

Agricultural Water Management

Inventory and Characterization of Potentials and Management of Wetlands in North Shewa

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Abstract

Formal survey was conducted in north shewa zone to investigate the extent, potentials, and management of wetlands there by characterizing them for proper utilization and management. The weredas covered by this study were Angolela Tera, Ansokiya Gemza, Basona Werana, Asagirt, Efratana Gidim, Ensarona Wayu, Gerakeya, Hagemariam, Kewet, Lalomama, Merhabete, Mida Weromo, Mojana Wedera and Tarmaber. Wetlands are areas of marsh, fen (deep marshes), peat lands or waters (containing decomposed and partly decomposed organic matter), whether natural or artificial, permanent or temporary, with water static or flowing, fresh, brackish or salty, including areas of marine water with the depth of which at low tide dose not exceed six meters. Most of these landforms in this zone were temporary wetlands usually used as grazing areas and crop and tree production when dry; and animal watering when wet. More than 2000 hectares of wetlands have been identified during the survey. However, the coverage was estimated to be about 10510 ha from topographic maps with 1:50000 scale. The current purposes of the surveyed wetlands by percent of responses was for grazing (31.82%), animal drinking (15.15%), source of drinking water for human being (9.09%), hay source (13.64%), vegetable production (16.67%), and tree plantation and nursery (10.61%). The wetlands are underutilized and threatened due to unsafe grazing, ground water exploitation, pollution, sedimentation, and inappropriate cultivation. There was very little awareness by the farmers as to the intensive utilization of wetlands and proper management practices. As a result, some flora (such as Fila, Dodot, Mush, Ablalit, Amkiela and Shenet) and fauna (such as Shurubit, Yewuhaenat and frog) have been extinct from some wetlands.

Few numbers of wetlands were covered by the formal survey and a wider range of research remains on the investigation and identification of potential management and effective utilization alternatives of each resource particularly to those wetlands which have large coverage and potentials. Wetlands found in Angolela Tera, Ensarona Wayu and Antsokia Gemza should be given special consideration for their potential utilization. Community education and formulation of bylaws for the protection, utilization, and management of wetlands are immediate actions to be taken.

Key words: biodiversity, North Shewa, proper management and utilization, Wetland

Introduction

Wetlands and water bodies are key resources for rural areas to fall back during extended dry seasons. However, these resources are under pressure due to severe degradation in the up stream catchments and the subsequent heavy load of sediment and solute transport into the system. As a result, quality of water (usually used by rural households) and other fauna and flora (last reserves) could be threatened. On the other hand, with the increasing population pressure and diminishing land size, inappropriate use of these resources is obvious. This demands special attentions to these resources.

According to the Ramsar Convention 1971, wetlands are defined as "Areas of marsh, fen, peat lands or water whether natural or artificial, permanent or temporary with static or flowing, fresh, brackish or salt, concluding areas of marine water the depth of which at low tide does not exceed six meters" (Stuip et al. 2002). This definition is obviously very broad and includes even lakes and rivers. According to humanity development library wetlands are unique transient ecosystems,

falling between true aquatic systems on one hand and terrestrial systems on the other. The water table is usually at or near surface, or the land is covered by shallow water.

Wetlands have essential functions, uses, and values to the people in the area. First, it serves for income generation by selling plant and animal sources, by production of crops and raising animals through improved management. Second, it serves for biodiversity conservation through protection that creates sustainable eco-system and tourism in the area. Third, it helps to arrest floods, recharge ground water, improve water qualities, deposit transported sediments and nutrients, and have a vital role in the hydrologic cycle.

The coverage and distribution of wetlands is indicated on topographic maps. On the map it is indicated as swamps or marsh and areas subject to inundation. Using topographic maps, the coverage of wetlands is estimated to be 1.14 % of the land mass in Ethiopia (Leykun, 2003). It is also assumed 3.7 % of the total in Amhara region (Abye, 2001). However, as it was checked during the survey, all wetlands are not indicated on the map. This implies the coverage and distribution of wetlands is yet unknown in the region as well as in specific areas. It needs, therefore, verification at ground.

