Available online at http://www.journalcra.com

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

International Journal of Current Research
Vol. 17, Issue, 06, pp.33186-33192, June, 2025
DOI: https://doi.org/10.24941/ijcr.49011.06.2025

ISSN: 0975-833X

RESEARCH ARTICLE

CROPPING SYSTEMS IN WEST AFRICA: AN ATTEMPT TO ASSESS THE AGROECOLOGICAL SUSTAINABILITY OF KORSIMORO IN BURKINA FASO

[1]NIKIEMA Wendkouni Ousmane, [2]YAMEOGO Augustin and [1]YANOGO Pawendkisgou Isidore

[1]Département de Géographie, Université Norbert ZONGO, Burkina Faso, BP 376 Koudougou;
[2]Université Yembila Abdoulaye TOGUYENI (Fada N'Gourma, Burkina Faso)

ARTICLE INFO

Article History:
Received 09th March, 2025
Received in revised form
21st April, 2025
Accepted 19th May, 2025
Published online 24th June, 2025

Key words:

Cropping systems, Evaluation, Agro-ecological sustainability, Korsimoro, West Africa.

Corresponding author:
NIKIEMA Wendkouni Ousmane

ABSTRACT

The industrial revolution has profoundly changed the habits and life of the human race in West Africa. It is characterised by the use of more efficient equipment in various areas of activity such as agriculture, livestock farming, industry and trade. This has contributed to the overall metamorphosis of agriculture, which is the main primary sector activity of rural populations. The aim of this article is to assess the sustainability of the cropping systems developed in the hydro-agricultural perimeter of the rural commune of Korsimoro on the scale of agro-ecological sustainability. The Indicateurs de Durabilité des Exploitations Agricoles (IDEA, 2008) method forms the backbone of this study. The hypothesis of this research is that the cropping systems practised in the Korsimoro hydro-agricultural perimeter are not in line with development standards.The target sample consisted of one hundred and four (104) people, 33.53% of whom were farmers, 66.47% of whom were women farmers and two (02) people from the agricultural department. The research results showed that 56.73% of producers have a sustainability score that does not exceed 25% of the maximum potential. The cropping systems practised in Korsimoro achieved a total score of 45/100 points. This represents an average of 15% of the maximum potential. Its coefficient of variation is 0.25. This is relatively low. The minimum observation offers a negative score (-4) with regard to the descriptive characteristics of the components.

Citation: NIKIEMA Wendkouni Ousmane, YAMEOGO Augustin and YANOGO Pawendkisgou Isidore. 2025. "Cropping systems in West Africa: an attempt to assess the agroecological sustainability of korsimoro in Burkina Faso*". International Journal of Current Research, 17, (06), 33186-33192.*

