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The Need for Including Organic and Ecologically Sound Land and Water Uses in an Integrated Sustainable Development Plan: The Case of the Sourou Valley in Mali

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Abstract

Ecological and Organic Agriculture (EOA) is a valuable option for farmers to increase their income by putting into use the principles and practices of its production system as well as when their products are certified. To increase the long-term sustainability of this production system one of the required measures for EOA-producers is the allocation of land and water as part of the Commune development plan. This paper examines this need from the planning perspective based on the recent completion of an integrated and sustainable development plan with its Strategic Environmental Assessment for the Sourou River Basin in Mali by the authors and their colleagues.

Introduction

The Sourou River Basin in the Mopti Region in Mali (Figure 1), the most northern part of the Volta Basin, has considerable potentials in terms of water resources for fishing and irrigation, land for food production and grazing, and endowed with biodiversity (e.g. the Ramsar site shared with Burkina Faso). The Sourou river is trans-boundary with a dam in Burkina Faso that controls the outflow of water from Mali. The main challenges in the dry and humid parts of the area are security, water and other related natural resources managements. Coupled with the afore mentioned are poverty and unemployment, food and nutrition insecurity, climate change, population growth, land cover degradation and loss of biodiversity. In addition, impoverishment of soil fertility is continuing in the dry zone.

The need for equitable sharing of natural resources, responding to the numerous challenges mentioned above and valorising sustainably the enormous potential of the area were the reasons for the creation of the Inter Community of the Sourou (ICS). The ICS comprises 26 communes and the prefectures of Bankass, Koro, and Douentza. It covers 15.685 km² and has a population of over 837.000 persons. The ICS decided to prepare a people-owned integrated and sustainable development program for the Sourou dovetailed with its Strategic Environmental Assessment (SEA).