Wetlands are often situated in the valley bottoms where rivers emerged from uplands surrounded by mountains and plateaus are flooded. Formation of wetlands due to water logging is also commonly observed in the flat lands where Vertisols have extensive coverage.

Currently the utilization and management of wetlands vary from place to place. This happens due to the variation in population pressure, number of livestock population, the factors/conditions limiting crop production, and the extent of specific constraints of the community. Wetlands now are mainly utilized for pasture, vegetable production through irrigation, source of water for human and animal drinking, hay production, and tree planting and nursery. Because of the improper management and utilization, many of the wetlands show land slide and gulying due to livestock trampling when grazed during wet season, converted for cultivation, dried due to overexploitation of water sources, and silted up by sediments from untreated uplands. Eventually these processes lead to environmental impact which can not be easily measurable; it ranges from destabilized eco-system in the surrounding up to the drastic reduction of ground water as well as loss of biodiversity (flora and fauna). Subsequently, this will have environmental consequences and affect negatively the livelihood of the people depending on them. The study aimed at exploring the current utilization and management, potentials, and threats of wetlands in the study area. It also attempted to estimate the coverage of wetlands in the surveyed villages.

Materials and Methods

The surveyed woredas were selected based on their representativeness of the three (Dega, Weyna Dega, Kolla) agro-ecologies. About fourteen woredas were included in the survey. The survey has been conducted in Angolela Tera, Antsokia Gemza, Asagirt, Basona Worana, Efrata Gidim, Ensaro Wayu, Gera Keya, Kewet, Hagere Mariam, Lalo Mama, Merhabete, Mida Weromo, Mojana Wedera, and Tarmaber. Since the definition of wetlands is very broad, which includes even rivers and lakes as far as their depth is less than 6 meters, in our study we tried to restrict the concept of the wetlands only to permanent or temporary marshy areas. The marshy areas usually have a water table at or near the earth surface or these lands covered temporarily by shallow water often during the rainy season.

Sites were selected through preliminary informal survey. Collection of primary data was done through formal survey. The survey was made in the form of focus group discussions and interviews with semi-structured questioners including transect walks. Detailed secondary data have been collected and reviewed which were available from different institutions. This used to verify the data provided by farmers. Primarily satellite images were intended to estimate the

coverage and distribution of wetlands. However, we were not able to get the images for this purpose. Instead, the area of each of the identified wetlands was simply estimated by asking the farmers in the surveyed villages and agriculture office experts. Topographic map at a scale of 1:50,000 have been used to estimate the area of the wetlands for comparison.

Data such as names, estimated area, current purpose and utilization, owner, future intention, threats, available and non-existence flora and fauna species, formation of wetlands, and rivers passing through and emerging from were collected. These data were subjected to descriptive statistics to explore the current overall attention given, utilization and risk management of wetlands.

Results and Discussion

Perception of the word wetland is somewhat vague for the farmers and subject matter specialists. Traditionally the sense of the word in the surveyed woredas is marshy areas were a special grass known as filla grows. Lands affected by water logging during the main rainy season are also considered as wetlands. This perception is in the minds of the majority of the population.

Out of the 14 woredas surveyed, wetlands have been identified in 11 woredas. Most of the wetlands are located in the highlands where there is water logging problem of Vertisols. Wetlands situated in the lowlands are formed due to flooding of rivers. Most of these landforms in this zone are temporary wetlands usually used as grazing areas when dry. These lands are communally and privately owned with a share of 56.25 % and 43.75 %, respectively. Recently, the communal lands are distributed to individual households for grazing purpose. Private investors are showing interest on such lands for different purposes. For instance, in *Efratana Gidim* woreda, wetland by the name *Alala* is leased out to an investor.

