



# Productive Sanitation Aguié, Niger

## Completion Report

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# 1 Introduction

The pilot project on productive sanitation “PS-Aguié” was carried out in the Aguié province in southern Niger with the main funding provided by IFAD<sup>1</sup> (200 000 \$). CREPA<sup>2</sup> was the main implementing organization in collaboration with PPILDA<sup>3</sup> and SEI<sup>4</sup>. The total project budget was 272 000 \$ including the project partners’ contribution.

The overall goal of the project was to improve agricultural productivity to ensure more food security and health for smallholder farmers through PSS (Productive Sanitation Systems).

The project specific objectives were:

1. PSS are accepted and have measurable effects on food production in the pilot communities (comparative analysis with other fertilizers or non fertilizers)
2. Other actors in the field of sanitation/agriculture integrate the concepts of PSS in their work and policies

The vision was that the results from the project in Aguié would stimulate interest and enable uptake of the productive sanitation approach by PPILDA and other IFAD projects as well as by other institutions and organizations in the field of sanitation, agriculture, food security and poverty alleviation.

The will and ability of external actors to replicate the productive sanitation approach depend on the success of the field work in the project but also on the quality of the project capitalization. Therefore an important part of the project was elaborating guides and manuals on low cost productive sanitation with emphasis on reuse. This was complemented by outreach on local, national and international level. The organization of a study visit with participants from six African countries in the end of January 2010 was the final major event of the project.

The PS-Aguié project started officially the 21<sup>st</sup> of October 2008 and finished the 28<sup>th</sup> of February 2010, after a no cost extension to finish off the activities. This completion report summarizes the project execution with information on the activities, the project costs, the level of accomplishment of project goals and objectives, the results and the benefits derived and to be derived from the project.

Before addressing the project activities and outcomes, the concept of productive sanitation is first described in the following section of the report.

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<sup>1</sup> International Fund for Agriculture Development

<sup>2</sup> Centre Régional pour l’Eau Potable et l’Assainissement à faible coût

<sup>3</sup> Projet de Promotion de l’Initiative locale pour le développement à Aguié

<sup>4</sup> Stockholm Environment Institute

## 2 Productive Sanitation

### 2.1 Definition

Productive sanitation is about the safe and productive reuse of human excreta in agriculture.

Often the synonym ecological sanitation is used which has been defined by EcoSanRes<sup>5</sup> in this way: “*Ecological sanitation systems safely recycle excreta resources (plant nutrients and organic matter) to crop production in such a way that the use of non-renewable resources is minimised*”.

The long term sustainability of sanitation interventions in general has often been quite poor. There is now a growing awareness of the different aspects that need to be considered to achieve a better sustainability. EcoSanRes definition of sustainable sanitation is: “*Sustainable sanitation systems protect and promote human health, minimise environmental degradation and depletion of the resource base, are technically and institutionally appropriate, socially acceptable and economically viable also in the long term*”.

The definition of ecological sanitation is focusing on the health, environment and resource aspect of sustainable sanitation. Thus ecological (productive) sanitation is not, per se, sustainable sanitation, but ecological sanitation systems can be implemented in a sustainable way and have a strong potential for sustainable sanitation, if technical, institutional, social and economical aspects are cared for appropriately.

### 2.2 Plant nutrients in human excreta

Food security and sanitation are two foundations of human well being. There is also a strong link between these two domains, as the plant nutrients in the food consumed by humans are then found in our excreta, i.e. urine and faeces. For Aguié the excreta from a family of nine contain nitrogen (N) and phosphorous (P) corresponding roughly to 50 kg of NPK and 50 kg of urea each year<sup>6</sup>. In Niger this is worth around 80\$ US depending of course on the current fertilizer price.

It may be surprising that essentially the same quantity of nutrients consumed will be excreted, but this realization is a key to understand the potential of human excreta recycling. In our food most of the N and P is found in the proteins. The part of the nutrients in the food that is not absorbed in our intestines is excreted with the faeces. The main part is however taken up and the body uses the amino acids of the proteins to repair and build up our cells. However the rate of construction is normally equal to the rate of degeneration and the cellular “waste products” are filtered out from the blood by our kidneys and excreted as urine. A growing human body will incorporate

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<sup>5</sup> EcoSanRes is a program at SEI working with research, capacity building and communication on sustainable and ecological sanitation

<sup>6</sup> See Dagerskog, L., Kailou, H., Issoufou, H., 2009, L’assainissement productif à Aguié, Niger : le secteur agricole prend le Volant, West Africa Regional Sanitation and Hygiene Symposium, 3-5 Nov 2009, Accra, Ghana.

<http://www.irc.nl/redir/content/download/146393/475789/file/Linus%20Dagerskog.doc>

and accumulate a minor part of the nutrients (roughly 5%), but in general what comes in will also come out<sup>7</sup>. This means that the excreta from one human being contain the same amount of nutrients the plants took up from the soil to produce the food for this human being in the first place. Recycling of human excreta is then an important part of maintaining soil fertility. This recycling is also known as “closing the loop” between humans and soil.

Of course there are other aspects of nutrient management that farmers are concerned with and know a lot about such as the recycling animal manure, plant residues and kitchen organic waste as well as soil and water conservation techniques. But the fate of nutrients taken away from the field with the harvest destined for human consumption is often neglected. The net loss of nutrients from the field often leads to dependence on external inputs to maintain fertility. Those who can afford it buy commercial fertilizers, but poor farmers that mainly farm for subsistence often have no choice but to rely on the use of local resources, and for them recycling of human excreta can make a difference. It is often the poorest part of the population that also have the lowest access to sanitation. The improper management of human excreta is a major factor of poor health in the developing world, causing the death of about 1,8 million people per year, mostly children<sup>8</sup>. In Niger for example 26400 children die each year due to diarrhoea<sup>9</sup>.

In a broader perspective the question of nutrient recycling from human excreta is also becoming an urban/rural issue. Today more than 50% of the world population live in cities<sup>10</sup>. This means that over half of the food produced is transported into urban areas. The return flow of nutrients in human excreta is a huge challenge. In the urban setting households have no incentive to reuse human excreta since they are often not growing food, and hence the system of collection, treatment and delivery of human excreta has to be financed externally either by the end user or by subsidies. For this to happen in a safe and structured way, there needs to be policies and regulations in place which today are mostly lacking.

However recycling of human excreta in the rural setting has several advantages, as the transport distances are shorter, and the households have an incentive to recycle in order to grow more food.

### **2.3 Danger of human excreta**

A safe reuse is based on treatment of the human excreta and safety measures during the application. It is important to know the sanitary risks and how to minimize them.

*Feces*: Human feces can contain many types of pathogens and reflect the general infection prevalence of the population. Poor feces management can transmit pathogenic viruses, bacteria, cysts of protozoa and eggs of helminthes. The pathogens

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<sup>7</sup> For a broader description on this issue see Jönsson et al (2004), “Guidelines on the use of urine and feces in crop production” [http://www.ecosanres.org/pdf\\_files/ESR\\_Publications\\_2004/ESR2web.pdf](http://www.ecosanres.org/pdf_files/ESR_Publications_2004/ESR2web.pdf)

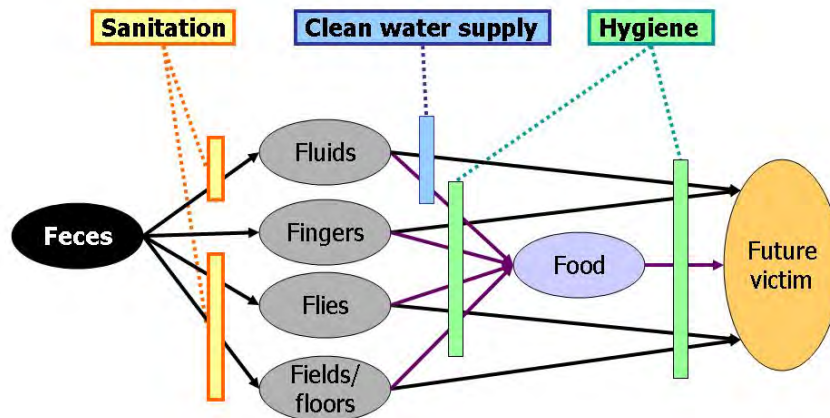
<sup>8</sup> According to the WHO facts and figures 2004:

[http://www.who.int/water\\_sanitation\\_health/factsfigures2005.pdf](http://www.who.int/water_sanitation_health/factsfigures2005.pdf)

<sup>9</sup> UNICEF/WHO (2009): Diarrhoea: Why children are still dying and what can be done, [http://whqlibdoc.who.int/publications/2009/9789241598415\\_eng.pdf](http://whqlibdoc.who.int/publications/2009/9789241598415_eng.pdf)

<sup>10</sup> UNFPA (2007), “State of the world population 2007 – Unleashing the Potential of Urban Growth” <http://www.unfpa.org/swp/swpmain.htm>

are normally transmitted by the fecal to oral transmission routes via contamination of the hands, food, water or other liquids (Figure 1).



