

Socio-Cultural and Economic Role and Importance of Biodiversity and Forest in the Democratic Republic of Congo: Case of the Upper-Katanga Province

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Abstract: Biodiversity plays a fundamental role in the life of the Congolese population in general and in that of the population of Upper-Katanga province in particular. The current study deals with the socio-cultural and economic role and importance of biological diversity and forest in the life of the population of Upper-Katanga province. The utilized methodology was based on observation, field investigation and bibliographic research. Investigations were concerned more particularly with wood and animal species which are significantly utilized in the province. The results reflect the use of wood and animals which are part of the province biological diversity. They are compiled under two segments, namely the socio-cultural importance of biodiversity with some species forbidden to the queen, those that are utilized to split couples, to give strength to children, to provide the king with authority power, etc. The second segment deals with the results which emphasize the socio-economic importance of biodiversity concerned with hunting, fishing, cutting of some wood species for sale, building houses, cooking food, producing heat during cold weather, making furniture and other finished products, and for personal use.

Key words: Biodiversity, forest, socio-cultural and economic importance, Upper-Katanga province.

1. Introduction

Since the Neolithic period, men have been domesticating animals and plants to feed themselves better, to take care of their health, to get clothes and other animals for their strength, their milk, their meat, their leather... They benefit from living biodiversity in a wide range of activities and agricultural production under all the latitudes and on all the continents [1]. Biodiversity is constituted with the living organisms that surround us and to which we belong, it represents the living tissue of our planet. Its origin is very old because the first forms of life appeared on the Earth more than three billion and a half years ago. Since then, the living organisms have been changing to present the biodiversity we know today [2].

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Since a long time period, forest and wood represent important resources for the humanity. The forest plays a crucial role in the water cycle, the climate control and wood exploitation make multiple variations which represent a major challenge to the nation on ecological, economic and social plan [3]. Being the consumers who depend on wood energy, the poor people are generally the first ones who face the negative impacts which are heavy social charges, particularly the respiratory health problems. Despite those faced problems, the resident population of the Upper-Katanga province adjust themselves to the feeding, the culture and so on, an adaptation which makes them a real society. However, the Congolese biodiversity in general and that of the Upper-Katanga province in particular, is subject to threats by mining and forest exploitation, agriculture occupation of sites, wood cutting and carbonization, pirate fishing,

military positions in the park, chasse poaching, commercial hunting, animal breeding, and human housing. There is housing destruction by itinerant agriculture on burnt down fields, hunting with bush fire, unsustainable forest exploitation inside and outside of protected areas, mining exploitation, group camping and armed gangs in protected areas. Besides, there is fauna destruction due to the destruction of habitats, to unrestrained killing of animals by unruly groups and armed gangs (Maï-Maï, FDLR, ADFNALU, LRA, SPLA), to chasse poaching with weapons for trophies and/or meat, to commercial hunting and to large scale hunting for subsistence [4].

In Central Africa, commercial hunting strongly contributes to supplying households with animal proteins in rural areas as well as in urban areas. It is accused to overexploit the fauna and to have a very negative impact on animal biodiversity and on forest regeneration, as well as creating important risks due to the development of emerging diseases [5]. On the other hand, biodiversity protection by the population of Upper-Katanga province is less striking/notable as the role or socio-cultural need of the population is absorbed by the economic one which leads to tree cutting, plant uprooting, hunting or to the extinction of certain animal species.

The objective of this paper is to identify and to define the role and the socio-cultural and economic importance of certain species of the biodiversity in the life of the population in Upper-Katanga province.

2. Methodology

The study was mainly carried out in the Upper-Katanga province located at 11°40'11" South and 27°29'00" East in the South-East of the Democratic Republic of Congo. After the administrative split of the former Katanga province into four new provinces (Lualaba, Tanganyika, Upper-Katanga, Upper-Lomami) in 2015, the Upper-Katanga became one of the current 26 provinces

of the country. The province has an area of 132.425 square kilometers (km²) and a population of 4,617,000 inhabitants [6]. It is limited at the North by the East of the Upper-Lomami province and the South of the Tanganyika province, at the East and the South by the Republic of Zambia and, at the Ouest, by the Lualaba province and the Upper-Lomami province. Lubumbashi is the capital city of the Upper-Katanga province. The province has six territories, notably Kambove, Kasenga, Kipushi, Mitwaba, Pweto and Sakania.