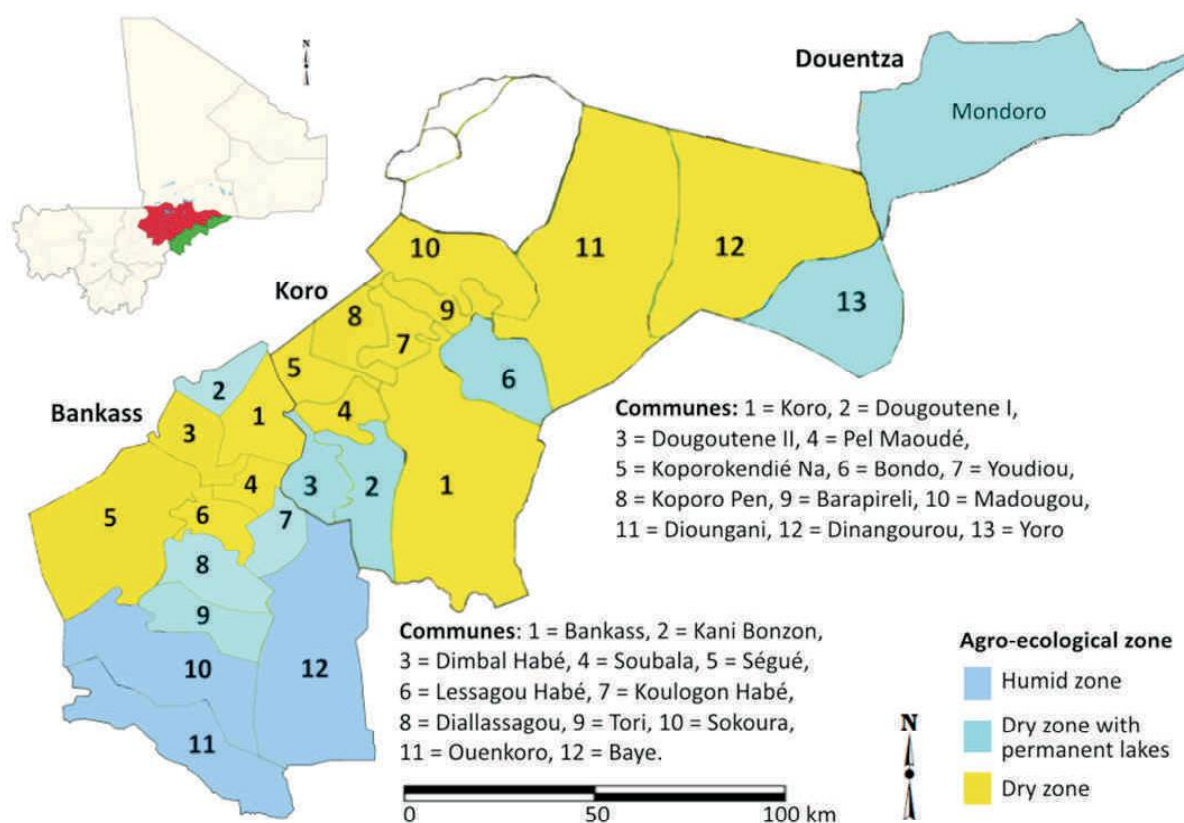


Figure 1: The three Prefectures with the 26 Communes Being the Inter Community of the Sourou, and their Agro-ecological Zones. Inlay: Location of the Mopti Region in Mali (in red) and the Sourou Zone in the Mopti Region (in green).

Methodology

A participatory approach of Integrated Water Resource Management and Natural Resource Management was used by the mayors with the help of two Consultants and a Technical Regional Planning and Evaluation Team (EPER). An effective interaction existed with an inter-ministerial committee (CIM) and with the most relevant stakeholders from Burkina Faso (e.g. Volta Basin Authority (VBA) and The Authority to increase the value of the Sourou (AMVS)). The vision of the plan and its SEA, abbreviated from its French name *Programme de Développement Intégré et Durable du Sourou avec son Evaluation Environnementale Stratégique* to PDIDS/EES, includes maintenance of the ecological integrity of Sourou. The plan has 17 strategic and cross-cutting development axes (covering thereby also several Sustainable Development Goals; CR, 2019a) targeted to the agro-ecological zones (Figure 1). These axes integrate existing knowledge of the Ecological and Organic Agriculture (EOA) production system of the EPER team supported by scientific and technical publications (e.g. AC3E, 2017, Guindo et al., 2017, MEADD/DNH, 2018., Ouedraogo et al., 2012, Samaké & Kodio, 2002; Samaké & van Duivenbooden, 1999). To mention, for instance, the increased and stabilized soil productivity resulting from intensive management of existing native woody vegetation in multifunctional landscapes that combines food crop production with other ecosystem services provided by trees (Felix et al., 2018). To facilitate an efficient execution of the plan, an inventory was made of on-going development projects in the valley and how they are aligned to these development axes (CR, 2019b).

For the SEA, the pivotal stages in the evaluation of the potential effects of the actions of the PDIDS were: *a)* considering two agro-ecological zones (wetlands and dry zone), *b)* the effective participation of the populace (the direct beneficiaries of the PDIDS) at all stages and in particular the validation of the selection criteria for the actions per constraint and strategic axis; *c)* the inventory of several actions as a solution to the constraints predefined by EPER; *d)* the decision-making in selecting the proposed actions; and *e)* the SEA analysis on those actions coupled with their required mitigation measures, if any (CR, 2019c). The impacts of the proposed actions on seven environmental and socio-economic components (including climate change) were qualitatively established. In case negative impacts were foreseen, the mitigation measures were deduced and discussed with the various stakeholders to make the best choice. Sometimes the debates during these meetings between them were intense, but before the end of the day they (farmers included) reached a common ground.

Results and Discussion

Executing the planning at the same time with performing the SEA was an innovative approach in Mali. During formal presentations of the PDIDS/EES, this approach was much appreciated by the authorities and donors. The first phase of 5-year of the PDIDS/EES was agreed upon by all stakeholders and approved by the state on 26th June 2019.

Results from the analyses of the SEA showed that the development scenario without a plan would lead to *i)* the continued over exploitation of natural resources and eventual collapse of the ecosystem; *ii)* the deterioration of basic social indicators; and *iii)* the proliferation of inter and intra-community conflicts. In the following the role and place of ecological and organic agriculture (EOA) in the PDIDS/EES is elaborated.

