WAMI/RUVU BASIN WATER BOARD
Adaptation Mainstreaming Proposal

DEVELOPMENT OF AN ADAPTIVE MECHANISM TO REDUCE SALT WATER INTRUSION IN COASTAL AQUIFERS SPECIFICALLY TEMEKE MUNICIPAL

1. Background information	
1.1. Proposed Title of the Project	**Development of an adaptive mechanism to reduce salt water intrusion in coastal aquifers specifically Temeke Municipal**
1.2. Project Main and Specific Objectives	**Main objective:** - The main objective of the proposed project is to capacitate the community on reducing salt water intrusion in groundwater aquifer. **Specific objectives:** - To conduct borehole inventory in Temeke Municipal by 2014. - To determine the groundwater status (water level, EC, pH and trace elements) in each borehole by 2014. - To compare the rate of saltwater intrusion between urban and peri urban areas within the study area by 2014. - To assess water demand within a project area by 2015. - Capacity Building on reducing salt water intrusion in groundwater aquifer by 2015.
1.3. Project location	- Temeke Minicipal in Dar es salaam city
1.4. Applicant(s)	Wami/Ruvu Basin Water Board - **Eng. Abdallah Mshana** - **Clarance Paul** - **Rosemary Masikini**

2. Project Summary	
2.1. Theme(s) the project addresses	**Water** Mainstreaming climate change adaptation to local community in Temeke Municipality- Dar es Salaam city
2.2. Intended project duration and Rationale for selecting this duration	The duration of the project is expected to be two years -The project has selecting this one year duration as - Data collection - Data analysis - Data Interpretation - Report writing - Capacity building and Information dissemination

2. Project Summary

2.3. Background information and project rational	The population increase in Temeke Municipal has fostered the increase in water demand to feed the inhabitants. In the other hand the infrastructure development of watersupply from RuvuRiver to community in Temeke is very slow compared to rate of population growth. This results to the community to depend on groundwater as the source of domestic water supply. Thus a lot of boreholes have drilled and the pumping rate has increased tremendous. Increasing groundwater pumping from coastal freshwater wells has been noted cause an increased saltwater intrusion in many coastal areas. This occurs when water extraction drops the level of fresh groundwater, reducing its water pressure and allowing saltwater to flow further inland. Saltwater intrusion is the movement of saline water into freshwater aquifers, which can lead to contamination of drinking water sources and other consequences. Saltwater intrusion may occur naturally to some degree in most coastal aquifers, owing to the hydraulic connection between groundwater and seawater. Because saltwater has a higher mineral content than freshwater, it is denser and has a higher water pressure. As a result, saltwater can push inland beneath the freshwater. Recently, salt water intrusion to coastal aquifers has been linked as indirect impacts of climate change. Sea level rise as an outcome of climate change has boost the issue of sea water intrusion to coastal aquifer since the sea level is highly and thus the coastal aquifer have been highly vulnerable to contamination from sea water. However, there has been only a limited amount of research in this area. Saltwater intrusion is expected to become a more serious issue as our climate changes. Sea-level rise, extreme weather events, coastal erosion, changing precipitation patterns, warmer temperatures, and the potential for increased freshwater demand could all increase the risks of saltwater intrusion. This study will revel the existing of seawater intrusion and the rate of this process by comparing the urban and peri-urban areas. Moreover the project is aming in sharing the information with the community and capacity building to identify ways thats can be used to reduce the saltwater intrusion in aquifers of Temeke Municipal.

2. Project Summary	
2.4. Proposed partner(s)	During the project time some of the partners should be participated: - **GIZ** should participate in borehole inventory to identify the existing borehole as they have already assisted Wami/Ruvu Basin during borehole inventory in Ilala Municipality - **Jica** is proposed to participate in data analysis and interpretation - **iWASH** program is proposed to participate in data dissemination as this program has signed an MoU with the Basin to enhance capacity building to staff and community/water users - **DAWASA** to provide data for the water status in the project area - **Ministry of Lands, Housing and Human settlements developments** for the implementation of the Land policy and/or reforms - **Ministry of Water** for the implementation of the Water policy and/or reform - **Bureau of Statistics** To provide relevant data on the current and future population in the project area - **World bank** To provide data and information from the implementation of Water Sector Development Programme(WSDP)

