

WATER USERS' ASSOCIATIONS AND INTEGRATED WATER RESOURCES MANAGEMENT IN GHANA

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Abstract

Water Users' Associations (WUAs), are important component of participatory governance arrangement for sustainable management of water resources in Ghana. At present, WUAs' are not organised in their respective sectors to function effectively. However, a number of the groups exist, evidenced by their governance structure, membership status, experience and knowledge in various sectors of the economy that are relied upon by public institutions especially in times of crisis. Although they offer a number of opportunities that are acquiescent for use in water governance, WUAs are besieged by a myriad of weaknesses and threats that need to be minimised to achieve their objectives. The current legal and institutional framework does not provide clear roles and or responsibilities with regards to integrated water resources management (IWRM) for WUAs. Thus, the WUAs in Ghana do not seek to promote the IWRM as they seek to promote the socio-economic interests of their membership. It is recommended that the formation of WUAs be encouraged and supported to play key roles expected of WUAs in IWRM in Ghana.

Introduction

Country Water Partnership (CWP)-Ghana is a member of the world-wide family of Global Water Partnership (GWP). The mission of the GWP is to support countries in the sustainable management of their water resources. Through its network, the GWP fosters integrated water resources management (IWRM) which aims to ensure the coordinated development and management of water, land, and related resources in order to maximise economic and social welfare without compromising the sustainability of vital environmental systems. Thus, the GWP provides a platform for multi-stakeholder dialogue at global, regional, national and local levels to promote integrated approaches towards more sustainable water resources development, management and use. CWP-Ghana works towards attainment of its objectives through advocacy and support for effective water governance in Ghana. One of such initiatives is the Pilot Project on Water Users'

Associations (WUAs), which is a component of governance arrangement for sustainable management and use of water.

Water Users' Associations refer to the groupings of water users, who take water from one or more sources (such as streams, rivers, reservoirs, irrigation canals, pumping stations, treated water/metered points, etc.) for the purpose of using or managing part of it. The boundary of the association can be based on a hydraulic unit, irrigation scheme or part of it, or a geographically administered area.

The GWP project encourages WUAs to be properly organised to assist in sustainable management of water resources in whatever sector of the economy they are engaged in, be they in agriculture, industry, transportation, recreation, etc. The paper discusses the role of WUAs in Ghana and reports the results of a preliminary survey of WUAs in southern Ghana that the CSIR-Water Research Institute (CSIR-

WRI) recently undertook in collaboration with the CWP-Ghana. The objective of the survey was to assess the legal and institutional framework within which WUAs operate to improve water governance, and, thereby, promote sustainable water resources development, management and use in Ghana.

Experimental

A survey was carried out to identify the major water-users in the various sectors of Ghana's economy. Where it was evident that a particular water user belonged to an association, further probing using a structured questionnaire, interviews and discussions with key personnel or executive officers of the associations were conducted to ascertain their roles and responsibilities in the management and use of water. The responses obtained provided the basis for assessing the mode of operation, strengths, weaknesses, opportunities and threats (SWOT) to the associations.

Framework for analysis - strengths, weaknesses, opportunities and threats

The internal characteristic of an association that enhance its role in the sustainable IWRM principles was considered as strength. Weakness was considered as any internal characteristic of the association that renders it potentially vulnerable in terms of sustainable management and use of water. An environmental condition that offers prospects for improving the general situation of the association was recognised as an opportunity whilst a threat refers to developments that undermine the overall interest of the association.

Study area

Climate. Ghana has a warm, humid climate. Mean annual rainfall of the country is estimated at 1,187 mm. Mean annual temperatures ranges between 26.1 °C near the coast and 28.9 °C in the extreme north. Annual potential open water

evaporation has been estimated ranging between 1,350 mm in the south and about 2,000 mm in the north. The actual amount of evaporation depends on a number of factors including water availability, vegetation cover and prevailing weather conditions among others.

Water resources

Surface water resources. The total annual mean runoff for Ghana is estimated at 54.4 billion m³ of which the runoff from Ghana alone is 39.4 billion m³, representing 68.6 per cent of the total. The remaining 15.0 billion m³ originates from outside Ghana's territory (WARM, 1998). Based on rainfall and vegetation, the Water Research Institute (WRI) of the Council for Scientific and Industrial Research (CSIR) has since the 1970s divided the river basins of Ghana into three broad systems, namely the south-western river system, the coastal river system and the Volta rivers system (Fig. 1).

