Resource-Oriented Sanitation concepts for peri-urban areas in Africa (ROSA)

ROSA project activities

Partners ARB & AMU

Ethiopia (Arba Minch)

September 2008

Ouagadougou, Burkina Faso

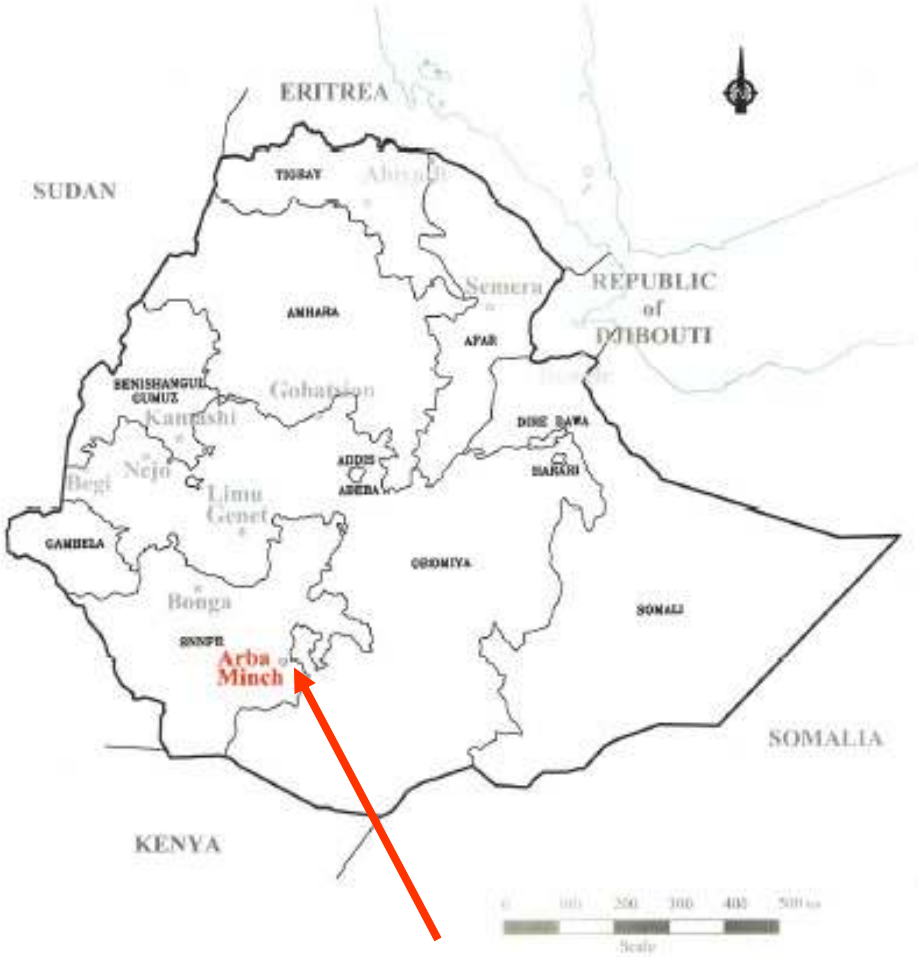
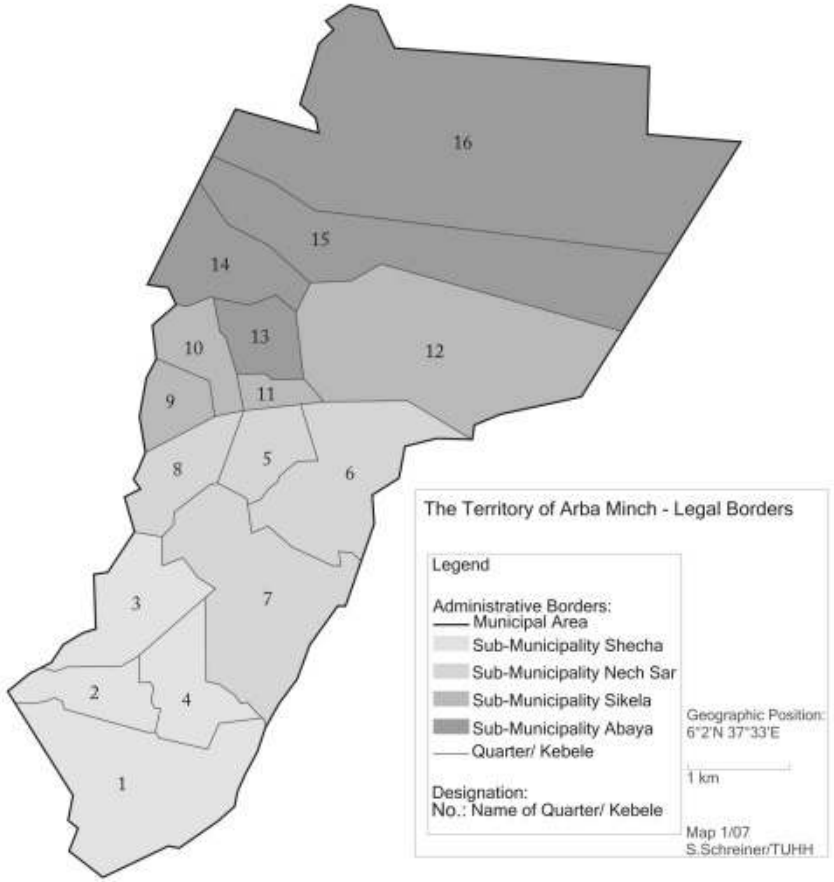


