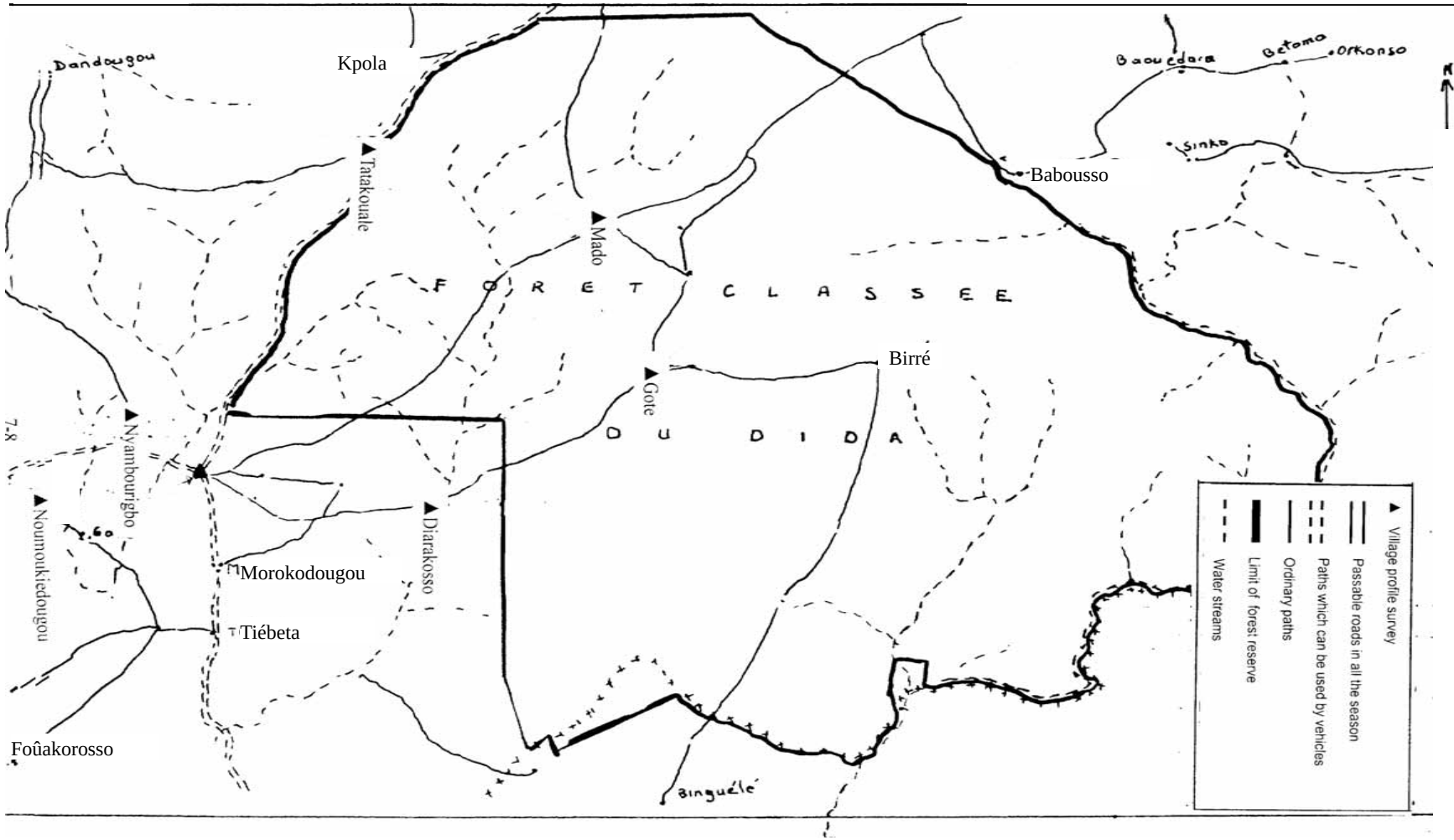

Figure 7.2 Location of the Neighbouring Villages of Dida F.R.