**Figure 1** The F-diagram showing the main pathways of fecal disease transmission and protective barriers<sup>11</sup>

*Urine:* Urine is normally sterile, but can contain salmonella and bilharzias if the person is infected. The main risk for the manipulation and reuse of urine comes from cross contamination of feces and not from the urine itself. WHO has concluded that pathogen transmission via urine is not a public health problem<sup>12</sup>.

*Comparing urine and feces:*

- **Volume:** A human produces around ten times more urine (~500 l/year) compared to feces (~50 l/year)
- **Pathogens:** Feces is by far the major source of pathogens
- **Plant nutrients:** The majority of nitrogen and potassium consumed is excreted via the urine. The distribution of phosphorous seems to be more equally distributed between urine and feces. Feces, rich in organic matter are a good base fertilizer while urine is a predominantly fast acting nitrogen fertilizer. See the compendium by Jönsson (2004)<sup>13</sup> for more information.

## 2.4 Treatment of human excreta

There are many ways to reduce the pathogen load of human excreta. In poor rural settings it is important to identify and apply simple, cheap and safe methods that can be effective, acceptable and scalable. Considering the different characteristics of urine and feces there are advantages in collecting and treating them separately. It facilitates treatment and also helps to retain a maximum amount of nutrients in the urine, which risk infiltrating or evaporating if mixed with feces. The separation also reduces problems with odors and flies. Urine separation does however introduce a higher complexity in the system, since people are not used to separation and there is a need for some kind of piping of urine to the recipient.

<sup>11</sup> World Bank Sanitation Water and Hygiene Resource Guide, see [www.worldbank.org](http://www.worldbank.org)

<sup>12</sup> The WHO guidelines from 2006 on the productive reuse of human excreta and greywater can be found here: [http://www.who.int/water\\_sanitation\\_health/wastewater/gsuweg4/en/index.html](http://www.who.int/water_sanitation_health/wastewater/gsuweg4/en/index.html)

<sup>13</sup> Jönsson et al., 2004, "Guidelines on the use of urine and faeces in crop production" (EcoSanRes Report 2004-2), Stockholm, Sweden, SEI

In Aguié simple urinals were used as a complement to the urine diverting latrines (Figure 2).

#### *Treatment of feces*

Two common methods for the sanitization of feces is either composting which in Aguié was used in the « composting toilet » or drying which was used in the « dry toilet ». To avoid manipulation of non-sanitized feces, the latrines had two pits, used in an alternate fashion.

- The composting toilet: The two pits are 1-1,5 m deep. Once a pit is full, the feces are composted for at least 12 months before emptying. The composting is stimulated by the regular addition of soil, leaves and straw. The anal cleansing water can go into the pit as well. To avoid too much liquid in the pit, urine was diverted on the slab and collected separately (Figure 3). In a culture where anal cleansing water is not used, the urine could go into the pit, but with a certain loss of especially nitrogen through evaporation and infiltration.

- The dry toilet: The vaults are constructed off the ground to accelerate the drying process. After filling up one pit, the feces are dried in the vaults during at least six months before emptying. The drying and pathogen reduction is stimulated by the addition of ash after each defecation. Urine is diverted into a jerry can and the anal cleansing water is canalized and infiltrated outside of the cabin to keep the vault contents as dry as possible (Figure 4).

#### *Treatment of urine*

Urine can be treated by simple storage in closed containers. In stored urine the pH rise to ~9 with the dissociation of urea to ammonium/ammoniac, this helps to eliminate eventual pathogens. The WHO guidelines (see footnote 12) mention that bacteria and parasites are inactivated by one month at storage of 20°C. However certain viruses can persist. The Niger climate, with high temperature is favorable to a more rapid deactivation of pathogens during storage.

In the case of family level reuse of urine the WHO guidelines state “*for an individual one-family system and when the urine is used solely for fertilization on individual plots, no storage is needed*”. The disease exposure within the family in their day to day activities is high compared to using their urine (non-stored) as fertilizer, which renders storage unnecessary. However in the Aguié project, urine was collected from several families and the harvest is often sold. So storage of at least one month was initially recommended.



**Figure 2.** A jerry can, a funnel and light bulb can make a simple urinal. Dug down it is adapted for the squatting position.



**Figure 3.** The composting latrine (Fossa Alterna) with urine diversion.



**Figure 4.** The dry toilet off the ground in local material except the slab and the vent pipe.



## 2.5 Reuse of treated human excreta

The correct containment and treatment is the first and important “barrier” to pathogen contamination from human excreta. The WHO guidelines emphasize the importance of multiple barriers along the sanitation chain to minimize the risks. The reuse of urine and faeces should therefore be done with some precautions, both by using some protective gear and in the mode and timing of application. Regarding protective gear in Aguié, the project supported the farmers with gloves and mouth protection.

The two types of «human fertilizers», sanitized feces and urine have different agronomic characteristics and complement each other well. Feces are especially rich in phosphorous and organic material and can replace NPK as a base fertilizer. The urine is predominantly rich in nitrogen and can replace urea as a fast acting fertilizer to be used during plant growth.

*Feces* : The sanitized feces should be applied before planting and worked into the soil to reduce exposure. Feces can be dosed according to phosphorous content of the feces and the local recommendations of phosphorous dose. The recommendation in Burkina Faso<sup>14</sup> has been around 50-500 g of feces/m<sup>2</sup> depending on the crop.

*Urine* : The plant nutrients in urine are in mineralized form. The urine is applied to the soil and not on the plants. Figure 5 displays different common ways of applying urine. First a small furrow or hole is made around 10 cm from the plant. Urine is applied and the furrow or hole is closed to avoid ammonia losses. The urine is then watered down to dilute it and avoid toxic effects to the roots. In some projects the urine is first diluted which also works fine, if the total urine quantity remains the same. For cereal crops, the urine can be applied after a good rain instead of watering down.



**Figure 5.** The application can for example be done with a watering can, a bucket and a cup or directly from the jerry can

Urine contains about 5 g/l of nitrogen. The total dose is about 0,5-2 litres per plant according to the nitrogen need. Like urea, urine is often applied in several fractions.

For vegetables eaten raw, WHO proposes a one month with-holding time between application and harvest. Concerning the pathogen die-off in the environment WHO states “...the precise values depend on climatic conditions, with rapid pathogen die-off in hot, dry weather and less in cool or wet weather without much direct sunlight (approximately 0.5 log units per day).” The hot dry climate in Niger allows for a faster reduction of eventual pathogens and a delay of two weeks was considered to be enough in the Aguié context.

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<sup>14</sup> From CREPA’s EcoSan Info newsletter # 14, September 2008

## 2.6 The productive sanitation system

In many conventional sanitation interventions the focus has been on the provision of a toilet/latrine, and not on the full system of containment, treatment, transport and reuse of excreta. If there is not a plan for what should happen once the pit is full, there will inevitably be problems with either unsanitary pit emptying/disposal/reuse or a return to open defecation.

In the productive sanitation system the full chain is kept in mind, where the toilet is only one part of the chain. In Aguié the villagers were informed and trained using participative methodology on the importance of using the toilet, but also on the treatment and the reuse, and how to reduce risks in the sanitation system. This also includes important hygiene measures that should accompany all sanitation interventions such as hand washing practices. Other important hygiene aspects are the household handling of food and water.

