

USE OF FOREST PRODUCTS BY THE LOCAL PEOPLE OF THE SALONGA NATIONAL PARK IN THE CONGO

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Abstract

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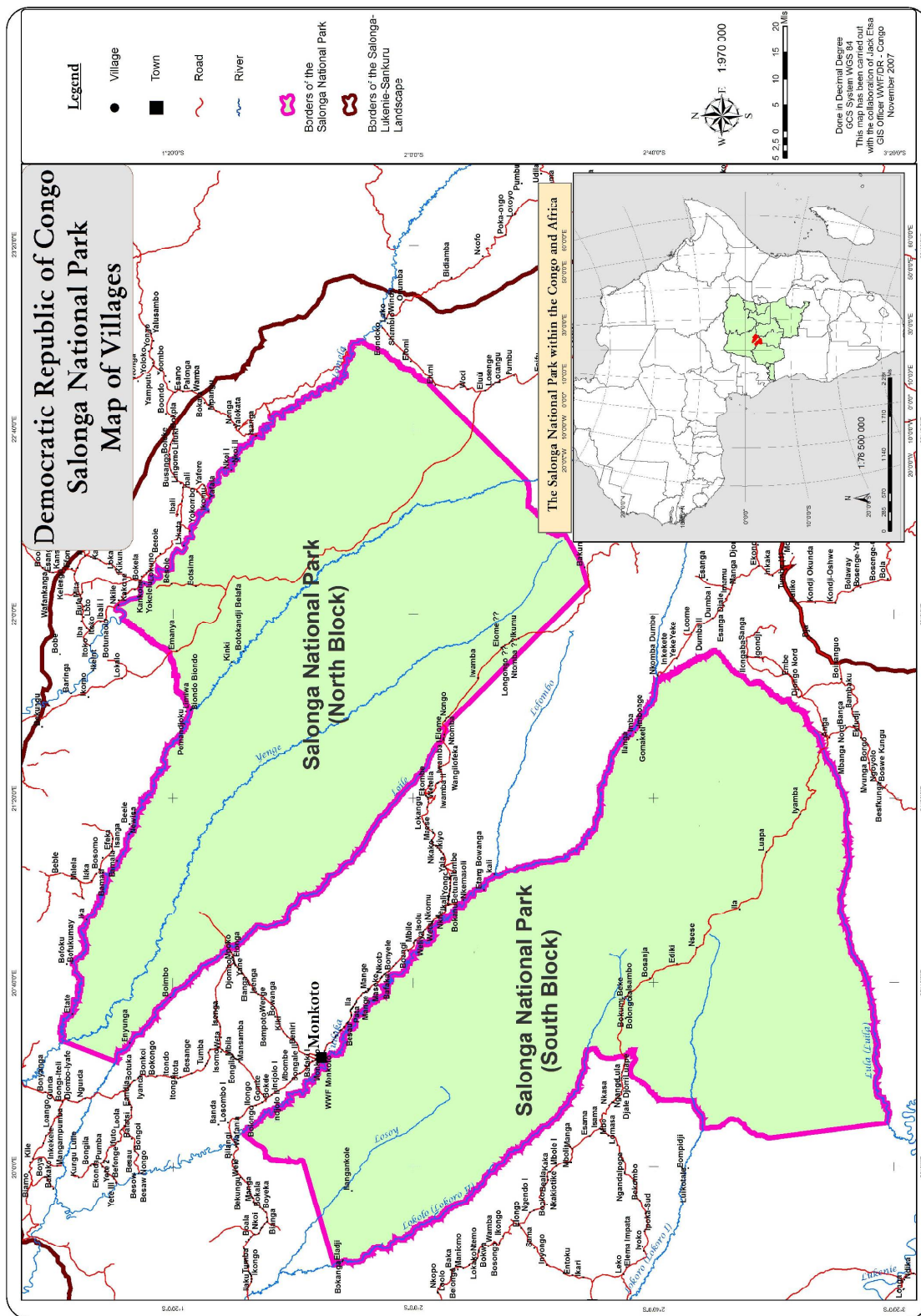
This article attempted to define a compromise making it possible the satisfaction of the material needs of the populations living within the National park of Salonga while ensuring the conservation of long-term forest resources. The management of the forests requires deepened knowledge of the resources and the participation of the local communities, which are the better, informed on of the forest resources. The implementing of a policy on sustainable forest management would be possible by a better integration and participation of the local populations. A survey was carried out in four villages of the National park of Salonga. The results of the investigation show clearly a positive attitude of the rural populations with regard to the forest resources. The diversity of the needs for the population corresponds to the choice of the products and services of the forest. Overall, the potential of the park's forests is superior in comparison with the needs of the population. The exploitation of the forest products is vast and is included in the category of a system of an economy of collection.