An estimated area of about 2027 ha of wetlands has been identified in the survey. The area of wetlands estimated by farmers and experts are highly underestimated when compared with the topographic map data. The coverage and distribution of wetlands were checked using 1:50 000 scale topo map. However, some of the wetlands identified in the survey are not indicated on the map and vice versa. The majority of the wetlands indicated on the map do not have similar names with the name provided by farmers and hence was difficult to verify its area. More likely, farmers considered and provided those wetlands which are utilized for individual households and for communal purpose in their villages. This might be the reason why many of the wetlands are small. The total coverage of wetlands indicated on the topo map is about 10510 ha without considering wetlands in Antsokia Gemeza and Hagre Mariam woredas. By considering wetlands around Kemissie the total area of wetlands is about 14872.50 ha. While the area estimated by farmers during the survey is about 2027 ha (Tables 1 and 2). This large discrepancy might be due to the estimation made by farmers. Even they did not estimate the area for some of the wetlands. Thus, the extent as well as distribution of wetlands indicated on the map need to be further verified using an image data. Moreover, recently extensive coverage of land is abandoned due to water logging, sedimentation and to some extent salinity problems.

Table 1: An estimated area (ha) of wetlands found in each wereda

Woreda	Got Where The Wetland Is Found	Name of wetland	Estimated Area, ha	Area from topo map, ha
Angolela Tera	Asa Bahir	Fwafwatie	30.00	407.5
	Asa Bahir	Enchuni dodoti/Kacha qola wenz	60.00	
	Boren	Kes meret	24.00	
	Chefanen	Jelisa/sanka	22.00	
	Cheki	Dodotina abadira	100.00	
	Gendewera	Derie meda	20.00	
	Safij	Islam mekaber	10.00	
	Totosie	Sanka	375.00	
Antsokia Gemza	Bulelie and Selama	Mekedesa cheffa	300.00	
	Atko	Atko Cheffa	300.00	
	Harbu Welde	Harbu Welde	300.00	
	Fiecho	Fiecho	50.00	
	Chekechek	Chekechek	20.00	
	Getem	Getem	50.00	
Basona Werana	Abamotie	Legeyida (Workie)	30.00	147.5
	Aloberet	Aloberet	30.00	420.00
	Berie Ager	Dibunu	-	
	Berie Ager	Arsi amba	-	40
	Debele	Abisa ager	-	
	Debele	Tora mesk	120.00	135
	Faji	Milki	-	
	Faji	Tach faji	-	
	Genet	Genet	-	
Efratana Gidim	Alala	Alala	-	165
	Hora Chefie	Hora chefie	50-60.00	
	Gadilo-mehal wenz	Gadilo	2.00	
	Kori Meda	Kori Meda	5.00	
	Kechen Meda-Selelona	Kechen Meda	1.00	
	Negieso-Jewuha	Negieso	3.00	65
	Metkoriya-Ambober	Metkoriya	1.00	
Ensarona Wayu Gera Keya	Agemso	Fincha	0.05	
	Angergera	Jer	1.00	
	Armongheorgis	Abaramesk	4.00	
	Beyu	Wulcho	0.05	
	Bodanakurie	Bera	1.00	
	Delie Amba	Keitiema	0.50	
	Kembo	Cheffa mesk	0.75	
	Gracha	Abayrobana cheffa	1.00	
	Kechinmesk	Kechinmesk	0.03	
	Ken	Lehumesk	1.00	
	Layignaw Keyet	Bera	0.75	
	Mesko	Shemanie wenz	0.50	
	Qeiq	Seka mesk	1.50	
	Robie Wenz	Robie wenz	0.85	
	Romiena Sakela	Deriena wabe chetu, dalina,	0.50	632.5
	Salayish	Shinkurtwoha /cheffa/	1.00	
	Seliela	Shele	0.25	25
	Sorni	Sorni	0.75	
	Wezed	Wezed	3.00	
	Mesel Mariam	Mesel Mariam	10.00	
	Gragh	Gragh	3.00	
	Furkuta	Furkuta	3.00	
	Alo Bahir	Alo Bahir	4.00	60
	Gumer	Gumer	3.00	
	Negasi Amba	Negasi Amba	3.00	
	Gedi	Gedi	3.00	
Hagre Mariam-Kesem	Enjorer	Enjorer	1.00	
	Abodansie,	Araba,	0.83	
	Shola Agebe	Shola Gebeya	0.03	
	Gebrial Agebe	Yelchet	0.01	
	Kidus Ge/washa	Kesem	1.00	
	Tach Sechat	Dindit	0.13	
	Zolazenbaba	Anbo	0.03	

Table 1: (Contd.)