For data collection, authors resorted to methods such as observation, field investigation and bibliographical research.

The various products encountered at the four selling sites of Lubumbashi market, notably the Rail, Kaleja and Mpande markets which receive products from Likasi road and Kasenga road, and the Matshipisha market which receives products from Kipushi, Sodimico and Kaponda "chefferie" (a rural county ruled by a traditional chief) on Kasumbalesa road, stem from the forest or the bush. They allowed us to distinguish different socio-professional groups whose roles are, among others, to be used as food, furniture manufacturing, wood frame/timberwork, building structure, sculpture, art works, manufacturing of coffins/caskets, drums, fishing pirogues, royal power signs, etc. Investigation was conducted through interview of target groups. Most questions asked to the surveyed people were open because we needed their opinion and that is why certain terms and/or names of some trees, insects, birds and other animals were written down in their own language or dialect. To that effect, of all the very important trees in the province Sanga, Yeke, Chokwe tribes, etc. (according to the given socio-cultural importance), the only tree (the "Mwemwe tuseko": *Sterculia quinqueloba*) of which our guides remembered again the location was photographed. The sample was randomly taken. A total of 295 people were questioned. Among them were 15 antelope hunters, 20 sellers of various woods, 80 embers' sellers, 40 wild duck sellers, 30 wood furniture

Table 1 Questioned people per socio-professional category and quantity sold per working day each week.

Socio-professional category of questioned people	Number of sellers	Quantity sold per week						Total
		Mon	Tue	Wed	Thu	Fri	Sat	
Antelope hunters	15	4	2	0	1	2	7	16
Wood sellers	20	500	600	650	700	550	600	3,600
Ember sellers	80	30	90	70	30	90	70	380
Kanga (Wild duck) sellers	40	2	4	5	1	4	6	22
Wood furniture sellers	30	5	4	3	5	6	2	25
Straw mat (per m ²) sellers	5	12	14	10	16	20	15	87
Goose sellers	40	13	17	25	30	15	20	120
Other birds' sellers	10	20	15	25	20	10	30	120
Pigeon and Guinea fowl sellers	40	50	45	40	20	30	45	230
Catfish and tilapia sellers	15	25	30	27	15	33	45	175
Total	295	661	821	855	838	760	840	4,775

sellers, 5 straw mat sellers, 40 goose and Guinea fowl sellers, 10 gosling sellers, 40 green pigeon sellers and 15 catfish and tilapia sellers (Table 1). In the same order, certain photographs taken with a Huawei Honor smartphone and a DN6JNAS4DKNV iPad are shown.

3. Results and Discussion

3.1 The Role and Importance of Trees and Animals in the Cultural Life of the Population of Upper-Katanga

The statistics of provincial inspection of public health in Lubumbashi city show that during 2002 in Kampemba, Lubumbashi and Ruashi communes, there were in total 100,507 cases of malaria, 10,591 cases of acute respiratory infections, 10,389 cases of diarrhoeic diseases (9,604 cases of simple diarrhea and 785 cases of bleeding diarrhea) and 5,826 cases of STI (Sexually Transmissible Infections). Those were the most frequent diseases in the Lubumbashi sanitary district.

To fight against that curse which decimates the population, mostly the poorest, people have to organize themselves according to their region in order to take care of themselves. The bad socio-economic situation faced by developing countries, particularly the DRC (Democratic Republic of Congo), pushes patients to resort to traditional medicine. One of the recent WHO (World Health Organization) reports indicates that 80% of the world population use natural

products, particularly plants to treat himself. Indeed, the traditional medicine resorts to the use of natural products of which the main sources are plants, mushrooms, animals and mineral products [7]. In the Lubumbashi region, traditherapists (traditional therapists) use plants to treat sickle cell anaemia and other various diseases [8].

Medicinal plants occupy a place of choice in the treatment of different pathologies. That reality is mainly observed in developing countries due to several reasons, including the completely deteriorated socio-economic situation, the extreme poverty of the majority of the populations, and cultural considerations [9].