The WHO guidelines from 2006 include a table with the effect of different barriers along the sanitation reuse chain (Table 1). It can be seen that the main barriers are the storage/treatment and the with-holding time between application and harvest. Cooking the food is also a very efficient way of reducing pathogens.

**Table 1.** The pathogen reduction effect of different barriers in the sanitation system (source WHO guidelines 2006)

Barrier	Pathogen reduction (log)	Pathogen reduction (%)
Storage of excreta (urine and faeces) according to the guidelines	6	99,9999
Incorporation of the urine and feces into the soil	1	90
A month with holding time between last application and harvest	4-6	99,99 – 99,9999
Wash the produce with water	1	90
Use a disinfectant and then wash the produce with clean water	2	99,9
Peel the produce	2	99
Cooking the produce	6-7	99,9999-99,99999

The productive sanitation approach addresses both the health and the recycling aspects. Containment and treatment is important to allow for a safe recycling. In this way pathogens are reduced and not spread out in the environment as would be the case with open defecation or other types of sanitation which do not consider the full system. The approach also tries to retain a maximum amount of nutrients in the excreta, and emphasizes the necessary training for an optimal application of treated excreta, both from agronomic and health point of view. In this way the population benefit from improved health and improved agricultural production in a safe way.

## 2.7 Productive sanitation in West Africa and Niger

Research on the efficiency of urine and feces as fertilizers have been undertaken in many places, like Sweden, Germany, Finland, China, India and Zimbabwe, and since 2002 in the ten countries in West Africa included in CREPA's regional EcoSan program. Burkina Faso and Côte d'Ivoire have now the most interesting initiatives,

with several larger scale projects. In Burkina Faso there are two large scale “food security” projects financed by the EU that combines productive sanitation with soil and water conservation methods. In Côte d’Ivoire some agro-industrial companies have started look into the approach, and SAPH (rubber tree industry) has built hundreds of urine diverting dry toilets in the workers’ villages to improve sanitation but also for trials with urine as a fertilizer for use in the nurseries and to enrich composts.

In Niger, CREPA was supported by the agronomic faculty at the University of Niamey with field testing of urine as a fertilizer in connection to the EcoSan demonstration project in Torodi 2006-2007. The PS-Aguié project is the first productive sanitation project in Niger at a certain scale, reaching 1143 households in the Aguié province.

## 3 Activities and results

### 3.1 Project setup

This pilot project was developed on the basis of parallel discussions that had been ongoing between CREPA Niger and PPILDA, between CREPA HQ and IFAD and between SEI and IFAD. With guidance from Laurent Stravato at the IFAD Technical division, CREPA HQ conceived the project proposal that was in the end granted and involved all organizations, with different areas of expertise and tasks in the project:

- CREPA: Coming from the sanitation sector, but with expertise in ecological sanitation since several years, CREPA was the main implementing organization and coordinator the project. CREPA HQ was set to coordinate the project to draw on the experience from the whole CREPA network and also being able to assure an efficient bilingual communication with all project actors. CREPA Niger was employing and supporting the local team in many different ways.
- PILDA: With good local knowledge and strong agriculture expertise PPILDA was the host organization of the local team and helped to facilitate the field work. PPILDA was also the relay organization that would continue to build on the results achieved in the project.
- SEI: With ten years of ecological sanitation research, demonstration, capacity building and communication on international level, SEI was mainly responsible for international outreach and communication, as well as scientific backstopping. SEI was also in charge of developing certain tools and financed a gender evaluation of the project.

With IFAD being the main donor of the project, there was a specific focus on participative agriculture production and pro-poor low cost technologies.

The project was carried out in the Aguié province in southern Niger, in the same intervention zone as PPILDA (Figure 6)

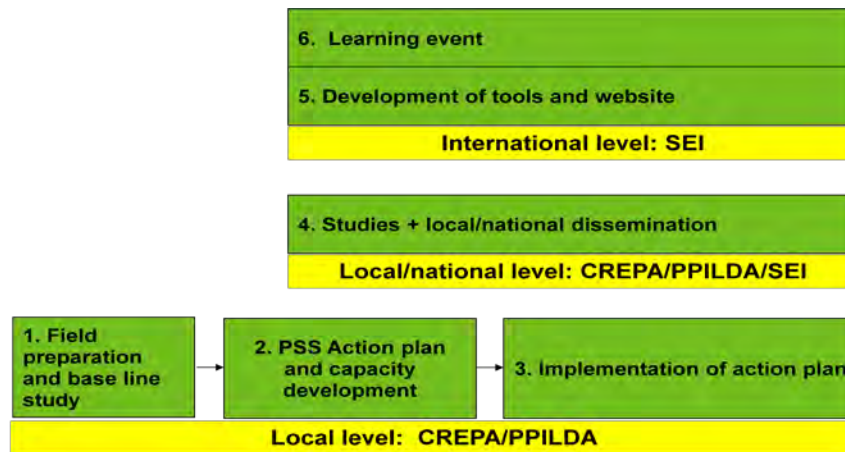


Figure 6. The location of Aguié in southern Niger on the border to Nigeria

Agreements were signed between CREPA Niger and PPILDA as well as between CREPA HQ and SEI to regulate the responsibilities of each organization.

### 3.2 Overview of activities and the modifications during the course of the project

The six main activities in the project were implemented on different levels (Figure 7). Activity 1-3 concerned the field work on local level, activity 4 the studies and local/national dissemination and activity 5-6 concerned the development of tools and website as well as the learning event.



20 Oct. 2008 → 28 Feb. 2010

Figure 7 The six main project activities at local, national and international level

During the course of the project there were certain modifications. Originally the project should have been finished by the 31 of December 2009, but seen the importance to continue over one more vegetable season, it was prolonged until the 28<sup>th</sup> of February. Table 2 summarizes planned project activities and modifications:

**Table 2** Planned project activities and modifications

<b>Project activities according to contract</b>	<b>Modification</b>
<b>Activity 1: Field work preparation</b>	
1.1 Choice of villages together with PPILDA (based on favourable local conditions)	-
1.2 Preparatory meetings with local authorities	-
1.4 Setting up of project office and team	-
1.3 Base line study on present socio-economic, sanitation and agricultural situation	-
<b>Activity 2: Development of PSS action plan for each village and capacity building of local team</b>	
2.1 Base line study validated locally and detailed action plan elaborated	-
2.2 Establishment of a local project committee	A formal local project committee was not seen as a priority by PPILDA. The local project team was working in direct relation with the facilitators, village chiefs and used community meetings when decisions were to be made. The community organizations that PPILDA is relying on, especially the PIP (farmer field schools) were also used in the project. Representatives from local authorities as well as civil society and the private sector were invited to all the major events, including planning and evaluation events.
2.3 Elaboration of awareness raising toolkit (PHAST) adapted to local setting and need	-
2.4 Elaboration of guides for building and maintaining basic urinals, compost toilets and grey water reuse systems	In the end very little emphasis was given to grey water in this project. A couple of smaller examples of grey water reuse were done in Saja Manja, but the focus of the project was managing excreta.
2.5 Elaboration of guides for safe handling and appropriate application of human fertiliser	-
2.6 Participative selection of local facilitators and artisans	-
2.7 Training of local facilitators (PHAST) and artisans	-
<b>Activity 3. Implementation of PSS action plan</b>	
3.1 Organizing awareness raising workshops in the villages	-
3.2 Conducting awareness raising activities on household level in each village	-
3.3 Provision to households of necessary equipment	-
3.4 Participative practical training on using urine as a nitrogen fertilizer in each village	-
3.5 Participative evaluation of agronomic results	-
3.6 Regular follow up on use of the sanitation installations	-
<b>Activity 4. Evaluation and dissemination of project results</b>	