7.2. Forest Resources and their Utilization

Boundary survey was implemented and boundary stones were set during the Study.

Dense tree savannah (Savane Arborée Dense) and sparse tree savannah (Savane Arborée Claire) occupy about 50% of the area. Much cultivated land is distributed in the reserve, occupying about 7% of the area.

The surveys were not thorough enough to clarify the actual state of utilization of forest resources; however, some residents admitted to collecting resources in the limited hearings that were conducted.

Land use and vegetation map of Dida F.R..

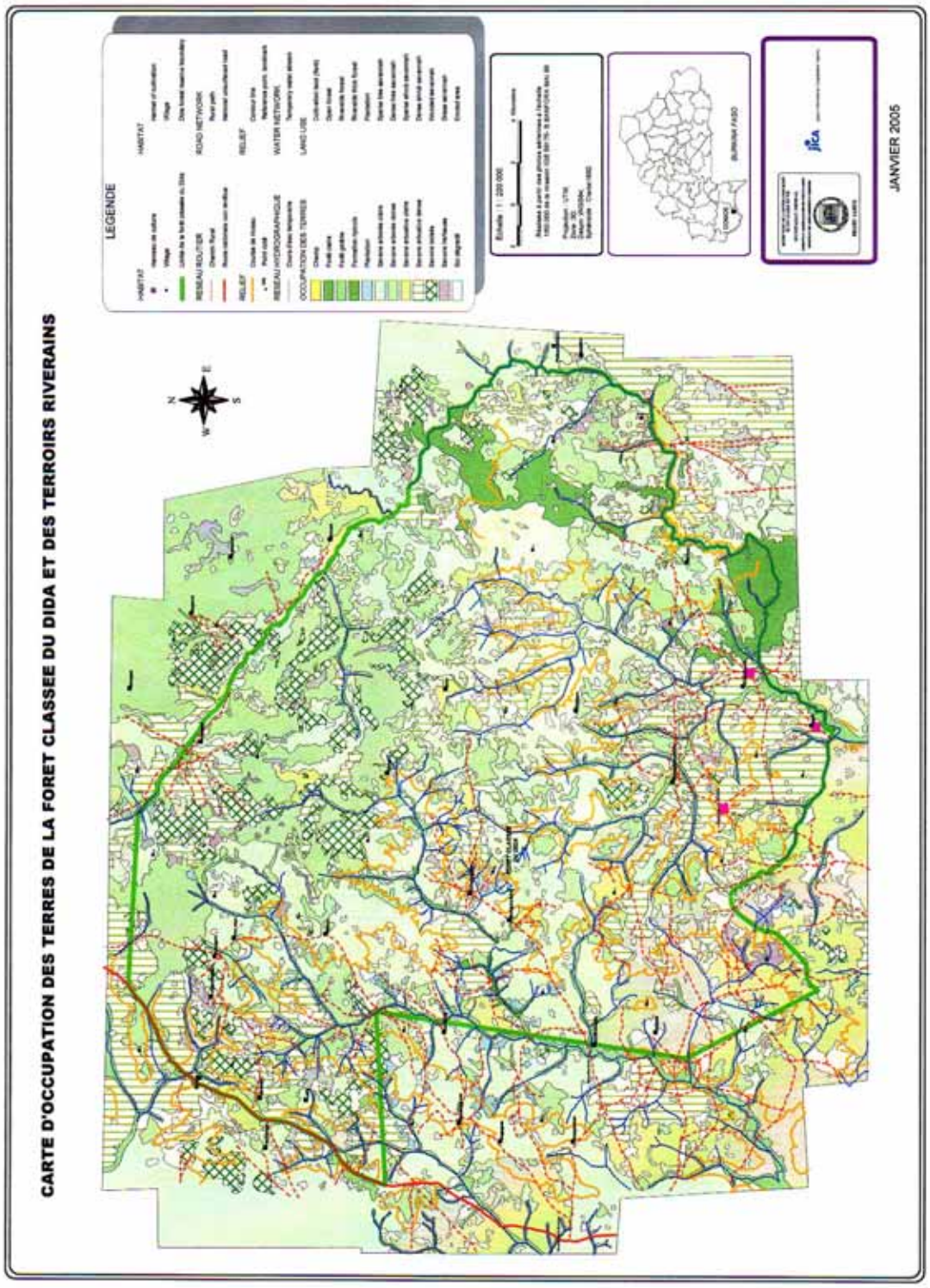

Figure 7.3 Land Use/Vegetation Map of Dida F.R.

Chapter 8 Basic Concept of Participatory Management Plans for the Forest Reserves

8. Basic Concept of Participatory Management Plans for the Forest Reserves

8.1. Background and Ideals

Background

In the domain of national forestry strategy, Burkina Faso is aiming for the following majors objectives:

- Conservation of biological diversity
- Restoration and conservation of forest resources
- Public participation with responsibility

Forest Reserves: Based on the policy goal of "protecting forest reserves as forest areas worth retaining in Burkina Faso," the forest reserves aim to preserve and regenerate the original state of forests while upholding their original purpose of establishment and taking current conditions into account.

Institutional Management: In line with the national trend of promoting decentralization and community participation in forest management, this policy aims to achieve the sustainable management of forest reserves based on voluntary participation by local citizens.

From 1987 to 1994, the FAO and the UNDP supported the establishment of participatory forest management for GGFs and GGF Unions in the forest reserve of Toumousseni village (one of the target villages of the Study) and forest reserves and protected forests of Ziro Province etc. Also, in 2004, a management plan adopting the GGF as the main implementing organization on the citizen level was compiled for Gonsé Forest Reserve (one suburb of Ouagadougou), which had originally been supported by the GTZ.

Ideals

Staff shortages and budget constraints, as well as the context of the decentralization, have lead the government to adopt the participatory approach as the foundation of its intervention in the forest reserves. The approach to participatory management of forest reserves is divided into the following two types, taking into account the current situation of local participation:

- Participatory management based on government initiative, and
- Participatory management under village organization.

