

TECHNICAL BRIEF

Degradation of Water Resources in Rural Burkina Faso: Drivers, Local Perceptions and Solutions

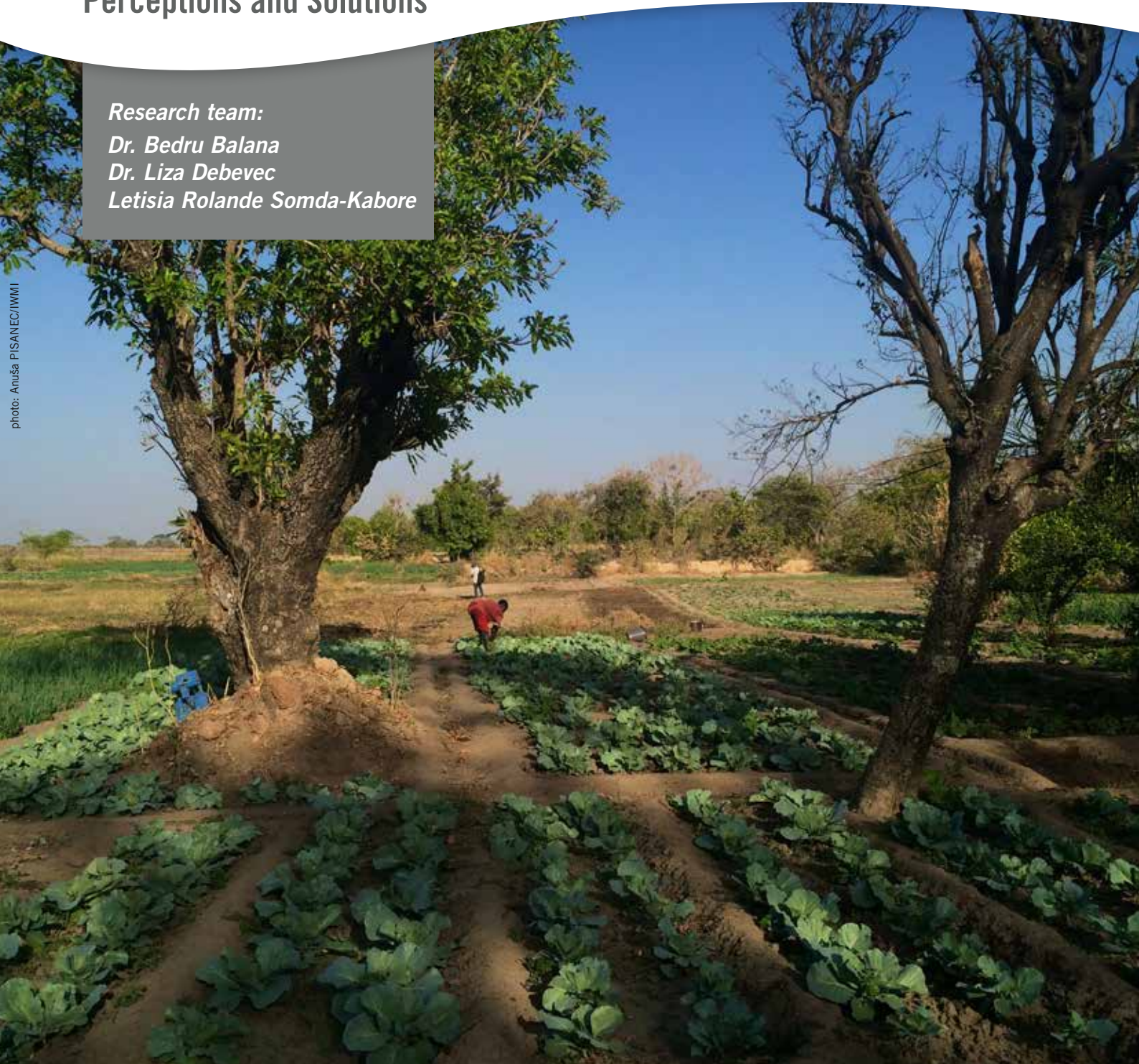
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RESULTS OF THE STUDY:

Farmers' perceptions and preferences regarding water management measures: case study in three catchments in Burkina Faso.



1. STUDY BACKGROUND

Burkina Faso reformed its water management institutions and adopted integrated water resources management (IWRM) for more than two decades, yet the country still suffers from weak institutions and ineffective implementation of water management reforms. The key institutional question is: *“How can IWRM reforms be adapted to increase effectiveness and sustainability of water management, and improve livelihoods of rural populations through increased participation of local stakeholders?”* A key practical issue related to this bigger institutional question is to understand the barriers to adoption of good land and water management measures by riparian farmers and other land/water users, and the mechanisms to induce behavioral change among these users. Knowledge gaps exist in understanding the local perceptions and preferences of alternative management measures, and the incentive mechanisms to induce behavioral change. The aim of this study, which was part of a 3-year project entitled ‘Participatory planning for more inclusive and sustainable water management in rural Burkina Faso’, was to understand the perceptions, preferences and willingness of farmers and other land/water users to adopt environmentally friendly land and water management measures. The study also examined potential mechanisms that could induce riparian economic actors to adopt such measures.

