



Call for course on adapted technologies in water and sanitation (EMAS)

A practical approach to cover basic needs, through job creation and through training.

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1 General description

The main purpose of this document is to describe the selection and registration process to participate in the course in EMAS technologies that will be held in Dioulacolon, Kolda (SENEGAL) for approximately 3 weeks, ideally from February 19 to March 10 .

The end date of the course will be specified as soon as possible depending on the availability of flights and other permits to travel for teachers since they come from Bolivia and Spain.

The course will always be held at the request of the Covid 19 pandemic, for which we will keep all selected participants informed at all times.

Likewise, section 2 [On EMAS technologies](#) describes EMAS technologies, as well as the process for the implementation of these technologies in a region.

In this call, guides are also given on the course contents.

Finally, the tasks to be carried out by the selected organization and its technicians are established after the conclusion of the course.

1.1 Organizers of the course

This course is organized and managed by the following organizations

- AIDA Organization Spanish based in Kolda organized the course
- MJPI Organization Senegalese collaborating in the organization of the course
- TADEH Spanish organization providing the course and helps organize
- EMAS German organization that teaches the course

2 EMAS technologies

Escuela Móvil de Agua y Saneamiento (EMAS)

EMAS is the acronym for Escuela Móvil de Agua y Saneamiento (Mobile School for Water and Sanitation), in Bolivia, whose director, Wolfgang Eloy Buchner, developed the EMAS pump and the EMAS hand drilling technique in the 1990's.

EMAS is not only the name of the mobile school for water and sanitation, but also a whole technical and social concept of water and sanitation which includes rain water harvesting, solar water heaters, wind power, hydraulic rams, water treatment, small tanks and sinks, a variety of hand and foot pumps, and ferro-cement tanks. The aim of the technologies and systems is to achieve the necessary supply of drinkable water, and water for micro irrigation in rural and sub urban areas.

The EMAS water and sanitation technology, labelled as low-cost technology was developed to encourage families to incrementally improve their household infrastructure and hence add value to their household living conditions and lifestyles. EMAS implements its strategy primarily through the training of local independent technicians and typically partners with other organisations and local/national governments for implementation, and promotes the same strategy through trainings and assessment trips.

Below are some of the typical EMAS technologies such as a drilled well or improved latrine



Drilled well with EMAS pump



VIP, improved odorless

See the technology summary at this link <https://www.youtube.com/watch?v=1YUiI0jqU8>

Important note:

- EMAS systems are systems designed for family use, among other reasons due to their low cost, their structural strength and their implementation by local technicians hired directly by the families.

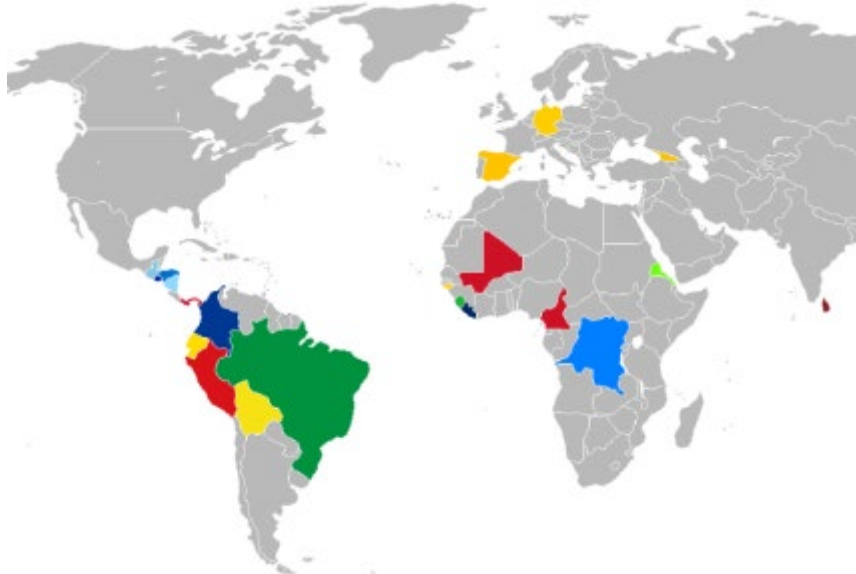
2.1 Achievements and sustainability EMAS technologies

In its 30 years of work using EMAS technologies, more than 500 technicians have been trained in more than 20 countries around the world.

In turn, these technicians have created their micro-enterprises with which they have carried out, among others:

- Installation of more than 100,000 pumps in existing wells
- Construction of more than 60,000 wells
- Construction of more than 6000 tanks

A very remarkable fact is that approximately 80% of these systems have been financed by the users themselves.