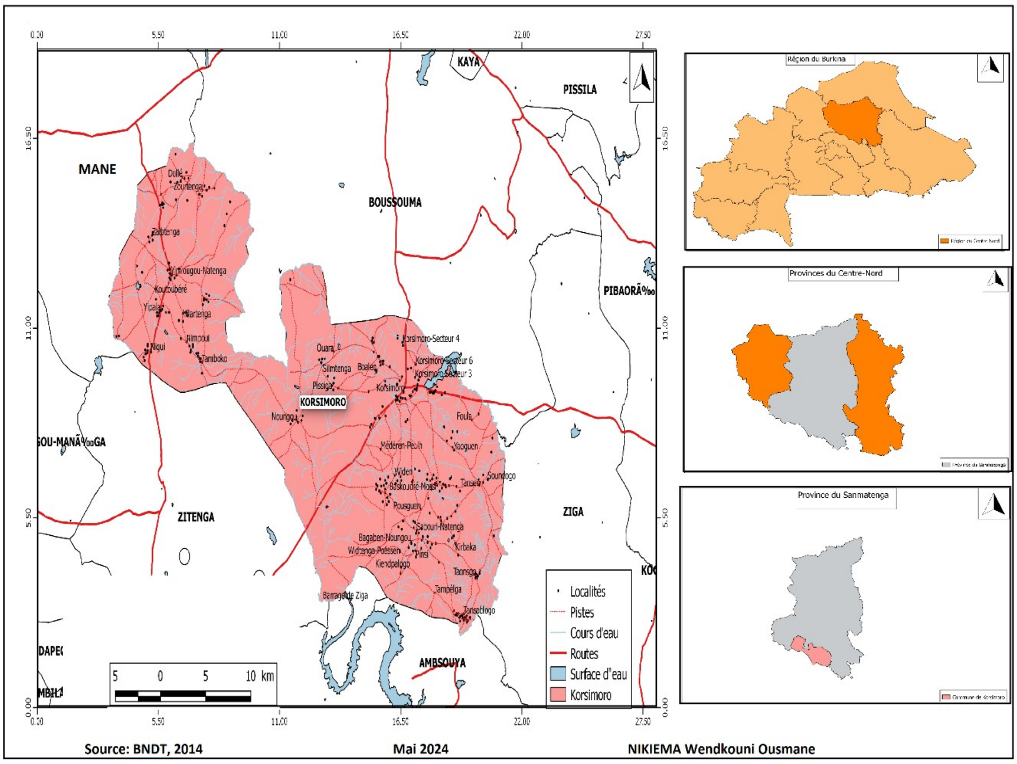
INTRODUCTION

With a view to supporting the agricultural world, the FAO has launched AquaCrop. This is a water-soil-plant productivity simulation model that serves as a decision-making tool for planning and analysing major agricultural programmes (J Wellens, 2014, p.10). In this way, agro-ecology is inviting itself into a debate that is more focused on research into industrial production systems. It is an alternative farming movement that is automatically linked to the organic movement. This has led critical agronomists to question the basics of the discipline and the ecological and social consequences. Agroecology is a normative concept that attempts to protect natural systems while taking into account sustainability and the social distribution of benefits in agricultural production (A Molly &*al*, 2022, p.8). Africa is the only continent in the world where agricultural production has remained low since the 1960s. Its average cereal production was estimated at 1.5 tonnes/hectare in 2014, compared with a global average of 3.6 tonnes/hectare. Labour power remains physical strength, with the use of hand tools and agricultural inputs. This limits the potential agricultural yield in cropping systems (Z Yuan, 2016, p.1). To make up for the shortfall in agricultural production in Africa, irrigation is necessary. It plays a key role in agricultural production and food security, as 18% of irrigated land accounts for 40% of world agricultural production. To this end, an overview of hydro-agricultural schemes has been carried out in various countries, with a particular focus on West African countries (J-M Faurès &*al*, 2001, p.1). In Burkina Faso, the areas farmed by women are more affected by climate change variability. This is due to the poverty of the plots they farm individually or collectively. The techniques used are inappropriate and they do not have access to suitable tools. This has a negative impact on agricultural productivity and, in turn, on cash income (A Romero, &*al*, 2011, p.4). Between 2012 and 2021, the areas under rice and maize cultivation increased by 90% and 10% respectively. The East, Centre-North and Boucle du Mouhoun regions have benefited most from substantial development efforts.However, the Centre-East, Centre-South and Sahel regions have not received much support (Marah, 2022, p.9). In the Centre-Nord region, hydro-agricultural schemes (96 water bodies) have been built in several communes to combat water shortages, poverty and food insecurity, especially in rural areas (W. O Nikièma &*al*, 2022, p.283). In the province of Sanmatenga, more specifically in the rural commune of Korsimoro, under the leadership of the Office Nationale des Barrages et des Aménagements Hydro-agricoles (ONBAH), the dam was built in 1984. It has a maximum height of

4.40 m and an earth embankment 1,100 m long (DGAEN, 2015, p.6). This led to the question: what is the scope of the cropping systems developed in the Korsimoro hydro-agricultural perimeter with regard to the determining factors of sustainability? The aim of this study is to assess the sustainability of cropping systems in terms of agro-ecological sustainability in the rural commune of Korsimoro. The hypothesis of this research is that the cropping systems developed are not in line with the principles of sustainable development. In order to carry out this study, it is necessary firstly to describe the methodological approach, secondly to analyse the research results and thirdly to discuss these results.