Woreda	Got Where The Wetland Is Found	Name of wetland	Estimated Area, ha	Area from topo map, ha
Kewet	Agam Ber/	Angay Tsebel	6.00	
	Agam Ber/ Charie	Felwuha	4.00	
	Yelen	Hora	5.00	
	Yelen Wacho	Tikur wuha	3.00	
	Zuti	Prison	5.00	
Lalo Mama	Astoya	Astoya	0.125	30
	Ago	Sewaro	0.25	
	Gurmign	Koso	0.25	12.5
	Kebele 06 Dasa	Yecha gons	0.15	
	Kebele 07	Angewa	15.00	
	Kebele 10	Agwat wuha	-	
	Kebele 10	Wemso	>0.50	
	Kebele 14/Tarma	Shema matebiya	8.00	
	Kebele 18/Tama Wenz	Menchfcheffit	-	
	Kebele 20	1.keyet got/weyra meder	0.0652	
	Kebele 20	2.Afker	-	
	Kebele 22	TirTra	0.0600	
	Kebele 25 Shayisho	Dot	-	
Tarmaber	Armania	Armania	1.00	
	Gorji	Around nursery site	20.00	
	Wanza Beret	Road side	4.00	
Merhabetic	Tembeito	Bira	1.00	
	Makur kola	Bira	1.00	
Total Estimated Area of wetlands surveyed			2027.91	

Currently farmers utilize the wetlands for grazing (31.82 %), vegetable and crop production during dry and belg season (16.67 %), animal drinking (15.15 %), hay source (13.64 %), tree plantation and nursery (10.61 %), and source of drinking water for human being (9.09 %). In addition wetlands are sources of biodiversity like different grass species used for roof thatching, and income sources for the poor farmers. As it was mentioned, wetlands are mainly meant for grazing by which degradation and pollution has come into effect. The neighboring residents provide a very limited attention and protection. In some places, they do not even know what should be done to keep these ecosystems from extinction. Farmers' opinion whether or not risky management practices were being undertaken by the nearby residents was collected. Farmers responded 65.5 % none, 20.7 % of tree planting that reduce the previous condition and coverage of wetlands, 10.3 % rising demand of cultivation land, and 3.5 % sedimentation. However, it is observed that compaction, land slide and gully formation due to excessive cattle grazing in the rainy season in water logged areas are of serious concern. Sedimentation due to excessive soil erosion and opencast mining, over-exploitation of ground water, cultivation for tree plantation, and minor pollution are mainly the factors that threaten wetlands in the study area. Under the current utilization, the ecosystem is highly affected because of unsustainable management of the system. Though there are such poor management practices, farmers and experts do not realize the negative impacts of these activities on the overall ecosystem.

Table 2: Area and location coordinates of wetlands indicated on the topographic map

