

## Mattress Making Using *Typha latifolia* and *Cyprus* Species of Chefa Wetland in Kemissie, Ethiopia: A Means for Livelihood Improvement

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### Abstract

The survey was conducted in May 2012 at Amrach and Santie villages in Kemissie. The objectives of the study were to assess challenges and opportunities of people involved in mattress production and their level of knowledge for sustainable utilization of *Typha latifolia* and *Cyprus* species from Chefa wetland. The villages were selected purposely and a total of 60 households were selected for interview randomly, 30 from each villages. In addition to questionnaires Participatory Rapid Appraisal (PRA) was used. The average age of mattress makers were 37 and 31 at Amrach and Santie respectively. Majority of the mattress makers, 76.7% at Amrach and 60% at Santie were female that indicate the profession has significant contribution for livelihood especially for women. The average monthly production of mattress at Amrach was higher (86) than Santie (23) because most of the people involved in mattress production at Amrach have no other livelihood means unlike the people at Santie. The average net income from mattress was 928 and 227 for Amrach and Santie respectively. There is high demand for mattress market at Kemissie, Dessie and Haik, however there is shortage of these raw materials, *Typha latifolia* and *Cyprus* species used for making mattress due to the presence of high demand by different stakeholders, pastoralists specially in dry season used as feed for their animals, making their shelter, the local people used for ceremonial purpose and making shelter. As the result the people involved in mattress production are forced to go more than 10 kilo meter per day to collect these plants and hence produce less mattresses per month and hence low income. Therefore awareness creation training should be given for stakeholders to promote sustainable utilization of these plants collected from Chefa wetland and improving income of mattress makers.

**Keywords:** Amrach; Mattress; Santie

### Introduction

Most developing countries depend heavily on the exploitation of its natural resources, especially biological resources. Most of these resources are found among very poor rural communities whose livelihood depends solely on the exploitation of these resources. Sustainable conservation and development depend heavily on strengthening the capacity of local individuals and communities to implement conservation initiatives [1]. One of such natural resources is aquatic plants that support the livelihoods of rural communities.

The five main uses of aquatic plants are for medicines, food for humans, animal feed, ornamental or horticultural use, and as a source of non-medicinal chemicals. A significant number of plants have also been used for making handicrafts and household goods, and as construction and structural materials [2].

In northern Africa, wetland vegetation can provide source of income to local people through the production and selling of household items, various utensils and craft products for sale to customers including tourists [3]. Wild aquatic plants are also valued locally as medicines, foodstuffs (such as tea, salads and spices) or construction materials for thatching and hedging.

Wetlands in Ethiopia have different socio-economic values. These include supply of food crops through agriculture by draining and recession, important sites for dry season grazing, resource extraction, raw materials supply, fish harvesting, source of medicinal plants and sites for tourist attraction and various traditional ceremonies. They are also part of the rural people's economy as they traditionally play an important role through the provision of water, and other materials, for both humans and livestock (EWNRA, 2001).

Despite the benefits gained from wetlands they are under threat from the conversion of wetlands for intensive irrigation, the expansion

of human settlements, industrial pollution, agricultural pollution by pesticides, use of fertilizers, water diversion for drainage and the construction of dams [4].

It has been reported that Chefa wetland is one of the wetland in Amahara Region that support large number of bird species next to lake Awass. Chefa wetland in Cheffa valley and Kemisse area refuges to 50,000 Afar and Oromo pastoralists and 200,000 animals (Gutema, 2003).

The local people are getting benefit from irrigation in dry season, fishery, source of feed and water for their cattle, collection of plants for making roofs of houses, mattress, used for fattened oxen transportation mechanisms to prevent sliding and ceremonial purposes. Although some studies were conducted on Chefa wetland, studies on importance of *Typha latifolia* and *Cyperus* plant species for making mattresses and supporting the livelihoods were lacking.