METHODOLOGY

Presentation of the study area: The geographical coordinates of the study area are latitude 12o 49‘ 27’‘ North and longitude 1o 04’ 05‘’ West. It covers an area of 674.1 km2 and the number of inhabitants per square kilometre is 64,349 (INSD, 2022). The rural commune is located in the Centre-Nord region. It falls within the province of Sanmatenga, in the Sudano-Sahelian climate zone. Thirty-one villages (31) are administratively attached to the rural commune of Korsimoro. Between 1991 and 2020, average annual rainfall was estimated at 669 mm in the commune of Korsimoro. This area is dominated by a long dry season from October to May. It is generally accompanied by dry, cool winds and dry, hot harmattan winds. The rainy season is relatively short, running from June to September. It is dominated by cool, rainy monsoon winds. The illustration below corroborates what has been said above (Map 1).



Map 1. Opposite, illustration of the study area in the rural commune of Korsimoro

The methodological approach: The methodological approach was based initially on the search for primary data. This involved the use of documents such as books, theses, dissertations, articles and reports directly or indirectly related to the subject of this study. Secondly, it looked at the collection of secondary data through household surveys. The demographic and spatial dimensions were taken into account. The area was limited to the rural commune of Korsimoro. The target population surveyed was all farmers carrying out agricultural activities in the Korsimoro hydro-agricultural perimeter. The sample size was determined according to the standards of the probabilistic theory of C Schwartz (1995), whose formula is as follows:

$$n = \frac{Z^2 \, X \, P(1-P)}{m^2}$$

Where n: sample size; z: confidence level according to the centred reduced normal distribution (for a confidence level of 95%, z = 1.96, for a confidence level of 99%, z = 2.575); p: estimated proportion of the population presenting the characteristic (when unknown, p = 0.5 is used, which corresponds to the worst case, i.e. the greatest dispersion); m = margin of error tolerated (for example, we want to know the real proportion to within 5%). This formula determines the number of people n to be interviewed as a function of the margin of error m that can be tolerated on a response proportion p. This enabled thirty-five (35) male and sixty-nine (69) female producers to be interviewed. Two (02) agricultural service agents were also involved. The total number of people surveyed was one hundred and six (106). Pseudonyms were used in order to preserve the anonymity of the respondents. The Kobo Toolbox software was used to collect the data. The data was then transcribed onto a computer for processing. To gain a better understanding of the farming systems adopted, the field observation phase was crucial. The perimeter was geolocated using GPS.

For cartographic and statistical production, software such as ArcGis10. 2 and XLSTAT, 2024 were used. Thirdly, the theory used in this work is the socio-ecosystemic approach. This concept alludes to two contemporary approaches, namely the latent commons and the actor-network. The notion of latent commons refers to human and non-human actors. Whereas the network actor is aligned behind a political dimension. It was chosen in view of the complexity of this theme. This study focused on the Indicateurs de Durabilité des Exploitation agricoles (IDEA, 2008) method. It was contextualised by taking account of local realities. A total of three (03) components or dimensions and fifteen (15) indicators were used to assess sustainability on an agro-ecological scale in the cropping systems developed in the Korsimoro hydro-agricultural perimeter. The sustainability score for the diversity component was 33 points. The spatial organisation component scored 33 points. And the agricultural practices component scored 34 points.This gives it a total score of 100 points on the agro-ecological sustainability scale. A score of -1 point is awarded when the conditions of the indicator are not favourable. A score of 0 points is awarded when the conditions of the indicator are constant. A score of +1 point is awarded when the indicator is in unfavourable conditions. And a score of +2 points is awarded when the conditions of the indicator are favourable (Table 1).

Table 1. Components and indicators of the agro-ecological sustainability scale

Components or dimensions	Indicators	Maximum values	
Diversity Functional	Diversity of exotic crops	11 pts	**33 pts**
	Diversity of perennial crops	7 pts	
	Associated plant diversity	5 pts	
	Enhancing and conserving genetic heritage	10 pts	
Organisation Of space	Crop rotation	12 pts	**33 pts**
	Action to protect our natural heritage	4 pts	
	Plot size	12 pts	
	Ecological regulation zone	5 pts	
Farming practices	Fertilisation	8 pts	**34 pts**
	Phytosanitary treatment	6 pts	
	Soil protection	4 pts	
	Source of irrigation and water management	2 pts	
	Energy dependency	2 pts	
	Managing production waste	6 pts	
	Managing chemical product packaging	6 pts	
Total		**100points**	