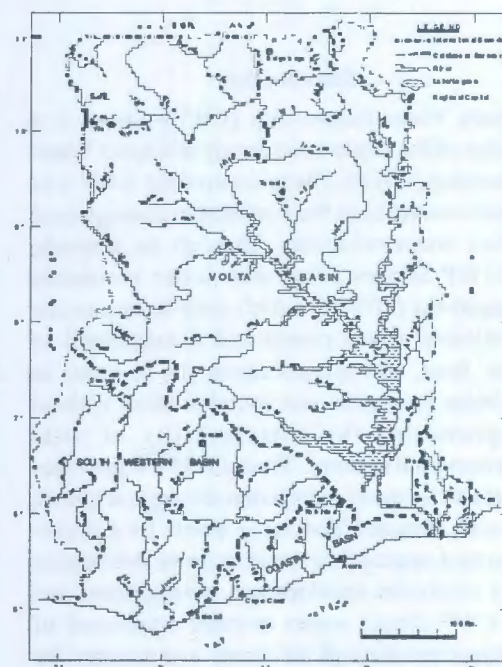


Fig.1. Major river basin systems of Ghana

Groundwater resources. Groundwater occurs mainly in the Voltain, crystalline/basement complex, Cenozoic/Mesozoic and alluvial/recent formations (Fig. 2). The Voltain formation has little or no primary porosity and, thus, groundwater

occurrence is associated with the development of secondary porosity as a result of jointing, shearing, fracturing, and weathering. In the wet forested south-western part of the country, the weathered zone has an average thickness of 60

m, while it is thinnest in the semi-arid area in the extreme north-east where the mean thickness is about 10 m. Yields rarely exceed $6 \text{ m}^3 \text{ h}^{-1}$ (WRRI, 1996).

The Cenozoic and Mesozoic sediments occur mainly in the extreme south-eastern and western parts of the country. Three aquifers occur in this formation. The first aquifer is unconfined and occurs in the Recent Sand very close to the coast. It is between 2 and 4 m deep and contains meteoric water. The intermediate aquifer is either semi-confined or confined and occurs mainly in the Red Continental Deposits of sandy clay and gravel. The depth of this aquifer varies from 6 to 120 m. The third aquifer occurs in the limestone and varies in depth between 120 and 300 m. Groundwater in this aquifer occurs under artesian conditions and is fresh. The average yield in this limestone aquifer is about $184 \text{ m}^3 \text{ h}^{-1}$. Falling groundwater levels have been observed in the upper regions where over