FIGURE 1.1
Location of Arba Minch

The territory of Arba Minch_ Legal boundary



Location and Topography

- Meaning: Arba Minch, in Amharic means "forty springs"
- Distance: 500 km south of A. A & 275 km south of Awassa
- Location: 6º2'N 37º33'E.
- Administrative structure
  - Led by Mayor
  - divided into four sub-cities and 16 kebeles
  - Popn ~78,000

Shecha, Kebele 01 to 04

- Nech Sar, Kebele 05 to 08
- Sikella, kebele 09 to 12
- Abaya, Kebele 13 to 16

Major activities in the past 24 months

Planning activities

- Baseline study (City assessment)
- Demand assessment

Lessons Learned from the Baseline Study and Demand Assessment

- Existing situation has been analyzed
- Gaps have been identified
- Enable us to compare or characterize each Kebele (gives us clue of what to do and where)
- Potentials and challenges have been identified

STRATEGIC SANITATION AND WASTE PLAN (SSWP) FOR ARBA MINCH TOWN

Short term (2008-09)
Medium term (2010-12)
Long term (2013-17)

Major activities (Implementation)

Crop trial

1. Rosa Office
2. AMU
3. Ganta
4. Sille

4

Arbor loo

1. ROSA office
2. Yeshi
3. Amsal
4. Asnakech
5. G/mariam
6. Anose
7. Hailu
8. Tanga
9. Ochacha

9

UDDT

1. ROSA office
2. Yigebahal
3. Chamo
4. Bogale
5. Agafari
6. Almaz
7. Zerihun

7

FossaAlterna

1. ROSA office
2. Adane
3. Abebe
4. Belaynesh
5. Tegegn
6. Geresu
7. Tefera
8. Gemeds
9. Denekе

9

Composting

1. ROSA office
2. EMCA
3. Yeshi
4. Agafari

4

Grey water tower

1. ROSA office
2. Yeshi
3. Catholic
4. Ayele
5. Adane
6. Zerihun

6

Biogas AMU 1

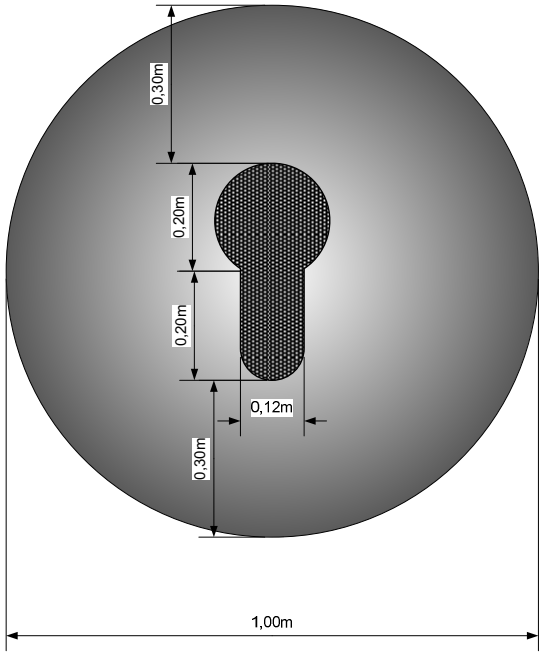
Urine experiment at Arba Minch University

