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RESEARCH ARTICLE

AVAILABILITY OF AGRICULTURAL LAND IN THE CONTEXT OF AGRO-ECOLOGY IN THE LOWER OUEME VALLEY (SOUTH BENIN)

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ABSTRACT

Benin, agriculture is the main activity and provides food coverage for the majority of its population. This research analyzes the availability of agricultural land in the context of agro-ecology in the lower Ouémé valley. The data used relate to climatic and soil data, socio-economic information and demographic data. Field investigations are carried out based on the determination of sampling. In total, 260 people were interviewed as part of this research. These data were processed using SPSS IBM version 21 software. The analysis of the results was carried out using the SWOT model. The results showed that the availability of agricultural land in the BVO is another reality to which agro-ecological faces. The mode of access to land which presents more difficulty is the mode of access by inheritance (89.58%). Indeed, the other methods of access to land which present difficulties in the study area are borrowing (18.89%), rental (9.45%), donation (9.12%) and usufruct (0.98%) according to the population surveyed. For 42.35% and 49.84% of those questioned, the land in the Lower Ouémé Valley is very fertile. Several agro-ecological practices are listed in the BVO including the agro-ecological experiments on the Sain farm school of Pascal Gbenou in Kode (Adjohoun), the experiments on the farm Zanou. The limits of agroecological tourism in the BVO were also discussed.

INTRODUCTION

The industrialization of agriculture and the globalization of markets have considerably disrupted agricultural practices for several decades (MCAT, 2004, p. 2). A real economic sector has been formed around agriculture and agro-ecology (O. Thomas, 2008, p. 12). Global agricultural production is expected to increase by 70% by 2050, according to international forecasts (FAO, 2009, p. 7). The strength of international agricultural production, in fact, constitutes the first factor in the development of agro-ecology (P. Chodaton, 2004, p. 16). With continuously increasing productivity thanks to the use of machinery in the production process, agriculture ensures food security for the world's population and provides feed for livestock which in turn provides raw material for the food sector. agri-food processing (milk, meat, eggs, gelatin, etc.) (GJ B Hounkonnou, 2001, p. 23). The economic growth of almost all of the nations that populate the earth depends primarily on the quality of the people who inhabit these nations but also and above all on the quality of the soil or subsoil of these nations (B. Hounkanrin, 2015, p.121). In Benin, agriculture is experiencing problems such as reduced fertility and soil degradation. This situation leads to a drop in yields and consequently a drop in producers' income. This phenomenon is constantly amplified by demographic pressure and the virtual disappearance of natural fallow cultivation practices (A. Agbahungba and A. Assa, 2001, p. 312).

Thus, projects were initiated and executed for this purpose to remedy the various difficulties experienced by producers (P. Attiogbe, 2010, p. 8). The lower Ouémé valley is full of enormous agro-ecological potential of great importance known nationally and even internationally and which can constitute a source of foreign currency for the population. So, a question arises. What is the availability of agricultural land in the lower Ouémé valley? This research aims to analyze the availability of agricultural land in the context of agro-ecology in the lower Ouémé valley. The lower Ouémé valley is on the continuum of the Ouémé watershed called lower valley and located in the Ouémé department, between 6°25' and 6°57' north latitude and between 2°24' and 2°38' east longitude. It is limited to the north by the department of Zou, to the south by Lake Nokoué, to the east by the commune of Akpro-Misséréte and the Department of Plateau and to the west by that of Atlantique (Figure 1).

Data and methods

Nature and source of data used: The data used in this research relate to soil data, ecological requirements of the chosen crops, agricultural production statistics, socio-economic information and demographic data were collected.

Collection of data: The methods implemented for collecting information took into account documentary research and field surveys in the lower Ouémé valley. Field investigations are carried out based on the determination of sampling. Thus, collection techniques and tools were used.