Source: Adapted from IDEA, 2008

The choice of these various indicators was made taking into account the specific characteristics of the study site. The weightings assigned to these indicators were judiciously determined according to their degree of importance. In this way, the diversity of production in the hydro-agricultural schemes in the commune of Korsimoro enabled a more accurate assessment of the complementarities and natural regulation processes of the agricultural ecosystem. In this study, diversity is approached through four indicators that determine the variety of cropping systems. However, the benefits of a diversified production system are perceptible if the advantages of the natural environment are exploited to minimise its impact on the environment. All these factors are taken into account by the indicators that affect the organisation of space and farming practices.

RESULTS

The hydro-agricultural perimeter of the rural commune of Korsimoro: Research by (W Zucchini et al. 2016, p.13) has shown that agro-ecological indicators help to assess production methods that have an impact on the environment and living conditions. In the Korsimoro hydro-agricultural schemes, direct observation in the field has revealed a diversity of cropping systems (polyculture and monoculture). It also enabled us to understand the spatial organisation of the farm plots. It also helped us to understand the farming practices used by farmers within the developed perimeter. To better assess the sustainability of cropping systems in terms of agro-ecological sustainability, the focus was on monoculture and polyculture. Monoculture is the type of crop grown during the winter period. It is practised by 98% of growers. Three main crops are grown during this period. These are Abelmoschus esculentus (okra) grown upstream of the dam.Zea mays (maize) grown on the left bank of the dam. Oryza sativa (rice) on the right bank of the dam. On the other hand, four (04) mixed cropping systems were identified. This system is more developed during the dry period, and 100% of farmers practise it. System 1: maize-cabbage-tomato, system 2: okra-pepper-pepper, system 3: tomato-onion-cabbage and system 4: tomato-onion-eggplant. This is illustrated in the plate opposite.

Author : W. O NIKIEMA

Plate. Shot showing the monoculture crops

Assessing sustainability on an agroecological scale in the rural commune of Korsimoro: According to the Alliance pour l'Agroécologie en Afrique de l'Ouest (3AO, 2018, p.5), 'agroecology is neither a niche nor a label obtained on the basis of certains practices. It is a universal rationale that involves rethinking farming systems in order to maximise biodiversity and stimulate interactions between different plants and species. It is a holistic strategy that aims to ensure long-term soil fertility and the sustainability of agrosystems and the livelihoods of the farmers who depend on them'. The data from the survey showed that the agro-ecological dimension of the cropping systems developed around the developed perimeter in the commune of Korsimoro scored a total of 45 points. These points were distributed between diversity (9 points/33 points), spatial organisation (17 points/33 points) and farming practices (19 points/34 points). As a result, 56.73% of producers have a sustainability score that is less than 25% of the maximum potential. Analysis of this table shows that the highest score is reported for the spatial organisation component. It concerns the plot size indicator and has a maximum value of 8 points. Indicators such as associated plant diversity (from the diversity component) and energy dependency (from the spatial organisation component) have a blank score (0 points). In addition, indicators that score one point are more frequent in the agricultural practices component. These are the chemical packaging management indicator and the soil protection indicator. In the diversity component, only the genetic heritage enhancement and conservation indicator has a score equal to 1 point (Table 2).

Table 2. Indicators for the agro-ecological sustainability scale of the managed perimeter in the rural commune of Korsimoro

Components or dimensions	Indicators	Maximum values	
Diversity Functional	Diversity of exotic crops	6 pts	**9 pts**
	Diversity of perennial crops	2 pts	
	Associated plant diversity	0 pts	
	Enhancing and conserving genetic heritage	1 pts	
Organisation of space	Crop rotation	5 pts	**17 pts**
	Action to protect our natural heritage	2 pts	
	Plot size	8 pts	
	Ecological regulation zone	2 pts	
Farming practices	Fertilisation	6 pts	**19 pts**
	Phytosanitary treatment	6 pts	
	Soil protection	1 pts	
	Source of irrigation and water management	3 pts	
	Energy dependency	0 pts	
	Managing production waste	2 pts	
	Managing chemical product packaging	1 pts	
Total		**45points**	