2,000 boreholes have been drilled since the mid-1970s in the

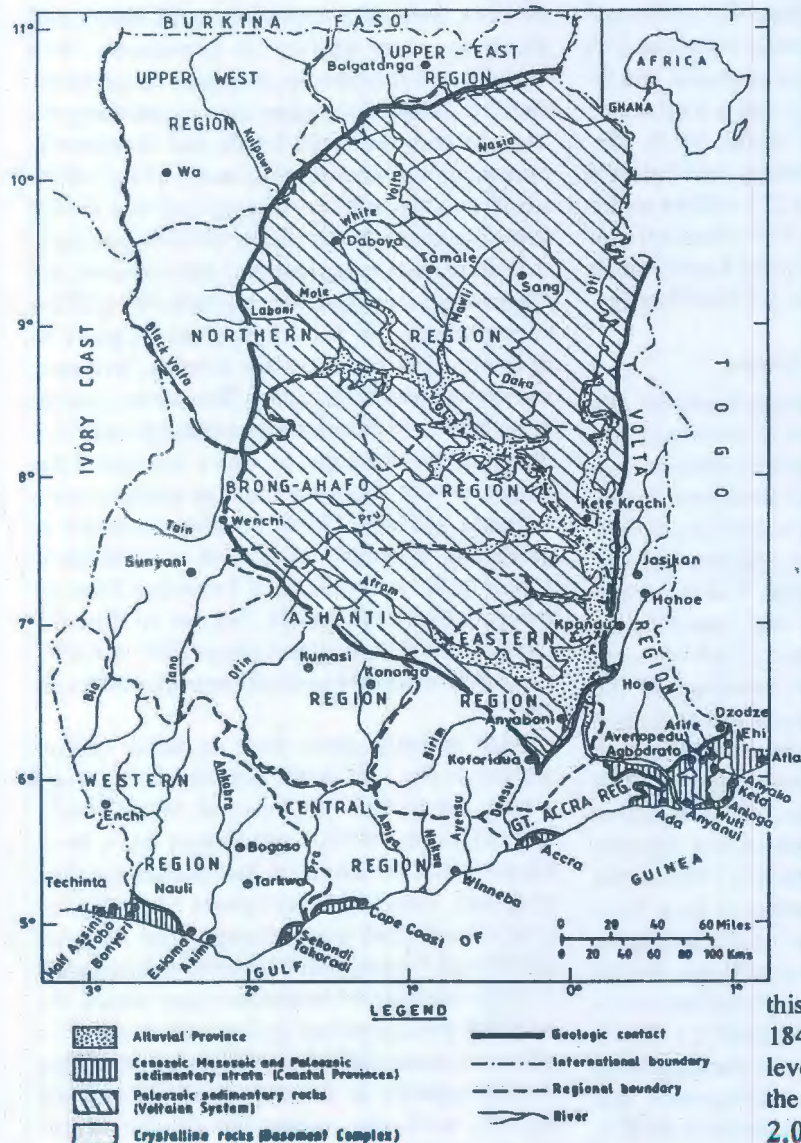


Fig.2. Hydrogeological provinces (Geological Survey of Ghana, 1969)

rural areas to provide potable water to communities.

Water use

The main consumptive water uses in Ghana are for domestic, industrial, irrigation and animal watering purposes. In 2000, about 652 million m³ of water (66%) were withdrawn for irrigation, 235 million m³ (24%) for domestic purposes, and 95 million m³ (10%) industry, giving a total water withdrawal of 982 million m³ (FAO, 2010). The combined withdrawal for domestic and industry is 95 million m³ for rural and 235 million m³ for urban areas. Current water use for hydroelectricity generation (only at the Akosombo Dam), which is non-consumptive water use, is 37.843 km³yr⁻¹.

Freshwater management in Ghana

Information on the management of the freshwater resources in Ghana, over the past two decades, indicate that a number of initiatives have been undertaken to address problems in the sustainable development and management of the country's water resources, particularly to streamline the role, functions, and decision-making processes within the water sector. In the rural and urban sectors, a number of reforms were introduced to accelerate the coverage of the provision of good drinking water and sanitation facilities. The Rural Water Department of the then Ghana Water and Sewerage Corporation (GWSC) was separated and set up as an autonomous Community Water and Sanitation Agency (CWSA) by an Act of Parliament in 1998. In the urban water supply sector, reforms have been undertaken to facilitate the creation of a favourable environment for increased private sector participation. This led to the formation of the Ghana Water Company Limited (GWCL). This is one of several initiatives for introducing private sector participation in the management and operation of urban water supply systems (MWH, 1998b).

The regulation of urban water and other utility services have been shifted from government to an independent body, the Public Utilities Regulatory Commission (PURC). The PURC, as established under Act 538 of 1997, is mandated to regulate and oversee the provision of utility services, including approving tariff levels and drinking water quality to consumers. The Commission is to ensure protection of consumer interests, while at the same time maintaining the balance between tariff levels and investment, operation, and maintenance costs of the utility services that will encourage private sector participation in the provision of these services.

With respect to agricultural development, the Ghana Irrigation Development Authority (GIDA) is responsible for the formulation of plans to develop water resources for farming, livestock improvement and fish culture. The reform strategy adopted was to increase agricultural production, through development of water resources for irrigation with focus on small to medium scale schemes (MWH, 1998c). Reforms aimed at protecting water and the general environment is rooted in the Environmental Protection Plan for the country (EPC, 1994). Further to this, the Environmental Protection Agency (EPA) Act 2001 conferred regulatory and enforcement powers on the EPA.