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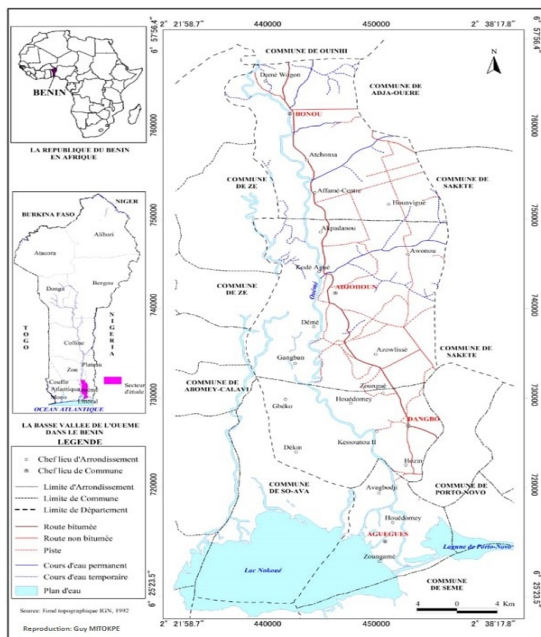


Figure 1. Geographical and administrative situations of the lower Ouémé valley

The surveys are carried out in the 5 communes of the lower Ouémé valley. The sample size was determined following the formula of D. Schwartz (1995, p. 94) which is presented as follows: $\beta = Z\alpha^2 \times pq / i^2$ with:

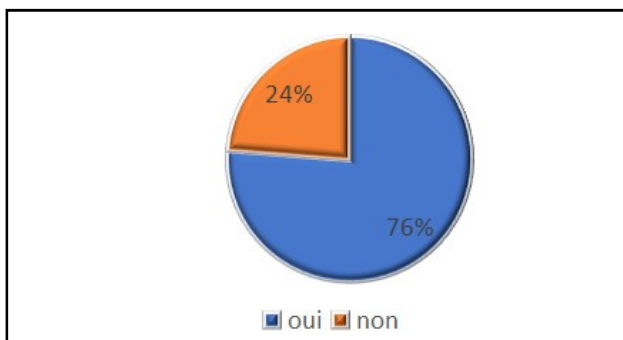
- β = sample size (β was determined for each municipality);
- $Z\alpha = 1.96$: reduced difference corresponding to an α risk of 5%;
- i = desired precision equal to 5% according to the INSAE technique;
- $q = 1-p$;
- p = the proportion of households with land in the research sector.

Thus, 260 people were interviewed as part of this research. This sample made it possible to collect socio-anthropological information. The various data were collected through the use of appropriate tools and techniques. The tools used for collecting data and information in the field are: a questionnaire, an interview guide, an observation grid, a camera, a GPS (Global Positioning System). The techniques that were implemented are direct and indirect observations and the Active Participatory Research Method (MARF). Statistical processing was carried out using the Excel spreadsheet and SPSS software.

RESULTS

Availability of agricultural land in the BVO

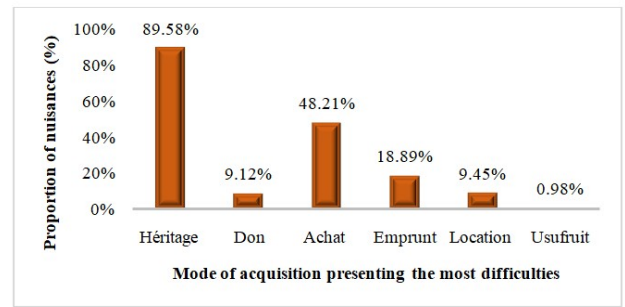
Access to agricultural land and sources of difficulties: Land is the basis of any agro-ecological development project. Figure 1 presents the perceptions of the population in the BVO on land acquisition.



Data source : Field survey, September 2021

Figure 2. Difficulties in land acquisition

It appears from the analysis of Figure 2 that 76% of the respondents revealed difficulties in acquiring land in the study area. Such a high number of people making this revelation is not likely to attract investment.

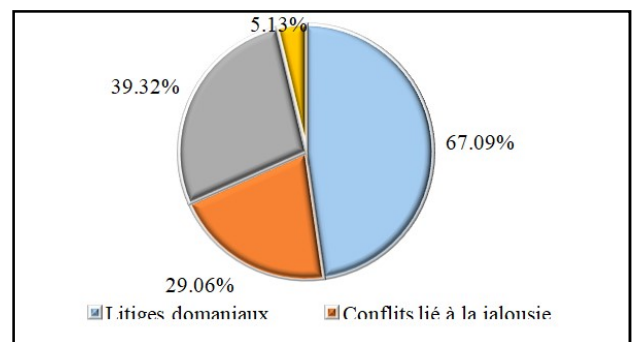


Data source : Field surveys, September 2021

Figure 3. Acquisition mode presenting the most difficulties

Agro-ecological development in a locality is always followed by an investment plan requiring easy access to land. The modes of access to land that are sources of difficulties have been listed in Figure 3 according to their importance and the perceptions of the people interviewed.