Source: Survey data, 2023

Characterisation of the dispersion of the various components: In order to give a more acceptable assessment, it was necessary to use the tools of descriptive statistics. Characteristics such as the 1st quartile, the median, the 3rd quartile, the mean, the standard deviation and the coefficient of variation were used to reveal these different components (Table 4). The agro-ecology component of the managed perimeter of the rural commune of Korsimoro has an average score of 15 points, i.e. a maximum potential of 15%. Its coefficient of variation is around 0.25. The dispersion around the average is not sufficiently large in relation to the value of the coefficient of variation. The standard deviation is 3.87. This means that the values are not sufficiently grouped around the mean. The 1st quartile is 11.25 (i.e. 25% representation of a score of 11.25 points). The 3rd quartile, which represents 33.75, means that 75% of the characteristics have a score of 33.75 points.

Table 3. Descriptive characteristics of the components of agro-ecological sustainability

Statistics	Agro-ecological component (100 points)
Comments	104
Minimum	-4
Maximum	45
1st Quartile	11,25
Median	11,5
3rd Quartile	33,75
Average	15
Standard deviation	3,87
Coefficient of variation	0,25

Source: Field survey, 2023

Estimates of the various components and their indicators: In this section, characteristics such as the average and maximum potential are taken into account. They were used to quantify the estimates of the various components and indicators of agro-ecological sustainability (Table 4). This table highlights the estimates of the various components and indicators of agro-ecological sustainability. A priori analysis of this table shows that the weakness of the agro-ecological sustainability of the cropping systems developed around the developed perimeter is directly linked to its various components, i.e. diversity, spatial organisation and farming practices. The diversity component has a maximum potential of 9.10%. This means that the cropping systems in the managed perimeter of Korsimoro are not diversified. In addition, the exotic species diversity indicator has a score of 18.18% maximum potential. The genetic heritage enhancement and conservation indicator scored 0.03% of its maximum potential. This shows that farmers use imported seeds in the production of cropping systems. Diversity of perennial crops scored low at 9.57% of its maximum potential. It is therefore clear that perennial crops rarely exist in the cropping systems developed around the developed site. There is no associated plant diversity in the cropping systems. The indicator has a score of 0.00% of its maximum potential. The spatial organisation component has a maximum potential score of 17.18%. This can be explained by the fact that the farm plots on the developed site are not organised. The plot size indicator scored 22.25% of its maximum potential. The heritage action indicator has a maximum potential of 16.75%. This indicates that actions to protect and manage the site's heritage are not well developed. The agricultural practices component has a maximum potential score of 18.62%. This is a relatively low score. The phytosanitary treatment indicator scored 33.33% of its maximum potential. This proves that in agricultural production, phytosanitary products are used in an uncontrolled manner.

The chemical packaging management indicator and the production waste management indicator each scored 11.16% and 5.50% respectively of their maximum potential.This means that in the developed site, the management of chemical packaging and production waste has a low level of adoption of sustainable development techniques. There is no energy dependency in the cropping systems, as the indicator is 0.00% of its maximum potential. This means that farming practices in the Korsimoro irrigated perimeter do not take into account the standards set by the technical services in charge of agriculture. So there is a remarkable weakness in the adoption of sustainable farming techniques. Furthermore, it is important to recognise that the cropping systems developed around the Korsimoro developed perimeter are not sustainable in terms of quantitative data. Direct observation in the field has corroborated the fact that, in their farming practices, producers use techniques that are not practical in terms of increasing their agricultural productivity. With a view to better defining the category of scores on the agro-ecological sustainability scale, it was wiser to emphasise the different environments and estimates. To do this, various limits were considered. These were the boundary below 25%, the boundary between 26 and 50%, the boundary between 51 and 76% and finally the boundary between 76 and 100% (Table 5).