- Urine as fertilizer - field trials
  - Maize, lettuce and tomatoes
  - Good results with maize

Urine experiment at ROSA office compound

Crop trial @ Ganta Meyche

Arborloo toilet slabs



Construction of Arbor loo

9 units

UDDT by ESE

eco-san toilet (ROSA office)

Construction of a waterless urinal from local material

Cut jerry can as shown

Heat a knife

Cut hole in plug, smaller than hose

Cut hole into cap, insert hose, attach with glue/silicon

Cut hole into cap, not into removed plug

UDDT pan production in Ethiopia

1. Awassa Ceramic Factory

2. Ethio-Fiber glass Factory

3. AquaSan Mfg Ethiopia Plc.

Construction of Fossa Alterna slabs

Construction of Fossa Alterna

9 units

Composting at AMU (food waste)

Co-Composting

Egnan Mayet Compost Production Association

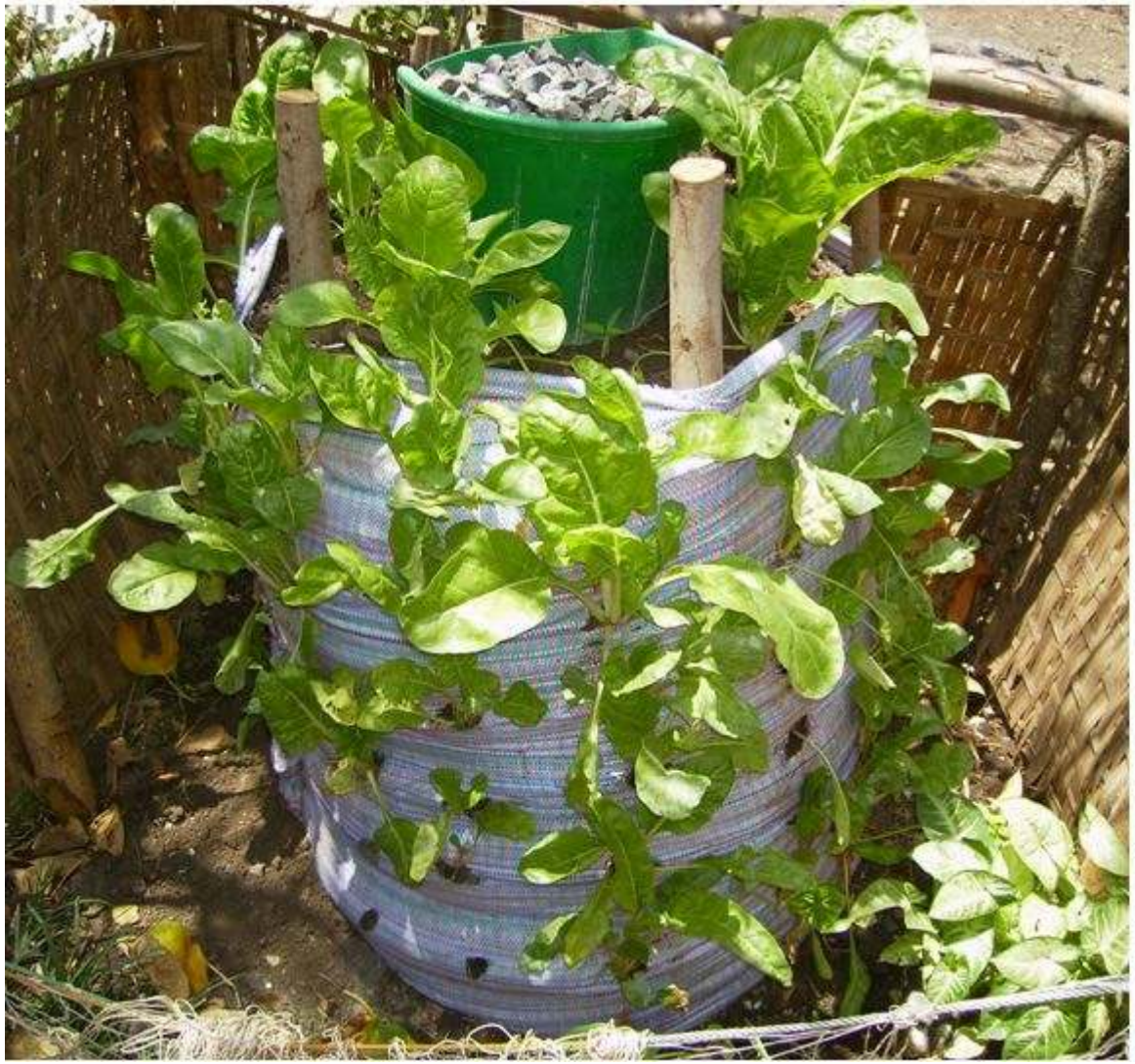
Composting at household level

Grey water tower construction

Construction of grey water tower

6 units

Construction of grey water tower



Biogas unit @AMU

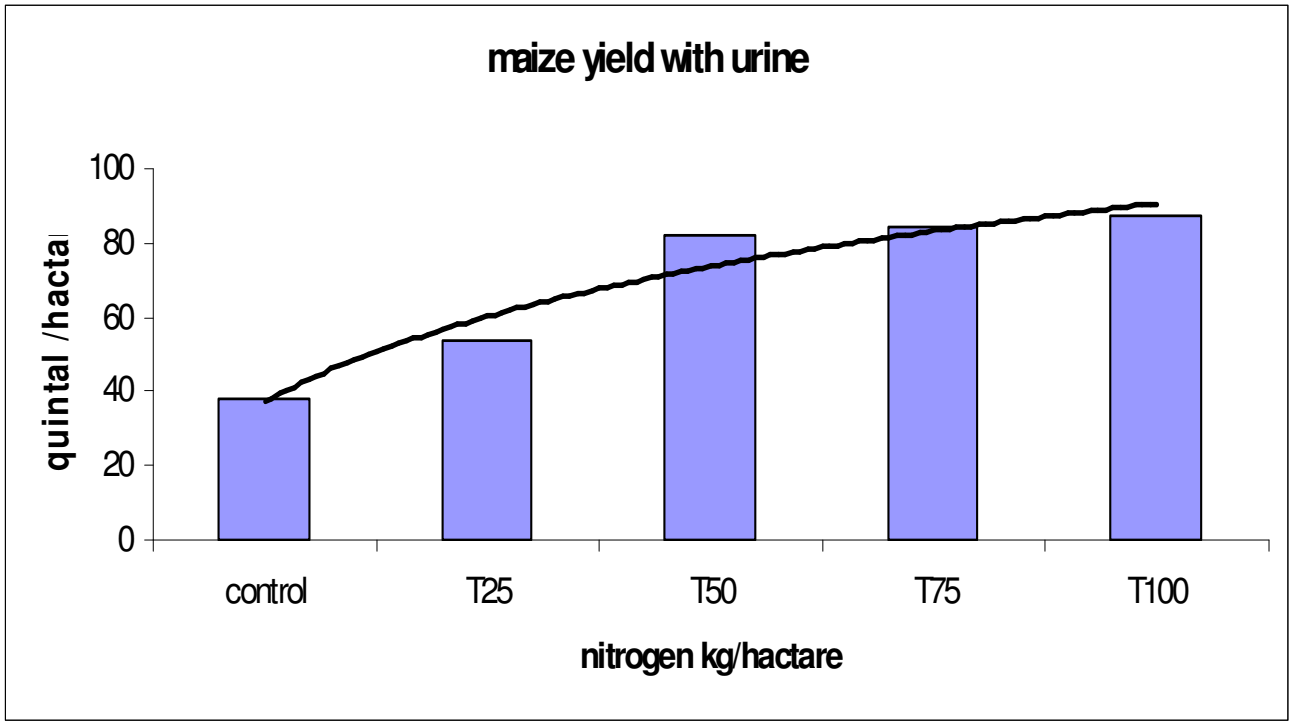
Plastic reuse training (40 women)

Research activities

- Fruit and vegetable market survey
- Microbial analysis on fruits and vegetables
- Crop trial using urine as fertilizer
- Investigation on urine evaporation
- Identification of potential users of human excreta products
- Research proposals submitted(5 thematic areas)
- Monitoring of existing units