2. METHODS

In early summer 2018, a survey of farmers and other riparian economic actors was designed and administered to gather data on current practices, perceptions, preferences and potential incentive mechanisms to induce behavioral change and adoption of environmentally friendly land and water management practices. Household-level primary data were collected from 201 respondents sampled from the population residing in three selected watersheds - Bougouriba 7, Mouhoun Tâ, and Kou. The questionnaire was administered in a local language through a face-to-face interview conducted by trained local enumerators. Besides descriptive statistics, a logit regression model was used to analyze the attitudes and perceptions of respondents on how urgently environmentally friendly land/water management measures need to be implemented in their respective watersheds. A weighted least squares regression model was applied to determine the major factors influencing the variability among the respondents’ willingness to contribute to cover the costs or bear potential short-term economic losses associated with implementing good agricultural and watershed management measures, such as preventing the cultivation of riverbanks, management of riparian areas, reducing or stopping the application of agrochemicals, and establishing infrastructure for cattle passages and drinking water facilities.



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3. KEY FINDINGS

3.1. Access to riparian land and agricultural measures

Majority of the respondents (about 79%) own land along rivers and water points. Those who do not own land have access to land through their families or relatives (about 52%), as well as through rental markets (about 21%) or other arrangements with the owners (about 26%).

Figure 1 shows the use of agricultural inputs and practices followed by riparian farmers. Chemical fertilizers and pesticides are used by 79% and 81% of

the farmers surveyed, respectively. About half of the farmers surveyed cultivate riverbanks or the nearby area, beyond the 100-m ‘no cultivation’ zone specified by the national government’s regulation, which is, however, not enforced. About 34% of the farmers practice irrigated farming. High rates of fertilizer and pesticide application coupled with the cultivation of riverbanks resulted in what is perceived by the users as causes of water pollution and siltation of riverbeds and reservoirs.