needs of the local people, use of forest products, management of the Salonga National Park

The Salonga National Park is a very important area for the conservation of biological diversity for both plants and animals. The Salonga National Park lies in the central basin of the Congo River, in the Democratic Republic of Congo, in Africa. The climate of the Salonga National Park is equatorial: hot and humid with a mean annual precipitation of 2,000mm. The mean annual temperature is 24.5°C. The Salonga National Park is the second largest forest park in the world after Tumucumaque Mountains National Park in Brazil (38700 km²). The Salonga National Park covers 36,000km² (Huang, 2005) and is divided into two parts separated by an unprotected space 50km wide (Van Krunkelsven, 2001). The park is home to the Congo Peacock (*Afropavo congensis*) and the dwarf chimpanzees (*Pan paniscus*) or Bonobo. The Bonobo is an endemic species in the Salonga National Park. The Salonga National Park is also home to many tree species such as *Gilbertiodendron dewevrei*, *Entandophragma palustre*, *Staudtia stipitata* etc. The local people find their primary needs only from the forest within the park boundaries. Their economic activities are focused on forest products (hunting, agriculture, picking and gathering of other forest products, etc.). Both animals

and trees are being threatened due to the presence of the villages within the park boundaries (Thomson *et al.*, 1995; Wilkie *et al.*, 1992). There is little scientific information about the park's forest and very little information about the ways the local people use forest products from inside the park boundaries. The University of Maryland produced global land cover classification of the Salonga National Park (Hansen *et al.*, 2000). Activities for bio-monitoring have not started intensively in the park yet (Hart, 2002). Huang (2005) carried out the first detailed information on land cover and land use in the Salonga.

This article has attempted to define a compromise, which satisfies vital material needs of the populations living within and around the Salonga National Park and conserves forest resources in the long-term at the same time. Two main objectives have been assigned to this study: (1) To analyse the relation between the conservation value and the needs of the people living in the Salonga National Park; (2) To work out proposals aimed at harmonizing the needs of the local people with their active participation for conservation of the Salonga area.



1: Location of the SNP

METHODS

This survey was conducted in the villages of Mpoko, Djombo, Monkoto and Bafaki from 20 to 24 June 2006. This survey looked into uses of forest products by the local people. Our research team was composed of a social presenter, a biologist, a photographer. The team used the "Rapid Rural Appraisal" method to collect basic socio-economic information. The study focused on the use of forest products and tree species that provide these products. Conversations were the main tool used by the team to get access to a large view of knowledge and opinions. Discussions were occasionally led by a social presenter. The key informants in this survey were individuals who are particularly knowledgeable about particular subjects discussed in this research. Most of them were local leaders and hunters. However, we do not pretend that their opinions are necessarily representative. We also approached focus groups of individuals with similar backgrounds namely, a group of hunters, farmers, fishermen and middle class people. The interviewer always made sure to limit the number of questions in order not to disturb the interviewees.

RESULTS AND DISCUSSION

In general, the interviews revealed that forests and trees are viewed as vital elements for the life and

provide the basic socio-economic factors to fulfill the needs of the local people in the Salonga National Park. This perception of the forest by the local people contributes to the threat and puts a lot of pressure on forest resources.