Table 4. Estimates of the various components and indicators of agro-ecological sustainability

	Average	Maximum potential	Minimum observed	Maximum observed	Maximum potential
Agro-ecological component	**15**	**15 %**	**-4**	**45**	**100**
Diversity	**3,00**	**09,10 %**	**1,00**	**9,00**	**33**
Diversity of exotic crops	2,00	18,18 %	1,00	6	11
Diversity of perennial crops	0,67	09,57 %	0,00	2	7
Associated plant diversity	0,00	0,00	0,00	0	5
Enhancing and conserving genetic heritage	0,33	0,03 %	0,00	1	10
Organisation of the space	**5,67**	**17,18 %**	**3,00**	**17,00**	**33**
Crop rotation	1,66	13,83 %	0,00	5	12
Action in favour of heritage	0,67	16,75 %	1,00	2	4
Plot size	2,67	22,25 %	2,00	8	12
Ecological regulation zone	0,67	13,40 %	0,00	2	5
Farming practices	**6,33**	**18,62 %**	**-11,00**	**19,00**	**34**
Fertilisation	2,00	25,00 %	-1,00	6	8
Phytosanitary treatment	2,00	33,33 %	-4,00	6	6
Soil protection	0,33	08,25 %	-3,00	1	4
Irrigation source and water management	1,00	50,00 %	-1,00	3	2
Energy dependency	0,00	0,00 %	0,00	0	2
Managing chemical product packaging	0,67	11,16 %	-1,00	2	6
Managing production waste	0,33	05,50 %	-1,00	1	6

Source: Field survey, 2023

Table 5. Estimates of scores on the agro-ecological sustainability scale, by environment

Score categories	Environments				Total	
	Urban		Rural			
Less than 25	26	68,42 %	49	74,24 %	59	56,73 %
26-50 %	12	31,58 %	17	25,76 %	45	43,27 %
51-75 %	0	00 %	0	00 %	0	00 %
76-100 %	0	0 %	0	0 %	0	0 %
Total	38	100 %	66	100 %	104	100 %

Source: Field survey, 2023

As regards the categorisation of scores by environment on the sustainability scale, the estimates move up and down. The estimated score for rural areas is 74.24%. The score for urban areas is 75%. In urban areas, the score is 68.42% of estimates. This concerns the category of scores below 25%. The agro-ecological sustainability score between 26 and 50%, in rural and urban areas respectively, is 25.76% and 31.58%. In addition, the category of scores between 51 and 75% of estimates have the same effect in rural and urban areas (0%). The same is true for the category of agro-ecological sustainability scores between 76 and 100%, regardless of the environment (rural and urban). Despite this analysis, it must be admitted that the scale of agro-ecological sustainability according to the different environments remains relatively low. Consequently, the cropping systems developed on the irrigated perimeter on the scale of agro-ecological sustainability are not sustainable in the commune of Korsimoro.

DISCUSSION

This study used the IDEA, 2008 method to analyse the research results. Pre-existing studies have also used this same method. These are : B. E Oguidi &*al*, 2023 ; F Zahm &*al*, 2023 ; F Ouédraogo &*al*, 2022 ; F Zahm &*al*, 2019, L Vilain, 2008. Further on, this study refers to three (03) components or dimensions and around fifteen indicators. The components are the diversity component (33 points), the spatial organisation component (33 points) and the farming practices component (34 points). This was done taking into account the realities of the context in which the study took place. M Koutou, (2023, p.38), in his research, found results that were not similar. His study showed that agroecology has a political dimension, an economic dimension, an environmental dimension and a social and cultural dimension. On the other hand, the research work of V Debray (2015, p.62) corroborated the same results. Components such as agricultural practices, spatial organisation and diversity were used in a context of climate change in Africa. More specifically, this is an innovative agro-ecological study. In a study conducted by M Goita *&al*, (2020, p.58), the results are not similar. The scientific and governmental dimension, the social and economic dimension and farming practices are the dimensions that were used to assess the sustainability of farms on the agro-ecological sustainability scale. This study also showed that the sustainability score on the agro-ecological sustainability scale is 45/100 points. This shows that in agro-ecological terms, the cropping systems developed are not sustainable in the Korsimoro hydro-agricultural perimeter. These results are similar to those of S. S Ndjadi *&al*, (2021, p.5). Indeed, in eastern Congo, farm sustainability scores 48.3/100 points. Consequently, efforts must be made to improve this sustainability score. M Abou et al, (2018, p.232), found similar results. In South-East Benin, more precisely in the hydro-agricultural developments of the Tandem Dangbo-Adjohoun plain, the cropping systems developed indicate a score of 58.72/100 points. The study also showed that the score for each component or dimension was between nine (09) and nineteen (19). Thus, the diversity component has a score of 09/33 points. The spatial organisation dimension scored 17/33 points. And the farming practices component scored 19/100 points.This resulted in an average potential score of 15%. This is less than 50%. In the Cameroon cotton zone, research by N Nyore *&al*, (2017, p.88), found scores that are not identical. Thus, the score for the agricultural practices component is 30.77. The spatial organisation component offers a score of 10.27. And the diversity component scored 25.02. This indicates that the cropping systems developed in this area of Cameroon are not sustainable in terms of agro-ecological sustainability. The same is true of the results of research by R. V. C Diogo, (2018, p.88), which are not also similar. In Benin, more specifically in the commune of Gogounou in the north-east, the domestic diversity component shows a score of 13.6. The spatial organisation component scored 14.5. And the farming practices component scored 2.7. This shows that farms in this commune are not sustainable in terms of agro-ecological sustainability.