Wetland Name/Local Area	Woreda	Map Sheet	Map area, cm ²	Actual area, ha	Approximate location coordinates			
					Y1-proj	Y2-proj	X1-proj	X2-proj
Asa Bahir	Angolelana Tera	0939D1	16.30	407.50	104000	104700	555000	559000
Tengego+Seriti+	Angolelana Tera	0939A4	153.00	3825.0	9°30'	105900	542000	554000
Aloberet	Basona Werana	0939A4	16.80	420.00	106200	106700	547000	551000
Arsi Amba or	Basona Worana	0939B3	1.60	40.00	106500	106700	572000	574000
Debele &	Basona Worana	0939B3	5.40	135.00	106100	106400	571000	575000
Dinbaro +Bakelo	Basona Worana	0939B3	19.30	482.50	107000	107600	566000	572000
Worke	Basona Worana	0939B1	5.90	147.50	9°45'	108000	567000	572000
Alela and Menter	Efratana Gidem	1039B3	6.60	165.00	113700	114000	601000	607000
Birtulom	Efratana Gidem	1039B3	2.70	67.50	114100	114400	600000	603000
Golecha Amba +	Efratana Gidem	1039B3	3.20	80.00	113400	113700	599000	602000
Jewuha	Efratana Gidem	1039D4	2.60	65.00	111600	111800	604000	607000
Hora swamp	Efratana Gidem	1039D4	3.00	75.00	114600	114700	601000	602000
Dire Gebre Korki	Ensarona Wayu	0939A3	7.50	187.50	107600	9°45'	511000	514000
Menehoro/Rikich	Ensarona Wayu	0939A3	42.00	1050.0	106900	107300	515000	522000
Sakila	Ensarona Wayu	0939A3	18.60	465.00	107300	9°45'	524000	39°15'
Sakila	Ensarona Wayu	0939A1	17.80	445.00	9°45'	108300	523000	526000
Selela	Ensarona Wayu	0939A3	1.00	25.00	107500	107700	517000	518000
Tosny/Jelbe	Ensarona Wayu	0939A3	33.80	845.00	106500	107200	506000	513000
Wele Deneba	Ensarona Wayu	0939A1	15.50	387.50	9°45'	108400	512000	522000
Weryo+Salayish	Ensarona Wayu	0939A4	31.30	782.50	106900	9°45'	535000	541000
Alo Bahir	Gera Keya	1039C4	2.40	60.00	112900	113100	552000	553000
Bish/Borken+Let	Kemissie	1039B4	70.20	1755.0	117000	117900	592000	602000
Borkena+Bish	Kemissie	1039B4	32.00	800.00	117600	118400	587000	597000
Chireti	Kemissie	1039B4	23.60	590.00	116400	116900	596000	602000
Kortem + Multu	Kemissie	1039B4	48.70	1217.5	117900	10°45'	588000	598000
Istoya	Lalo Mama	1039D3	1.20	30.00	111000	111200	568000	570000
Koso	Lalo Mama	1039D3	0.50	12.50	112100	112300	572000	574000
Afezez(Jema)	Merhabetie	0939A1	6.50	162.50	109900	110200	500000	505000
Dawo+Menalafto	Moretena Jiru	0939A1	8.90	222.50	108400	108700	522000	39°15'
Total Area				14872.				

Farmers tried to mention the untapped benefits or future potential uses of the wetlands. Accordingly, it will have potential for vegetable irrigation production (29 %), for any development program (12.9 %), for drinking (9.68 %), and note identified (48.39 %). Major fauna of wetlands were frog (*Gurt*), birds (including *Gagano*), and fish (*Asa*, *Yayit Asa*). It was found out that some species of fauna like *Yewuhaenat*, frog, and *Shurubit* have been lost from some wetlands. Like wise the major flora of the wetlands in North Shewa are Eucalyptus, grass species (*Fila*, *Gudegn*, *Ketema*, *Mashengie*, *Yegesa sar*), leafy species such as *Mush and Wenz admik*. There were also some species of flora that

have extinct from some wetlands. This species were *Fila*, *Dodot*, *Mush*, *Ablalit*, *Amkiela* and *Shenet*.

Conclusion and recommendation

A few numbers of wetlands were covered by the formal survey. It is attempted to observe the extent, current utilization, and management of wetlands from the sample wetlands to bring attention on it. Wetlands are meant for different purposes beyond its environmental benefit. They are also sources of plant and animal species which are useful for the ecosystem. The low awareness of farmers about wetlands and the increasing threats are the limitations for potential utilization. Through proper management of wetlands there is a possibility to gain benefit by rearing livestock, producing vegetables and environmental benefit as a whole. Focus should be given on community education to increase their perception and knowledge so they can be able to choose and implement proper management options. Formulating bylaws to protect, utilize, and manage communal and private wetlands is another measure to be taken. A wider range of research remains on the investigation of effective utilization and potential management alternatives of each resource particularly to those wetlands which have large coverage and potential. This helps to identify the productive purposes that improve the livelihood of the surrounding farmers. Wetlands found in *Angolela Tera*, *Ensarona Wayu* and *Antsokia Gemza* should be given special consideration for further investigation to attain its potential utilization. Priority should also be given to map the extent and distribution of the wetlands using image data and verify the estimated coverage provided in this study as well as on the topo maps.

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