Harvest and use of forest products

The harvest recovers a range of products from the Salonga forest. The most commonly used are fruits, leaves and wild shoots as vegetable. Most of them are used for food and medicines. The children collect more than half of the harvest. Women are also involved in the harvesting of fruit. Men collect fruits but they do not spend as much time as the women and children. The local people go throughout the forest to look for fruit. The supply of the most common fruit tree species are found not far from the village. For other fruit trees, the distance of supply is less than 1km. Within a distance of 2km, the bulk of supply is met. The distance can reach 5km for *Landolphia heudelotii* and *Saba senegalensis*, 6km and *Parkia biglobosa* *vitx doniana*, 6–7km for *Lofira lanceolata*, 8km for *Butyrospermum paradoxum* and even 10km to *Tamarindus indica*. Table 1 provides a list of the 40 major species of fruit most often sought after and harvested by the villagers.

I: Main species for picking

No	Scientific names	No	Scientific names
1	<i>Elaeis guineensis</i>	21	<i>Lannea microcarpa</i>
2	<i>Adansonia digitata</i>	22	<i>Uvaria chamae</i>
3	<i>Carapa procera</i>	23	<i>Eugenia nigerina</i>
4	<i>Raphia soudanica</i>	24	<i>Ximenia americana</i>
5	<i>Hibiscus micranthus</i>	25	<i>Khaya senegalensis</i>
6	<i>Citrus limon</i>	26	<i>Annona senegalensis</i>
7	<i>Psidium guajava</i>	27	<i>Cordia mixa</i>
8	<i>Carica papaya</i>	28	<i>Lannea acida</i>
9	<i>Tamarindus indica</i>	29	<i>Opilia amentalea</i>
10	<i>Mangifera indica</i>	30	<i>Bombax costatum</i>
11	<i>Butyrospermum paradoxum</i>	31	<i>Cola cordifolia</i>
12	<i>Parkia biglobosa</i>	32	<i>Parinari curatellifolia</i>
13	<i>Anacardium occidentale</i>	33	<i>Leleri</i>
14	<i>Vitex doniana</i>	34	<i>Ceiba pentandra</i>
15	<i>Lophira lanceolata</i>	35	<i>Pterocarpus santalinoides</i>
16	<i>Landolphia heudelotii</i>	36	<i>Sterculia setigera</i>
17	<i>Saba senegalensis</i>	37	<i>Piliostigma reticulatum</i>
18	<i>Detarium mocrocarpum</i>	38	<i>Nauclea esculenta</i>
19	<i>Gardenia erubescens</i>	49	<i>Acacia macrostachya</i>
20	<i>Balanites aegyptiaca</i>	40	<i>Faidherbia albida</i>

Source: Our survey, June 2006.

Beekeeping and honey

Traditionally, the local people of the Salonga National Park find honey in two different ways. First, they harvest honey in the forest, it is usually located in the trunks of trees. The second is performed by using the traditional beehives made from herbs. They are set out in hives near the village to facilitate regular surveillance against thieves. In both cases, bees are pushed away with torches lit at harvest time. An error manipulation quickly causes severe burn-

ing of bush fire. Honey is used to sweeten some foods, especially porridge prepared in the morning. To avoid risks and improve production, small projects have attempted to popularize modern techniques of beekeeping. However, they do not have sufficient money to keep on with the projects. During the installation of hives, beekeepers are careful of the composition of flora. The 37 melliferous species are listed in the table 2 below.