In the first type, the population conduct forest management and so forth upon receiving authorization regarding traditional rights of utilization from the government. In other words, this is forest reserve management based on passive local participation. Accordingly, this

management remains passive. In the latter type, local communities conduct the sustainable management of forest reserves as owners based on the understanding of forest reserves as their own assets. In reality, participatory management is not conveniently classified into these two types, but there are various forms of participatory management situated in between these two extremes.

Government initiative (participatory management) **Local initiative**

The status of the participatory management of forest reserves is determined by a number of factors such as the following:

- The policy concerning participatory management of forest reserves by the government/ Ministry of Environment and Habitat etc.
- Awareness and understanding of the necessity of the participatory management of forest reserves
- Relationship of trust between the government and local communities nurtured through the actual practice of participatory management of forest reserves
- Clarification of the benefits obtained from management and the manner of benefit sharing, and securing of funds for operation, maintenance and management by government organizations and citizen groups, etc.
- The capacity of government and citizen groups to promote the participatory management of the forest reserves

The above factors can be classified into the following chronological order:

- Policy and legal support to accelerate the participation of local communities (government initiative);
- At the same time, promotion of understanding regarding the necessity of participatory management (government initiative);
- Building of a sustainable structure of government and citizen groups
- Improvement of organizational capability and trust between government and village organization via actual work
- Management based on greater local initiative

In principle, the participatory forest reserve management must be organized in which local communities take the initiative themselves rather than play a passive role within an

administrative framework. However, this is not immediately feasible. As was already mentioned, it is first of all important to explain the importance of participatory management and to prepare legal formalities to support it. It is also necessary to establish an organisational system and structure. More than anything, it is necessary to gradually realize the participatory forest reserve management based on local initiative, while developing trust between government and village organizations through actual work.

