Log Frame Irrigation Thematic group Country Water Resources assistance Strategy (Draft)

Topic	Subject	Problem	Reasons	Potential Solutions
Institutional and Legislative Aspects in Irrigation	1.1 Role of MAI and its branches in Irrigation at the National and local Levels	Weak Institutional set up in the Ministry	- Limited local budget (inefficient and limited use of recurrent budget) - Limited Specialized staff - Stagnation in unqualified staff - Slow implementation of irrigation policies - Weak monitoring and coordination in irrigation department. - Lack of integrated structures in irrigation department national and locally	- Allocate adequate recurrent budgets to support human and institutional capacities of irrigation sector - Restructure staff in irrigation sector - Establish an integrated approach to implement irrigation policies based on clear priorities and adequate budget - Prepare clear job description and clear definition of tasks in the management of irrigation sector - Revise the role of irrigation department and its relations with branches. - Ensure adoption of decentralization
	1.2. Role of NWRA in assessment and management of Water Resources	Weak role of NWRA in water resource assessment and management	- NWRA has been established recently - NWRA structure has not been completed national and at the local level - Limited human and material facilities - Weak institutional set-up - Wrong perception among some members of communities about public ownership of water resources - Weak data base and information and incompletion of studies of different water basins	- Complete structure of NWRA at the national and the local levels. - Clear identification of roles of different parties related to water resources to avoid duplication. - Raise awareness on the importance of water resources and the public ownership of underground water. - Complete studies of water basins and collect data on underground water and allow access to this information. . - Establish the Information Center.
	1.3. Role of NGOs in irrigation management	Weak role of NGOs in irrigation management	- Limited experience of NGOs in irrigation management - Lack of institutional set up for management of shred tube wells (intermountain plains case) - Limited awareness among share water users on water uses. - Lack of incentives for rational use of water - Limited enforcement of laws on water uses.	- Collect information on recently established WUAs and participatory monitor progress in development and eliminate factors preventing progress. - Support technical and institutional capacities of WUAs and participatory irrigation. - Increase awareness on the importance of water among NGOs and beneficiaries from irrigation. - Direct support in the direction of the use of modern irrigation methods to minimize underground mining of water. - Identify the responsibility for law enforcement

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	1.4 Traditional water rights in irrigation	**Unequal distribution of flood water**	- Traditional water rights contradicts modern concrete irrigation structures in some locations - Traditional water rights are sometimes undermined by influential sources.	- Review traditional water rights to be adapted to the constructed irrigation structures. - Establish laws and regulations to ensure equity in flood irrigation
	1.5 Role of MAI and NWRA in monitoring irrigation water	**Weak monitoring of irrigation water**	- Weak coordination between MAI and NWRA in monitoring irrigation - Limited material and human in MAI for monitoring of irrigation - Un clear roles between MAI and NWRA in monitoring - Delay in implementation of water law because of delay in issuing by-laws and the creation of Ministry of Water and Environment - Difficulties in implementation of water legislations under the Yemeni context.	- NWRA should be responsible for water monitoring at the basin level. - Assess the water equation in the basin - Locate sites for dam construction - MAI should be responsible for monitoring of irrigation at the field level. - Implement dam construction and affiliated irrigation networks - MAI should withdraw from Participatory irrigation with NGOs on a gradual basis till irrigation structures are handed over to NGOs - Support technical and institutional capacities of MAI to perform monitoring in a professional manner. - Speed up issuing by laws of water law to ensure equal distribution of water resources.
2. Management and Uses of water	**2.1. The rationale of dams**	**Low efficiency of water use from dams in irrigation or for recharge of underground water**	- Unsuitability of some locations - Limited geological and hydrological studies of some dams - Lack of independent bodies for supervision of constructions and handing over. - Limited experience of some contractors - Limited involnement of local communities in planning, supervision implementation and management of dams	- Prepare a national plan for dam construction on the bais of sound scientific and objective studies by specialized institutions. - Involve local communities in planning, implementation, operation and management of dams and water structures.