The “biomedicine” does not take into consideration the somatic dimension of the illness whereas the traditional medicine takes care of the somatic as well as the psychic dimensions (a man is considered as a bio-psycho-socio-cultural constituent) [9].

According to the belief of the population in Upper-Katanga province, certain trees and animals present a great socio-cultural importance in the life. That is notably the case of:

(a) The “*Mwemwe tuseko*” (*Sterculia quinqueloba*), a white tree of which roots serve to provide chance and good evolution in professional life (Fig. 1).

(b) The “*Mutakali*”, a tree of which trunk and branches are utilized as the pillars on which the drums



Fig. 1 The Mwemwe tuseko (*Sterculia quinqueloba*).



Fig. 2a The *Mutakali*.

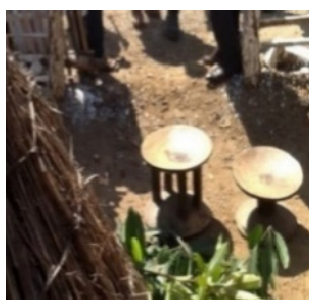


Fig. 2b The *Mutakali*.

of the Yeke tribe kingdom are hanged (Fig. 2a), the same “*Mutakali*” also used for manufacturing small chairs on which the king and the queen seat down during different rituals (Fig. 2b).

(c) The “*Nkota bagoli*”, a tree which is among the constraints/tabous in the Yeke tribe and of which, for instance, it is forbidden to the queens to burn for warming themselves up.

(d) The “*Mulwalwa*”, a tree of which the roots are often abusively used for separating couples; it means that it is only enough that the roots of this tree be thrown to the roof of a house to note/observe later on the breaking up of the couple who was living in the house.

(e) The “*Mubanga*” (*Pericopsis angolensis*), another tree of which roots and leaves are soaked in bath water

by mothers of young children (boys) for their boys to become strong during their childhood.

(f) The “*Ndulwe kyulu*”, a tree of which bitter roots are used for causing abortions.

(g) The “*Mutondo*” (*Julbernardia paniculata*), a tree economically good for charcoal-burners as its trunk and branches also produce charcoal.

(h) “*Musamba*” (*Brachystegia wangemeeana* or *Brachystegia boehmii*), a tree of which bark is used as a rope to tie up/to link together hunters’ burdens.

(i) The “*Mulombwa*” (*Pterocarpus angolensis*), an economically important tree because of the quality of its wood which is appreciated by joiners. The “*Mulombwa*” produces a hard and beautiful wood, two qualities economically profitable for the joiners as the furniture made from that tree, and attracts customers because of the wood qualities.

(j) “*Lion*”, a very important animal in the Bayeke tribe as it represents the life of the king, and the Bayeke chief is considered as a lion. The skin of the animal serves as a carpet on which the king puts/places his feet onto the main courtyard. The lion tail symbolizes the power of the king (Fig. 3).

(k) “*Pangolin*”, a mammal animal which is not consumed as it causes the kwashiorkor (a malnutrition illness due to protein deficiency) to children, according to the tradition of “*Bajila-Kasanga*”, a tribe of the Central Kasai province. That tribe forms almost 10% of the population of the Upper-Katanga province.

Since a long time, certain collectivities protect such or such trees because those trees are used as rallying point or because they assume a sacred character.



Fig. 3 A lion tail in the hands of the Bayeke chief.

3.2 The Role and Importance of Forest in the Economic Life of the Population of the Upper-Katanga Province

Economically speaking, biodiversity occupies a great place in the life of the Upper-Katanga population, especially that biodiversity provides the population with many things such as wood for building houses, wood for charcoal/ember making and for charcoal-fired heating in rural area (Fig. 4). The embers constitute more than 80% of energy consumption by the Upper-Katanga population, they are packed in 50-kg bags (Fig. 5a). They are ignited with ember igniters (Fig. 5b).

Wood is also used for making house equipment such as furniture (Fig. 6a), mixers and mortars (Fig. 6b). Moreover, biodiversity also provides households with food and financial resources through the sale of biodiversity products, etc. The strongest dependence



Fig. 4 Construction trees for sale.



Fig. 5a 50-kg bags of embers for sale.



Fig. 5b Ember igniters for sale.



Fig. 6a Wood furniture for sale.