II: List of melliferous tree species

No	Family	No	Family
1	<i>Zanthoxylum zanthoxyloides</i>	20	<i>Landolphia heudelotii</i>
2	<i>Ximenia Americana</i>	21	<i>Grewia mollis</i>
3	<i>Vitex doniana</i>	22	<i>Gardenia erubescens</i>
4	<i>Trichilia emetica</i>	23	<i>Entada africana</i>
5	<i>Terminalia avicennioides</i>	24	<i>Diospyros mespiliiformis</i>
6	<i>Tamarindus indica</i>	25	<i>Detarium microcarpum</i>
7	<i>Saba senegalensis</i>	26	<i>Daniellia oliveri</i>
8	<i>Pterocarpus erinaceus</i>	27	<i>Cussonia barteri</i>
9	<i>Piliostigma reticulatum</i>	28	<i>Combretum adenogonium</i>
10	<i>Parkia biglobosa</i>	29	<i>Cochlospermum tinctorium</i>
11	<i>Parinari curatellifolia</i>	30	<i>Citrus limon</i>
12	<i>Xeroderris stuhlmanii</i>	31	<i>Ceiba pentandra</i>
13	<i>Nauclea latifolia</i>	32	<i>Cassia sieberana</i>
14	<i>Monoteskerstingii</i>	33	<i>Carapa procera</i>
15	<i>Maranthes polyandra</i>	34	<i>Butyrospermum paradoxum</i>
16	<i>Lophira lanceolata</i>	35	<i>Bombax costatum</i>
17	<i>Lannea microcarpa</i>	36	<i>Berlina heudelotii</i>
18	<i>Lannea acida</i>	37	<i>Albizia zygia</i>
19	<i>Azalia Africana</i>		

Source: Our survey, June 2006.

Natural resources used in craft activities

The local carpenters have been providing the villages with doors, windows, tables, chairs and beds using very modest equipment. The smiths belong to that category of profession in which the practice is passed on from father to son. They move from village to village according to the needs of the other members of the local community. This secondary activity practised during the dry season earns a supplementary income. The smiths use wood, which grows near villages and they should have a licence for cutting, but they find its costs high. They prefer

to take the risk of doing things illegally, without having a licence. Some craftsmen make beds and deckchairs with the central nerve of the raffia, or with wild lianas or with other sorts of wood. Because of the lack of the beds made with the wood, some local craftsmen make beds from second hand materials. The stalks of *Maretancea* are used for the manufacture of weavings for beds. The wild lianas are used to make traditional baskets, henhouses, deckchairs etc. Table 3 below gives the list of tree species used in craft activities in the Salonga area.

III: Tree species used in the craft and construction in Mpoko and Djombo villages

No	Scientific names	Wood	Other use	No	Scientific names	Wood	Other use
1	<i>Acacia macrostachya</i>	x	Channel tool	26	<i>Gmelina arborea</i>		Decoration mortuary
2	<i>Afzelia Africana</i>	x	Drumstick, dugout, door; ustensil	27	<i>Hibiscus micranthus</i>		Tool handle
3	<i>Albizia zygia</i>	x	Channel tool	28	<i>Isoberlinia doka</i>	x	Chevron; perch for the roof
4	<i>Annona senegalensis</i>	x	Pick-tooth	29	<i>Khaya senegalensis</i>	x	Dye; dye (fruit)
5	<i>Berlina heudelotii</i>		Kitikwala (traditional bed)	30	<i>Landolphia heudelotii</i>	x	Tool handle; door; rafters; perch roof
6	<i>Bombax costatum</i>	x	Drumstick; dugout, door, manger	31	<i>Lannea acida</i>	x	Pestle; stepladder; fruit; door...
7	<i>Borassus flabellifer</i>		Shoe (Bark)	32	<i>Lannea microcarpa</i>	x	Latex for glue
8	<i>Burkea africana</i>	x	Tool handle; Pick-teeth	33	<i>Lophira lanceolata</i>	x	Tool handle; manger; door
9	<i>Butyrospermum paradoxum</i>		Soap (fruit)	34	<i>Oncoba spinosa</i>	x	Tool handle; manger; door
10	<i>Carapa procera</i>		Fruit for the soap	35	<i>Pandanus candelabrum</i>	x	Fruits for soap
11	<i>Ceiba pentandra</i>		Waterproofing of roof terraces	36	<i>Parinari curatellifolia</i>		Tobacco
12	<i>Cissus populnea</i>		Packaging (leaves)	37	<i>Parkia biglobosa</i>	x	Ladder
13	<i>Cola cordifolia</i>	x	Traditional guns; bed	38	<i>Pericopsis laxiflora</i>	x	Tool handle
14	<i>Combretum molle</i>	x	Bark for shoe; Coloured Pottery	39	<i>Prosopis africana</i>	x	Tool handle; structure of the roof
15	<i>Cordia mixa</i>		Tool handle; dugout; door; manger	40	<i>Pteleopsis suberosa</i>		Tool handle; structure of the roof
16	<i>Cussonia arborea</i>	x	Tool handle; chevron; door; hive	41	<i>Pterocarpus erinaceus</i>	x	Perch for the roof
17	<i>Daniellia oliveri</i>	x	Tool handle	42	<i>Pterocarpus santalinoides</i>	x	Structure roof terraces; handle tool
18	<i>Detarium microcarpum</i>	x	Tool handle; perch for roofing	43	<i>Raphia sudanica</i>	x	Fruits
19	<i>Diospyros mespiliformis</i>	x	Brooms	44	<i>Swartzia madagascar</i>	x	Bed
20	<i>Elaeis guineensis</i>		Structure roof terraces	45	<i>Terminalia avicennioides</i>	x	Structure roof terraces
21	<i>Erythrophleum africanum</i>	x	Perch for the roof terraces	46	<i>Uapaca togoensis</i>	x	Door; handle tool
22	<i>Eucalyptus camaldulensis</i>		Brooms	47	<i>Vitex doniana</i>	x	Manger; stepladder
23	<i>Feretia canthioides</i>	x	Structure of the roof terraces	48	<i>Xeroderris stuhlmanii</i>	x	Handle tool
24	<i>Ficus sur</i>		Perch for the roofing	49	<i>Ximenia americana</i>	x	Handle tool
25	<i>Gardenia erubescens</i>	x	Sticking Session				

