



How to develop hydro-agricultural resources in West Africa?

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Background

The discussion *How to develop hydro-agricultural resources in West Africa?* was held on the FSN Forum in West Africa platform (<http://www.fao.org/fsnforum/west-africa>) from 20 May to 13 June 2014.

The topic was prepared and facilitated by Aliou Bamba, Gregorio Velasco et Ruhiza Boroto from FAO Regional Office for Africa and participants were invited to respond to the following issues:

- **Is the field of groundwater resources well understood? Where and how can relevant information be found?**
- **How can groundwater be extracted without appropriate technology and the necessary energy supply?**
- **Which forms of infrastructure management will guarantee the viability and sustainability of irrigation projects by the improvement of the productivity of crops and water?**
- **Is a call to action needed for the alignment and harmonization of different Initiatives, taking into account national objectives and priorities, with a view to a common implementation approach by those involved in the development of the irrigation in the Sahel?**

The discussion received 20 contributions from eight countries: Benin, Burkina Faso, France, Ghana, Mali, Niger, Senegal and Togo.

The following summary aims at providing readers with a general overview of the discussion.

The topic introduction and full text of all contributions received are available on the discussion page.

As emphasized by facilitators and participants, there is no doubt that the mobilization of groundwater resources presents a great opportunity for extending surfaces irrigated and guaranteeing increasing food production.

Our region remains today one of the uncommon areas of the world which has real potential in water resources and therefore in the extension of irrigated surfaces. (Abdoulaye Dembele, Mali)

The topic proposed has, therefore, generated the appreciation and interest of members of the Forum FSN for West Africa network as well as other invited colleagues.

This topic is relevant and concerns our people and especially the authorities in our States. This initiative gives us the opportunity to unite our efforts in the search for lasting solutions for food security. Once more, my support and congratulations to all the think-tank. (Mamadou Diatta, Senegal)

Is the field of groundwater resources well understood? Where and how can relevant information be found?

There have been several different points of view on the question of understanding groundwater resources.

Some of the participants believe that the field of groundwater resources is well known and that it is enough to talk to the relevant national services in each country to obtain the information and data required.

Among the relevant institutions, some participants have indicated, for example, the Ministère de l'Hydraulique [Ministry of Hydraulic Works] in Senegal, through its technical branches: the Direction de la Gestion et de la Planification des Ressources en Eau (DGPPE) et la Direction de l'Hydraulique Rurale (DHR) [Water Resources Management and Planning Department (DGPPE) and Rural Hydraulic Works Department (DHR)]; in Benin, la Direction Générale de l'Eau [General Department for Water] (and its corresponding departments in the country), le EAA (Eau et Assainissement en Afrique, ex-CREPA) [Water and sanitation in Africa, ex-CREPA], the Société Nationale des Eaux du Bénin [Benin's National Water Corporation], le Collège Polytechnique Universitaire de l'Université d'Abomey Calavi [Polytechnic University College of the Abomey Calavi University], the Ministère de l'Agriculture, de l'Elevage et de la Pêche et la Direction Générale de l'Eau [Ministry for Agriculture, Animal Husbandry and Fisheries and the General Department for Water].

On the other hand, some participants are firmly convinced that the level of detail in the studies of the sub-region available at present, both at national and sub-regional level, does not provide the necessary data for an efficient and effective planning and implementation of small-scale irrigation projects and programs.

As one of the participants said:

The field of groundwater resources is yet to be developed. (Prosper Monde, Benin)

On this question it is important simply to remember that the realities in all countries are not the same, arising from the fact that the countries concerned are not of the same area in size.

For example, in The Gambia, the amount of information seems very interesting, because for every 1000 km² it is possible to anticipate the drilling results with great precision.

Based on the data from hydrological studies available in a project for development of vegetable producing areas on different sites in the country a flow rate of 21m³/h at a depth of 30 to 35m has been foreseen. (Aliou Bamba, facilitator of the discussion, Ghana).

This is not the case in other countries:

In Mali, the SIGMA [Système Informatique de Gestion des Ressources en Eau du Mali, Informatics System for the Management of Water Resources in Mali] database for DNH, which is the only reference available, provides information on isolated sites of water points only. It is not possible to have precise information on availability or the parameters of groundwater basins or aquifers which are reported mainly in the north of the country, where, according to certain DNH data this zone is over flowing with large groundwater reservoirs of very good quality. The description is no more than qualitative. (Abdoulaye Dembele, Mali).

Major efforts really need to be invested in knowledge of the groundwater sector if the dream of massive exploitation of water resources in irrigation is to be achieved, without risks.

West Africa needs a complete mapping of the surface and underground water, necessary for the development of agriculture in this region. (Georges Bazongo, Burkina Faso; Richard KomlanFolly, Togo).

One participant proposed the use of the collaborative mapping system called Open Street Map (OSM), a simple and practical tool that allows each person using the internet to be able to add geographical and/or human information on a centralized database. One of the advantages of the system is the reinforcement of technical and technological capabilities of farmers and the fact that the collaborative and participative character of the project will reduce the costs of financial investments. (Richard KomlanFolly, Togo)

How can groundwater be extracted without appropriate technology and the necessary energy supply?

Regarding this question, the impression is that those responsible have broken down. Despite the fact that there are many water mobilization systems, it is not evident that the appropriate technologies are employed on every occasion.

Those which are adapted to the development of the water table are not suitable for deep underground water. Accordingly, the break down comes from the fact that it is not known in advance whether at such or such point water should be available from deep underground or from groundwater.

To develop groundwater resources it is necessary to have the political will and to work with research institutions in order to test and assess innovative technologies (for example, solar pumping systems).