Figure 1. Agricultural inputs used and practices followed by riparian farmers

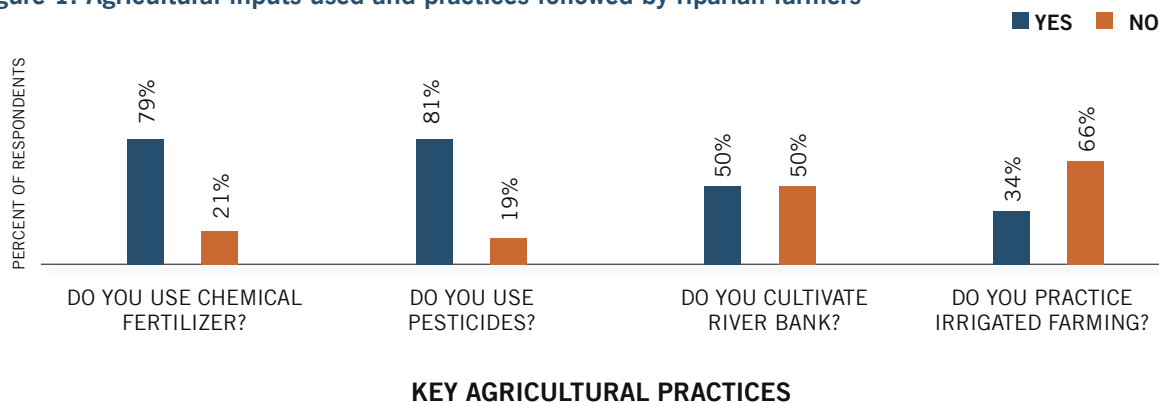


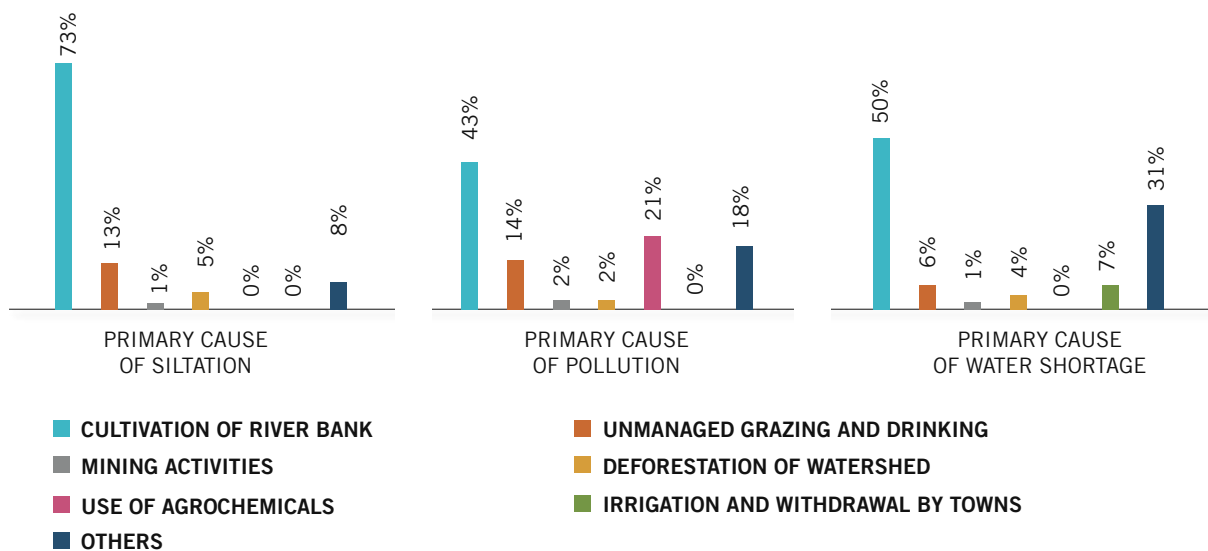


photo: Manon Königstein/IWMI

3.2 Challenges and drivers

Survey respondents identified siltation of riverbeds as the biggest problem (about 81.5% respondents) followed by shortage of water (11%) and water pollution (6.5%). In terms of water consumption, vegetable growers are the highest users (54%), followed by cattle keepers (28%) and cereal producers (7.5%). Urban water users, rice producers and gold miners are not the major water consumers in the study watersheds. Figure 2 shows the primary factors that cause siltation, water pollution and water shortage in the study areas. For instance, cultivation of riverbanks is the primary cause of siltation of water bodies (73%). It also causes water pollution (43%) as well as water shortages and drying of water bodies (50%). The second primary cause of siltation is uncontrolled grazing and livestock watering. The use of agrochemicals is the second most important factor causing water pollution. The combined effects of over-abstraction, natural factors such as low rainfall, institutional failures (non-compliance with regulations), and lack of good management or maintenance also contribute to water shortages, according to one-third of the respondents.

Figure 2. Factors causing siltation, water pollution and water shortages



3.3 Farmers' opinions – how urgent is the need to implement water and land management measures?

Survey respondents were asked to state their subjective opinions on 'how urgent the need was to implement water/land management measures'. Key factors determining their responses include area (size) of riparian land owned, household size, age of the respondent, whether they use agrochemicals or not, perception on how each individual's own activities contribute to watershed problems, and the respondent's opinion on the availability of water for agricultural use. Accordingly:

- (a) Older respondents are more likely convinced that urgent action is needed. Older people seem to have more experience and knowledge about natural resources and environmental changes.
- (b) Respondents with large families seem less willing to focus on urgent measures. The larger the family size, the more mouths to feed. The introduction of water/land management measures could compromise their production (in the short term) and therefore their food security.
- (c) Households with large landholdings in riparian areas are more likely to accept the urgency of implementing water/land management measures.
- (d) Farmers using agrochemical products seem to be reluctant to adopt urgent measures. They may fear a decrease in production as a result of adopting new measures.
- (e) Farmers who believe that their own activities contribute to the watershed problems are more likely to highlight the urgency of implementing water/land management measures.
- (f) Respondents who believe that they have a sufficient quantity of water for their activities are less likely to believe in the urgent need for adopting water/land management measures.



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3.4 Are farmers willing to make a financial contribution?

About 98.5% of the respondents indicated their willingness to implement or adopt land/water management measures, of which about 95% were willing to contribute financially to cover the costs of implementing these measures. However, a high degree of variability was observed among those who expressed their willingness to contribute financially (from a minimum of XOF [CFA Franc] 500/year to XOF 120,000/year [EUR 1 = XOF 655.957]). Key factors that explain the variation in their willingness to contribute include the following:

- (a) *Riparian landownership:* Households that own land along the riparian areas are willing to contribute financially.
- (b) *Use of agricultural inputs:* Users of fertilizers and agrochemicals are willing to contribute to implementing the proposed management measures. They seem to recognize that their actions (fertilizer/pesticide application) may contribute to the problem and hence show willingness to support the proposed measures.
- (c) *Perception of own activities:* Farmers who feel that their activities contribute to the problem are willing to pay. Those who point to others as being responsible for the problem still showed their willingness to contribute, but a reduced amount.
- (d) *Perception of water quality:* Respondents very concerned about water quality are willing to pay more.