Source: Our survey in June 2006.

Plants as natural medicines

In case of illness, the local populations of the Salonga National Park simultaneously use both traditional and modern medicine. The choice depends on

needs, the use and availability of finance and on success expectations. Most local people appreciate this treatment because of its efficiency. In the villages of Djombo and Mpoko, medical costs are taken care of

by the head of the family. Traditional medicines are prepared from roots, from barks, from leaves, from flowers, from fruits, twigs, from fibres, from latex, from plantations parasites or ashes. The forms of use are also very diverse: purge, decoction, maceration, application, bath, herb tea etc. The appreciation of

the curative qualities of healing plants is extremely subjective. The strength of the traditional pharmacopoeia in the Congo lies essentially in its variety. Forty-four plants used in the traditional pharmacopoeia have been listed in the Salonga area.

IV: Plants used in the traditional pharmacopoeia

No	Scientific names	No	Scientific names
1	<i>Cassia sieberana</i>	23	<i>Fougarakako ladon</i>
2	<i>Combretum micranthum</i>	24	<i>Ficus sycomorus</i>
3	<i>Anthocleista djalensis</i>	25	<i>Cordia mixa</i>
4	<i>Afzelia Africana</i>	26	<i>Combretum nigricans</i>
5	<i>Zanthoxylum anthoxyloides</i>	27	<i>Annona senegalensis</i>
6	<i>Balanites aegyptiaca</i>	28	<i>Ficus platyphylla</i>
7	<i>Opilia amentalea</i>	29	<i>Adansonia digitata</i>
8	<i>Khaya senegalensis</i>	30	<i>Xeroderris stuhlmanii</i>
9	<i>Tamarindus indica</i>	31	<i>Detarium microcarpum</i>
10	<i>Combretum molle</i>	32	"Lécouni"
11	<i>Mitragyna inermis</i>	33	<i>Burkea africana</i>
12	<i>Faidherbia albida</i>	34	<i>Acacia macrostachya</i>
13	<i>Spondias mombin</i>	35	<i>Oxytenanthera abyssinica</i>
14	<i>Diospyros mespiliformis</i>	36	<i>Carica papaya</i>
15	<i>Cussonia arborea</i>	37	<i>Pteleopsis suberosa</i>
16	<i>Entada Africana</i>	38	<i>Combretum sericeum</i>
17	<i>Butyrospermum paradoxum</i>	39	<i>Terminalia avicennoides</i>
18	<i>Citrus limon</i>	40	<i>Psidium guajava</i>
19	<i>Combretum adenogonium</i>	41	<i>Pericopsis laxiflora</i>
20	<i>Pterocarpus erinaceus</i>	42	<i>Azadirachta indica</i>
21	<i>Parkia biglobosa</i>	43	<i>Mangifera indica</i>
22	<i>Erythrina senegalensis</i>	44	<i>Ceiba pentandra</i>