This study on socio-economic importance of mattresses made of *Typha latifolia* and *Cyprus* species of Chefa wetland is vital to show policy makers and planners to what extent these plants are contributing for livelihood of the poor, mainly women in Amrach and Santie Villages in Kemissie town to propose sustainable utilization of these resources and improve their income.

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Materials and Methods

Study Area

The Cheffa Wetland/Cheffa Flood Plain (also known as the Borkena Valley) is about 82,000 ha, (EPA, 2003). The wetland type comprises seasonal intermittent freshwater marshes on inorganic soils, including sloughs, seasonally flooded meadows, and sedge marshes. There are hot springs on the eastern side of the flood plains. The main feeder of the wetland system is the Borkena River, which is heavily silted during periods of rain [5]. Kemissie, the town of Oromia Zone, Amahara Region, Ethiopia found near Chefa wetland (Figure 1).

Methods of Data Collection

The study areas are Amrach and Santie which are found in Kemissie town near Chefa wetland. They are mattress production sites. The sample frame consists of the set of mattress producer individuals. From a total number of mattress producer in Kemisse (200), 30% of them were selected using Rule of Thumb [6]. A combination of cluster and random sampling procedure were used to select 30 respondents from both Amrach and Santie. Questionnaires were developed and pre-tested in May 2004 E.C and then administered to the selected respondents. In addition to questionnaires Participatory rapid appraisal (PRA) was used. A wide range of data in respect of type of plants used for making mattress, education level, source of income, reasons for mattress production, cost of production of a mattress, and

major constraints to mattress production using pair-wise ranking and scoring were collected.

Statistical Analysis

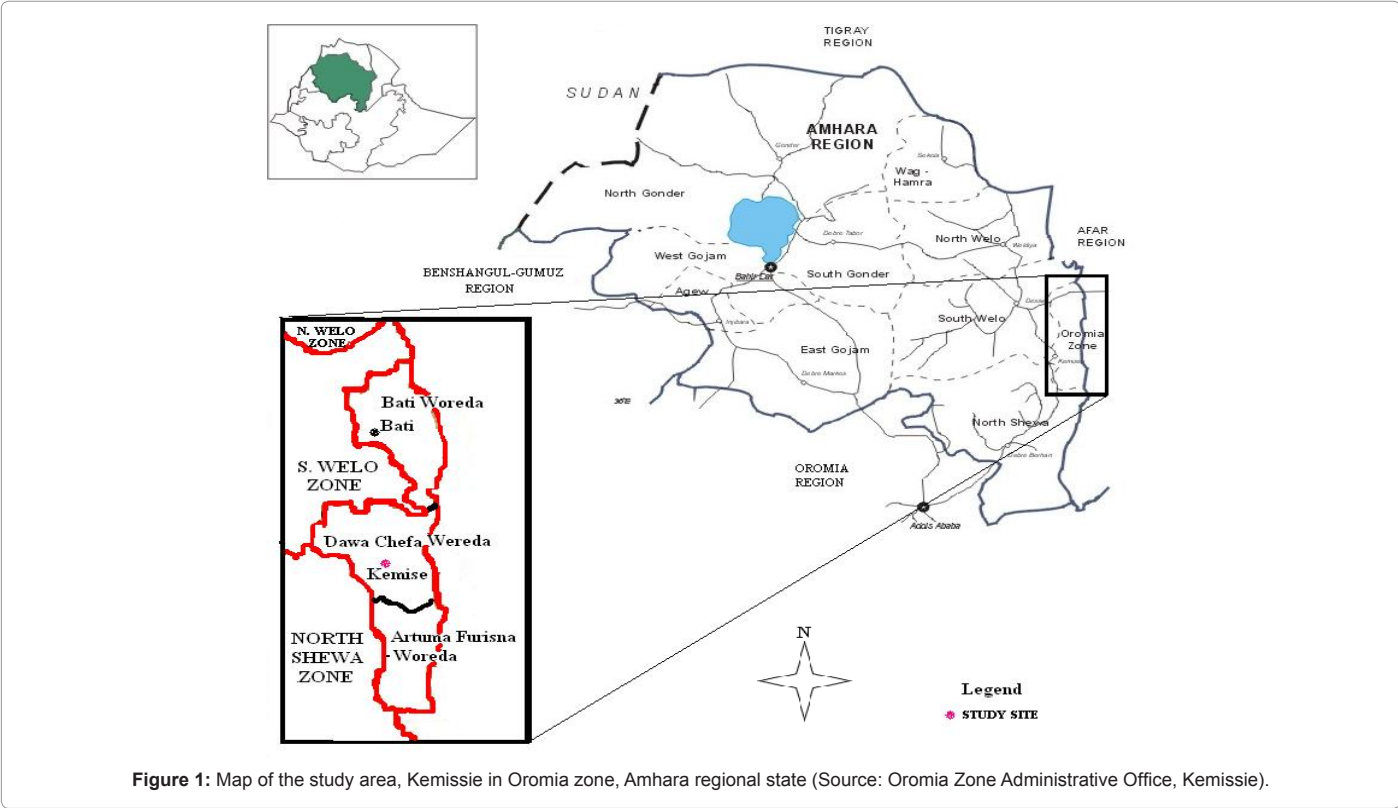
The data collected were entered into SPSS software program. The collected qualitative and quantitative data were summarized using descriptive statistics, mean, frequency and percentage. Inferential statistics, independent *t*-test was used to test the existence of significant difference in mattress production and net income gained from mattress between Amrach and Santie villages.

