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ATHENA INFONOMICS

CGIAR RESEARCH PROGRAM ON Water, Land and Ecosystems

LED BY: IWMI International Water Management Institute

SWOT ANALYSIS REPORT

	Helpful to achieving the objective	Harmful to achieving the objective
Internal origin (attributes of the organization)	Strengths S	Weaknesses W
External origin (attributes of the environment)	Opportunities O	Threats T

INTEGRATED RURAL URBAN WATER MANAGEMENT FOR CLIMATE BASED ADAPTATIONS IN INDIAN CITIES (IAdapt)

SWOT Analysis Report

Proposal Code:	**Proposal # A-69683**
Submitted to:	International Development Research Centre (IDRC) Canada
Submitted by:	ICLEI South Asia
Project Consortium:	ICLEI South Asia (Lead Member) Athena Infonomics LLC International Water Management Institute (IWMI) Indian Institute of Technology, Madras (IIT M)

Introduction

SWOT analysis (or SWOT matrix), an acronym for *strengths*, *weaknesses*, *opportunities*, and *threats*, can be used to measure the effectiveness and requirement of a project. It helps to identify the internal and external factors that are favorable and unfavorable to achieve the project objectives. The degree to which the internal environment of the project matches with the external environment is expressed by the concept of strategic fit.

- Strengths: characteristics that are advantagoes give it an advantage over others
- Weaknesses: characteristics of the project at a disadvantage relative to others
- Opportunities: elements in the environment that the project could exploit to its advantage
- Threats: elements in the environment that could cause trouble for the project

Figure 1: SWOT Analysis Method

Identification of SWOTs is important because they can inform later steps in planning to achieve the objective. SWOT analysis was used to identify the micro-catchment around each city where detailed project activities will be undertaken. The results drawn from the focus group discussions, key personnel interviews, inputs from officials and secondary data collected were used to carry out the SWOT analysis (refer Figure 2). The parameters that were used for the analysis include:

- Urban rural integration
- Biodiversity
- Pollution
- Regional significance of water bodies
- Agriculture and Economy
- Attitude of the community