Arba Minch University

- Urine as fertilizer – intermediate results

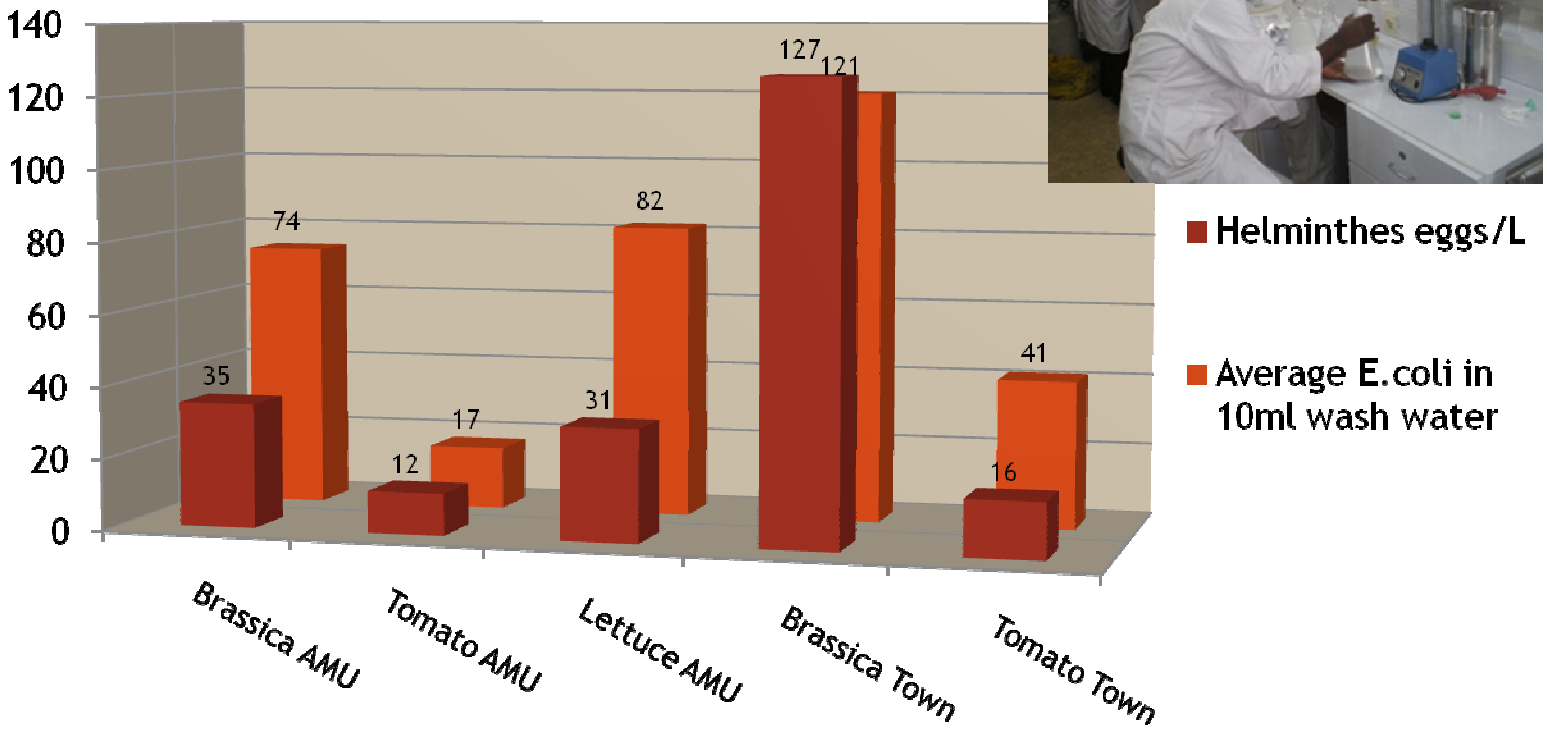


Market survey

- 17 markets/shops studied, 25 types of fruits and vegetables
- hygienic situation
  - No toilets and garbage bins in the markets, but in some of the shops
- Eating habits
  - All fruits and most of the veg. are eaten raw

Microbial Analysis

- Microbial properties



Urine evaporation experiment (using ash and soil to arrest the N)

Research activities (Contd.)