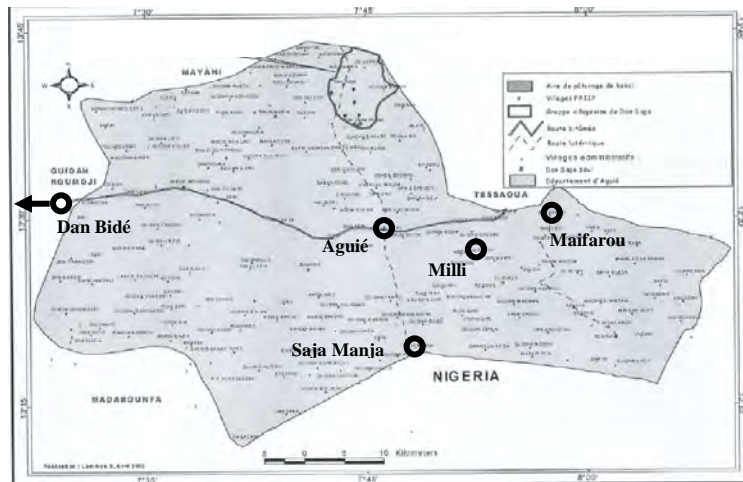
<b>Project activities according to contract</b>	<b>Modification</b>
4.1 Conducting agro-economic and health studies as well as study on urine and soil quality	-
4.2 Evaluation of the project implementation process	-
4.3 Local dissemination of the study results	-
4.4 Dissemination of results to IFAD Programme Managers	-
<b>Activity 5. Development of tools and materials to facilitate replication and up-scaling</b>	
5.1 Production of a simplified PSS model	-
5.2 Production of PSS dissemination and policy dialogue materials	-
<b>Activity 6 Development of an international learning platform</b>	
6.1 Setting up a high-impact expert team	It was agreed by all partners to cancel this activity. It was deemed too ambitious regarding the short period of the project. Liberating some funds here, made it possible to extend the project period with two months which is needed to: <ul style="list-style-type: none"> <li>- Support the tests of urine as a fertilizer on a second cycle of vegetables, consolidating the results from the first year</li> <li>- Organizing the visit by FIDA project directors in the end of January 2010, which is a good time to see the results from the vegetable season</li> <li>- Allowing for a completion all the latrines, which was interrupted by the rainy season</li> </ul>
6.2 Establishing and animating the learning platform on PSS systems	This activity was changed into a learning event which was held during the World Water Week in Stockholm, the 19 <sup>th</sup> of August 2009.

A monitoring and evaluation manual was also conceived in the beginning of the project with help from PPILDA to facilitate the follow up of the project results. This manual is among the project documents listed in Annex 1.

### 3.3 Activity 1. Field work preparation

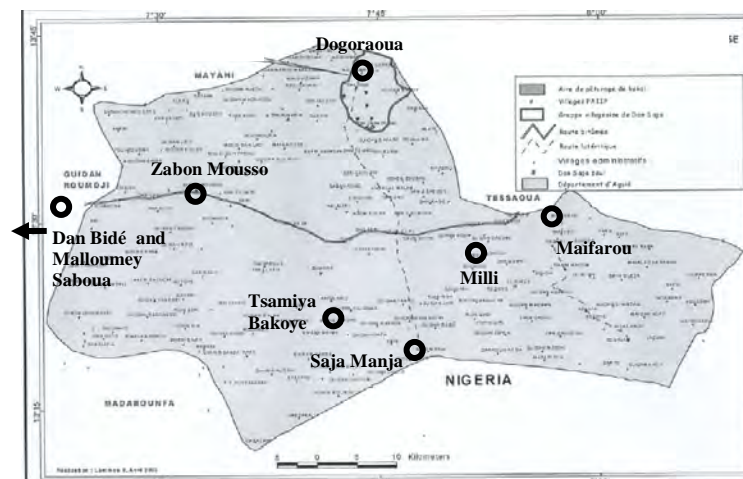
#### 3.3.1 Choice of villages together with PPILDA (based on favourable local conditions)

PPILDA selected five villages for the first dry season. Of these, four villages also hosted tests during the rainy season. Another three villages were selected for testing urine during the rainy season, which later was complemented by a fourth village that was particularly interested in testing the approach. All in all nine villages have been involved in testing urine as a fertilizer (Figure 8). Another two villages neighbouring to Dogoraoua and to Saja Manja have also started urine collection which makes a total of eleven villages.



#### Dry season (vegetable tests):

Aguié  
Dan Bidé  
Maifarou  
Milli  
Saja Manja



#### Rainy season (cereal test):

Dan Bidé  
Maifarou  
Milli  
Saja Manja  
Dogoraoua  
Tsamiya Bakoye  
Zabon Mousso  
Malloumey Saboua

Figure 8 Villages involved in testing urine as a fertilizer in the Aguié province

#### 3.3.2 Preparatory meetings with local authorities

A launching workshop was organized the 27<sup>th</sup> of October 2008 with participants from IFAD, PPILDA, CREPA, SEI, the prefecture, municipalities, villages, religious leaders, agriculture authorities and representatives from the health and education sectors in the Aguié department. A tour was also organised in targeted PPILDA villages together with the PPILDA director to analyze the context where the project will be implemented and to present it to the local communities.



The photos on the next pages are from this first “launching mission” that took place in Aguié th 25<sup>th</sup>-28<sup>th</sup> of October 2008.

**Key aspects of village visits with the PPILDA director :**

- The presence of the Director showed that PPILDA is supporting the new approach
- Photos showing production with and without urine was shown to the villagers which caught their interest

**Key aspects of the launching workshop:**

- The presentation by Dr Bonzi on the PS experiences in Burkina Faso
- The marabout (religious leader), who reminded the participants that the fields closest to the village where people relieve themselves always produce better than the fields further away.
- The proposal to give the name « Takin Ruwa » (liquid fertilizer) for sanitized urine and « Taki Bussasché » (dry fertilizer) for sanitized faeces.



PPILDA's site in Aguié



Cheibou Guéro  
Director du PPILDA



Dr Moussa Bonzi  
CREPA



Laurent Stravato, IFAD and  
Linus Dagerskog, CREPA HQ



Saley Kanta, PPILDA



Cecilia Ruben, SEI



Issoufou Hadidjatou  
CREPA Niger



Kailou Hamadou  
CREPA Niger



Visiting the pilot villages



The millet harvest 2008



Wells constructed by PPILDA for irrigation during dry season



Nursery for vegetable production



Explanation of the reuse of urine



Mr Guéro, Director of PPILDA, headed the meetings in the villages



Information workshop on Productive Sanitation with local authorities, representatives from health, education, agriculture, NGOs and farmers.





Practical session – urine application on fruit trees at the PPILDA office



Dr Bonzi gives instructions



Step 1 : Make a furrow around the tree



Step 2 : Apply around one liter of urine (per week)



Step 3 : Water down to make the urine enter into the soil



Step 4 : Close the furrow

### 3.3.3 Setting up of project office and team

A local project team composed of one coordinator (agronomist), one technician and one sociologist was set up. Office and necessary working tools were provided. The main coordinator from CREPA HQ and the supporting staff from CREPA Niger and SEI were also identified.

#### CREPA contracts for project

Name	Institution	Role in the project	Months of contract	Period of contract
Linus Dagerskog	CREPA HQ	Main coordinator	10	Ten months within the period 15 Jan 2009 – 15 Jan 2010
Issoufou Hadidjatou	CREPA Niger	Local coordinator/agronomist	15	1 Dec 2008 – 28 Feb 2010
Alassane Kane	CREPA Niger	Local sociologist	13	21 Dec 2008 – 31 Jan 2010
Ibrahim Sayabou	CREPA Niger	Local technician	13	21 Dec 2008 – 31 Jan 2010