CONCLUSION

This article began by describing the cropping systems developed in the Korsimoro hydro-agricultural perimeter. The analysis was then developed following the standards of the IDEA, 2008 method, while taking into account the realities of the local context. In this analysis, the descriptive characteristics of the different components, the estimates of the different components and the different indicators were developed. An attempt was made to compare rural and urban areas. This resulted in a total score of 45/100 points on the agro-ecological sustainability scale. An average of 15% of maximum potential. Consequently, the cropping systems developed in the rural commune of Korsimoro on the agro-ecological sustainability scale are not sustainable.In order to improve the sustainability of cropping systems, awareness-raising and ongoing training for growers need to be initiated. The focus should be on indicators such as associated plant diversity, the diversity of perennial crops, the enhancement and conservation of genetic heritage, the ecological regulation zone, soil protection, energy dependency and the management of chemical product packaging. The distrust of producers meant that it was not possible to have a large coverage of people surveyed. Insecurity in the area also had an impact on the study. Assessing cropping systems on the scale of economic sustainability and on the scale of socio-territorial sustainability in the rural commune of Korsimoro can be seen as a research prospect.

REFERENCES

ABOU Mouritala, YABI Ibouraïma, OGOUWALE Euloge, 2018. « Evaluation de la durabilité agroécologiques des aménagements hydro-agricoles de la plaine inondable dans le Tandem Dangbo-Adjohoun au Sud-Est du Bénin ». *European Scientific Journa March* 2018 edition, Vol.14, No 9, pp.226-242.

DEBRAY Valentine, 2015. *Des innovations agroécologiques dans un contexte climatique changeant en Afrique*. Coordination Sud, Solidarité Urgence Développement, 98 p.

DIOGO Rodrigue V. C, ADODO P, NOUATIN G S et DJEDJE M, 2018. « Durabilité agroécologique et déterminants du degré d'investissement des producteurs dans la gestion durable des terres au nord-est du Bénin ». *Bulletin de la Recherche Agronomique du Bénin* (BRAB), pp.75-86.

Direction Générale de l'Agence de l'Eau du Nakambé, 2015. *Rapport d'étude du périmètre de protection du Barrage de Korsimoro*. Rapport définitif, Burkina Faso, 19 p.

FAURES Jean-Marc, SANOU Moïse, 2001. Les aménagements hydro-agricoles en Afrique : situation actuelle et perspectives. Organisation des Nations Unies pour l'alimentation et l'agriculture, 15 p.

GOITA Mamadou et FRISON Emile, 2020. *Valeur (s) ajoutée (s) de l'agroécologie. Déverrouiller le potentiel de transition en Afrique de l'Ouest*. International panel of experts on sustainable food systems (iPES FOOD), 179 p.

KOUTOU Mahamoudou, 2023. *Agroécologique : historique, principes et dimensions*. Atelier de formation sur les pratiques agroécologiques avec un accent sur les cultures négligées et sous-utilisées (nus), 43 p.

Ministère de l'Agriculture, des Ressources Animales et Halieutiques, 2022. Tableau de bord statistique de l'agriculture, des ressources animales et Halieutiques. Direction Générale des Etudes des Statistiques Sectorielles, 96 p.