Fig. 6b Mixers for sale in a mortar for sale, too.

toward wood energy is observed in Sub-Saharan African countries where 93% of the rural population and 58% of the urban population depend on biomass (such as wood for fire, embers, agricultural waste, animal feces) for combustible [10].

Practically, the food offered to the Upper-Katanga households by the biodiversity concerns notably the antelope that is one of the most consumed meat in the province. It is followed by the goose, the wild duck (also called “Kanga”), the Guinea fowl, the green pigeon, the catfish and the tilapia. Those species of which local demand is considerable represent a very high level of hunting and fishing in the province (Figs. 7a-7d).

The commercial hunting has a long history which started with the Belgian colonization and continued without breaking off but with different actors up to now. The hunting is concerned with small and medium-sized fauna which presents natural dynamics of very high reproduction and which withstands well high hunting pressure [5]. The venison, especially the smoked meat, plays an important role in the food security for the rural and the poorest urban people. Hunting for meat is not with free access but the network is strongly regulated



Fig. 7a Guinea fowls and green pigeons alive in a wire-mesh cage and smoked Guinea fowls above the cage.



Fig. 7b Tilapia fish in two small baskets.



Fig. 7c Catfish hanging with a rope by a seller.



Fig. 7d A wild duck in the right hand of a seller.

by social, economic, geographic and technical constraints [5]. Besides, one can also find in the pots of the Upper-Katanga population the “*Maninshi*” which are termites having the form of small wasps. They go out of termite mounds at the first great rainfall of the season. They are directly captured under sieve when they go out of their small holes or on tree leaves placed

around the holes and on which they climb before flying away. The “*Malomba*” are termites going out of holes of termite mounds where they are captured at night using paraffin lamps/hurricane-lamps or any other luminous means in rainy season. The “*Malomba*” in Kisanga dialect are called “*Inswa*” in Kiswahili.

Rats are captured in the bush or in the fields before, during or after harvesting using traps which are called “*Biriba*” in Kisanga. The “*Nseshi*” are reed rats that often live on the river banks or in humid places. They are captured by hunting dogs often during the dry season, from the end of April to October.

The “*Nzobe*” are antelopes of large size which live in humid places. They are often hunted in dry season and rarely/seldom in rainy season. One can hunt them alone but they are often hunted by group of hunters who use hunting dogs and also by using traps made of copper wires called “*Sambo*”.

Edible caterpillars, that are part of the main non-agricultural products, are strongly consumed in the Upper-Katanga province.

Secondly, financial resources are guaranteed through selling of the cited products or species drawn from the biodiversity to satisfy other needs that would not be satisfied otherwise (Tables 1-3; Figs. 8-20).

The budget of the Upper-Katanga province is made/constituted of 80% of mining exploitation/activities but the main activities in the province are notably the small trade that occupies the first place (50%), followed by industrial and artisanal mining activities (25%), then urban and peri-urban truck gardening (22%), and farming (3%). Agriculture, small trade and farming together account for 19.9% in the province budget. The biodiversity products encountered on the social, cultural, economic and sanitary markets constitute a small portion in terms of contribution to the budget of the province, especially that those products are illicit. This means that the trees and animals are clandestinely cut or killed and that is why no reforestation is done after deforestation. It is only from sanitary service offered by traditherapists at the level

Table 2 Embers production with a frequency of twice a week.

Category	Charcoal	Quantity	PU (in CDF)	TP (in CDF)	TP (in USD*)
Furnace (Kibiri)	4 trees (furnace of 3 m long × 2 m wide × 2 m high)	30 bags	9,000	270,000	163.64
	12 trees (furnace of 10 m long × 5 m wide × 2 m high)	90 bags	9,000	810,000	490.91
Tree field of 50 m long × 25 m wide for a charcoal furnace	Furnace of 8 m long × 4 m wide × 2 m high	70 bags	9,000	630,000	381.82
Total	16 trees and a charcoal field of 50 m × 25 m	190 bags	9,000	1,710,000	1,036.37
Total multiplied by	a mean of 20 charcoal sellers per sale point	3,800 bags	9,000	34,200,000	20,727.27

CDF: Congolese franc; PU: price per unit; TP: total price; USD: United States of America dollar; * 1 USD = 1,650 CDF.

Table 3 Types of animals sold at the market.