photo: Manon Koningstein/IWMI

4. SOLUTIONS AND INCENTIVE MECHANISMS

Several potential management measures/scenarios were presented to the respondents. More than 95% of respondents indicated that they would like to adopt one or more of the proposed measures. About 75% stated they would stop cultivating on the riverbanks as a first step to reduce siltation. A 100-m ‘no cultivation’ zone along water bodies exists on paper in national legislation, but there is currently no penalty in place for users not respecting this regulation. Respondents also stated that they were willing to adopt measures to improve water quantity and quality, such as establishing livestock corridors (61.5%), reducing the application of agrochemicals (43%), and ceasing to use watercourses/reservoirs for traditional gold cleaning (50%).

Finally, respondents were asked open-ended questions to suggest a set of mechanisms that could potentially induce or motivate them to adopt water/land management measures to mitigate the problems in their respective watersheds. A summary of the key mechanisms suggested by the majority of respondents are presented in Table 1.

Table 1. Summary of mechanisms suggested by respondents to mitigate problems in their watersheds

Current challenge	Mechanisms identified or suggested by farmers that may encourage them to adopt water/land management measures (note: Summary statements are based on views indicated by the majority)
FARMING ON THE RIVERBANKS	<ul style="list-style-type: none"> • At the institutional level: strengthen existing institutions (enforce regulations), ensure effective follow-up and severely punish offenders • At the land level: provide and develop land away from water points • Credit/finance: help poor farmers in gaining access to credit/financial support • Equipment: help farmers to equip themselves (e.g., with water pumps), so that they can cultivate further away from water points • Capacity building/awareness raising: make farmers aware of the long-term benefits of cultivating away from the riverbank • Create alternative economic opportunities
CHEMICAL PRODUCTS	<ul style="list-style-type: none"> • At the institutional level: set up a monitoring committee to supervise, report and punish non-compliance, enforce existing laws (involve traditional authorities), ban the use of agrochemicals • Grants or financial support: subsidize organic/natural products (e.g., neem used as a pesticide) and organic farming practices • Capacity building/awareness raising: raise awareness and train farmers on the harmful effects of agrochemicals • Financial support: provide financial support to compensate for yield losses
LIVESTOCK	<ul style="list-style-type: none"> • At the institutional level: punish those who do not comply with the rules • Infrastructure support: assist in the construction of watering points and corridors for livestock • Facilitating negotiation: bringing breeders and farmers together to discuss and find common solutions • Awareness raising/capacity building: raise awareness among livestock owners of the negative effects of uncontrolled livestock watering
GOLD MINING	<ul style="list-style-type: none"> • At the institutional level: establish management rules and a monitoring committee to ensure control through traditional chiefs or Village Development Councils; sanction those who violate rules through a supervisory committee • Creating employment opportunities: creating income-generating activities • Mining equipment: helping gold miners acquire modern equipment • Technical and financial assistance: provide financial assistance to gold miners (access to credit) and support for the establishment of gold washing facilities (drilling, water retention) • Awareness raising: sensitize gold miners to the harmful effects of uncontrolled mining activities in and around water points

Recommendations

Three fundamental interventions or actions are recommended to motivate farmers to adopt more sustainable land/water resources management measures:

- (1) **Establish effective institutions to ensure compliance with water laws.** Authorities should focus on the enforcement of existing laws and regulations, and effective sanctions for non-compliance, particularly sanctions on those who violate the 100-m 'no cultivation' zone.
- (2) **Provide technical and financial support.** Farmers lack the resources and knowledge needed to adopt good water/land management practices. Introduction of support programs (such as access to credit) and training could enhance the adoption of good management measures.
- (3) **Strengthen local capacity and raise environmental awareness.** Farmers have not yet grasped the seriousness of the long-term impacts of water resource degradation. Tailored trainings and awareness-raising programs could stimulate farmers to adopt good water/land management measures.



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Partners



International Water Management Institute (IWMI) - in charge of the coordination of the project and the scientific research

Mouhoun Water Agency (Agence de l'Eau du Mouhoun [AEM]) - main partner and intermediary between the project, the government, various integrated water resources management institutions and the researchers

AGRINOVIA Master's Program at the Joseph Ki-Zerbo University - in charge of providing support to the research component and capacity building of the national researchers

Vienna Doctoral Programme on Water Resource Systems at the Technical University Vienna (TU Wien) in Austria - in charge of the scientific research and providing advisory support for coordination

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This work was made possible through funding provided by the Austrian Development Cooperation, the Austrian Ministry of Finance and the CGIAR Research Program on Water, Land and Ecosystems (WLE).

Graphic design: Laura Delhommeau