Result and Discussion

Chefa wetland plants used for making mattresses

*Typha latifolia* and *Cyperus* species are major macrophytes of chefa wetland used for livelihoods. *Typha latifolia* used for animal transportation, animal feed, for making roof and making mattresses. *Cyperus* species used for cermonial purpose for covering floors, making mattress and animal feeds (Table 1).

***Typha latifolia*:** Is a perennial herbaceous plant in the genus Typha, which grows in temperate, subtropical and tropical areas throughout the Northern Hemisphere. It grows in marshy areas and flowers in mid to late summer. The common cattail shares its range with other related species and hybridizes with *Typha angustifolia*, narrow-leaf cattail to form white cattail. Common cattail is usually found in shallower water



Botanical name	Family name	Local name	Uses	Economic value (Birr) per bundle
<i>Typha latefolia</i>	Typhaceae	Webelo	Mattress,roofing,and walling ,animal transportation	35-40
<i>Cyperus species</i>	Cyperaceae	Filla	Mattress, floor covering, animal feed	30-40

Table 1: Economically important macrophytes of Chefa Wetland used for making hand craft.

than narrow-leaf cattail. The plant is 1.5 to 3 metres high and it has 2 to 4 cm broad leaves, and will generally grow out in to 0.75 to 1 metre of water depth. The rhizomes can be consumed after cooking and removing the skin, while the peeled stems and leaf bases can be eaten raw or cooked. While *Typha latifolia* grows all over, including in rural areas, it is not advisable to eat specimens deriving from polluted water as it is used as a bioremediation, it absorbs pollutants. Do not eat them if they taste very bitter or spicy [7]. The price of one bundle of *Typha latifolia* in Kemissie is ranged from 35-40 ETB.