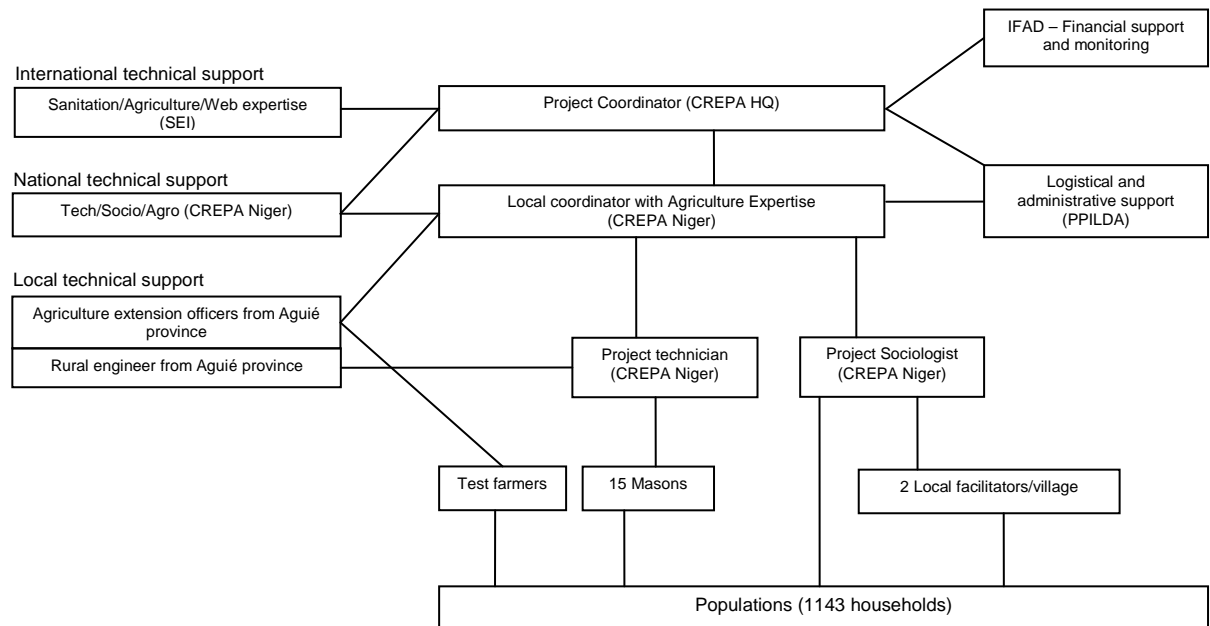
The local team worked in close collaboration with several local actors :

- The PPILDA technician of component 1. Component 1 of the PPILDA project works with innovations that once tested and evaluated are disseminated through component 2.
- The CDA (Chef District Agricole) who are the local agriculture extension officers. They were involved in the supervision of the tests with urine at the vegetable sites and the PIP (the PPILDA farmer field schools). These agents had contracts with PPILDA for supporting various PPILDA activities, including the productive sanitation project.

- The provincial rural engineer in Aguié was involved in the supervision of latrine construction and had a specific project with the project. Involvement of the local authorities was deemed important in order to strengthen their capacity and prepare for a large scale dissemination of the approach in Aguié.

CREPA Niger was specifically involved in the different training sessions and in the elaboration of tools and guides for the masons and the village facilitators.

The organization chart of the project is shown in Figure 9:



**Figure 9** Organization chart of PS-Aguié



**Figure 10.** The local team taste the first urine fertilized carrots in Dan Bidé :  
 Alassane Kané, Sociologist PS-Aguié  
 Mahamane Adamou, Agronomist/technician PPILDA  
 Ibrahim Sayabou, Technician PS-Aguié  
 Issoufou Hadidjatou, Local coordinator and agronomist PS-Aguié

### 3.3.4 Base line study on present socio-economic, sanitation and agricultural situation

20 households per village (in the five selected pilot villages) were interviewed for the base line study (total 100 hh out of 780 hh = 13 %). Two focus groups in Dan Bidé and Aguié complemented the results from the household interviews.

#### Main results:

100% of the participating households are Muslim. From a sanitation point of view this implies:

→ *Use of water for cleansing after defecation and urination. The latrines have to be adapted to water use.*

→ *Belief that urine is «dirty». Extra emphasis has to be made on explaining that storage treats the urine and that the odour of sanitized urine indicates the presence of fertilizer (ammonia).*

→ *Men urinate in the squatting position. The urinals have to be adapted to the squatting position.*

89% of the household heads cite agriculture as their main activity. 100% of the households have agriculture as a source of income.

→ *Productive sanitation is potentially useful for all households.*

Calculating the fertilizer quantity in the excreta in Niger based on the food intake reveals:

→ *The average family in the Aguié department (9 persons) produce via their urine and faeces an annual quantity of nitrogen and phosphorous equivalent to one 50 kg bag of urea and one 50 kg bag of NPK (15:15:15).*

The average annual quantity of fertilizer purchased per household was:

- Urea : 25 kg
- NPK : 21 kg

→ *Complete reuse of human excreta represents a substantial increase in fertilizer input*

75% of the households in the rural villages do not have a latrine and practice open defecation in the fields. However the vast majority of households urinate in the shower or the space designated for ablutions.

→ *In the Aguié Productive Sanitation project, it is especially urine collection that will have a positive impact on the nutrient flows in the villages. Concerning faeces, the ecological latrines, if well used, will provide a more efficient faeces reuse compared to open defecation. The controlled reuse will also be less risky and diminish the pathogen exposure due to the elimination microorganisms.*

In general the household chiefs are aware of the danger in excreta; however more think that urine is dangerous (83%) compared to faeces (80%).

→ *Awareness raising on the danger of fresh faeces is important and on the more limited health risk of fresh urine*

100% believe that faeces contain fertilizers, compared to 94% for urine. 96 % confirm to have seen the fertilizing effect of human excreta. 87 % cite the fields closest to the village as example.

→ *Taking the example of the fields closest to the village is useful when raising awareness on fertilizer effect of excreta. PS will improve the « traditional » or anarchic recycling by considering hygienization before reuse.*

The main agriculture problems cited in the survey are parasite attacks and the cost and availability of chemical fertilizer.

The study shows a strong interest in PS. After explanations of the PS concept:

- 99% are interested by a urinal
- 98 % are interested by a latrine
- 100% think that the agricultural tests with hygienized urine are interesting
- 98% are ready to test hygienized urine in within the context of the project
- 90% are ready to consume the crops after fertilization with hygienized urine and faeces.

→ *Productive sanitation corresponds to the needs and demand of the rural populations.*

The average distance between the house and the field is 2,3 km. 80 % propose that they will use a donkey cart to transport the PS fertilizers.

→ *The distance to the fields could be a limiting factor for the direct reuse of urine*

The full report is listed in Annex 1.

### **3.4 Activity 2. Development of PSS action plans and capacity development**

#### **3.4.1 Base line study validated locally and detailed action plan elaborated**

The restitution of the base line study was done in all the first five pilot villages (Figure 11). The results on the general findings were shared as well as the findings on sanitation, agriculture production and the perception of productive sanitation. The villagers were also informed about the fertilizer value of urine and feces (Figure 12) and on how the continued support would look like – the type of latrines, the cost and the acquisition procedure.



**Figure 11** The project team shares the base line study results with the villagers from Milli



**Figure 12** A family of 9 produce excreta equivalent to two bags of fertilizer each year!

**The key aspects of the sharing of the base line study:**

- Occasion for the villagers to share the local realities and validate the results in the base line study.
- Occasion to clarify for the villagers that the households who took part in the baseline study are not favored for the rest of the project.
- Opportunity to explain how the project will support the village for further PS implementation.

The action plan was developed and is summarized in Table 3:

**Table 3** Overview of the productive sanitation action plan

Domain	Subject	Information	Comment
<i>General</i>	<i>Involved villages</i>	Five villages with vegetable production Three more villages for the rainy season In total 8 villages  The « new » villages will only benefit from urinals (around 50 per village)	
<i>Technology</i>	<i>Sanitary installations to promote</i>	Around 200 latrines and 750 simple urinals  Simple urinal kit = 1 funnel, 1 light bulb and 8 jerry cans  Dry toilet : Double vault with urine diversion  Composting toilet : Twin pit with urine	All installations receive 8 jerry cans (1,5 \$ per jerry can).  The urinal is fully subsidized (1,5 \$ for funnel and light bulb) and the