For example, the revival program of the President of Niger, Issoufou, which emphasizes the mobilization of groundwater resources to establish a sustainable agriculture whereby, the people of Niger feed themselves. (Moussa Kossey, Arc-En-Ciel, Niger)

Other suggestions focus on the capitalization of well-tried sound practices in this field and their dissemination by technology transfer.

Some participants have proposed the possibility of a community or collective approach, among farmers, for the extraction of water.

Many have highlighted the issue of energy in the region and the opportunities provided by local energy resources, in particular, solar and photovoltaic.

I think that our region has practically inexhaustible resources of solar energy, the mobilization of which, through photovoltaic cells available today everywhere, remains a great opportunity for development of proximity irrigation sourced from groundwater. (Abdoulaye Dembele, Mali)

Which forms of infrastructure management will guarantee the viability and sustainability of irrigation projects by the improvement of crops and water?

On this question, it appears that important progress could be quickly achieved if:

- Directives and tools for planning and management of water are put in place, in particular by observing the principle of the integrated management of water resources;
- The quality of the design of irrigation infrastructures is improved;
- Regarding irrigated perimeters, farmers are more closely involved in water management while respecting the rules of good governance for water and land.

Many participants have emphasized the possibility of irrigation management by farmers and communities, as long as it is supported and facilitated (Christophe Rigourd, IRAM [Institut de Radioastronomie Millimétrique, Institute for Millimetric Radio Astronomy], France ; Alfred K. Yergo, Ministère en charge de l'eau au Bénin [Benin's Ministry in charge of Water], Benin ; Amen Hadeou, DIRO Center [Centre pour le développement institutionnel et le renforcement des organisations, Centre for institutional development and the strengthening of organizations], Benin).

Some believe that community management of irrigation infrastructures on a more or less large scale is only sustainable with the permanent support of public institutions through technical assistance and various subsidies.

The cost of groundwater resources mobilization and of investments for the implementation of infrastructures is such that the States are forced to be involved directly if food and nutritional security in the sub-region is made to be the priority of priorities. (Abdoulaye Dembele, Mali)

Raising awareness and training water consumers is also considered important for infrastructure management. Some of the participants stress the professionalization of water management in the arrangement, which implies separating hydraulic services from agricultural production services. (Hervé Marcel Ouedraogo, Burkina Faso)

Is a call to action needed for the alignment and harmonization of different initiatives taking into account national objectives and priorities, with a view to a common implementation approach by those involved in the development of irrigation in the Sahel?

Very few comments have been made regarding this question, even though it has tremendous importance. These comments keep to a very general level. Should discussion of the question take place at a level other than the technical?

It is apparent that sub-regional mechanisms at the level of ECOWAS, CILSS, and WAEMU could be more effective at employing funds for these purposes than isolated actions at country level. (Georges Bazongo, Self Help Africa, Burkina Faso).

An organization like FAO could, therefore, provide support to these mechanisms using its competence in the technical field concerned and in the mobilization of resources.

A call to action is certainly necessary, but I think that given the forecasts drawn up for the future regarding the capacity of mankind, and in particular the Sahel sub-region, to guarantee food supply for an ever growing and urban population, we are forced to go beyond a call and to formulate and implement an authentic 'marshall plan' to develop irrigated agriculture in the Sahel. (Abdoulaye Dembele, Mali)

Questions asked/issues

Among the other questions raised by the participants, are noted:

- Land grabbing: the development of hydro-agricultural resources necessarily begins by their protection against seizures and excessive use of water at the expense of family agricultural producers. (SomaMaïmouna, Burkina Faso)
- The impact of groundwater use for agricultural irrigation on the water table (Georges Bazongo, Burkina Faso): in-depth studies on the field of groundwater are necessary, focusing not only on the water table but also on very deep aquifers, where the resources are yearly renewed. It is apparent that if hopes of developing small-scale irrigation are based only on the use of ground water, it will not be sustainable.

Conclusions and recommendations

The conclusions/recommendations which can be drawn from this first on-line discussion on the development of water resources in West Africa are the following:

- West Africa should invest in studies of underground water knowledge to build a map and a quantitative and detailed database in all countries.
- Identify the most appropriate water mobilization technologies in the environmental, social and energetic context of the sub-region, taking into account renewable resources, solar/photovoltaic first and foremost.
- Formulate policies/strategies at national level for small-scale irrigation and, on this base, a harmonization of policies at sub-regional level.
- With a sub-regional policy and a harmonized approach, it will be possible to strengthen and coordinate the appeal/mobilization of financial resources at sub-regional level.
- Promote the exchange of experiences and good practices among the countries in the sub-region and with other countries which have already undertaken development of underground water.
- It is also necessary to invest in training and in the professionalization of water management.
- Find forms of management of collective infrastructures so that farmers could participate and get benefits from the water resources and share the necessary costs.

Finally, the question of water does not seem to be very well known at the political level nor by the general public in West Africa; to make those involved clear on and aware of the opportunities offered by the exploitation of underground water and on the difference between groundwater table and deep aquifers could give rise to a more constructive debate on the question and create a stronger support for initiatives related to underground water.

We hope that this on-line discussion has helped to clarify the issues on developing underground water in West Africa.

References shared by the participants

Site of the ASIrrri capitalization project: Mali component: <http://www.innovations-irrigants.com/asirri-mali>

Alternative irrigation practices for the north of Mali Pratiques alternatives d'irrigation pour le Nord Mali : www.irrigation-nord-mali.org

Report produced on the alternative practices in the field of irrigation of the north of Mali: http://www.irrigation-nord-mali.org/classified/rapport_pratiques_d_irrigation_tombouctou-final.pdf

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