- Related ongoing work

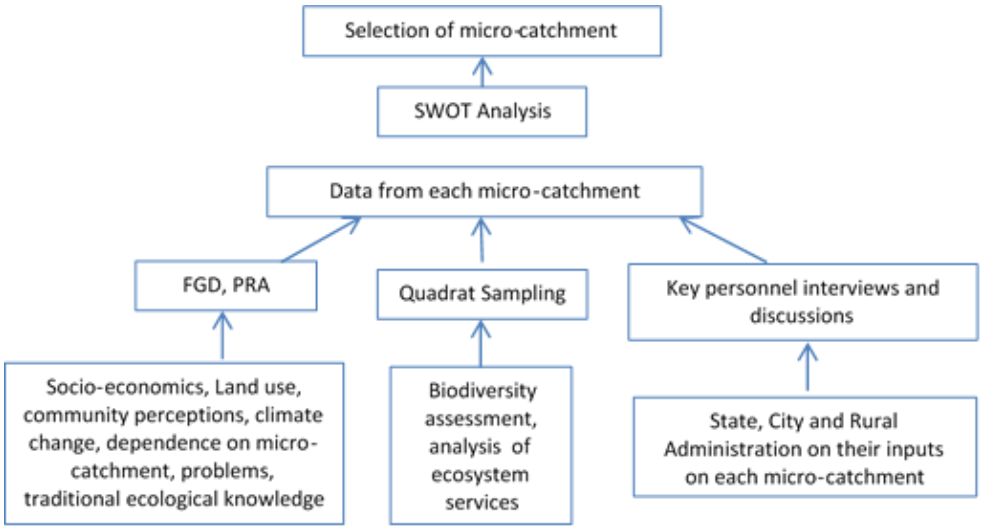

Figure 2: Inputs from various activities which were used for the SWOT analysis

SWOT Analysis of Urban-Rural Micro catchments in Solapur

Micro-catchment S1- Bale (within city), Kawathe, Degaon (within city), Gulwanchi	
Strength	Weakness
• Micro-catchment includes largest sewage treatment plant of Solapur Municipal Corporation. • Community has undertaken water conservation works like nallah (stream) widening, ground water recharge pits under various schemes by government. • Micro-catchment is close to Great Indian Bustard Sanctuary. • Highest Shannon Diversity.	• Untreated sewage discharged by Degaon stream and underground drainage is being used to irrigate sugarcane crop. • Issues like increased hardness of the ground water, smell, mosquito and sometimes colour in the water are very common in the villages in the micro-catchment. • Incomplete coverage of septic tanks and drainage system in the villages in the micro-catchment. • Villages in the micro-catchment close to the industrial belt are affected by pollution • High incidences of human-wildlife conflicts
Opportunity	Threat
• Planning is in progress to treat the wastewater till tertiary level in the sewage treatment plant and reuse for industrial purposes at National Thermal Power Corporation's plant near Solapur, which will reduce stress on Ujani reservoir and increase water share for Solapur city.	• High levels of pollution in the water bodies can see further increase due to industries and sewage from villages. • Stress of rapid development and ignorance of villagers resulted into de-notification of some areas from wild life sanctuary

Strength 4	Weakness -5	Total -1
Opportunity 1	Threat -2	Total -1
Overall		-2

Micro-catchment S2 - Hotagi lake - Hotgi-Sawathed, Yatnal, Kumbhari	
Strength	Weakness
• Micro-catchment has second prominent lake in the region, serving for drinking water, irrigation and industrial uses. • Major sugarcane producing region and thus high dependency on the water supply from the lake. • Community has initiated water conservation projects like constructing	• High levels of pollution in lake, leading to loss of fish and related livelihoods. • Incomplete coverage of septic tanks and drainage system in the villages in the micro-catchment. • Discharge of untreated sewage and industrial wastewater have polluted nearby water bodies in the micro-catchment.

weirs to recharge ground water under various schemes of government and CSR activities of industries	• Agriculture area is reducing due to unavailability of water for irrigation. • Lowest Shannon Diversity
Opportunity	Threat
• Traditional practices of worship and protection of nature can be revived. • Industry and ecology co-existence can be retrieved	• High levels of pollution in the lake (Oil on water surface, odour and sometimes colour are prominent characteristics noted by community members) can see further increase due to pollution. • Villages in the micro-catchment are already facing water stress, which will further increase due to climate change • Politically and administratively sensitive area because of industries (sugar mill) • Rapidly developing micro-catchment affecting ground water quality and quantity

Strength 3	Weakness -5	Total -2
Opportunity 2	Threat -4	Total -2
Overall		-4

Micro-catchment S3 – Ekrukh lake - Tale hipparga, Haglur, Ekrukh, Tartgaon, 70% area of core city	
Strength	Weakness
• Close proximity of Ekrukh - major lake in the micro-catchment to city • Solapur Municipal Corporation and 10 more villages are sharing this water resource. • Community highly dependent on water from Ekrukh lake for their agricultural fields. • Community well aware of need for conservation and taking initiatives for plantation, water conservation projects like constructing weirs to recharge ground water, recharge pits through various state level programs. • City government also wants this micro-catchment to be focused on to maintain quality and quantity at intake • Regional stakeholders are interested	• Due to siltation over the period and inadequate rainfall, capacity of Ekrukh lake has reached nearly half of its original. • Unavailability of wastewater treatment plant in the neighboring villages leads to pollution of the lake due to gray water and septic tank discharge. • Solid waste treatment plant of the Solapur Municipal Corporation is defunct and leachate from this place might be adding pollution of the lake. • Severe from fertilizers and sewage discharged through runoff. Siltation and pollution may lead to eutrophication problem.