In line with this principle, it is important to build a system of collaboration between government and village organizations for the sustainable management of each forest reserve and to formulate participatory management plans, taking into account the current conditions and interaction of related villages with forest resources in each reserve.

8.2. Basic Concept of the Plans

8.2.1. Government /Forestry Service concerning Forest Reserves Management

The following four roles of government can be raised in this domain:

- Upholding of the law (control of illegal activities)
- Granting of authorizations
- Formulation of policies and development plans, etc.
- Dissemination of techniques (services)

The role of government is to execute the laws and deliver the authorizations prescribed by the legislature. The government is also responsible for formulating national development and economic and agricultural policies, as well as collecting and analysing statistical data for such planning work. As for provincial areas, the current trend of decentralization in Burkina Faso requires that provincial governments be responsible for the compilation and implementation of provincial development plans. The administrative roles of controlling illegal activities and granting authorizations have become well established as government roles in the regions. However, in reality the control of illegal activities is greatly restricted due to budget and staff constraints.

In addition to its role of law enforcement, the government is responsible for dissemination of techniques. However, budgetary constraints hinder this work too; for example, the Forest Service of Burkina Faso is extremely limited in its ability to conduct public education activities and technical guidance on planting and cutting techniques, etc.

In participatory the participatory forest reserve management plans, the role of government and the Forestry Service is to facilitate participation of the local communities. This role of facilitator falls under the abovementioned dissemination of techniques. In order to function as a

facilitator, rather than take an authoritarian approach to enforcing compliance by the population and village organizations, it is important to promote participatory management based on respect of local autonomy. The two roles of guardian of the law and facilitator of local participation are somewhat contradictory, and the fact that organizations and officers need to fulfil both roles simultaneously makes it difficult for them to improve implementation capacity. Furthermore, seen from the viewpoint of the population, these contradictory roles have a subtle impact on the development of relationships of trust with the government.

In the initial stage where local communities commit themselves to the participatory forest reserve management plans within the government-led framework, the Forest Service needs to display the roles of both guardian of the law and facilitator. However, as village organizations become more independent and take the initiative in actual implementation, the role of administration/Forest Service as facilitator will become more important and it will need to cooperate more closely with village organizations.

8.2.2. Village Organizations concerned with Forest Reserves Management

The main implementing agencies in the participatory forest reserve management plans are the Forestry Service and village organizations. The respective roles of the Forestry Service and citizen groups greatly differ according to the status of community participation between the government and local sides, i.e. the condition of village organizations in target villages.

It is important that all the concerned villages participate in the implementation of the participatory forest reserve management plans. Therefore, in theoretical terms, it is necessary for the village organizations concerned to be representative of entire villages. However, it is not realistic to expect the unified involvement of entire villages right from the start of the participatory management plans. For example, taking the case of Gonsé Forest Reserve, because of the difficulty in getting village-wide village organizations involved in management, emphasis is placed on the GGF as the citizen organization for forest reserve management. The GGF, which conserves and utilizes the resources of the forest reserve, is an appropriate choice as implementing agency for the following reasons:

- Administrative consistency guaranteed through authorization by the Forestry Service
- The facility to establish an economically sustainable mechanism of self-funding (sales of fuel wood, etc.)
- The facility to understand the objectives and activities

In future, ways to involve all village organizations in villages will need to be explored, however, for the time being, the GGF can be considered as the major actor (implementing agency) in forest reserves management. Concerning this point, it is necessary to clarify the relationship

between the GGF and the CVGT established under the PNGT 2. The role of each CVGT is to formulate a village development plan and to coordinate actions between different village organizations, whereas the GGF conducts activities on the ground in the same way as women's groups. Therefore, the participatory forest reserve management plans, in particular action plans, compiled by the Forest Service and CVGT, etc. should be proposed to the GGF and assemblies of related villages in order to obtain consent.