Animal type	Quantity	Price (in CDF)	Quantity	Price (in CDF)	Price (in USD*)
Antelope	1 portion	30,000	1×4 portions	120,000	72.73
Kanga (Wild duck)	2 portions	50,000	2×2 portions	100,000	60.61
Goose	1	65,000	1	65,000	39.39
Pigeon	1	5,500	1	5,500	3.33
Guinea fowl	1	25,000	1	25,000	15.15
Catfish	1	5,000	1	5,000	3.03
Tilapia	1 straw basin	5,000	1	5,000	3.03

CDF: Congolese franc; USD: United States of America dollar; * 1 USD = 1,650 CDF.

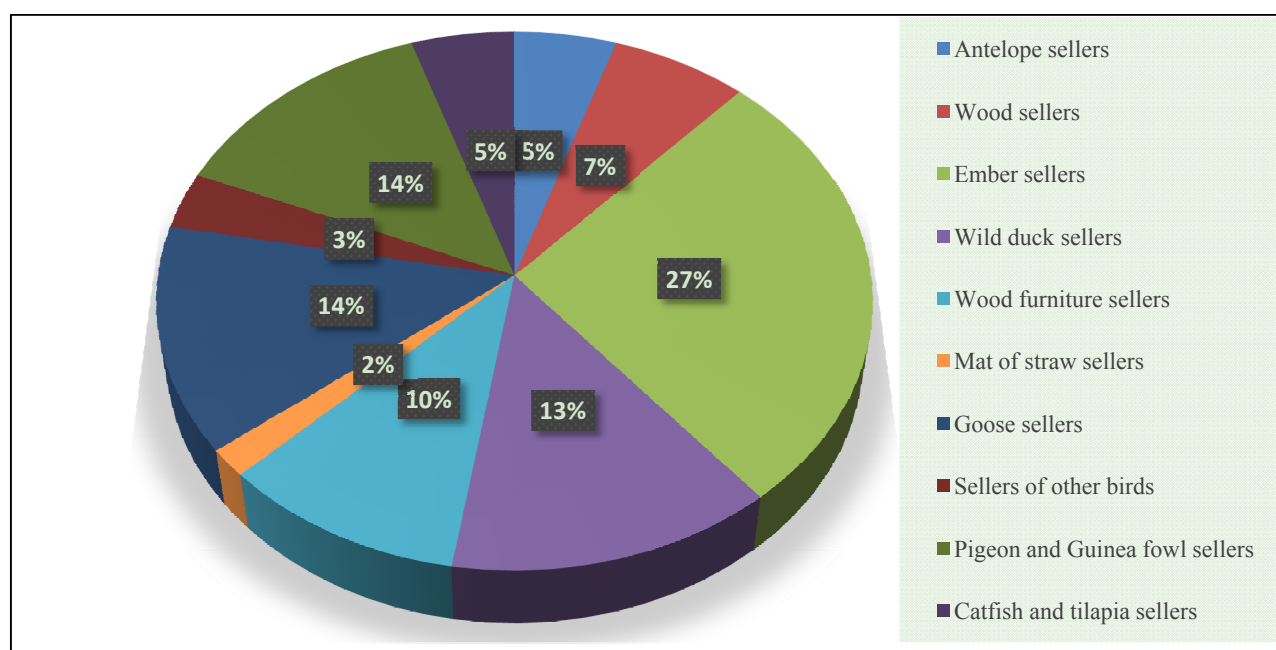


Fig. 8 Surveyed people per socio-professional category.