(ongoing lake conservation activities could be strengthened) • Relatively high Shannon Diversity. • Highest species abundance over time, as predicted through Rarefaction curve. • Micro-catchment also holds Sidhheashwar lake – an oldest lake of a region and pilgrim location in addition to Kambar lake - facing eutrophication issue.	
Opportunity	Threat
• Traditional culture of co-existence with nature can be revived. • Being a regional resource; efforts and initiatives would reach out to maximum population and set an example	• Further siltation and decreased rainfall due to climate change can lead to reduction in water supply from Ekrukh lake and increase stress on the micro-catchment.

Strength 9	Weakness -4	Total 5
Opportunity 2	Threat -1	Total 1
Overall		6

Micro-catchment S4 – Pakani, Shivani, Tirhe	
Strength	Weakness
• Micro-catchment harbours agriculture zones and industries. • Micro-catchment includes water treatment plant (80 MLD) of Solapur Municipal corporation on Ujani water supply scheme • Community has undertaken water conservation works like construction of weirs, widening of streams, recharge of open well, recharge pits and plantations various schemes by government and NGOs.	• Sinna river, a river in this micro-catchment, used to be a perennial river but construction of a dam, industrial development and wastewater discharge has transformed it to a seasonal water resources. • Industrial development, wastewater discharge and increased number of consumers resulted in pollution and stress on the available water resources. • Wastewater from industrial areas resulted in colour and odour problems in the agricultural fields in the micro-catchment.
Opportunity	Threat
• Close proximity to National Highway. • Industrial co-operation for runoff management can be acquired to	• Increased industrial and infrastructural development along with climate change will put additional stress on

reduce pollution of water resources	the water resource in future.

Strength 3	Weakness -3	Total 0
Opportunity 1	Threat -1	Total 0
Overall		0

SWOT Analysis of Urban-Rural Micro catchments in Vijayawada

<table>
<tr><td colspan="2">Micro catchment V1:</td></tr>
<tr><td>Strengths</td><td>Weaknesses</td></tr>
<tr><td>• In the rural areas, agriculture is the dominant occupation with many practicing fishing as another means of livelihood
• Water demand for irrigation is met through the Pattiseema project</td><td>• Limited drinking water supply in few areas of the micro-catchment including hilly areas
• Irrigation water availability from Tummalapalem lift irrigation is dependent on upland condition
• Poor drinking water quality within the micro-catchment compels households to purchase drinking water from RO plants
• The storm water drains are open and mostly blocked causing bad odour, flooding of waste water and rampant breeding of mosquitos often leading to outbreak of vector-borne diseases in some of the villages/wards in the micro-catchment
• Villages in the micro-catchment have had crop losses due to cyclone impact
• The urban area of the micro-catchment is currently poorly connected by UGD network
• Most urban households/apartments have a private borewell connection indicating disappointment over the current water supply thereby causing over exploitation of ground water</td></tr>
<tr><td>Opportunities</td><td>Threats</td></tr>
<tr><td>• The larger community is aware about the metrics of climate change and its likely impacts
• The city is being connected by storm water drains and proposed to be connected by underground sewage drains
• Many sewage pumping stations have been proposed in the urban area of the micro-catchment
• A barrage is being proposed near Vijayawada to allow for more storage (prevent discharge of surplus water from Prakasham barrage to the sea)</td><td>• There is no conscious effort by the government/ community to recharge the ground water
• Not every official agrees with climate change as a phenomenon which could bring about severe harmful impacts if climate resilience and adaptation is not considered. There is very less co-ordination observed among departments in the water and sanitation sector
• Budgetary constraint is preventing the ULB from constructing more STPs. The proposed no. of treatment plants is not enough to hold the capacity of</td></tr>
</table>

and to prevent salinity creep.	Vijayawada's sewage and storm water in the future years