**Cyperus species:** Cyperus species is a members of the sedge family that possess a rhizome, a root like underground stem out of which grows a tuft of basal leaves. The leaf bases expand into sheaths that entirely close around the stem. The stem itself is usually unbranched and leafless, with a cluster of inconspicuous flowers at its tip. Each flower is borne in a single bract (modified leaf) and has either no perianth (floral envelope) or one reduced to a series of scales or bristles rather than showy petals. Sedges are generally distinguished from grasses by their triangular stems and by leaves with closed sheaths. The family is of some economic importance. Stems and leaves of many genera, including the bulrush, are used for weaving mats, baskets, and hats, as well as in paper making. The paper reed was the source of ancient Egyptian papyrus (Encarta, 2009). Cyperus species from Chefa wetland is used for making mattress, animal feed and covering the floor of the houses for ceremonial purposes. The Cyperus papyrus species collected from Southern Gulf of Lake Tana is the sole livelihood for Negede Woito though making of handcraft, Moseb. This plant is also used by some women in Kemissie for making Moseb (Amaharic). The price of a bundle of Cyperus species used for making a mattress is 30-40 ETB.

### Educational level of the respondents

Most of the respondents 70%, at Amrach and 73.3% at Santie had primary and above educational level. Since most of them can read and write, they can adopt technologies that can add values to *Typha latifolia* and Cyperus species in addition to making mattresses such as mats, baskets, hats and Umbrella. They can also improve their knowledge on how to use these resources sustainably if get training. Table 2 shows level of education among the respondents.

### Source of livelihood of the respondents

Most of the respondents (43%) income source is wetland plant based (mattress production) followed by mattress production and livestock (40%), mattress and crop farming (8.3%) and mixed farming with mattress (8.3), because many of them do not have land that will be

enough to support their family. According to some respondents, even they have very little land exposed flooding by Borkena River. Table 3 shows source of income of the respondent

### Mattress production

Macrophytes, Chefa wetland plants, *Typha latifolia* and Cyperus species have different importance for local and pastoralists that come from Afar and nearby Oromia districts such as: for making roofs of the houses, feed for animals, transportation of fattened animals, preventing sliding, for covering floors during ceremonial purposes, making pillows and mattresses (Figure 2 and Table 4).

The mattress produced in Kemissie, Amrach and Santie villages is locally known as Kemissie foam. The independent *t*-test analysis showed that there was significant mattress production in Amrach and Santie ( $t(58)=14.95$ ,  $P<0.05$ ). The average mattress production per month was higher at Amrach (86) than Santie (23). The net income from mattress was also significantly different in Amrach and Santie ( $t(58)=12.63$ ,  $P<0.05$ ). The average net income was higher in Amrach (928) than Santie (227). The mattress makers at Amrach produced higher number of mattresses due to the fact that most of them have no other livelihood means.

Mattress makers at Amrach and Santie produced three different sized mattresses, smaller, medium and larger having different prices, 30, 45 and 60 birr at Kemissie and 35, 60, 80 ETB in Dessie Market (Figure 3).

### Economic contribution to women

Selling of handcraft used to be done by older women in previous years, but nowadays it is done by mostly women who have 'O' level education due to non-qualifying academic grades for entry into tertiary institutions and due to high unemployment rate in the country in Swaziland [8]. The economic contribution of handcraft products to family lives is significant. The handcraft products sold by Negede Woito women in Bahir Dar have significant contribution for livelihood (Personal observation). The number of women mattress makers in both Amrach and Santie were higher than males, 76.7% and 60 % respectively. The average net income of women from mattress was 957.40 and 222.06 in Amrach and Santie respectively. The contribution of mattress production in Amrach was higher due to the fact that almost all of them were landless

### Constraints of mattress production

Chefa wetland is open access for local and pastoralists that come every year during dry season, as the result there is no restriction for

Educational background	Amrach		Santie	
	Frequency	Percentage	Frequency	Percentage
Illiterate	18	30	16	26.7
Primary	11	18.3	14	23.3
Secondary and above	1	1.7	0	0

**Table 2:** Educational Background of respondents in Amrach and Santie Villages.

Source of income	Amrach		Santie	
	Frequency	Percentage	Frequency	Percentage
Mattress	19	31.7	7	11.7
Mattress and crop	5	8.3	19	31.7
Mattress and livestock	4	6.7	1	1.7
Mattress, crop and livestock	2	3.3	3	5