Source: Our survey in June 2006.

The meaning of the traditional medicine is more than just the cure of the diseases. Knowledge gained from it, is passed on from the older generation to the new generation. It has a sacred character, which confers on its holder a certain social prestige and real power. Through the incantations, prayers and blessings, which accompany every treatment, the traditional medicine is strictly connected to the animistic religion. Nevertheless, many people, including the women, know the most common preparations. The improvement of infrastructure, in particular in the field of the health is one of the major concerns of the villagers. Health and infrastructure are particularly highlighted not only in the four villages surveyed but also in all the other villages in the Salonga area.

Harvest of firewood by native forest users

The harvest of dead trees for firewood constitutes one of the main causes of the degradation of forests. The needs for wood energy imply the use of large areas of the forests. Most of the Congolese live in poor zones in the forests. Given that the use of firewood should evolve as a rule at the same rhythm as the population, it is necessary to pay attention to the restriction of pressure on forest resources. Fuelwood is the main source of energy for the people in the study area.

Electricity is not provided at all in rural households. The local people use lamp oil during the night. Sometimes, corn debris is used to replace fuelwood. The herbaceous species such as *Andropogon gayanus*

is used instead of fuelwood for the cooking of meals in the villages of Mpoko and Djombo. Mixed with twigs, it produces intense heat around the cooking pots. Charcoal is reserved for the market in the cities. Fuelwood is used to warm the water for the morning bath and for food cooking. Food cooking takes a lot of energy because of the type of the dishes and because of the weak combustion of the wood in the homes. The herbaceous plants such as *Andropogon gayanus* are used instead of fuelwood for the cooking of meals in the villages of Mpoko and Djombo.

The local people of the Salonga National Park use axes and machetes to cut trees in the forest. Women constitute a first group of those users who assure the supply of firewood for the village. Every woman decides, according to her availability and her necessities, to fetch the wood of energy that she needs.

The women constitute another group of wood users at the villages of Monkoto and Bafaki. The majority of them exploit forest as amateurs for firewood supply. Sometimes, they sell firewood at the edge of the roads leading to Monkoto. Certain forest users exploit in a systematic way to produce some charcoal. Most of the local people are those who are living in the place where they work and develop an 'emotional' relationship with the local land. That relationship obliges them to respect the local customs in the protection of certain techniques of exploitation. They exploit the forests indifferently without any consideration of the code of practice and the rules of the traditional properties. We wish that a new legislation for forest management at the village level should be introduced to improve this situation.

V: The most used tree species as species for firewood

No	Scientific names	No	Scientific names
1	<i>Aidia onchrolea</i>	20	<i>Gnmelina arborea</i>
2	<i>Arundinaria alpine</i>	21	<i>Detarium microcarpum</i>
3	<i>Blighia welwitschii</i>	22	<i>Terminalia avicennioides</i>
4	<i>Caloncoba welwitschii</i>	23	<i>Burkea Africana</i>
5	<i>Cola nitida</i>	24	<i>Pericopsis laxiflora</i>
6	<i>Corynanthe paniculata</i>	25	<i>Parinari curatellifolia</i>
7	<i>Croton haumanianus</i>	26	<i>Pteleopsis suberosa</i>
8	<i>Dialium pachyphyllum</i>	27	<i>Monotes kerstigmii</i>
9	<i>Hylodendron gabuense</i>	28	<i>Butyrospermum paradoxum</i>
10	<i>Hymenocardia acida</i>	29	<i>Hymenocardia acida</i>
11	<i>Macaranga</i> spp.	30	<i>Combretum adenogonium</i>
12	<i>Musanga cercropioides</i>	31	<i>Danielia oliveri</i>
13	<i>Xylopia</i> spp.	32	<i>Berlinia grandiflora</i>
14	<i>Isobertia doka</i>	33	<i>Mangifera indica</i>
15	<i>Albizia zygia</i>	34	<i>Vitex doniana</i>
16	<i>Cola cordifolia</i>	35	<i>Opilia amentalea</i>
17	<i>Entada Africana</i>	36	<i>Lophira lanceolata</i>
18	<i>Parkia biglobosa</i>	37	<i>Brideria</i> sp.
19	<i>Eucalyptus camaldulensis</i>	38	<i>Isobertia doka</i>