The analysis of Figure 3 reveals that the mode of access to land which presents the most difficulty is the mode of access by inheritance (89.58%). This mode is explained by the fact that the land which belongs to a family, a family group or a head of household is inherited subsequently by beneficiaries who are the members of the family or the children of the head of household to whom the land belongs to the beginning. However, in certain cases, the head of the family can sell a portion of the land without the family or family resource persons being informed. This explains the fact that the second mode of access source of difficulties that the population identified is the mode of access by purchase. Indeed, the other methods of access to land which present difficulties in the study area are borrowing (18.89%), rental (9.45%), donation (9.12%). and usufruct (0.98%) according to the perceptions of the population surveyed. Figure 4 presents the main types of conflicts and difficulties in the study area.



Data source : Field survey, September 2021

Figure 4. Conflicts in the study area

Taking into account local perceptions of conflicts in the area reveals that land disputes come first according to 67.09% of those questioned. This explains the importance of the difficulties of access to land raised upstream. Conflicts with breeders were raised by 39.32% of those interviewed. This is a transhumance conflict between farmer and breeder. This is a major concern to take into account for securing agro-ecological crop sites. Another particular type of conflict was mentioned by the population. These are conflicts linked to jealousy. It is a personal conflict often internal to the population, in which a third party takes a dim view of the success of another in a given area. This confirms the fact that the lands in the Lower Ouémé Valley are very fertile and pose no difficulty to the population.

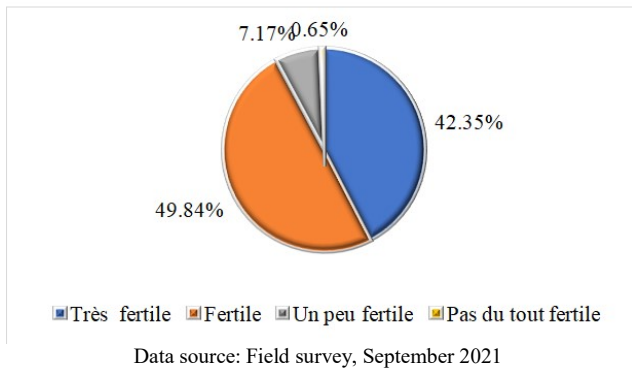


Figure 5. Assessment of land fertility

Assessment of soil quality: The analysis of Figure 5 reveals that for 42.35% and 49.84% of those questioned, the land in the Lower Ouémé Valley is very fertile or even fertile. Only 7.17% and 0.65% of the latter have the opposite opinion. For the latter, respectively the land is not very fertile and not at all fertile. But this opinion can be put into perspective. We can therefore hypothesize that there exists in isolated places land which is no longer productive. Otherwise the general trend, known to all and true, is that the lands in the Lower Ouémé Valley are very rich. For some, “the Lower Ouémé Valley is the 2nd richest valley in Africa after the Nile Valley”. Indeed, the soils benefit from silt deposits activated by the permanent regime of floods and recessions. Not only are the lands fertile, but also the region offers the possibility of growing off-season crops and allows for several speculations. The current observation is that this agroecological potential available to the Lower Ouémé Valley is very underexploited. It is noted that there is still land that is not exploited. Those which are occupied are under-exploited due to lack of technical means offering large production capacity.

Agro-ecological practices in the BVO

Agro-ecological experiments on the Sain school farm of Pascal Gbenou in Kode (Adjohoun): La Ferme Ecole is an initiative of Pascal Gbenou , founder and director of the farm school. Indeed, the Sain farm school aims to train young farmers in integrated and sustainable agricultural practices. The Sain farm school located in the Lower Ouémé Valley, precisely in Kodé in the commune of Adjohoun (plate 1). Observation of plate 1 shows that several agro-ecological activities are developed on the Sain school farm in the commune of Adjohoun . Photo (1.1) shows rice boards produced on site on the farm. Photo (1.2) illustrates the fertilization of a papaya plant using natural organic fertilizer and photo (1.3) shows a bottle of papaya juice produced on the Sain farm. Indeed, all production on the healthy school farm is healthy and organic.