Regarding sustainability, there are several studies carried out on EMAS techniques. It is worth highlighting those carried out by the RWSN (Rural Water Supply Network), a benchmark entity in terms of water supply in rural areas.

For this, in 2013, it carried out a study of 79 pumps in installed wells up to 25 years old. All of them were working at the time of the study except 1 of them, 12 had had problems but they had been fixed either by the user or by local technicians trained either in EMAS courses or by technicians who had learned from other technicians in these courses.

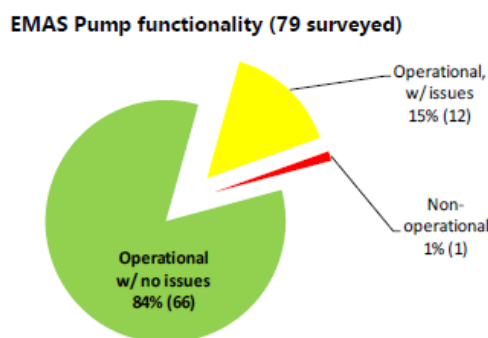
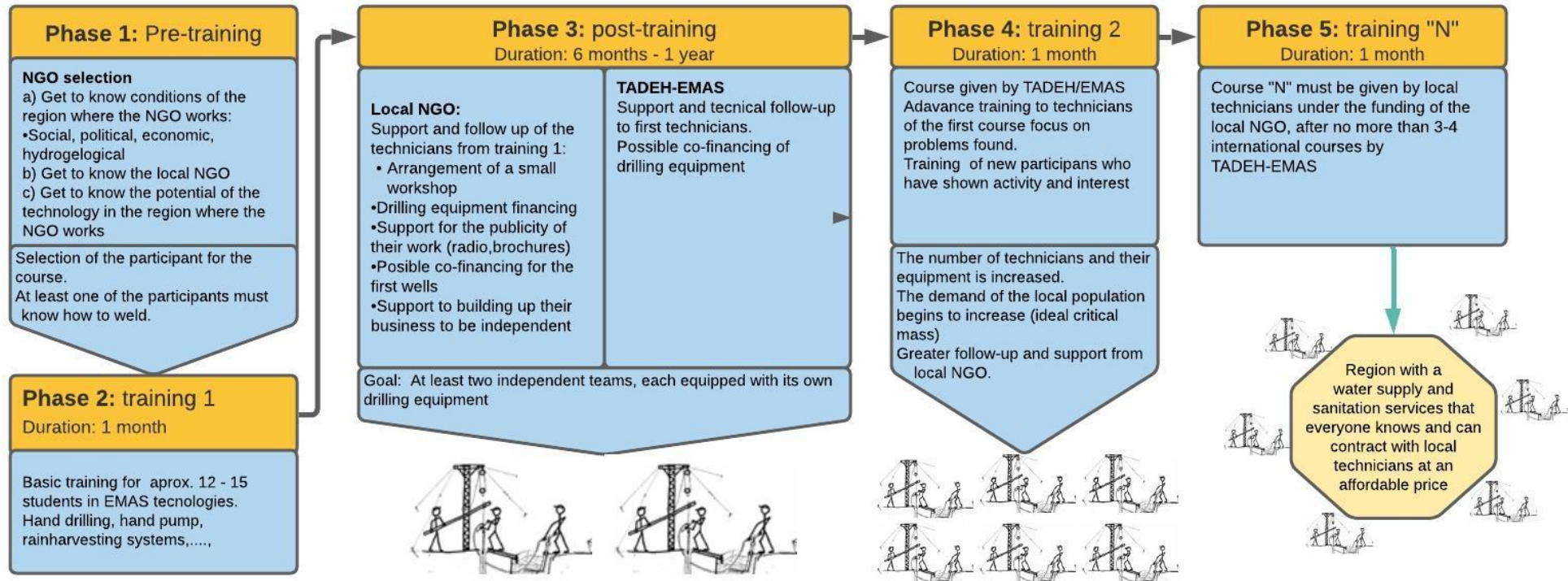


Illustration 1 Pump operation study by RWSN

The complete study can be viewed at [this link https://tadeh.org/documentacion/SostenibilidadEMAS.pdf](https://tadeh.org/documentacion/SostenibilidadEMAS.pdf) .

2.2 Implementation cycle of EMAS technologies in a region

The following diagram shows the typical implementation cycle of EMAS technologies in a region



* The Local NGO refers to the NGO from which the participant comes.