It is normal for multiple villages to possess traditional terroir in forest reserves. Accordingly, it is first necessary to select the related villages of the forest reserve in question (see the Appendix for criteria of selection). When conducting selection, since there are mother villages that hold traditional influence (including decision-making) over sub-villages, it is necessary to take into account the interaction between each village including the mother villages. All the related villages that are selected should take part in management of the forest reserve, however, in reality the related villages are selected based on consideration of their relation and interest in the forest reserve. Also it is necessary to leave the management structure open to other related villages that wish to participate from a later stage.

If there is no GGF in the related villages, GGF should be established on the principle that each village should have one. When establishing a GGF, it is necessary to give ample consideration to its sustainable management and its economic relationship with the forest reserve. Moreover, it is necessary for the GGF of related villages to form a GGF Union for conducting management over the entire forest reserve.

The main function of the GGF Union is to provide a forum to discuss the overall forest reserve. The Forest Service with jurisdiction over the forest reserve needs to work with and support the GGF Union; also, the related Stockbreeding Service, Ministry of Agriculture, NGOs and associations, etc. should take part in GGF Union discussions as necessary. Moreover, it is important that the GGF members of related villages that constitute a GGF Union promote such participation on the premise that the said participants have access to the forest reserve and follow the union regulations.

8.2.3. Other Important Items in Forest Reserve Management

Controlled grazing in the forest reserve

In order to prevent conflict between farmers and stockbreeders as much as possible, efforts should be made to allow grazing within forest reserves in accordance with rules designating grazing sites and periods, while giving consideration to the restoration and conservation of forest resources. Controlled grazing should thus be permitted inside forest reserves, however, it is necessary for the Forest Service and GGF to hold close discussions, and eventually for rules to be established and followed between the Forest Service and stockbreeders.

Under GGF supervision, stockbreeder groups shall follow the designated procedure with the Forestry Service allowing them to conduct grazing in forest reserves over limited sites and periods. Moreover, since conditions in forest reserves differ every year according to zoned activities, the said authorization shall be renewed at yearly intervals. Authorization shall be granted through a written contract clearly stating the period, site, head of grazing livestock and obligations of stockbreeders (for example, the grazing fee per head, duties in the event of bush fire and forest plantation, patrol responsibilities, etc.; expected to differ according to each forest reserve).

(1) Extensive stockbreeding is practised in related villages using natural meadowland, fallow land and forests. It is closely linked to farming in that residues of crops such as millet and sorghum are used as livestock feed in the dry season. For this reason, disputes frequently arise between farmers and stockbreeders during the harvest period. Accordingly, before and after the harvest period (August-October), the forest reserve shall be opened for grazing. However, livestock shall be prevented from entering restricted areas by a system of zoning.

(2) Stockbreeding is principally carried out inside the terroir all year long in many related villages. There are some villages that use wells as watering places for livestock during the dry season, and they sometimes allow livestock to drink from ponds inside the forest reserves before switching to these wells. Accordingly, livestock should be permitted to use watering places in forest reserves that contain such villages, on condition that they do not stray from the permitted watering places and trails.

8.2.4. Basic Concept

Preconditions

When compiling management plans, based on the existing legal framework and policy of the Forest Service, villages, local villagers and occupational groups, etc. shall be permitted to utilize forest resources inside the forest reserves regarded as national assets, however, there shall be no transfer of ownership.

Initial environment

As a result of implementing rough environmental impact assessments on the management plans for the four forest reserves based on the law in Burkina Faso, the Direction of Environmental Evaluations with jurisdiction over the matter deemed there to be no problem with the plans.

Concerning the method of survey, first of all the contents of the management plan were confirmed; then interview hearings were conducted with villagers and GGF members from the

related villages concerning environmental impact, and then field surveys were conducted inside the forest reserves. Although the Direction of Environmental Evaluations judged that there is no environmental impact, it did recommend that environmental committees be established in order to monitor environmental conditions.