Until recently, there were no water quality standards for raw water (surface and ground water). For potable use, however, World Health Organization (WHO) guidelines have been adopted, and for irrigation and animal watering purposes, Food and Agriculture Organisation (FAO) guidelines were adopted. The EPA Act (2001) and the associated Legislative Instrument (1652) concentrated on surface water. Hence, the national environmental policy, which seeks to place environmental conservation and protection on high priority in the national developmental agenda with the enactment of the Water Resources Commission (WRC) Act 552 of 1996,

TABLE 1
List of WUAs surveyed

<i>Name of WUA</i>	<i>Status (Formal or Informal)</i>	<i>Membership</i>	<i>Composition</i>	<i>Activity</i>
Private Water Tanker Drivers Welfare Association	Formal - registered	150	Male dominated	Sells treated water in tankers. permitted by GWCL
"Mechingani" Water Tankers	Informal (plans to form an association)	Exact number is not known	Male dominated	Draw raw water from the Weija lake (Densu river) for sale
Weija Irrigation Farming/Marketing	Formal - registered.	-	Mixed but male dominated	Irrigated vegetable farming
Dawhenya Food Farmers Co-operative	Formal - registered	200 (estimated)	Mixed but male dominated	Irrigated rice farming
Ashiaman Vegetable Crops' Farmers	Formal - registered	96 (17 females, 79 males)	Mixed but male dominated	Irrigated vegetable farming
Boat Owners Association	Affiliated to National - Inland Fishermen Council - Accra		Male dominated	Fresh water fishing and ferrying of people
National Inland Canoe Fishermen Council	Formal - registered	50,000 (since 1994 census)	Male dominated male:female ratio, 3:1	Coordinates all inland fishing and fish farming activities
Boat Owners Association Kpando - Torkor Branch.	Informal	-	Male dominated	Fresh water fishing and ferrying of people
Ashanti Region Fish Farmers Association	Formal - registered	-	Male dominated	Fish farming
National Association of Sachet Water Producers	Formal - registered	300	Female dominated	Packaging of sachets of Sachet Water

Guinness Ghana Breweries Ltd	No association	Employs workers under labour law	Mixed but male dominated	Brewery
Beverage Investment Ghana Co. Ltd (Pepsi)	No association	Employs workers under labour law	Mixed but male dominated	Brewery and filtered bottled water (AquaSplash)
Accra Brewery Co. Ltd	No association	Employs workers under labour law	Mixed but male dominated	Brewery
The Coca-cola Bottling Co. Ltd	No association	Employs workers under labour law	Mixed but male dominated	Mineral bottling and production of filtered bottled water
Aloy's Bay	Proposed to other recreational resorts on the banks of Volta river to associate.	Employs workers under labour law	Mixed but male dominated	Provide recreation and hospitality

enhanced the institutional framework for managing freshwater resources in its entirety.

The mandate of the WRC to regulate and manage the country's water resources and to coordinate government policies was in response to the need to achieve integration of water resources planning, development and management. Thus, the current legal and institutional framework for water management is based on a close working collaboration between EPA and WRC. These two public agencies are to ensure sustained development and management of water resources and the environment to avoid the exploitation of water in a manner that might cause irreparable damage to the country.

Results and discussion

Institutional role of water user associations in water management in Ghana

Available information on the involvement of WUAs in water management show, no direct, specific roles or responsibilities for the major water users in agriculture, industry, transportation and recreation. Water users and or their associations are not members of the river basin boards. The

non-involvement of such users, who collectively exploit enormous quantities and impact on water quality, especially in irrigation schemes and water supply, represents an unhealthy development in attempts to manage the water resources of the country on sustainable and participatory basis. The national irrigation policy, being drafted since 2005 (MOFA, unpublished) for the country, recognises the need to ensure that local water management arrangements are all inclusive, instead of the "top-down" management approach, which exist at present.

Preliminary survey of water users' associations in Ghana (SWOT)

To ascertain the existence or otherwise of WUAs in the country, consultations were made with some institutions/associations/groups. In all, 15 entities from different water activities were surveyed in southern Ghana. (Table 1). Eight WUAs were formal, one was informal, five were not associated and one was being formed. The formal WUAs have constitutions or sets of rules governing them. Table 2 is a summary of the outcome of the SWOT analyses of the WUAs surveyed.