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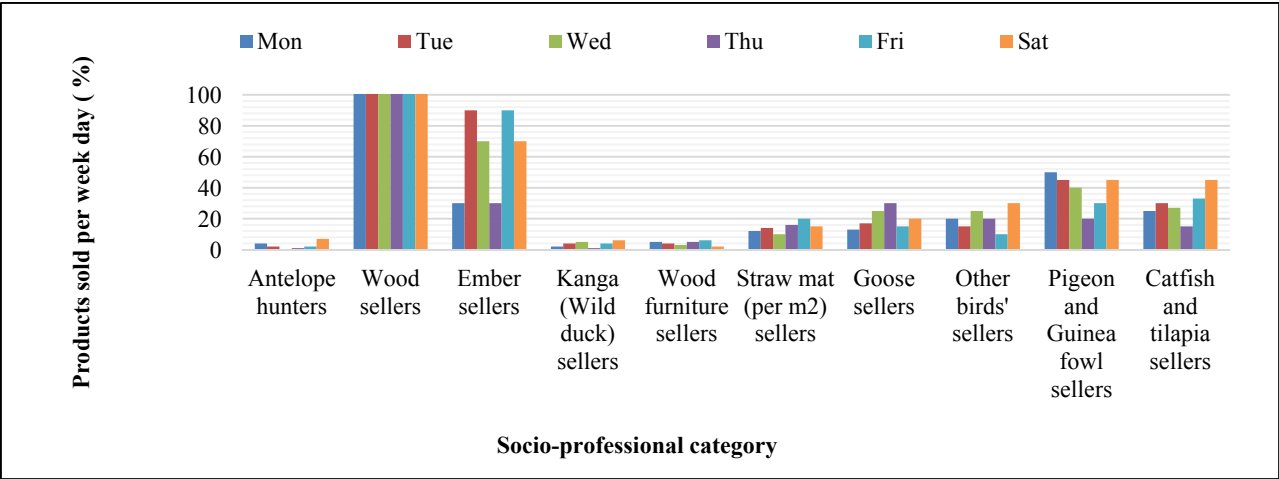


Fig. 9 Frequency of product sale per socio-professional category.

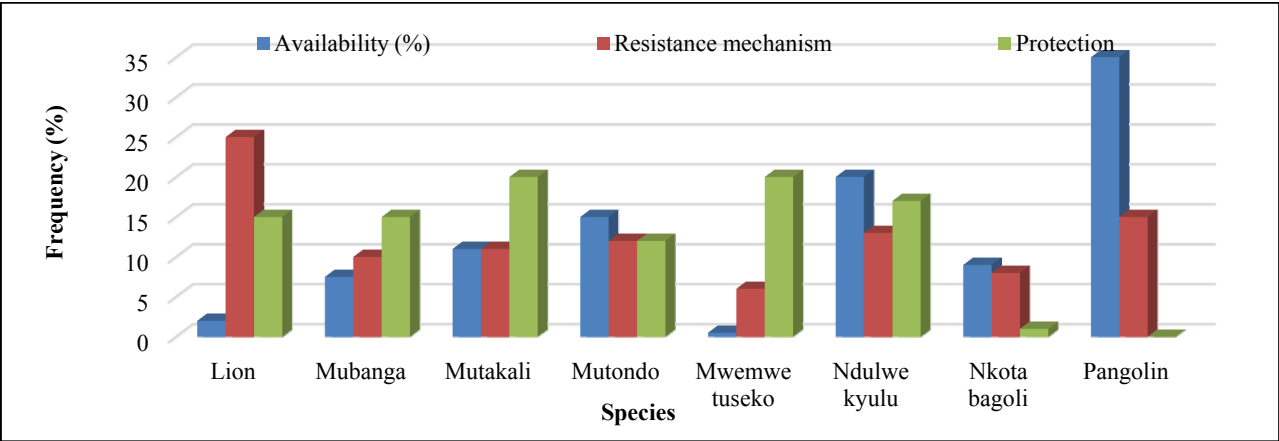


Fig. 10 The socio-cultural role and importance of biodiversity.

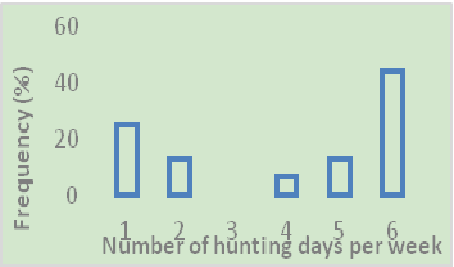


Fig. 11 Frequency of antelope hunting days per week.



Fig. 13 Frequency of embers sale days per week.

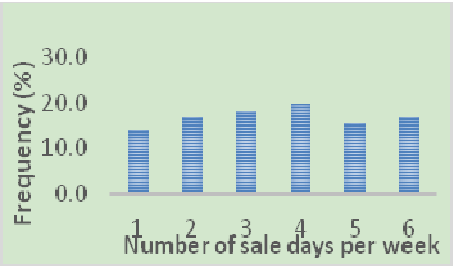


Fig. 12 Frequency of wood sale days per week.