Domain	Subject	Information	Comment
		<p>diversion</p> <p>The households who construct a toilet also benefit from a funnel and light bulb so they can put a urinal in the shower area. This makes a total of 750 urinals.</p>	<p>latrines are subsidized with 40-50 \$.</p> <p>The latrine subsidy concerns the imported material and the cost of the mason. The household take on unskilled labour and local material (sand, gravel, water, clay bricks etc)</p>
	<i>Distribution between villages</i>	<p>All households in the villages that so desire can have a urinal.</p> <p>Between 30-50 toilets will be constructed per village depending on village size and demand</p>	<p>At least 30 toilets per village – the rest will be in proportion to size and demand</p>
	<i>Supporting the most vulnerable</i>	<p>The households considered extremely vulnerable will benefit from a supplementary subsidy = mud bricks and clay for the substructure.</p>	
	<i>Procedures</i>	<p>Urinals: Demand to local facilitator, delivery of funnel+light bulb + 4 jerry cans. Follow up to ensure the good use and then delivery of the last 4 jerry cans.</p> <p>Toilets: Demand to local facilitator, 10 days to mobilise the household contribution, delivery of project contribution, construction by village mason, validation by technician, follow up on good use, delivery of the last 4 jerry cans.</p>	
<i>Socio</i>	<i>Awareness raising tools</i>	<p>The PHAST method (picture based method used to induce change in hygiene and sanitation behaviour) will be used with the hiatus history, three piles of cards and the contamination routes. The traditional tools will be complemented with images that shows fertilizers in excreta and photos that describe the PS chain (from soil – plant – food – humans – excreta – soil...)</p>	
	<i>Local facilitators tasks</i>	<ul style="list-style-type: none"> <li>- Register demand</li> <li>- Awareness raising sessions during village – meetings and during markets with smallholder farmers</li> <li>- Door to door promotion and awareness raising</li> <li>- Follow up on the households with urinals and latrines (at least once per week until a good use is confirmed)</li> </ul>	
	<i>Evaluation of PS use</i>	<p>Each trimester the beneficiaries will be evaluated on a certain number of criteria to assess the good use of PS :</p> <ul style="list-style-type: none"> <li>• Use of toilets/urinals</li> <li>• Storage</li> <li>• Reuse</li> </ul>	<p>The household is given a score from 1-3 in each PS step based on criteria that have been defined to indicate good use.</p>

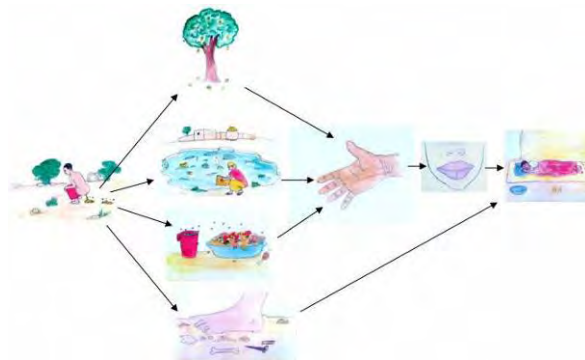
Domain	Subject	Information	Comment
Agro	<i>Reuse tools for the households</i>	The households will benefit from gloves, mouth protection, a bucket and a mug to facilitate the application of the Takin Ruwa (sanitized urine)	Considering the low quality of the watering cans, the project has opted for buckets and mug instead.
	<i>Training for households</i>	All beneficiaries should receive training on urine application.	
	<i>Demonstration sites</i>	7 villages will have so called PIP (Farmer Initiative Plots). PPILDA use PIP to disseminate innovations to farmers in a participative way	

### 3.4.2 Establishment of a local project committee

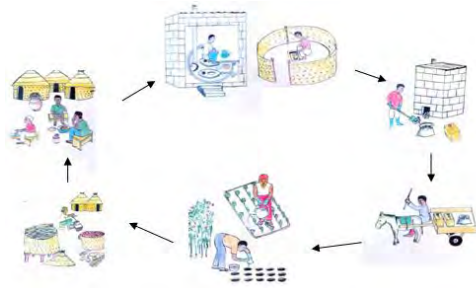
This activity was deemed unnecessary (see explanation in Table 2).

### 3.4.3 Development of awareness raising toolkit (PHAST) adapted to local setting and need

The PHAST tools helped to transmit the main productive sanitation messages in a participative way using pictures. The tools were designed to convey the message of the danger in excreta (Figure 13) as well as the fertilizer value (Figure 14). The sociologist at CREPA Niger used the training in SARAR/PHAST of the local actors to design the animation guide and the tools that would suit the local setting.



**Figure 13.** The images of the tool « Transmission routes”. This tool is complemented by the tool showing the sanitary barriers for each transmission route



Images de for the « Fertilizer circuit » tool



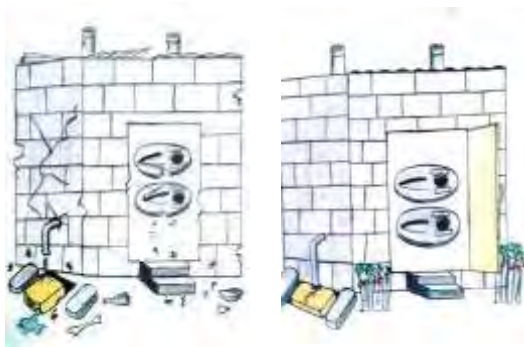
The tool « Fields close and far away from the village »



The tool « One family = two bags of fertilizer per year »

**Figure 14.** The tools for the understanding of resources in excreta.

The understanding of these two characteristics of excreta is fundamental. After this initial understanding comes the ability to handle the sanitation chain of collection, storage and reuse. This is facilitated by other PHAST tools like “Histoire Hiatus” and “Three piles of cards”:



« Histoire Hiatus » is composed of two images that show the good and the bad example, in this case the maintenance of a latrine.



« Three piles of cards » is here applied on the storage of jerry cans. In one case the cans are stored without cap, in another they have holes and finally an image with intact jerry cans. The participants rank the different cases according to bad, medium and good.

**Figure 15** Two types of tools used by the local facilitators to convey knowledge on the collect (use of latrine) and storage.

The tools were multiplied in 12 copies and given out to the local facilitators after the second training workshop.

### 3.4.4 Elaboration of guides for building and maintaining basic urinals, compost toilets and grey water reuse systems

Simple photo guides were developed for urinals, compost toilets and dry toilets. For each type of installation, one sheet was on overview, one on preparation and one on use (9 in total). The overview is shown in Figure 16:



Urinals

Composting toilet

Dry toilet

**Figure 16** The photo guides with an overview of the different types of PS-installations in Aguié

These guides were included in the facilitation kit given to the local facilitators as a reference.

CREPA Niger also developed technical documents for the two types of toilets. These documents are listed in Annex 1.

### 3.4.5 Elaboration of guides for safe handling and appropriate application of human fertiliser

The same type of photo guides as for the construction and use of toilets were developed for the application of the human fertilizer. These guides are also listed in Annex 1.

### 3.4.6 Participative selection of local facilitators and artisans

The criteria for the choice of local facilitators and artisans were shared with the villagers:

- Know how to read and write
- Be dynamic
- Have patience with the beneficiaries
- Have good relations with the others
- Be popular and have good morale

The choice was made during a village assembly with the participation of everyone. Women were encouraged, however due to the high rate of illiteracy only two women were proposed among the facilitators. Unfortunately one of the women got pregnant and the other one proved not to be up to the task, so finally all facilitators and artisans were men.

### 3.4.7 Training of local facilitators (PHAST) and artisans

Since the field trials had to start quite soon after the project launch, priority was given to train the first test-farmers. As productive sanitation is quite new in Niger, it was decided to arrange a training and exchange trip to Burkina Faso for the five vegetable farmers that were chosen as representatives for their respective village. One agronomist from PPILDA and the project coordinator was also participating during this mission. The four days in Burkina Faso were intense with theory and practice on urine application, and a lot of time to exchange with Burkinabè farmers. The visit is summarized in the photos below:



Arrival of the mission to Ouagadougou



Reception at CREPA HQ



Pepper harvest after urine fertilization in Sector 27



The local coordinator and EcoSan carrots



Practical sessions of urine application with the trainer Nikiema Yamba from the project EcoSan\_UE.



Visiting Ambroise Dipama, vegetable farmer and productive sanitation practitioner in Saaba outside Ouagadougou.

Visiting the chief Naba Yemde in Koupela and application of urine on the chief's sweet potatoes.

The participating farmers shared their experience in general assembly once back in their home village.

**Key benefits of the study trip :**

- Meetings with farmers who could share their experience
- Very practical training on urine application to different crops
- Reception by the traditional chief of Koupela, Naba Yemde, and his conviction of urine as a fertilizer.