2. Project Summary	
2.5. Organisations targeted for replication, and strategy to achieve scale	The organization to be included during the project implementation are Temeke Municipal, Ilala Municipal, Kinondoni Municipal and Academic Institutions
2.6. Other organisations working on related issues in the project area, and how you propose to collaborate with them	Wami/Ruvu Basin will cooperate with ARU, TASAF, TCMP on implanting project

2.7. Summary of proposed Goal, Purpose, Expected Outcomes, Outputs and first year activities

Goal *(What is the overall, higher-level objective to which the project/programme will contribute?)*	Reducing salt water intrusion in groundwater aquifer in coastal region of Dar es Salaam.

Purpose (Overall Objective) *(What is the positive developmental change that the project will produce if successful?)*	**Expected outcomes (5 max)** *(What are the expected short and medium term effects of the interventions outputs?)*	**Expected outputs** *(What are the deliverables achieved as a result of implementing project activities?)*	**Illustrative activities** *(Examples of top line activities)*
Borehole inventory conducted in Temeke Municipal	Developed planning on identification of training needs	- 600 Boreholes identified by 2014 (400 from Urban and 200 peri urban)	- Preparation of questionnaire - Identification and interview of households with borehole - Taking coordinate for borehole location
Groundwater status (water level, EC, pH, Temp, ORP and trace elements) in each borehole determined	Develop groundwater amelioration strategies Establish groundwater monitoring network	- 600 samples are expected to be analysed to know the extent of EC, pH,Temp, ORP trace elements and water level by 2014 - Presenting of one report to the stakeholders by 2014	- Collection of samples for water quality analysis - Measure the water level, EC, pH, Temp, ORP of the borehole - Preparation of report for submission to stakeholders

Purpose (Overall Objective) *(What is the positive developmental change that the project will produce if successful?)*	**Expected outcomes (5 max)** *(What are the expected short and medium term effects of the interventions outputs?)*	**Expected outputs** *(What are the deliverables achieved as a result of implementing project activities?)*	**Illustrative activities** *(Examples of top line activities)*
The rate of saltwater intrusion between urban and peri urban areas within the study detrmined		- The result of salinity level from the urban 400 water samples will be obtained by 2014 - The result of salinity level from the peri urban 200 water samples will be obtained by 2014	- Take water sample from urban boreholes and analyse to know the level of salinity of water - Take water sample from peri urban boreholes and analyse to know the level of salinity of water

Purpose (Overall Objective) *(What is the positive developmental change that the project will produce if successful?)*	**Expected outcomes (5 max)** *(What are the expected short and medium term effects of the interventions outputs?)*	**Expected outputs** *(What are the deliverables achieved as a result of implementing project activities?)*	**Illustrative activities** *(Examples of top line activities)*
Water demand within a project area to assessed.	- Protection of water sources to ensure sustainable availability of water - Proper planning and investing on other sources apart from groundwater.	- Amount of existing an future population will be identified by 2015 - Model showing the future water demand of the community by 2015 - Reports on present and future water demand in Temeke Municipality by 2015	- Obtaining current and future population - Computing the existing water consumption in the community - Computing the future water demand in the community - Preparation of reports

Purpose (Overall Objective) *(What is the positive developmental change that the project will produce if successful?)*	**Expected outcomes (5 max)** *(What are the expected short and medium term effects of the interventions outputs?)*	**Expected outputs** *(What are the deliverables achieved as a result of implementing project activities?)*	**Illustrative activities** *(Examples of top line activities)*
Capacity Building on reducing salt water intrusion in groundwater aquifer conducted.	- Reduction of pumping rate on groundwater aquifer - Improve water supply from other sources (Rivers, Rain water harvest)	- Capacity building to 600 households on rainwater harvesting by 2015 - Present one report to the stakeholders meetings by 2015	- Recruiting of Trainee staff - Identify training needs to water users - Conduct training - Prepare report for presentation to stakeholders