Fig. 14 Frequency of wild duck sale days per week.

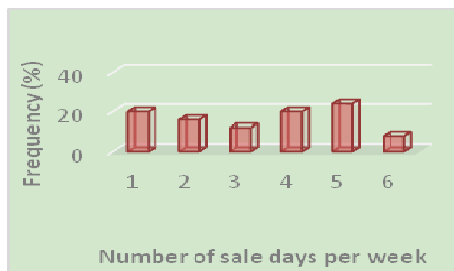


Fig. 15 Frequency of wood furniture sale days per week.

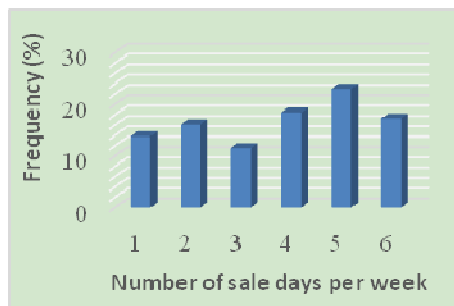


Fig. 16 Frequency of straw mats (per m²) sale days per week.

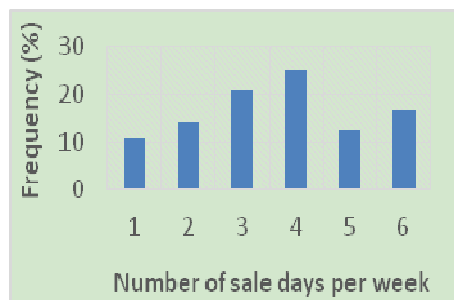


Fig. 17 Frequency of goose sale days per week.

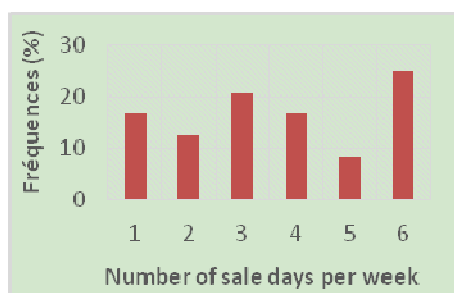


Fig. 18 Frequency of gosling sale days per week.

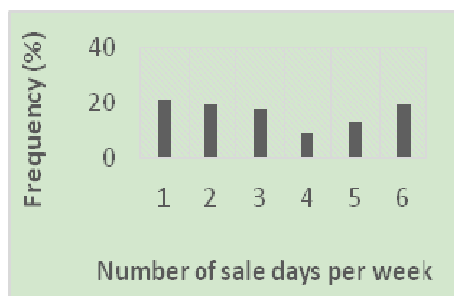


Fig. 19 Frequency of green pigeon sale days per week.

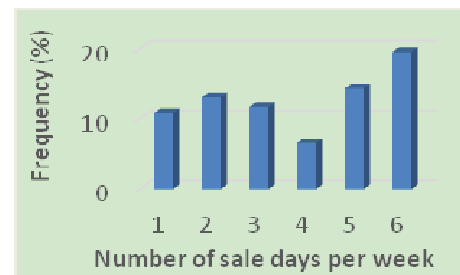


Fig. 20 Frequency of catfish and tilapia sale days per week.

of 95% and whose actors are required to pay for administration and other expenses necessary for the functioning of the province.

4. Conclusion

The biodiversity and forest play various important roles in the life of the Upper-Katanga population. This study brings light to different spheres of the daily life of the same population through the trees and animals they utilize under cultural, economic and social forms. On one side, the trees are culturally used in the king's yard, for breaking up couples, for causing abortion and, on the other side, in an economic manner by constituting financial resources through selling charcoal/embers (wood energy), wood for construction and wood for making furniture. Various plants and mushrooms are used by tradition medicine to treat different diseases. Animals too are utilized in the same cultural and economic contexts. The lion tail and skin are considered as a source of authority and power for the king. The hunted and captured animals are consumed or sold by the population. The importance, more economic at 99.99% than socio-cultural (0.01%), given to those species pushes to an overexploitation which threatens those animals with extinction.

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