CONCLUSIONS

This article has attempted to define a compromise between the local people of the National Park Salonga and their forest resources for the long-term conservation of the park. The Salonga National Park is located in the Congo basin in the Democratic Republic of Congo. The park covers 36 000 km². The park is divided into two separate blocks. In the light of the results of our survey, we find that all the primary needs of the local people are met by the use of forest products. The local people are abusively exploiting

the forest resources without considering any conservation methods for the future generations. The local people have no help at hand from the government neither are they invited to contribute to the conservation process of the Salonga National Park. That is the reason why we propose that the local authorities involve the local villagers in the management process by empowering them so that they become more aware and more capable of using the forest products properly, taking into account the future requirements.

SUMMARY

This article has attempted to analyze various forest products used by local people living within the Salonga National Park. In order to find data for this research, we conducted a survey on the ground. We selected four villages as the basis of our investigations. The results of the survey confirm that local people draw most of their primary needs from forest products. The results of these surveys also show that local people use other forest products to meet their basic needs. In fact, to fulfill their vital primary needs, local people practise activities such as picking, gathering, collecting honey, handicrafts, traditional medicine and collecting firewood. Our surveys have nevertheless recognized that local people are not involved in the process of the management of the Salonga National Park. For a better conservation of this treasure – the Salonga National Park –, we suggest in this paper the following principles to be taken into account:

1. Extensive research is needed to help obtain relevant information about the forest park.
2. Local populations must be integrated into the process of the management of the park.
3. The relationship between the population and forest resources in the park are necessary.
4. Forest management and community development are concomitant.
5. The management of forest resources is a continuous process.
6. The exploitation of the usufruct must be independent of land ownership.

This research concluded that the management of natural forest resources of the Salonga National park is the driving force behind the community development. The success of management would depend on the taking into consideration the key-conditions and on accepting the limits they impose.

We all know that where the vegetation is, there is life. The Salonga National Park has to fulfill its natural vocation: being a living space for all organisms including humans. The Congolese government must be aware of this problem and, in cooperation with other governmental, non-governmental and international organizations; they should do their utmost to fulfill this task – to take care of the forest in the Salonga National Park.

SOUHRN

Využití lesních produktů domorodými obyvateli lesů v národním parku Salonga

Tento článek se pokouší vymezit a přiblížit využití různých lesních produktů místními obyvateli NP Salonga. Za účelem získání dat bylo podniknuto šetření v místě a vybrány čtyři vesnice k analýze vztahu lidí a prostředí. Výsledky průzkumu potvrzují, že místní lidé uspokojují většinu svých životně důležitých potřeb primárním využíváním zemědělských a sekundárním využíváním lesních produktů. Pro uspokojení základních potřeb obyvatelstvo praktikuje sběračství ovoce, medu, řemeslnickou výrobu a výrobu uměleckých předmětů, tradiční léčebné postupy a sběr palivového dříví. Naše šetření nicméně dokazuje, že vesničané nejsou zapojeni do procesu správy parku. Pro lepší ochranu národního parku Salonga proto nabízím následující zásady, které je vhodné vzít v úvahu:

1. Realizace rozsáhlého výzkumu by měla napomoci získat relevantní informace o prostředí.
2. Místní obyvatelé musí být integrováni do procesu správy parku.
3. Vztah mezi obyvatelstvem a lesními zdroji parku je přirozený.
4. Lesní hospodářství a místní rurální rozvoj je vhodné souběžně provázet.
5. Obhospodařování lesních zdrojů je kontinuální proces.
6. Užívací práva musí být nezávislá na vlastnictví půdy.