TABLE 2
Summary of SWOT analysis of WJAS surveyed

<i>Name of WUA</i>	<i>Modus operandi</i>	<i>Strength</i>	<i>Weakness</i>	<i>Opportunities</i>	<i>Threats</i>
1. Private Water Tanker Drivers Welfare Association	Formed to seek member's welfare; governed by a written constitution; membership opened to anybody who owns or drives a clean water tanker; the drivers of the water tankers assemble daily at their station to take orders from proprietors or clients; members contribute an agreed commission daily on the quantity of water drawn; the proceeds go into a common fund for the administration of the association	Expertise of members are relied upon by public institutions such as PURC, GWCL and the World Bank in taking decisions; assist, public bodies National Disaster Mgt. Organization (NADMO) and Fire Service in times of disasters.	Emphasises welfare and financial gains than instilling proper water management practices among members; does not have nationwide representation; membership is limited to the Accra Metropolis only.	Unplanned and rapid development in the metropolis makes it technically difficult for the GWCL to supply potable water to several households and industries; association has geared itself up to fill the gap; new wave of private sector participation in water delivery in recent years has created awareness among Ghanaian about the services of the association.	High maintenance cost of the vehicles. Traffic congestion within the city leading to high fuel consumption cost; unreliable supply of water from treatment plants; High maintenance cost of hydrants and the emergence of splinter groups at other locations in the metropolis
2. "Mechingani" Water Tankers	An informal grouping of raw water providers; members supply water mainly to contractors and private estate developers.				
3. National Association of Sachet Water Producers	Formed in 1999 with membership opened to persons registered under the Companies Code, 1963 (Act 179) to engage in the commercial	Extensive membership across the country and the implementation of active educational programmes	Lack of offices at the local and district levels.	Technical difficulty for GWCL to supply potable water to several households;	Lacks the capacity to instil discipline and facilitate the acquisition of inputs for its members.

packaging of water; has a strong collaboration with the Food and Drugs Board (FDB), Ghana Standards Board (GSB) and the Metropolitan/Urban/Local Authorities; funding of the association is from membership dues and levies decided upon in times of need or problems.

4. Weija Irrigation (Farming/Marketing)

Formed in 1983 with membership opened to any person who farms within a 5-miles radius of Tubakrom, Weija area of the Accra metropolis, upon accepting to abide by the written constitution of the association; as part of its governance structure, the association has a number of committees including a water task force that ensures that recalcitrant members pay water use, fees for onward payment to the relevant authority; facilitation of produce marketing through advertisement in the mass media and facilitate input acquisition by members.

Enjoys patronage evidenced by enthusiastic attendance of members at meetings and a strong governance structure of the association, thus, facilitating its functions.

The objectives of the Association emphasize input acquisition and marketing; no mention was made anywhere about the management of water - an important input sustaining their operation; does not have nationwide representation; currently, membership is limited to the locality only.

The rehabilitation of the irrigation infrastructure at the site in recent times has assisted in renewing interest of the farmers to acquire more land for cultivation; in addition, enhanced export awareness created among irrigation site farmers as a result of Vegetable Producers Association of Ghana (VEPEAG)'s; continuous awareness creation programme offers the chance for strengthening the sector; the use of windmill to distribute water on members' plots minimises the payment for energy cost.

High electricity tariff paid by members and difficulties in marketing of produce especially during times of glut.

5. Dawhenya
Food Farmers
Co-operative

Formed in 1973; funding of activities of the association has been from contribution of members; membership is opened to any farmer who operates within a 5-mile radius of Dawhenya; the functions of the association are performed through *ad-hoc* committees; for instance, the land allocation committee distributes lands to prospective farmers; the water task force oversees controlled use of water, etc; others include disciplinary and advisory committees; currently there are 165 members, dominated by males; the association is of the view that excessive use of agrochemicals has resulted in members' plots becoming saline and unproductive in recent years.

The association is endowed with persons experienced and knowledgeable in both agronomic practices and environmental issues.

Widespread expression of pessimism in the future of irrigated agriculture by members.

The use of windmill to distribute water on members' plots minimises the payment for energy cost.

Lack of **inputs** and funds to **undertake** farming; **unavailability** of machinery to till the land; **inability** of members' **produce** (rice) to **compete** with **imported** rice.

6. Ashiaman
vegetable crops'
farmers

Formed in 1998; membership of the Ashiaman irrigation farmers cooperative society (AIFCS) is opened to any person granted a plot at the irrigation project site; its constitution outlines a governing structure that specifies roles to such committees as executive, agricultural, financial and maintenance. The roles of

The society has members who are experienced and knowledgeable in both agronomic practice and environmental issues.