Strength 2	Weakness -7	Total -5
Opportunity 4	Threat -3	Total 1
Overall		-4

Micro catchment V2:	
Strengths	Weaknesses
• In the rural areas, the micro-catchment is observed to be harvesting multiple crops • Water demand for irrigation is met through the *Pattiseema* project • Rain water harvesting irrigation tanks exist in few rural areas of the micro-catchment • In return for utilising the old quarry area in one of the villages for the city's solid waste dumping, the village is allowed to procure drinking water from the adjacent ward which is supplied water by VMC.	• Due to shortage of surface water, irrigation canals are filled only during the Kharif season. This shortage of surface water for irrigation leads to overexploitation of ground water by farmers. Due to this over exploitation, there is drop in ground water level rendering to higher costs in pumping water from a deeper level to meet irrigation needs • Most urban households/apartments have a private borewell connection indicating disappointment over the current water supply thereby causing over exploitation of ground water. They are compelled to rely on tankers during summers • A village's households who go to the adjacent ward to collect drinking water tend to have conflicts during collection. • Post *Pattiseema* project, the water quality has become unfit for drinking thereby creating a shift towards purchasing RO drinking by households who can afford to. • Losses during transmission of water supply in the urban areas is observed to cause reduction in water supply quantity. • During rains, flooding of storm water and irrigation canals occur in several areas of the micro-catchment. • The drains are open and mostly blocked causing rampant breeding of mosquitos often leading to outbreak of vector-borne diseases in some of the

	villages/wards in the micro-catchment • Occurrence of skin diseases have also been reported due to poor quality of water used for domestic purposes. • The urban area of the micro-catchment is poorly connected by UGD network
Opportunities	Threats
• The city is being connected by storm water drains and proposed to be connected by underground sewage drains • There is a proposed remediation of all solid waste dumping grounds where the land may be converted into an open space thus creating a natural aquifer for ground water recharge. • There is a proposal to lay new water supply lines reducing loss in transmission in some urban areas of the micro-catchment • The larger community is aware about the metrics of climate change and its likely impacts • A barrage is being proposed near Vijayawada to allow for more storage (prevent discharge of surplus water from Prakasham barrage to the sea) and to prevent salinity creep.	• There is no conscious effort by the government/ community to recharge the ground water • Not every official agrees with climate change as a phenomenon which could bring about severe harmful impacts if climate resilience and adaptation is not considered. There is very less co-ordination observed among departments in the water and sanitation sector • The newly constructed storm water drains will be diverted to the three irrigation canals causing even more water pollution. Eluru, Bandar and Ryves canals are being used by rural communities for domestic, irrigation purposes. The polluted irrigation canals, after serving their purpose, is diverted into sea without any treatment • Budgetary constraint is preventing the ULB from constructing more STPs. The proposed no. of treatment plants is not enough to hold the capacity of Vijayawada's sewage and storm water in the future years

Strength 4	Weakness -9	Total -5
Opportunity 5	Threat -4	Total 1
Overall		-4

Micro catchment V3:	
Strengths	Weaknesses
• In the rural areas, agriculture is the dominant occupation • Government has subsidised RO drinking water for rural areas through	• Due to shortage of surface water, irrigation canals are filled only during the Kharif season. This shortage of surface water for irrigation leads to

the NTR Sujala Scheme • The micro-catchment has a significantly high Shannon diversity and high species abundance. • Agriculture is practiced by few households living in the urban areas due to their proximity to peri-urban agricultural lands and irrigation canals • There is a fair amount of UGD coverage in the urban area of the micro-catchment • There are 4 Sewage Treatment Plant (STP) in the rural and urban areas of the micro-catchment	overexploitation of ground water by farmers. Due to this over exploitation, there is drop in ground water level rendering to higher costs in pumping water from a deeper level to meet irrigation needs. • The drains are open and mostly blocked causing rampant breeding of mosquitos often leading to outbreak of vector-borne diseases in some of the villages/wards in the micro-catchment • Flooding of waste water is perceived to be polluting the ground water on which households depend for their domestic and drinking water use. • Poor drinking water quality from ground water is creating a shift towards purchasing RO drinking by households who can afford to. • Climate induced heat waves has led to few deaths in the rural areas of the micro-catchment • Sewage and industrial waste in the urban areas of the micro-catchment is released into Ryves, Eluru, Bandar canals – the main source of water for irrigation and its water is also used for household purposes by few locals. • Villages in the micro-catchment have had crop losses due to cyclone impact • There are households in the micro-catchments who do not have an individual water connection • Most urban households/apartments have a private borewell connection indicating disappointment over the current water supply thereby causing over exploitation of ground water
Opportunities	Threats
• There is a proposed capacity augmentation of the Sewage Treatment Plant (STP) in the rural area of the micro-catchment • The city is being connected by storm water drains and proposed to be connected by underground sewage drains	• There is no conscious effort by the government/ community to recharge the ground water • Not every official agrees with climate change as a phenomenon which could bring about severe harmful impacts if climate resilience and adaptation is not considered. There is very less co-