- Research proposals submitted(5 thematic areas)
- Monitoring and evaluation of existing units

Masters theses

- Material Flow Analysis in Arba Minch by Catharine (TUHH-Germany)
- Resource oriented public toilets in Arba Minch by Aleksandra Drewko (TUHH-Germany)
- Specification and bill of quantities for sanitation facilities in Arba Minch by Mastewal Seyum (UNESCO-IHE, Netherlands)
- Sustainable Financing Options for Sanitation and Waste Management: The Case of Arba Minch Town By Gezmu Kelbo (Ethiopian Civil Service College)

Local project consortium members of ROSA prject (15)

1. 4 Sub-city Administrators
2. President of Arbaminch University
3. General manager of Water Supply and Sewerage Enterprise
4. Head of Zonal Health Department
5. Arba Minch district health Center
6. Meyor from Arba Minch Town administration
7. General Manager of Arba Minch town municipality
8. Head of Zonal Agriculture and rural development department
9. General manager of Housing Development Project office
10. Head of Town Women Affairs office
11. Representative from Catholic church (NGO)
12. Representative from Refugee trust international (NGO)

WORKSHOPS

Kick off meeting

Nov30, 2006

WORKSHOPS (Contd.)

April 20 2007

WORKSHOPS (Contd.)

ROSA Day

April 8,2008

18 month ROSA workshop

(April 16-19,2008)

Sanitation in peri-urban areas in Africa (SPA)

Kenya, Mali, Malawi, Ethiopia and Zambia

TRUST program

Linked to the ISSUE-2 programme and ROSA project

General project data

- **Financial data**

Total budget
€ 7,000,000
(Birr 98,000,000)

50% grant + 50%loan

- SNS REAAL WATER FUND:

€ 3,500,000

- DGIS: € 3,500,000

- **Ethiopia**: Arba Minch
- **Kenya**: Nakuru
- **Malawi**: Blantyre
- **Mali**: Segue
- **Zambia**: Lusaka

PROGRAMME MANAGEMENT

	Role	Tasks
Plan Nederland	Project holder	- Reporting to DGIS - Overall project monitoring - Management of DGIS funds - Audits - Evaluations - Distribution of project results - Through its Plan network, support by Plan Country Offices on techniques for approach of target population (e.g. hygiene)
WASTE	Main executing organisation	- Inception missions - Main adviser to utilities - Detailed project monitoring - Training on technical aspects - Capacity building - Distribution of project results
SNS REAAL Waterfonds N.V.	Main co-financing partner	- Loan provider to utilities as co-financing arrangement - Advice on bank affairs
W& S facilities	Implementation	

Business Plan

Sustainable Sanitation Service Delivery
Arba Minch Town

Overall objectives

To deliver sustainable sanitation service to all inhabitants of Arba Minch town and surrounding sub-urban community based on a user-pays principle.