Shooting: Mitokpè G. March 2022

Plate 1. Agro-ecological experiments on Pascal Gbenou 's healthy school farm in Kode (Adjohoun)

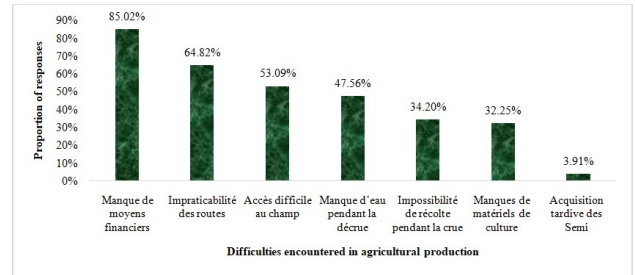
Experiences on the Zanou farm: The commune of Adjohoun is home to another farm called FermeZanou. Plate 2 presents some activities carried out on the Zanou farm. Photo (2.1) shows a pile of animal purse used as fertilizer and photo (2.2) shows a cultivation of *Solanum macrocarpon* (Great nightshade) on the Zanou farm in Azonwlissè . This is a healthy agroecology protection that presents the environment. *Solanum macrocarpon* _ is a market gardening crop well appreciated by Beninese people in general.



Shooting: Mitokpè G. March 2022

Plate 2. Stock exchange of animals used as fertilizer (2.1) and Cultivation of *Solanum macrocarpon* (2.2) on the Zanou farm in Azonwlissè (Adjohoun)

Limits of agroecological tourism in the BVO: Figure 6 takes stock of the difficulties encountered in agricultural production.



Data source: Field survey, September 2021

Figure 6. Difficulties encountered in agricultural production

The analysis of Figure 6 reveals the existence of several difficulties in agricultural production in the study area. The first difficulty expressed by the population is the lack of financial means according to 85.02% of those questioned. Agricultural production requires start-up funds and reserves for crop and soil maintenance. Without financial means, the activity is almost impossible given the start-up requirements. That being said, it is not uncommon to see land uncultivated for various reasons, but mainly financial. The impassability of roads (64.82%) and difficult access to the field (53.09%) are also major difficulties experienced by the population in this area.

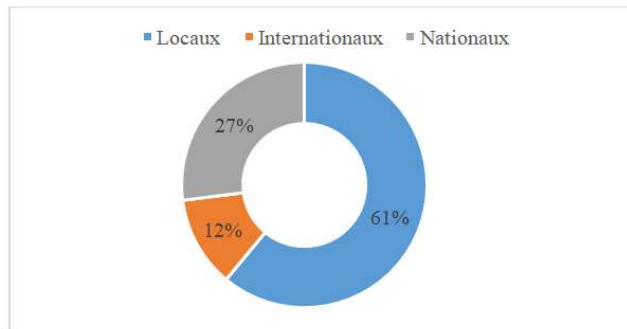
Agroecological production in the Lower Ouémé Valley also faces two difficulties which contrast but which are characteristic of the hydro-climatic constraints of the environment. These are the lack of water during the recession and the impossibility of harvesting during the flood according to respectively 47.56% and 34.20% of those questioned. Another institutional limit was mentioned by some of the people interviewed. This concerns the late acquisition of semis for crops. Apart from these difficulties, the population experiences great difficulty controlling water during the flood. Farmers are often surprised by the flood which floods the crop fields.

Floristic and faunal wealth: For 54% of those questioned, the Lower Ouémé Valley is characterized by rich flora and fauna. Thus, the flood plains and banks of banks support a degraded riparian forest where we find *Manilkara multinervis* , *Parinaricongensis* , *Cynometramegalophylla* , *Pterocarpus santalinoides* , *Hallea inermis*. In marshes and swamps grow *raphiales* , *Cyclosorus meadows striatus* and thickets in *Alchorneacordifolia*.