On the basis of the above discussion, the basic concept for the participatory forest reserve management plan is as follows:

"Collaborative and sustained management of forest reserves by the government and local communities shall be aimed for by sharing responsibility and benefits."

For the participatory management of forest reserves, the responsibility and benefits of administration/Forest Service and the local communities shall be as follows.

Administration/Forest Office side:

Building of a partnership with citizens will impart benefit (activity funds) to the Forest Service through conserving forest resources inside forest reserves (national assets) and realizing better management, and it will also contribute to achievement of the National Program of Forest Management.

Community side:

Benefits (higher standard of living) will be imparted to the related villages and citizens through the granting of permission to utilize forest reserves. At the same time, incentive will be given to participate voluntarily in activities for the conservation of forest resources (dividends of participation).

Consideration should be given to the following two points when compiling the participatory forest reserve management plans.

(1) Scientific planning

Upon correctly understanding the current state and conditions of use of forest resources that differ between each forest reserve, it is necessary to compile management plans that are both rational and immediately effective in natural scientific and socio-economic terms.

(2) Institution building for implementation

When it comes to applying participatory management to forest reserves that until now couldn't be effectively conserved under government initiative, it will be important to adopt institutions and systems that are suited to each forest reserve.

8.3. Roles of Major Parties Concerned with Forest Reserve Management

In consideration of the respective roles of administrative and citizen groups in the participatory forest reserve management plans mentioned earlier, the roles of administration and citizens for realizing this basic concept have been set as follows.

Government/Forest Service

- To be responsible for upholding laws and regulations, and to play the role of mediator in conflicts (guardians of the laws, and mediator)
- To monitor progress and conditions of forest resources in line with the management plans (monitor)
- To establish institutions and systems enabling villagers to participate in forest conservation and management, and to support the formation of villagers' forest management groups
- To construct a system for controlling and supporting these citizen groups after they are formed (builder of institutional partnership)
- To support organizational strengthening of villagers and their know-how and techniques of resource management, and to implement education activities concerning the need for resources management in forest reserves
- To collect and arrange necessary information for the management of forest reserves, and to provide it to organisations that need it (technical supporter, educator and information provider)

The population /GGFs

- To participate in the management and conservation of forest reserves (joint manage with the Forest Service)
- To manage resources in the forest reserves. However, concerning the scope and degree of utilization, items to be adhered to, and methods of conservation, etc., agreement will need to be reached with the Forest Service (resources manager)
- To report on action plans and obtain consent in village assemblies (communication pipe with village organizations)
- To jointly compile participatory supervision and assessment methods with the administrative side, and to reflect lessons learned in future implementation plans (monitor and reviewer of activities) execution

GGF Unions

- To advertise the participatory forest reserve management plans and to consult with the

Forest Service

- To reach agreement between GGFs and with the Forest Service on issues concerning resource management inside forest reserves (appropriate utilization of forest resources, monitoring of violators, implementation of conservation measures, etc.)
- To arrange roundtable discussions with the administration, NGOs, and associations concerned with forest reserve management in collaboration with the Forest Service (coordinator with related parties)

8.4. Basic Concept of the Implementation Plan

It is necessary to compile implementation plans that take into account the characteristic feature of participatory forest reserve management plans whereby the roles of the Forest Service and village organizations vary according to the activities of GGFs and so forth. Basically, rather than adopting the blueprint approach in which targets and invested resources are set for three-year or five-year periods, the benchmark approach, whereby plans are flexibly revised according to conditions, is preferred. In this approach, targets and resource investment plans for their realization are set for each phase, and the said targets must first be achieved before activities move onto subsequent phases. Also, it is also possible to amend phase targets and investment plans according to the state of progress.