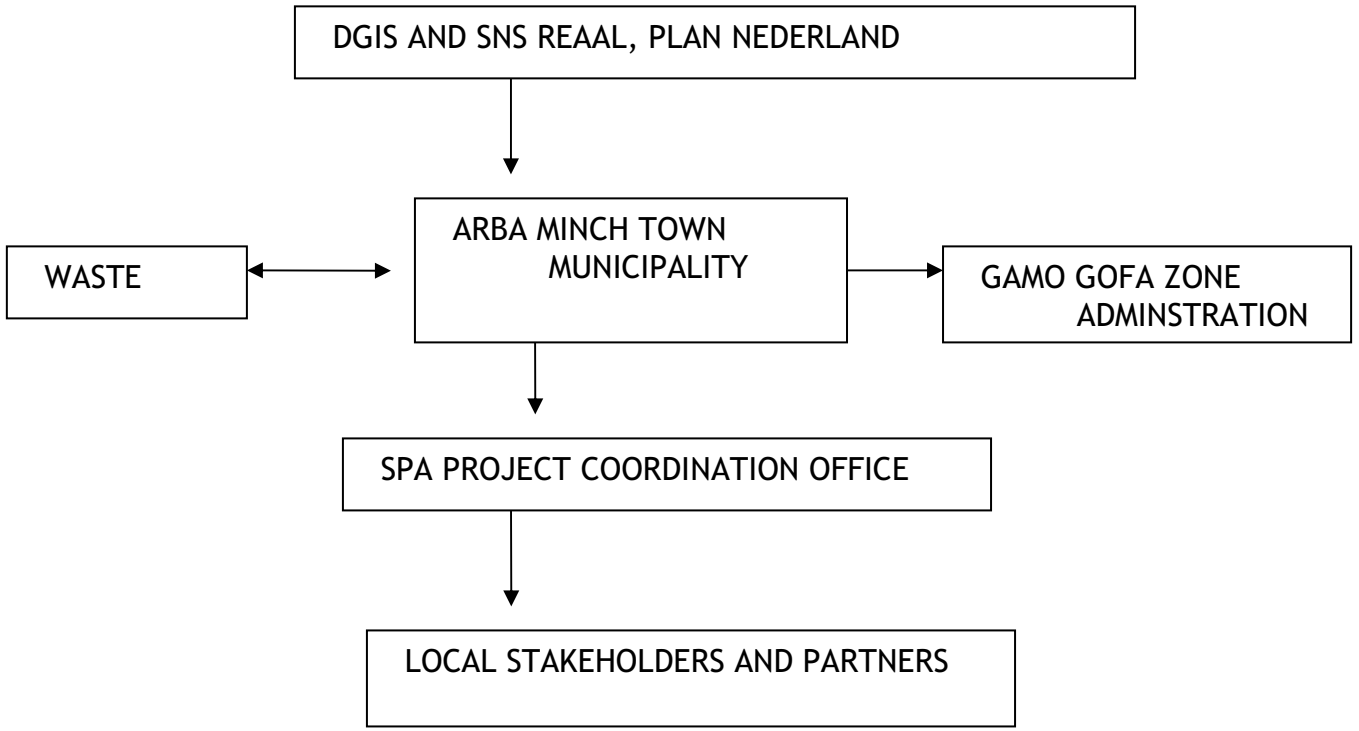
Mission

- to enable the town municipality provide adequate sanitation services and facilities development.

Vision

- To see healthy Arba minch town population and clean city environment with improved sanitation at the fullest of its waste disposal and reuse systems.

Institutional set up for SPA



Implementation plan

Short term (2008-09)

Workshops and awareness raising campaigns

- 4 workshops
- 11 meetings
- site visits by 500 persons
- 1400 Brochures
- Birr 11000

Use of urine for growing crops

Recommendations for the storage of urine:

- Direct use after collection or a short storage time is acceptable on the single household level
- For larger systems, urine should be stored before application for preferably longer than one month for fodder crops and six months for food crops
- Urine can be stored in bottles or plastic containers as they are used for water collection provided they are well capped and the ammonia is not allowed to escape

Nutrients in urine:

The average concentrations of nitrogen, phosphorus, potassium and sulphur in one litre of urine are as follows:

4 - 5 g N / l
0.5 - 1 g P / l
1.5 - 2 g K / l
1.5 - 2 g S / l

It can therefore replace mineral fertilizers such as urea and DAP.

Depending on the crop, the maximum application can be approx. 120 kg nitrogen (N) per hectare and year. Thus, an amount of 2.5- 3 l urine per square meter can maximum be used for fertililisation.

Urine is recommended for example for:

maize, tomatoes, teff, beans, pepper, eggplant, cotton, fruit trees, etc.

In general urine can be used as fertilizer for all plants with a high demand of nitrogen.

Further uses of urine in agriculture:

- Urine as an "activator" for compost
- Urine as a medium for fermentation of plant residues

For further information refer to World Health Organisation (2006): "Guidelines for the Safe Use of Wastewater, Excreta and Greywater ".

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Arba Mich Town Water Service