**Training of local facilitators**

Training was then carried out in Aguié the 5<sup>th</sup> -9<sup>th</sup> of March, 2009 for the local facilitators (10) as well as agents from PPILDA and from the agriculture and health authorities (Figure 17).



Timbo, sociologist at CREPA Niger



Participant from health authorities



Group exercises



PHAST is based on pictures



Contamination routes



Testing the PHAST tools in Dan Bidé and Milli



**Figure 17** The PHAST training in Aguié by the CREPA Niger sociologist Timbo Abdel Kader



A second training on the new PHAST tools was organized in June for nine of the original facilitators + three facilitators from the new villages, when they also received their animation kits with ~60 SARAR/PHAST images and aide-memoires.

**Figure 18** The animators with equipped with facilitation tools

A recycle session was also organized for the local facilitators during two days in February 2010 Figure 19.



**Figure 19** Recycling of former village facilitators

**Training of local artisans (11-17<sup>th</sup> of March and 25<sup>th</sup> of March-1<sup>st</sup> of April, 2009)**  
CREPA Niger trained 15 masons from the 5 pilot villages on the construction of dry toilets, composting toilets as well as improved urinals. An agent from the rural engineering department also took part in the training course as well as Ibrahim Sayabou, the project technician.





Facilitator Hamidou Kailou Constructing a round latrine slab from CREPA Niger



Prototypes were constructed on the PPILDA area



Meeting evaluating the bill of quantities and defining the cost for the mason for the different toilets



The representative from the rural engineering department.

**Figure 20** Training of artisans on the construction of latrines and urinals by Hamadou Kailou, the CREPA Niger engineer.

Recycle trainings have been organized for the artisans of Maifarou and Saja Manja.

### Training of the CDA 10<sup>th</sup> of July

A one day training was organized for the new CDA (Head of Agriculture District) that would supervise the tests in the new villages. This was also the opportunity to recycle the former CDA and PPILDA agents. All in all there were 19 participants on the one day seminar.

The participants also discussed around the following aspects of implementing productive sanitation:

*What are the key points for acceptance?*

- Sensitization
- Demonstration
- Convincing results
- Inter farmer visits
- Sanitation of the community that helps to avoid certain diseases
- Increased production by using these low cost fertilizers
- Access to collection material
- Adapting the collection to the cultural context

*What are the difficulties?*

- Hesitation because urine is considered dirty
- There is a certain hesitation to apply urine to crops with leaves or edible roots.
- The large quantity of urine needed per hectare
- The number of recipients to use and the transport of this product
- Certain are sceptic towards consuming the crops
- Regarding the participative tests :
  - o Important to acquire the materiel and fertilizers on time
  - o Sabotage by some farmers who also put fertilizer on the control plot.

*What is the role for the CDA in the dissemination of the PS approach?*

- The agriculture agents play an important role in informing and sensitizing the farmers, which is the first step towards appropriation of the innovation
- The CDA also supervise the test sites.



### 3.5 Activity 3. Implementation of PSS action plan

#### 3.5.1 Organizing awareness raising workshops in the villages

Besides the regular community meetings and sensitization sessions arranged twice per month by the project sociologist and the local facilitators, a number of meetings were organized in the villages:

- Introductory meeting in October 2008: A delegation from the project partners visited the selected villages and held introductory meetings led by the PPILDA director.
- Sharing of the study visit in Ouagadougou in December 2008: After the return of the five farmers who had been taking part in the study trip to Ouagadougou, sharing sessions were organized in the villages to explain what they had seen and learnt.
- Distribution of jerry cans/funnels to start urine collection in December/January 2009: In order to have the necessary “liquid fertilizer” for the first experiments during the dry season an initial batch of simple urinals were distributed after a general assembly. Around 15 jerry cans per village were needed for the first experiments. The head of the vegetable farmers were in charge of collecting the full jerry cans for the tests. At the end of January over 160 jerry cans of urine had been filled, which was more than enough for the tests. In the beginning of April, 145 households had received a urinal and 340 jerry cans were full.
- Sharing of the base line study results in March 2009: The baseline study results were shared at a general assembly in each village, with the results from this particular village exposed.
- Sharing of the vegetable results in May/June 2009: The results from the dry season tests were shared with the population in each of the five villages (Figure 21).



Sharing the results from the vegetable season with farmers in Saja Manja



Presentation of the results to the women in Dan Bidé

**Figure 21** Sharing the results from the dry season at village meetings

#### 3.5.2 Conducting awareness raising activities on household level in each village

The local facilitators visited each PS household to inform the families, monitor the good use of the PS-system and the collection of urine twice per month per household.

### **3.5.3 Provision to households of necessary equipment**

The plan was to provide 300 households with urinals and latrines. However, with the popularity and simplicity of the urinals it was decided to reduce the number of latrines to 210 and provide 700 households with urinals. A total of 5000 jerry cans were acquired and by the end of the project 1143 villages were registered to collect urine in the 9 main villages and in 7 neighbouring villages, with 170 latrines finished and 18 under construction.

#### **Urinals**

The urinals consisting of jerry cans and funnels were easy to distribute and to use and very popular in the villages. A total of 4822 jerry cans with 25 litre capacity were acquired in the project. Many households preferred to dig down the jerry to allow for the squatting position. Others used a small recipient to collect urine and transfer it to the jerry can. The urine collection is a relatively simple way to improve nutrient management – and at the same time provide a sense of hygiene, as there is no more odours in the shower/ablution area where most people used to urinate.



The villagers have two approaches to the urine collection. One option is to dig down the jerry can to enable the squatting position which is used by women and men. The other option is to use a recipient and then pour the urine into the jerry can.



Mr Boda in Saja Manja shows how urine is collected in his family.



Urine storage in the villages

**Figure 22** Example of urine collection and storage in the villages

The cost of the urinal was about 1350 CFA which is ~ 3 \$.

Funnel : 400 CFA

Light bulb : 250 CFA

Jerry can : 700 CFA

The light bulb can be changed to something local, like a small stone or nut, which can block odors and reduce nitrogen loss just as efficiently. A family will need several jerry cans, if they want to store it for the right application time and not just add the urine to their compost. It was intended that each family would receive 5-7 jerry cans to be able to store a fair amount of urine.



Another type of improved urinal with some bricks and cement was proposed as well to the households, but with no subsidy. The cost would be around 5000 CFA or 10\$. A couple of the trained masons constructed this urinal at their own house, but the households preferred the simple urinal.

Figure 23 Improved urinal

### Key aspects of urine collection:

- The villagers were very keen to start the experience after having listened to the accounts of the farmers who had seen the experience of farmers in Burkina Faso.
- The villagers adapted the urinals to their own convenience (ex digging them down)
- The collect also satisfied a need – the women were very happy with having less odors in the shower and compound after starting the collection.

### Toilets

Equipment for a total of 210 latrines was acquired, but due to some delay it did not arrive in time before the rainy season (June-September). With the rains, it becomes impossible to make mud bricks, so the constructions came more or less to a halt. Most of the latrines were then built between October and February and a total of 170 were finished and 18 were ongoing at the project closure (Table 4). However it is included in PPILDA's workplan for 2010, to continue the work in the same villages to increase the coverage and make sure that all the acquired material is used.

Table 4 Latrines constructed in the different villages

Villages	Toilets finalized by end of project	Toilets under construction
Aguié	2	1
Maifarou	42	2
Dan Biddé	39	3
Milli	22	9
Saja Manja	39	2
Dogaraoua	3	0
Malloumey Saboua	10	0
Tsamia Bakoye	3	0
Mallamawa	2	1
Zabon Mousso	4	0
PPILDA demonstration	2	
Total	170	18

**The project subsidized the imported parts of the toilets to around 40-50\$. The household contribution is normally in kind and local material and not in money. However in**

Table 5 the household contribution is evaluated based on what it would cost to actually pay for the materials. A very detailed description of the cost of the toilets and proposals to reduce the costs can be found in the MSc thesis by Djariri, which is listed

in Annex 1. The Capitalization note 3 on social and technical issues also goes into details, and can be found in Annex 1 as well.