The bodies of water are populated by *Eichhorniacrassipes* , *Pistiastratiotes* . The *ichthyofauna* is rich and composed of valuable species such as *Heterotis niloticus*, *Chromidotilapia guntheri*, *Clarias agboyiensis*, *Clarias gariepinus*, *Brycinus sp.*, *Schilbeintermedius*, *Gymnarchus niloticus*. The avifauna includes the African cormorant, herons, *Bittern* (Palearctic), egrets, widowed *beetle* , chickens (sultana, allen and water), terns, etc. The mammalian fauna includes the situnga (*Tragelaphus spekei*), bushbuck (*Tragelaphus scriptus*), the manatee (*Trichechus senegalensis*), the spotted-necked otter (*Lutramaculicollis*), the white-cheeked otter (*Aonyx capensis*), the red-bellied monkey (*Cercopithecus erythrogaster*), etc. Among the reptiles we must mention the pythons, the monitor lizards, the najas

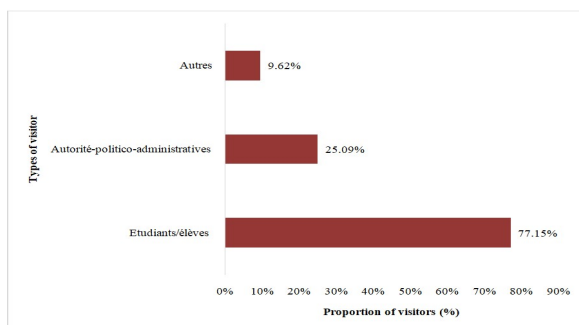
(*Najanigracolis* in particular) and crocodiles. Field investigations revealed that some of these species have disappeared in some places (crocodiles) and others on the red list of threatened species, for example the red-bellied monkey (*Cercopithecus erythrogastrer*).

Nature of tourist visitors in the BVO: It has been done, the categorization of the types of visitors or tourists in the BVO. This categorization made it possible to realize the diversity of tourists who frequent the BVO. There is a diversity of tourists grouped into three categories (figure 7).



Data source: Field surveys, September 2021

Figure 7 Different categories of tourists in the Lower Ouémé Valley



Data source: Field survey, September 2021

Figure 8. Nature of tourist visitors in the BVO

The analysis of Figure 7 shows that 61% of tourists are locals. Next come national (27%) and international (12%) tourists. This demonstrates the importance that local tourists attach to the lower valley due to the conditions of its attractive landscapes, the welcome and hospitality offered by the populations. Nationals and internationals travel less. The figure takes stock of the nature of local (national) visitors who frequent the BVO according to field investigations (figure 8). The analysis of Figure 8 shows that many tourists visit the Lower Ouémé Valley. According to socioanthropological investigations, the people interviewed inform that 25.09% of visitors to the Lower Ouémé Valley are political-administrative authorities. Another category of tourists is made up of students (77.15%). These are learners from universities, schools and agricultural training centers. This group of visitors frequent the Lower Ouémé Valley for various reasons. For the latter, it is mainly a question of professional internships in the locality. 9.62% of visitors constitute the diverse group of people. These are people who visit the BVO to discover nature or a relaxing place.

DISCUSSION

According to P. Odjo (2010, p. 7), one of the major concerns of the countries of the world and in particular those located south of the Sahara is to ensure a healthy diet for its population. This concern arose from the difficulties linked to the rapid increase in population and climatic hazards which compromise agricultural production.

However, agriculture is the main and economic activity of most developing countries (P. Attiogbe, 2010, p. 9). This is the case of Benin where agriculture is the main activity and provides food coverage for the majority of its population (O. Thomas, 2008, p. 10). According to P. Chodatou (2004, p. 13), agriculture occupies a special place in the Beninese economy. It represents on average 70.2% of exports and contributes more than 35% to the formation of Gross Domestic Product (GDP). It employs more than 54% of the active agricultural population (ABE, 2001, p. 7). R. Bamisso (2014 (2014, p. 12) showed that agriculture represents a strategic weight in the social and economic fabric of Benin, in terms of contribution to food security, employment, income formation and creation of goods and services. More than 60% of male workers and 36% of actually employed female workers exercise an agricultural profession.

CONCLUSION

This research made it possible to analyze the availability of agricultural land in the context of agro-ecology in the lower Ouémé valley. The data used in this research relate to soil, socio-economic and demographic data. Thus, the results showed that the availability of agricultural land in the BVO is another reality that tourism faces. The method of access to land which presents more difficulty is the mode of access by inheritance. Thus, the lands in the Lower Ouémé Valley are very fertile, even fertile. Several agro-ecological practices are identified in the BVO including the agro-ecological experiments on the Sain farm school of Pascal Gbenou in Kode (Adjohoun), the experiments on the Zanou farm. The limits of agroecological tourism in the BVO were also discussed.

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