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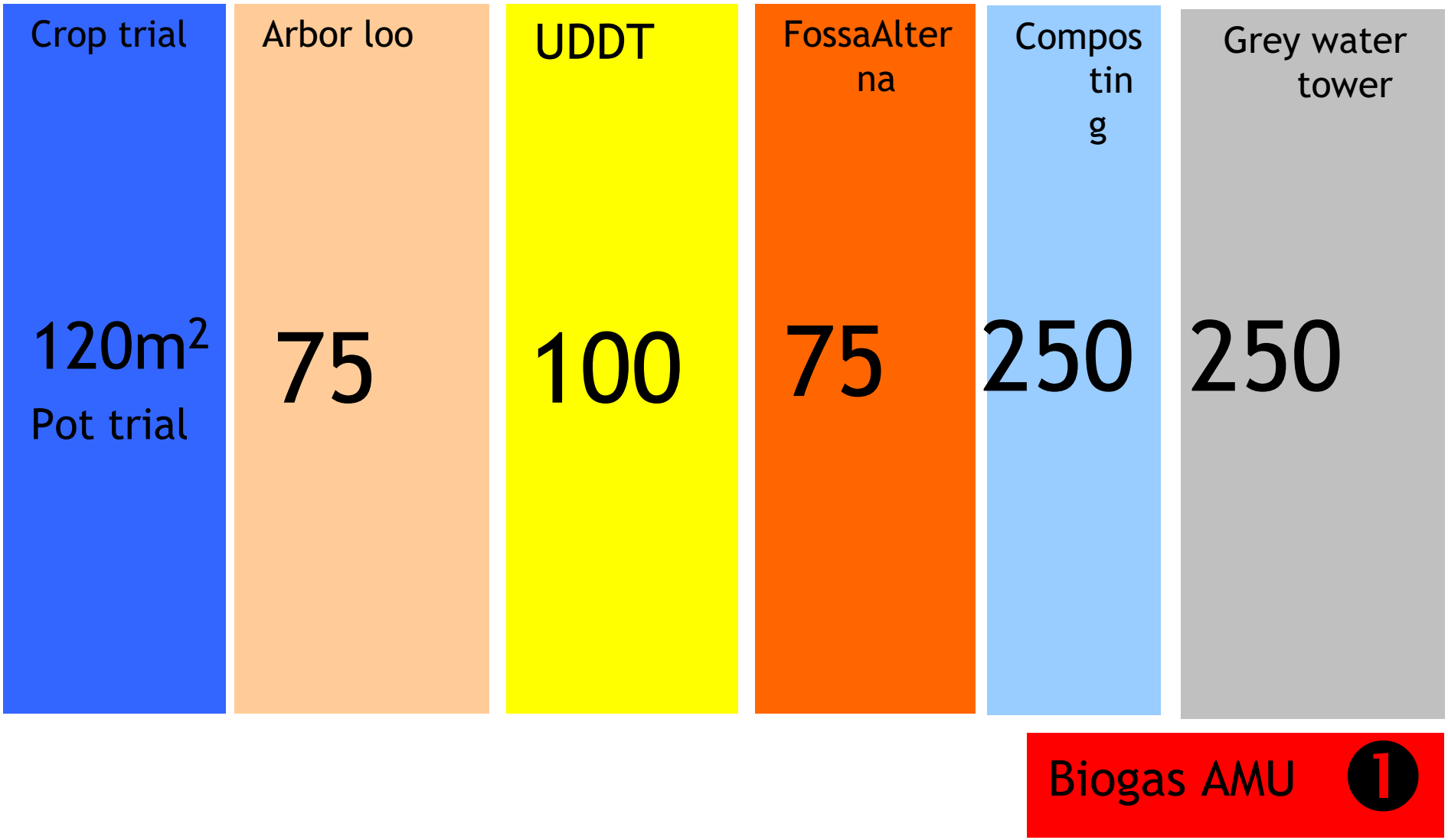
Resource-Oriented Sanitation concepts for peri-urban areas in Africa

Use of urine for growing crops

Natural compost

Implementation (ROSA project period)



Construction of constructed wetland

- 1unit
- Textile factory
- Labor and technical support (ROSA)
- Material cost (Textile factory)

Design and construction of hand driven carts

- 3 designs
- 1 construction
- Birr 2500

Design and construction of donkey driven carts

- 3 designs
- 1 construction
- Birr 4000

Selection of site and construction of septic tank sludge disposal scheme

- Site selection
- Design
- Construction of 3 septage drying beds
- Birr 75,000 (ROSA)

Selection of site and construction of solid waste disposal system

- Site selection
- Design
- Construction by Municipality

Training of local artisans and MSE

- 30 trainees
- Birr 3000

Training on solid waste separation and reuse

- 250 family heads
- Birr 1500

Education on health risks and good hygienic practices

- 250 family heads
- Birr 1500

Training on WHO guidelines

- 40 Health and agriculture experts
- Birr 800

Main Challenges

- Mandate of Gov't orgs on sanitation
- Potential users of ecosan products (Urine, feaces, compost)
- Transportation of ecosan products
- Operation and maintenance of ecosan systems
- Government policy on fertilizer use
- Ability to pay for sanitation
- Willingness to pay
- Feeling and perception on the use of human urine and feaces

Thank you!

Some of the team members