In the implementation plans for each forest reserve described later, targets (benchmarks) and tasks for each phase are proposed. For example, the Phase I target for Bounouna Forest Reserve is the implementation of tree planting (agroforestry) by the GGFs, etc. in Plot I of the former reforestation zone with a view to restoring the forest. Although the time required for trees to grow differs according to the planted species, the benchmark for Phase I is the restoration of vegetation (grown trees) in Plot I. Only after the Phase I benchmark is achieved can the work proceed to Phase II.

The Phase I targets in each of the forest reserve management plans are feasible plans in consideration of the findings of the Pilot Study and the results of discussions with the administrative side/Forest Service. As for Phases II and III, it is hoped that the administrative side/Forest Service takes a flexible approach to planning upon taking conditions of implementation in Phase I into account.

As the benchmarks in each phase, the conditions of vegetation recovery and regeneration are important points. At the same time, it should not be forgotten that the implementing capacity of the GGFs and GGF Unions hold the key to the actual realization of benchmarks. Since any organization is untried and faced with confusion at the start, it is realistic to start off with small and simple goals. Also it is essential that the Forest Service provides support in the initial stage.

As the said organizations acquire norms and social practices through such activities, they become capable of implementing larger scale and more complicated activities. In order to compile more feasible plans, it is important that the implementation plans for future phases are prepared upon carefully considering this kind of organizational evolution (organizational development).

Target zones are identified in the implementation plans, however, the respective plots need to be selected at each phase based on discussion and agreement by the Forest Service, GGFs and GGF Union, etc. [1] The Forest Service then identifies the selected plots by GPS and, together with the GGFs and so on, retains the related documentation stating the activity regulations. Accordingly, the location and scope of plots are determined for each phase; however, since the GGFs and other citizen organizations only have feeble implementing capability at the start, plot areas are initially small and are steadily expanded in proportion to the experience and organizational capacity.

Zoning entails determining the methods and contents of activities inside forest reserves according to sustainable utilization zones, protection zones, and so forth. When compiling plans for participatory conservation and management, it is essential to incorporate not only the viewpoint of natural resources but also the socioeconomic viewpoint (citizen groups). For example, it is necessary to establish development zones (fuel wood and charcoal cutting, controlled grazing) aimed at sustaining citizen participation.

In specific terms, sustainable utilization zones, protection zones, livestock zones and so on are set on the map with a view to attaining the goals for the forest reserve, upon taking vegetation conditions and the state of citizen groups (implementing agencies) into account. Then the activities in each zone are arranged as “Contents of zonal activities.” Zoning is planned through the following procedure: 1) examination from the viewpoint of targets for the forest reserve, 2) examination from the viewpoint of natural and socioeconomic conditions,

3) examination of protection zones, 4) examination from the viewpoint of zone boundaries, and 5) overall review by related parties. Moreover, the zoning is determined in a manner that fully utilizes the terrain (undulations, rivers, mountains, etc.) of the forest reserve.

Similarly, terrain of the forest area is utilized by each GGF for setting the working areas for conducting various activities in consultation with the Forest Service. Also, related persons confirm the positions of working areas by actually visiting forest reserve sites.

In consideration of the above points, the basic concept for compiling implementation plans for participatory forest reserve management plans can be summarized as follows.

[1] Sub-plot I (plantation: agroforestry) in Plot I of the Labola GGF reforestation zone in Bounouna Forest Reserve was originally envisaged close to Labola village or alongside the road, however, land alongside the boundary of the working area with Cagose was selected.

- Implementation based on the benchmark setting of targets and tasks
- Setting of goals (benchmarks) for each Phase, and progression to subsequent phases after they are attained
- Setting of realistic plan contents in Phase I based on the findings of the Pilot Study, etc.
- Consideration of the state of development of citizen groups such as the GGFs and GGF Unions, in order to compile more feasible implementation plans
- Preparation of zoning plans and identification of target zones within implementation plans
- However, selection of plots in each zone should be determined as the need arises in consultation between the Forest Service and GGFs, etc.
- Retaining by related parties of the documents describing the regulations of activities in the selected plots