1. In the **short term**, the perspective is to establish the technological transmission among the new trained technicians and make the water supply reach the inhabitants of the different towns where the NGO works. To do this, the trained students are supported with drilling equipment so that they can work among the different communities providing water services, which may initially be partially financed.

On the other hand, the assistants of these technicians learn so that at the end of a certain period they can have their own drilling equipment.

Identifying and supporting these helpers through adequate training is one of the keys for projects to grow little by little and more and more people can access these technologies and therefore have decent access to water.



On radio and in public meetings, EMAS technologies will be publicized to generate a demand for low-cost products.

2. In the **medium term there** should be trainers of trainers, that is, local professionals who are capable of carrying out the training courses for new students.
3. In the **long term**, EMAS technology must be established in the region as a water and sanitation service that everyone knows and can contract with local technicians at a local price.

3 Course structure

The course is divided into theoretical and practical parts. Theoretical classes will focus on understanding water cycles, water resource management, sanitation, health and safety training, and cross-cutting issues such as gender equality and poverty.

The practical course covers simple construction techniques using locally available low-cost materials allowing more comfortable access in the daily use of water:

- ✓ Drilling systems for the establishment of wells.
- ✓ Rainwater harvesting systems (capture, filtration and storage):
- ✓ EMAS hand pumps independently or in combination with a rocker / pedal to pump for long periods of time to small and large ferro-cement tanks and underground storage tanks.
- ✓ Sinks , latrines, shower stalls produced by local materials such as cement that will greatly reduce production costs and offer a new sense of added value by using individual toilets or showers and sinks for washing hands or dishes.
- ✓ Micro Irrigation Systems (locally designed pipes and sprinklers) - This application will support small-scale agricultural production such as orchards or nurseries. The EMAS pump is connected by a 1.5-inch PVC pipe to a navigator that irrigates the fields.
- ✓ Water Treatment, Filtration, Chlorination and Iron Removal Techniques, if required.
- ✓ Support for professionals trained in business creation.
- ✓ Electrical pumping and study of different electrical options



Example of manual drilling by students at Crossing school, Sierra Leone

3.1 Course duration, timetable and language

The duration of the course will take approximately 3 weeks, Monday through Sunday.

The days start at 7 in the morning (especially when you have to drill and work under the sun it is important to get up early) and usually end at 4 in the afternoon, although sometimes they can be altered depending on the work to be done. Sundays are usually part-time and with simple jobs, as a theory review.

The course will be taught mainly in French, although also depending on the language spoken by the students, the classes will be translated simultaneously into English, Spanish and / or Portuguese.

Important note. The last week of the course will be focused on building and welding parts of the drilling equipment to allow for greater autonomy for the students. Also during this week specific electrical tests will be carried out on the electric pumps. Due to this and the lack of space in the workshop where these activities will be carried out, only one third of the students will be selected to stay for the 3 weeks. The rest of the students will only stay for the first two weeks.

4 Request to participate in the course (Pre-course)

This course is aimed mainly at **local personnel** who have relationships with:

- organizations that work in impoverished countries and who wish to support self-sufficiency as a way to satisfy basic needs in terms of access to water and sanitation.
- organizations that wish to contribute to food security especially through the improvement of agricultural production.
- organizations that wish to promote the generation of employment in the water and sanitation sector, and also especially in the agriculture sector, allowing families to have their orchards and create their businesses helping to improve the social and economic fabric of the region.

These organizations work in a mainly rural area and must select candidates who will later have to support them to become future water and sanitation technicians in their areas of job.

4.1 Selection criteria

1. The organization must select two candidates to attend the course, of which at least one must know how to weld. The other participant must have knowledge of masonry, carpentry or other types of mechanical work.
2. The organization must show the following videos on EMAS technologies to future candidates to get their opinion.
 - A. Video tutorials on EMAS Technologies:
 1. Summary of EMAS technologies <https://vimeo.com/51002714>
 2. EMAS pump construction . <https://vimeo.com/8365884>
 3. Manual Drilling <https://vimeo.com/8356556>
 4. Construction ferrocement tank <https://vimeo.com/8453807>
 5. heater construction Soar <https://vimeo.com/8454222>
 - B. Video Deployment of a similar project in EMAS technologies in Sierra Leone: <https://vimeo.com/111885900>
3. Candidates must build an EMAS technology they want from the previous video tutorials, either a pump (video tutorial 2) or a ferrocement tank (video tutorial 4).

The organization must attach a photo and a video (no more than 12 MB) of the technology built in the process of requesting participation in the course.

Important note: It is not important in itself that the built technology works perfectly well or not, but rather to see the interest shown.

However, otherwise selection criteria is the quality of the technology developed either for a pump or ferrocement made.