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	2.2. Qat	**Continuous expansion of qat. Qat is major contributor in water mining**	- Economic return in qat from M^3 of irrigation water exceeds any other crop - Low irrigation efficiency in qat cultivation. - Increased demand for qat	- Introduce crops with competitive returns to qat. - Improve irrigation efficiency in qat cultivation. - Create awareness on the danger of qat on health, family income and the environment.
	2.3. Under ground water Mining	**Sharp drop of underground levels and deterioration of water quality in most basins**	- Random drilling of tube wells - Irrational use of water in irrigation - Deterioration of terrace systems and low efficiency in water harvesting - Expansion of irrigated crops irrespective of the amounts of underground water available	- Regulate drilling of wells by laws and legislations - Improve water management at the field level. - Give attention to terrace systems and improve water harvesting efficiency - Adopt the comparative advantage principle in planning expansion in cultivation of irrigated crops. -
	2.4. The use of treated waste water, brackish water and saline water in agriculture	**Waste and ignorance of secondary sources as potential resources in irrigation so far**	- Defects in designs and capacity of some treatment facilities. - Improper selection of sites of waste waters some treatment facilities.(Aden) - Current level of treatment allows only limited use of TWW in irrigation. - TWW has not been officially recognized as source for irrigation. -	- Improve designs and capacity of treatment facilities. - Improve level of treatment of waste water to broaden uses in irrigation. - Expand the construction of treatment facilities to make use of TWW in agriculture irrigation. - Adopt technologies for the use of saline water in irrigation
	2.5. The virtue of water and food security.	**Low productivity per unit area in irrigated and rainfed crops**	- Low return per unit area in growing rainfed food crops. - Low return from growing irrigated food crops compared to irrigated cash crops.	- Improve return per unit area and per unit water used in irrigated production systems. - Improve proclivity of food crops under rainfed production systems. - Improve livestock production - Improve range and honey production.
	2.6. Water shed management and terrace maintenance	**Deterioration of natural resources**	- Migration to cities and abroad - Overgrazing/deterioration of tradition systems/ fuel wood cutting - Lack of a national institution to coordinate development efforts in water sheds - Low economic return from food crops - Shift of agriculture from subsistence to market oriented agriculture.	- Establish a national institution for law enforcement and coordination of development efforts in water sheds. - Promote the use of butane gas for cooking. - Improve productivity of food crops in rainfed areas (better varieties, drought resistant, early maturing) improve crop and resource management, introduce new technologies for growing cash crops using drip irrigation and water harvesting

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				- Adopt participatory approaches in range improvement. - Integrate gender in all aspect of water shed management and terrace maintenance. - Integrate environmental concepts in any development intervention. - Increase awareness on environmental issues among local communities in watersheds.
	2.7. Water costing and cost recovery	**Irrational use of water resources in irrigation.**	- The spread of wrong perceptions about ownership of underground water by owners of wells and not public property. - Most dogged wells are privately owned - Government policies of led to total dependent on government in irrigation structure constructions and management. - No efforts were made so far to implement laws and legislation of partial pricing of flood irrigation - Under Yemeni context under ground water pricing is a long-term intervention.	- Increase awareness on the importance of costing and cost recovery in irrigation structures. - Correct policies, which led to total reliance of local communities on the government. - Adopt a gradual approach in adopting costing of water for irrigation under flood irrigation conditions in the medium term .and ensure cost recovery as per existing legislations.
	2.8. Operation and Maintenance of Irrigation structures.	**Deterioration of irrigation structures(dams, diversion weirs, irrigation canals)**	- Development efforts concentrated on construction and overlooked management of these structures. - Lack of maintenance programs/ financial constraints/ specialized departments. - Passive role of beneficiaries and local councils.	- Define roles of government and local communities in management and maintenance of irrigation structures. - Encourage local communities and provide help in formulation of WUAS in management of irrigation structures. - Strengthen capacities of local councils in monitoring and supervision of irrigation structures.

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Research and Extension in irrigation	**Irrigation Research Irrigation efficiency/ water requirements/Cropping pattern/ Management of water at the field level. Irrigation economics.**	**Low water use efficiency in irrigation**	- The dominance of traditional methods of irrigation. - Low demand for modern irrigation techniques. - Limited information on crop water requirement of different crops under different production systems. - High cost of irrigation systems. - Bad leveling of fields. - Limited experience in research on water and irrigation systems. - Limited information on cropping pattern which economize water use. - Problems of sharing of tube wells and their impact on irrational use of water. - Fragmentation and scattered nature of land ownerships. - Lack of incentives for rational use of underground water.	- Promote the use of modern irrigation techniques. - Create awareness on modern irrigation techniques. - Support research on crop water requirements and irrigation scheduling under local conditions. - Introduce salt tolerant varieties. - Lift incentives for mining of underground water. - Conduct socio-economic research on cropping patterns for economizing water use. - Improve water management at the field level. - Improve water conveyance to the fields - Improve water application at the field level. - Promote participatory research and extension in irrigation. - Conduct applied and adoptive research on secondary water resources. - Improve land leveling of agricultural fields. - Conduct research on improvement of water holding capacity of soils. - Give priority in human resource development to irrigation and economic fields of specialization. - Review research strategy to ensure priority for water in research programs and research management. - Improve quality of training provided by irrigation institute to cover modern irrigation systems and rationalization of of water resources in irrigation.
	Irrigation Extension	**Lack of extension in irrigation**	- Lack of qualified and trained staff - Limited information on water uses in irrigation. - Irrigation is not reflected in the structure of extension agencies.	- Priority in training of extension should be for irrigation techniques, methods and skills. - Prepare extension material in irrigation. - Make use of Multi media in irrigation extension. - Conduct research and extension with farmers' participation. - Revise the extension strategy to include developments in extension service provision by different service providers - Revise extension agencies structures to ensure that irrigation is a priority. -