Role of Ecological and Organic Agriculture (EOA) in the PDIDS/EES

Although the PDIDS/EES did not focus specifically on EOA as a production system, ten out of 17 axes, which included such characteristics as the current agro-sylvo-pastoral and aquaculture practices, has a bearing to EOA and the zone being part of a Ramsar site. These relevant axes are: Agriculture, Livestock, Fishing and aquaculture, Environment-Natural Resource Management & biodiversity, Drinking water, Hygiene & Sanitation (WASH), Energy, Climate Change, (Trans-boundary) Water Resources, Gender; and Land tenure (CR, 2019a).

In the plan, several actions to promote organic agriculture and/or ecological sound measures have been included, such as: *a)* Introduction of hybrid (thermal and solar) ferry boat; *b)* For irrigation: Archimedean screw equipped with solar or wind energy (based on experiences in Burkina Faso); *c)* Compliance with irrigation standards according to the crop (efficient use of water); *d)* Compensatory reforestation using the PLASA (planting trees in a deep hole without watering) technique; *e)* Livestock numbers are monitored to avoid overgrazing and action (destocking) will be taken; *f)* Protected areas are the bases to avoid overexploitation of fish and promote a natural regeneration; *g)* Establishment of school arboretums; *h)* Promotion of turning organic waste into compost; *i)* protected areas for hippopotami; *j)* planting trees around irrigated land; *k)* sustainable use of trees and shrubs for their leaves, branches and fruits; *l)* farmer assisted land regeneration (zaï, stone-bunds, multi-purpose tree plantations, etc.); and *m)* the development of the renewable energy value chain (deliveries and maintenance of equipment), the basis for autonomous and sustainable access. Capacity building among those producers themselves is a key factor for the transfer of technical skills (expertise) adapted to climate change.

Currently, farmers and local decision makers in the Sourou are in various degrees complaining about the longevity of their grains of rain fed crops, the poor quality of stems as feed or construction materials, and the recent pollution of chemical fertilizer with its negative impact on the environment. This may

provide room to put more emphasis on EOA practices during the implementation of the PDIDS/EES. Making use of lessons learned from areas with similar agro-ecological and cultural conditions this specific land and water use needs to be integrated in the commune development plans to guarantee the EOA practices at the specified locations in the long run. This will also be instrumental to prevent contamination with chemicals in these locations.

Finally, the planned professionalization of all value chains together with the expected increase in revenues and the application of current agroforestry systems (e.g. Baobab, wild raisins) and other agro-pastoral systems, male and female producers will produce more EOA products of higher quality. Since certification is not yet taking place a potential for certified EOA-products exists. For that matter, the timely creation of a Participatory Guarantee System for Certification (PGS) as part of the plan is paramount.

Conclusion and Recommendations

The analysis of the development scenario with the PDIDS, for which the ICS is the authority and guidance provider, allowed the choice of promising alternative solutions (of which EOA is one) by sector and strategic axis, integrating as much as possible the innovations for sustainability (including ecological and cultural values). All actions of the government, humanitarian aid and development organisations can now be steered towards effective execution of the integrated plan. Through increasing synergy and alignment of activities (CR, 2019b) a boost in the overall impact is expected.

The example of the PDIDS/EES shows that in the Sourou valley in Mali there is scope for EOA practices. It is also demonstrated that a multi-disciplinary approach, an integrated development plan, is needed to further stimulate EOA from a higher than farm level perspective. To increase the long-term sustainability of EOA practices, allocation of land and water in the commune development plans is paramount. The PDIDS/EES was also instrumental for all stakeholders to better understand the need to apply organic and ecological sound land and water uses. With increased application of proven EOA technologies and solid PGS, its share could increase to feed the population with healthy food and to position the Sourou better on the international organic market.

Recommendation to improve the livelihood based on ecological sound principles are:

1. Scaling-up of proven organic and ecological sound technologies.
2. Land and water for EOA should be clearly defined in the communal development plans.
3. The timely creation of PGS is key when the organic market is opted for in the plan.
4. Farmers in EOA associations should be supported to add value already in their village and work together in creating the right products for markets in capitals and for export.

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