Illustration 2 Example of EMAS pump



Illustration 3 Example of jugs 50-liter

4. The organization must clearly inform the candidates that during the course they will carry out jobs that require great physical effort, such as standing for several hours, drilling and lifting weights.
5. The number total of places available for participants is 18.

4.2 Submission of applications

The request to participate will be made by the organization by completing and sending the form in annex 1 and attaching a photo and video of an EMAS technology specified in the previous section.

The address for sending the applications will be made to the following address indicating in the subject "EMAS course participation request"

asociaciontadeh@gmail.com with copy to marian.dia@ong-aida.org

5 Costs of the course

Organizers will be responsible for the cost of the course including:

- materials teaching and advertising brochures and including catalogs technologies.
- Materials and tools for the manufacture of different technologies.
- Accommodation.
- Food.

Not included in any case:

- transportation to the place where will take the course (Dioulacolon, Kolda) place. This must be carried out either by the participant or by the NGO with which he participates.
- Payment of any kind as fees.

During the course, several drilling equipment will be built that will be delivered to some participants based on the evaluation of the objectives achieved by each participant.

The objective of the delivery of this equipment is to allow them to start drilling wells among other technologies. The delivery conditions for these drilling rigs will be carried out under an agreement in conjunction with the NGO with which it participates, always guaranteeing access to water for the poorest.



Figure 4 Example of delivery of drilling equipment and diploma following a course in Sierra Leone

6 After the course (Post-course)

has been devoted a chapter exclusively to the Pot-course because of its importance in the process of implementation of EMAS technologies in a region (see section 2.2).

The reason for making a chapter Besides, it is because there is still a long way to go to implement these technologies in his region and the new water and sanitation technician needs the support of his NGO with which he participates in order to get the most out of the newly acquired knowledge.

For this reason, here are some points that the participating NGO should comply with

- Provision of a small workshop to weld another mechanical operations.
- Support for the dissemination of their work (through radio, brochures, cards)
- Possible co-financing of first wells to create demand



Illustration 5 Example of a workshop where you can weld



Illustration 6 technician Water and Sanitation Offering his services

- Regarding the way of working, it should be very clear that the drilling equipment belongs to a **single** person and that person is responsible for this drilling equipment . In this way, your assistants (since several people are needed to make a well) will be the family to whom the well is made. Thus, the family will participate in the making of the well, thus making the well cheaper, while the family learns and also has a different feeling of ownership than if it had only paid for it.
- Remember that they are wells, pumps and systems for family use.
- TADEH / EMAS will provide technical support during the implementation for the success of the project, which normally lasts several years. This includes providing all kinds of well information price, brochures to aid in dissemination, etc. ...

7 Selection of participants and other important dates

- December, 15 2021 → Last day to send questions about the call.
- January, 15 2022 → Last day to send the applications and photos and videos of the pump or little reservoir
- February 4, 2022 → Communication of admitted and not admitted to participate in the course.
- February 18, 2022 → Beginning of the course. The start of the selected students will be confirmed as soon as possible
- March 4, 2022 → Completion of the course for students not selected for the equipment construction and electrical testing part.
- March 10, 2022 → End of the course.

Annex 1. Registration form for a course in EMAS technologies in Kolda

Informations sur les ONG

Contact details of the organization (All fields are required):

Name:

Represented by:

Phone:

Adresse:

Main places of intervention:

Main plans that you have with the EMAS technology

.....

Do you have previous experience in water related projects? Could you briefly describe it?

.....

.....

Other technical questions..

a) Do you have a workplace, for example 28m²? ☐ yes ☐ no. If not, will you obtain them?

b) do you have welding tools and other metal-mechanical working tools?

Information about course participants:

Participant 1.

First name; Last name.....

Adresse:

Phone Email

Function in the NGO (if applicable):

Profession;

Questions about EMAS technologies:

1. Are you using these techniques?
2. Would you like to have an EMAS pump in your home?
3. How much would you pay to have a pump and in your house?)
4. Does this sound easy to you?
5. Do you think you could make it your job by selling these techniques to your neighbors or in other villages?
6. Other comments?
7. What are going to do with this technique?

Participant 2.

First name; Last name.....

Adresse:

Phone Email

Function in the NGO (if applicable):

Profession;

Questions about EMAS technologies:

8. Are you using these techniques?
9. Would you like to have an EMAS pump in your home?
10. How much would you pay to have a pump and in your house?)
11. Does this sound easy to you?
12. Do you think you could make it your job by selling these techniques to your neighbors or in other villages?
13. Other comments?
14. What are going to do with this technique?