• There is a proposal to lay new water supply lines reducing loss in transmission in some urban areas of the micro-catchment • The larger community is aware about the metrics of climate change and its likely impacts • Many sewage pumping stations have been proposed in the urban area of the micro-catchment • A barrage is being proposed near Vijayawada to allow for more storage (prevent discharge of surplus water from Prakasham barrage to the sea) and to prevent salinity creep.	ordination observed among departments in the water and sanitation sector • The newly constructed storm water drains will be diverted to the three irrigation canals causing even more water pollution. Eluru, Bandar and Ryves canals are being used by rural communities for domestic, irrigation purposes. The polluted irrigation canals, after serving their purpose, is diverted into sea without any treatment • Budgetary constraint is preventing the ULB from constructing more STPs. The proposed no. of treatment plants is not enough to hold the capacity of Vijayawada's sewage and storm water in the future years

Strength 6	Weakness -9	Total -3
Opportunity 6	Threat -4	Total 2
Overall		-1

Micro catchment V4:	
Strengths	Weaknesses
• In the rural areas, agriculture is the dominant occupation with many practicing fishing as another means of livelihood • The micro-catchment has is observed to have the highest Shannon diversity among all micro-catchments • There are 2 Sewage Treatment Plants (STP) in the industrial estate of the city • A barrage is being proposed near Vijayawada to allow for more storage (prevent discharge of surplus water from Prakasham barrage to the sea) and to prevent salinity creep.	• Industrial pollution from Jawaharlal Nehru Autonagar Industrial Estate is discharged into Eluru and Ryves irrigation canal causing bad odour for residents in the micro-catchment as well affecting the agriculture irrigated by the canal water. • During rains, there is an occurrence of flooding of the canals causing skin diseases and other health concerns when residents come in contact with the polluted water. • The drains are open and mostly blocked causing rampant breeding of mosquitos often leading to outbreak of vector-borne diseases in some of the villages/wards in the micro-catchment • Poor drinking water quality within the micro-catchment compels households to purchase drinking water from RO

	plants. • In the rural area, where the dependency for drinking and domestic water is from ground water, health concerns have been reported. • The urban area of the micro-catchment is poorly connected by UGD network • Most urban households/apartments have a private borewell connection indicating disappointment over the current water supply thereby causing over exploitation of ground water
Opportunities	Threats
• The larger community is aware about the metrics of climate change and its likely impacts • The city is being connected by storm water drains and proposed to be connected by underground sewage drains • Few sewage pumping stations have been proposed in the urban area of the micro-catchment	• There is no conscious effort by the government/ community to recharge the ground water • Not every official agrees with climate change as a phenomenon which could bring about severe harmful impacts if climate resilience and adaptation is not considered. There is very less co-ordination observed among departments in the water and sanitation sector • The newly constructed storm water drains will be diverted to the three irrigation canals causing even more water pollution. Eluru, Bandar and Ryves canals are being used by rural communities for domestic, irrigation purposes. • Budgetary constraint is preventing the ULB from constructing more STPs. The proposed no. of treatment plants is not enough to hold the capacity of Vijayawada's sewage and storm water in the future years • The polluted irrigation canals, after serving their purpose, is diverted into sea without any treatment

Strength 4	Weakness -7	Total -3
Opportunity 3	Threat -5	Total -2
Overall		-5