**Table 3:** Source of income of respondents in Amrach and Santie.





*Typha latifolia* (standing)



*Typha latifolia* (dried)



Cyperus species (standing)



Cyperus species (dried)

**Figure 2:** Macrophytes used for making Mattress in Amrach and Santie.

Raw material types	Quantity	Unite price	Total price in ETB
Niddle	1	1	1
Thread	1/10 of bundle	1.6	1.6
<i>Typha latifolia</i>	1/10 bundle	4	4
<i>Cyperus</i> species	1/4bundle	10	10
Sacs	3	4	12
Total cost	-	-	27.6

**Table 4:** Cost of raw materials for making a medium sized mattress.



**Figure 3:** Different sized mattresses ready for sale at Kemissie market.

extraction of any resources of the wetland. The major problems associated with mattress production business are: high destruction of macrophytes used for making mattresses due to over grazing, excessive removal by fattened oxen traders for animal transportation, and flooding of the area with water during wet season. The shortage of these plants caused by the above problems forced mattress makers to walk more than 10 km per day or purchase with high cost that affect their time or net income (Figure 4).

The pair-wise ranking and scoring tool of PRA showed that overgrazing had first rank followed by poor marketing linkage and macrophytes extraction for fattened animals transportation (Table 5).

Chefa wetland faced over grazing problem specially during dry season (January to June). According to Kemissie Office of Agriculture and Rural Development, Chefa wetland supported about 300,000 cattle that came from Artumafursi, Jile Tumuga, and Deweyharewa, Dalfagie, Bati and Afar Zone two. In Dawacheffa Woreda where mattress makers collect macrophytes (*Typha latifolia* and *Cyperus* species) about 20,600 cattle supported resulted excessive destruction of these raw materials used for mattress making.

## Conclusion and Recommendation

The mattress handcraft is source of livelihoods for females that covers 68.3% of mattress makers using *Typha latifolia* and *Cyperus* species plants from Chefa wetland especially during dry season. They collect these plants through cut and carry system that has no negative effect on their growth unlike overgrazing, excessive extraction by fattened animals traders and burning the macrophytes to convert the land to agricultural land. The sector is especially very important for Amrach village that have no other alternative means of livelihood. About 8 cars mattresses transported to Kombolcha, Dessie and Alamata from Kemissie daily. Over 10 cars of macrophytes (*Typha latifolia*) extracted from Chefa wetland every week for animal transportation that affect the livelihoods of the poor participating in mattress production. Therefore sustainable utilization of these plants should be used by different stakeholders. The responsible bodies should work together to conserve Chefa wetland vegetation. The mattress makers also should produce other types of hand craft types such as: baskets,



**Figure 4:** Over grazing , the left (A) and excessive extraction of *Typha latifolia* in the right (B).

	Constraints	Rank	Causes	Proposed strategies
Amrach	Overgrazing	1	Highest cattle number in dry season	Cut and carry method
	Excess extraction of macrophytes used for mattresses	2	For animal transportation	Taxation mechanism
	Poor marketing linkage	3	Lack of organization	Established strong Association
	Labour intensive	4	Fully manual	Supported by machine
Santie	Flooding	1	Degradation of Borkena catchment	Watershed management
	Cattle disease	4	Mixing with pastoralist cattle	Cut and carry method
	Overgrazing	2	Highest cattle number in dry season	Cut and carry method
	Excess extraction	3	Excess extraction of macrophytes used for mattresses	Taxation mechanism

**Table 5:** Pair –wise matrix sheet, Rank of problems of mattress makers in Amrach and Santie.

Umbrella for Cafeterias, pillow and mats to improve their income from macrophytes of Chefa wetland. The *Cyperus Papyrus* species in Chefa wetland if sustainably used can be used for making paper that can create huge job opportunities for the people in Amranch and Santie.

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