A threat to the group is the difficulty in marketing of produce; also there is the lack of working capital and encroachment on their reservoir.

the agricultural committee includes input allocation, planning cropping calendars and arranging for water supply to plots and extension services; levies on irrigation services provided are the main source of funds for administering the society; the society recognizes that the activities of its members have impacted negatively on the land as the soils have become saline due to the excessive use of agrochemicals; in addition, water scarcity and quality deterioration is experienced due to serious encroachment in the catchments of the reservoir; these developments raise issues of sustainability.

<p>7. National Inland Canoe Fishermen Council</p> <p>Registered in 1983 with an initial membership of 15,000; membership is opened to anybody involved in inland fishing; the governance structure starts from the community executives, linked to the zone, district, national and the council of elders at a national congress which is the highest decision making body; regular funding is from</p>	<p>Large membership across the country</p>	<p>Difficulty in updating records of its membership and the absence of offices at the zonal and district levels.</p>	<p>Enormous potential for expansion and recruiting members nationwide.</p>	<p>Lacks the mandate to phase out or abolish undesirable fishing methods, and encounters difficulties in the acquisition of inputs for its members.</p>
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members' contribution as outlined in the constitution; this includes one-time payment of registration fees and surcharges on inputs.

8. Ashanti Region Fish Farmers Association, Kumasi	Formed in 1992; it is composed of persons associated with the business of fish: (farmers, fish mongers, feed sellers); registration fees, dues and levies charged on fish and fish products are the main source of funds for administering the association.	Members are quite influential in the society.	Emphasises measures to enhance socio-economic well-being of its members, to the detriment of water resources management issues.	Enormous unexploited potential for expansion nationwide	Lack of confidence in leadership expressed by members and difficulties in the acquisition of inputs.
9. Boat Owners Association	Composed basically of resourceful fishermen who own motorised boats used to transport goods and people on the Volta lake in addition to fishing; the formation of the group in 1996; the group monitors the safety status of boats on fortnightly basis and advises accordingly.	Endowed with persons experienced and knowledgeable in diving, fishing and operation of motorized boat.	Lack of safety devices on boats, technical know-how in navigation and general environmental awareness among members.	Vast area of the lake that is inaccessible but abounds in resources which are required in other parts of the country.	Increasing scarcity of wood for boat construction.

Conclusion

To ascertain the mode of operation of existing WUAs in Ghana, 15 WUAs were surveyed in southern Ghana. The existing WUAs were found in agriculture (irrigation and fisheries) and water tanker operations. WUAs in the manufacturing industry (breweries) and recreation sector are practically non-existent. The existing legal and institutional water resources management frameworks in Ghana do not provide clear roles and/or responsibilities for the WUAs. Existing water legislative instruments tend to directly regulate the activities of existing WUAs instead of involving them in decision making. The results showed that though WUAs have important roles to play in IWRM generally, WUAs in Ghana do not seek to promote the IWRM concept. Rather, they seek to promote the socio-economic interests of their members.

The need for user entities to coordinate and monitor the distribution of water, collect water charges, and organise operation and maintenance at water projects and irrigation schemes below secondary canal levels could be the basis for the establishment of WUAs. The successful establishment and operation of WUAs require strong support from local and water authorities.

Recommendations

On the basis of the preliminary survey of WUAs in southern Ghana, it is recommended that the formation of WUAs should be encouraged in all water sectors. Specific roles and operations should be identified for WUAs to promote sustainable management of water resources in the country. The Water Resources Commission of Ghana could take the lead to extend membership of river basin boards to identified WUAs. WUAs must be encouraged to put in their governing structures/constitutions the legal framework of IWRM principles. Water tanker operators should be encouraged to formalize their operations in the form of officially registered

WUAs. The governing structures of WUAs in irrigation and other bodies could be strengthened by way of institutional support from the relevant government or non-governmental agencies. Water users in recreations such as water sports should be encouraged to form WUAs. WUAs should be strengthened in terms of capacity building. Through training and workshops, members of WUAs could be informed about the usefulness of integrated and sustainable water resources management for their own good and the good of the country. An intensive country-wide field survey of WUAs and their activities ought to be carried out to enable concrete findings, and conclusions, appropriate policies and recommendations made.

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