Realizovaný výzkum přinesl poznání, že management přírodních zdrojů národního parku Salonga je také hlavní silou ovlivňující rurální rozvoj. Úspěch tohoto managementu bude záviset na realistickém zvážení všech faktorů podmiňujících vztah mezi lidmi a přírodou, včetně a především v kontextu limitů těchto vztahů. Pro vyvážený management NP Salonga je třeba ještě prohloubit znalosti o rozsahu, obsahu i hodnotě ekosystémové biodiverzity i účinně zapojit domorodou komunitu, která obývá NP a využívá zdroje z lesa. Praktická opatření v oblasti ochrany přírody a udržitelného lesního hospodaření jsou možná jen za zlepšené a funkční integrace místního obyvatelstva. Konžská vláda by se za spolupráce s nevládními a mezinárodními organizacemi měla pokusit o takový funkční způsob managementu.

potřeby místních lidí, využívání lesních produktů, správa a řízení národního parku Salonga

REFERENCES

DUPAIN, J., Van KRUKELSVEN, E., VAN ELSACKER, L., VARHEYEN, R. F., 2000: Current status of

Bonobo (*Pan paniscus*) in the proposed Lomako reserve (Democratic Republic of Congo), Biological conservation, 94, 265–272.

- FAO, 1990: Community forestry: herders' decision-making in natural resources management in arid and semi-arid Africa. FAO Community Forestry Note No. 4, Rome.
- HANSEN, M. C., DeFRIEES, R. S., TOWNSHEND, J. R. G., SOHLBERG, R., 2000: Global land cover classification at 1km spatial resolution using a classification tree approach. *International Journal of Remote Sensing*, 21, 1331–1364.
- HART, T., 2002: Conservation in Anarchy: Key conditions for Successful Conservation of Okapi Faunal Reserve, In *Making Parks Work, Strategies for Preserving Tropical Nature*, Edited by J. Terborgh Carel van Schaik, Lisa Davenport Radhu Rao, pp 76–85.
- HUANG, S., 2005: Multisource data combination for the Assessment of Salonga National Park in The Importance of Multi-Sensor Satellite Data Applications for environmental Monitoring with special emphasis on land cover mapping, desertification monitoring and fire detection, Ludwig-Maximilians-Universität, Deutschland, pp. 24–37.
- KRUNKELSVEN, V. E., 2001: Density estimation of *Pan paniscus* in Salonga National Park, Congo, *Biological Conservation*, Vol. 99, n°: 3, pp. 387–391, Elsevier.
- KRUNKELSVEN, V. E., BILA-ISIA, I., DRAULANS, D., 2000: A survey of Bonobos & other large mammals in the Salonga National Park, Congo, Vol. 34, n° 3, pp. 180–187, Blackwell Publishing, Wharton.
- LOVELAND, T. R., REED, B. C., BROWN, J. F., OHLEN, D. O., ZHU, Z., YANG, L., MERCHANT, J. W., 2000: Development of global land covers characteristics database & IGBP Discover from 1km AVHRR. *International Journal of Remote Sensing*.
- SCHNEIDER, P., 1996: Sauvegarde et aménagement de la forêt classée de Farako (Mali) avec la participation et au profit des populations riveraines, Zurich, 317p.
- THOMPSON, J., 2003: Lukuru Wildlife Research Project. Rhino Fantome 2, Biosphere Reserve nomination form submitted to UNESCO, Paris.
- WILKIE, D. S., SIDLE, J. G., BOUNDZANGA, G. C., 1992: Mechanized logging, market hunting and bank loan in Congo, *Conservation biology*, 6, 570–580.

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