MOLLY Anderson, FISON Emile, GOITA Mamoudou, HOWARD Philip, LEACH Melissa, MCNEILL Desmond, ROCHA Cecilia, SALVADOR Ricardo, 2020. *De la poudre aux yeux. Conflits de cadrages sur la durabilité des systèmes alimentaires : agroécologie, agriculture régénératrice et solutions fondées sur la nature*. International Panel of Experts on Sustainable Food Systems (iPES FOOD), 30 p.

NDJADI Serge S, AHOTON Léonard E, KIZUNGU Roger V, SAIDOU Aliou, MUGUMAARHAHAMA Yannick, MUSHAGALUSA Arsène C, SAFINA Francine B, et MUSHAGALUSA Gustave N, 2021. « Evaluation de la durabilité des exploitations maraîchères du Sud-Kivi (Est de la République Démocratique du Congo) ». *Cahiers Agricultures*, 30, 15, 10 p.

NIKIEMA Wendkouni Ousmane, ZONGO Zakaria, YANOGO Pawendkisgou Isidore, 2022. « Les impacts socioéconomiques du périmètre hydro-agricole de Pensa dans le Sanmatenga ». *Revue de Géographie de l'Université de Ouagadougou*, N° 11, Vol. 3, pp.281-299.

NYORE Nyore, GAFSI Mohamed, MADI Ali, 2017. « Durabilité des exploitations agricoles familiales de la zone cotonnière du Cameroun ». *Afrique durable 2030*, pp.80-100

OGUIDI Babatundé Eugène, TOPANOU LIGAN Francine Olivia Dona, TOHOZIN Antoine Yves, 2023. « Evaluation de la durabilité économique des fermes agricoles modernes dans la commune de Sakete au Sud-Est du Bénin (Afrique de l'Ouest) ». *Revue Espace Géographique et Société Marocaine*, Numéro 69, pp.225-243.

OUEDRAOGO Félix, TAPSOBA Parfait Kiswendsida, 2022. *Transition agroécologie dans le maraîchage au Burkina Faso : contraintes, pistes et espoirs*. Harmattan, p.40.

ROMERO Ana, BELEMVIRE Adam, SAULIERE Saya, 2011. *Changements climatiques et femmes agricultrices du Burkina Faso*. Rapport de Recherche d'Oxfam, 48 p.

YUAN Zhou, 2016. *La mécanisation de l'agriculture en Afrique de l'Ouest*. Fondation Syngenta pour l'agriculture durable, 11 p.

VILAIN Lionel, 2008. *La méthode IDEA : indicateurs de durabilité des exploitations agricoles*. Edition Educagri, Guide d'utilisation, 184 p

WELLENS Joost, 2014. « Un cadre pour l'utilisation des outils d'aide à la décision à diverses échelles spatiales pour la gestion de l'agriculture irriguée en Afrique de l'Ouest ». Thèse de Doctorat, Département des Sciences et Gestion de l'Environnement, Université de Liège, 132 p.

ZAHM Frédéric, UGAGLIA Adeline Alonso, BARBIER Jean-Marc, BOUREAU Héloïse, DEL'HOMME Bernard, GAFSI Mohamed, GASSCLIN Pierre, GIRARD Sydney, GUICHARD Laurence, LOYCE Chantal, MANNEVILLE Vincent, MENET Amandine et REDLINGSHÖFER Barbara, 2019. « Evaluer la durabilité des exploitations agricoles. La méthode IDEAv4, un cadre conceptuel combinant dimensions et propriétés de durabilité ».*Cahiers Agricultures*, 25, 5, 10 p.

ZAHM Frédéric, GIRARD Sedney, ALONSO UGAGLIA Adeline, BARBIER Jean-Marc, BOUREAU Héloise, CARAYON David, COHEN Sarah, DEL'HOMME Bernard, GAFSI Mohamed, GASSELIN Pierre, CESTIN Clément, GUICHERD Laurence, LOYE Chantal, MANNEVILLE Vincent, REDLINGSHOFER Barbara, RODRIGUES Inès, 2023. *La Méthode IDEA4-Indicateurs de durabilité des exploitations agricoles*. Principes et guide d'utilisation. Evaluer la durabilité de l'exploitation agricole. Educagri éditions, 339 p.

****