2. Project Summary (continued)	
2.8. Rationale for choosing project approach	To overcome the problem of saltwater intrusion resulting from over pumping of groundwater in coastal areas
2.9. Alignment with national/Municipal/City development strategies and key partner priorities	The project has a common goal with the Ministry of Water and Government in general to implement MKUKUTA strategy by 2025. In aligns with the key partners strategy (eg NGOs) as they have the same strategy with the Ministry of Water
2.10. Fit with Country/Municipal/City strategy and links to existing projects or programmes	The project will focus on limiting the number of individual borehole as thus will insist in drilling community boreholes to surfice the demand through water supply from the relevant authority (DAWASA/DAWASCO). Furthermore the government has initiated the Big Result Now (BRN) campaign to increase efficiency on planned activities from LGA's to National level in which water supply projects are among them.
2.11. Programme assumptions	The rapid increase in population will results to high pumping of groundwater due increasing of water demand and individual or household drilled borehole as a result of inadequate water supply services, thus leads to saltwater intrusion
2.12. Cross-cutting issues	The project will ensure the availability of adequate safe and clean drinking water Also the project will address gender issues create awareness about HIV Aids during interview
2.13. Geographical project area and rationale for selecting this area	Temeke District is the southernmost of three districts in Dar es Salaam, Tanzania with an area of 786.5 km² and population of 768,451 (2002 Census). The Indian Ocean is located to the East and to the South and West is the Coastal region of Tanzania. The project area was selected as it will bring clear picture on the saltwater intrusion in the urban areas compared to periurban areas.

2. Project Summary (continued)	
2.14. Activities that will be carried out to address the objectives of the project -	Activities: **To conduct borehole inventory in Temeke Municipal 2014** - Preparation of questionnaire - Identification and interview of households owning borehole - Taking coordinate for borehole location **To determine the groundwater status (water level, EC, pH,Temp, ORP and trace elements) in each borehole 2014** - Collection of samples for water quality analysis - Measure the water level, EC, pH of the borehole - Preparation of report for submission to stakeholders **To compare the rate of saltwater intrusion between urban and peri urban areas within the study area 2014.** - Take water sample from urban boreholes and analyse to know the level of water salinity - Take water sample from peri urban boreholes and analyse to know the level of water salinity **To assess water demand within a project area by 2015.** - Obtaining current and future population - Computing the existing water consumption in the community - Computing the future water demand in the community - Preparation of reports **Capacity Building on sea water intrusion in groundwater aquifer by 2015.** - Recruiting of Trainee staff - Identify training needs to water users - Conduct training - Prepare report for presentation to stakeholders

3. Project Proposal Development & Required Resources

3.1. Financial and technical resource requirements

Financial Resources

S/N	Activity	Estimated Cost
Year 1 (2014)	To conduct borehole inventory in Temeke Municipal	USD 90,000
	To determine the groundwater status (water level, EC, pH, Temp, ORP and trace elements) in each borehole	USD 100,000
Year 2 (2015)	To assess water demand within a project area.	USD 50,000
	Capacity Building on sea water intrusion in groundwater aquifer	USD 50,000
Grand Total		**USD 290,000**

Technical Resources requirements

- Hydrogeologist 3
- Hydrogeologist Tech 3
- Evironmental Expert 3
- Hydrologist 3
- Hydrology Tech 3
- Chemist 2
- Community Development 3

3.2. Partner resources available

JICA study team -Provide shapefile of the project area

The Wami/Ruvu Basin Water Board will facilitate one vehicle during project period together with available borehole data

Higher Learning Institution(ARU) will facilitate project implementation by supporting the project through their expertise

4. Resource Mobilisation & Sustainability Potential	
4.1. Potential to raise funds for this project.	- ***The Ministry of Water*** - ***iWASH*** *Programme* ***- GIZ*** *Based on input from funding teams and your own assessment of in-country fundraising opportunities, please give details of any potential donors*
4.2. Technical resources required for successful implementation	*The resources will provided by the Basin Water Board as follows:* - Hydrogeologist 3 - Hydrogeologist Tech 3 - Evironmental Expert 3 - Hydrologist 3 - Hydrology Tech 3 - Chemist 2 - Community Development 2
4.3 Planning for sustainability	After completion of the project the data obtained will be used by The Wami/Ruvu Basin Water Board and Temeke Municipal as baseline data for developing and allocation of Water Resources leading the Water Supply Authority(DAWASA/DAWASCO) to the proper location for borehole drilling for community water supply

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