**Table 5.** Unit cost of the composting and dry toilets and the part

	Item	Composting toilet	Dry toilet
Project contribution	Cement	1,5 bags	1,5 bags
	Iron bar 8mm	1 bar	1,5 bar
	PVC 100 mm	3m	3m
	PVC 32 mm	30cm	2m
	Plastic hose pipe	20cm	1m
	Fil de fer recuit	0,1 rolls	0,1 rolls
	Prise en charge maçon	3000 CFA	3000 CFA
	<b>Total subsidy cost</b>	<b>21750 CFA</b>	<b>24800 CFA</b>
Household contribution	Digging out pits	1,6 m maximum	30 cm maximum
	Mudbricks	250	250
	Mud	4 carts	4 carts
	Sand	2 carts	2 carts
	Non qualified manpower	2 man days	2 man days
	Water	2 barrels	2 barrels
	Super structure	Straw or bricks	Straw or bricks
	Roof	Not mandatory	Mandatory
	<b>Estimated cost of household contribution</b>	<b>26750 CFA</b>	<b>22750 CFA</b>
<b>TOTAL COST</b>	<b>48500 CFA</b>	<b>47550 CFA</b>	

The composting toilet has been by more popular than the dry toilet. The advantage of the composting toilet is that it doesn't need stairs to access, and a roof is not necessary. Also in the composting toilet, the anal washing water can go in the pit, which facilitates use. This is the first time to our knowledge that such composting toilets are coupled with urine diversion. Taking the urine out of the pit increases the amount of nutrients retained (otherwise a substantial amount of nitrogen would be lost in leaching and evaporation from the pit) and reduces the amount of liquid going into the pit. The composting pit receives water from the anal wash water. For the user it is important to balance the humidity and composition of the pit by frequently adding organic material. This has also been convenient for the families, since the swept dust and debris from court yard goes into the pit. The composting toilet has been working quite fine with a minimum of odours and flies.

The dry toilet has the advantage of being easier to empty, and no need to move the slab. If it is well used it is also fly and smell free. Since it is built off the ground there is not risk for ground water contamination either. However in the context of Aguié, the ground water level is quite deep and the composting pits relatively shallow so the risk for polluting the ground water is low.

To summarize it seems like the composting toilet corresponds well to the needs of the populations, and should probably be the model for the dissemination phase. The training of masons and the local facilitators on two models makes implementation quite a lot more complicated. However, the fact of giving people a choice can increase the feeling of appropriation.



Construction of a composting latrine under supervision by the Rural Engineer of Aguié province



A finished composting latrine

In each village 3-4 extremely vulnerable households were identified and given extra support. The criteria were the same as the criteria used by PPILDA (land < 1ha, 0 livestock, 11 months of food insecurity). An extra priority was given to households a woman being the household chief. These households receive a support from the project to buy the mud bricks and the mud needed to construct the latrine.



This old man is one of the extremely vulnerable that the project gives extra support



The extremely vulnerable also benefit from the mud bricks and mud for the pit construction.



### **3.5.4 Participative practical training on using urine as a nitrogen fertilizer in each village**

Tests were set up during the vegetable season in all five villages. Five vegetable farmers per village were trained in urine application on tomatoes, lettuce, cabbage, onions and pepper. During the rainy season, 130 farmers have tested urine fertilization in PPILDA's farmer field schools (PIP) on millet and sorghum. A summary is given here, while a more detailed account can be found in Capitalization Note 2, listed in Annex 1.

#### **Vegetable season 2009**

In each pilot village, five farmers were chosen in a participative manner to test the Takin Ruwa (liquid fertilizer). The farmers decided among themselves the crops they wanted to test. Each test was grown on a three plots of 10 m<sup>2</sup> each :

Plot 1. Control, with only base fertilizer (organic matter = OM)

Plot 2. OM + urea

Plot 3. OM + Takin Ruwa

The Takin Ruwa was applied according to the nitrogen dose recommended for urea. The Takin Ruwa was applied in either three or four fractions depending on the crop.



Samples were taken in the villages to analyze the fertilizer content



Urine analyzed with the project's N-meter. The urine contained in general 4 g N/l.



The first urine application



Gloves and mouth protection is used for safety



The urine is watered down in the soil after application





Pepper Takin Ruwa in Milli



Pepper Urea



Control



Carrots Takin Ruwa and urea in Milli



Carrots control plot



A private initiative to test Takin Ruwa by a vegetable producer who was not one of the five test producers in Saja Manja



Takin Ruwa onion and onion from the control plot

**Key benefits of the vegetable tests:**

- The tests makes the farmers adhere to the project – seeing is believing
- The support with some basic materials such as watering cans and gloves was necessary
- The farmers chose the crops in which they were interested to test

- The agriculture extension officers (CDA) were involved in the development of the test protocol and also in the supervision of the farmers, which showed the farmers that the authorities are behind the approach.

### Cereal season 2009

PPILDA use the PIP<sup>15</sup> methodology for testing and disseminating innovations in agriculture. The PIP test is setup on a common field that is shared between a group of farmers in the village (usually around 10-20 farmers). The field is divided into several plots where different tests are carried out. The farmers decide together on the tests and the parameters to follow with guidance from the CDA and PPILDA. They meet up every ten days to work together and follow the development of the crops. “Commented visits”, “Inter-farmer visits” and “Open House” are organized to share the experiences.

The test with Takin Ruwa was done in eight villages. Two villages (Maifarou and Saja Manja) hosted the tests of two students (urine added to compost and urine added during the dry season). Six villages used the PIP setup (farmer field school) – four with millet (Tsamiya Bakoye, Zabon Mousso, Dan Biddé, Malloumey Saboua) and two with sorghum (Dogoraoua, Milli).

Each PIP had four elementary plots, each plot with a surface of 200 m<sup>2</sup>.

- T0 : OM (Organic matter)
- T1 : OM + SSP (Super single phosphate) + Urea
- T2 : OM + SSP + Takin Ruwa
- T3 : OM + Takin Ruwa

The fertilizers were added according to the local recommendations:

OM	20 ton/ha
SSP	100 kg/ha
Urea	50 kg/ha ( 5 g/pocket ~ 2,3 g N/pocket)
Takin Ruwa	5000 litres/ha (0,5 litres/poquet ~ 2,5 g N/pocket)

Five CDA were involved in supervising the 120 farmers. Sowing was carried out in the middle/end of June 2009. The first TR application was in the end of July/beginning of August 2009. The harvest is now carried out. In the end of October 2009 the results will be ready to share. Here follow some photos from the cereal season:

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<sup>15</sup> Parcelle Initiative Paysan = Farmer Field Initiative



Elementary plots prepared with organic matter



Transport of Takin Ruwa to the field



CDA giving instructions



Pouring the Takin Ruwa into the bucket to facilitate the application



Application of Takin Ruwa – 0,25 litre per pocket



Certain sites had problems with criocere attacks



The women in Dogoraoua working at the PIP



PIP meeting in Dan Bidé



A big sign was put up on each of the test sites



The test plots have each an identification sign written in Hausa – the local language

### 3.5.5 Participative evaluation of agronomic results

#### Vegetable season 2009

##### Results:

Crop	Harvest (ton/ha)		Increase with Takin Ruwa (%)
	Urea	Takin Ruwa	
Cabbage	36,5	43,7	20
Tomato	38,7	56,6	46
Lettuce	21,1	26,6	26
Pepper	37,6	49,7	32
Onion	33	48	45

##### *Evaluation of the Takin Ruwa experience on vegetables*

33 farmers who had used Takin Ruwa on vegetables were interviewed regarding their experience. Of the 33 farmers taking part in the survey, 18 were amongst the test farmers and 15 had done tests on their own initiative. The questions concerned the comparison between Takin Ruwa and urea when it comes to yields, the size of fruits and the extended harvest period. The questionnaire was carried out by students whom the farmers did not know from before, in order to decrease the risk of biased answers.

**Table 6. Some interesting comments regarding Takin Ruwa**

Vegetable	Yield	Size	Extended harvest
<b>Cabbage</b>	“Very good yield”	“Big and beautiful cabbage heads” “The green leaves and a compact head that attracts customers”	-
<b>Tomato</b>	“Very high yield” “The yield is much superior to urea, and the fruits are beautiful”	“Nice and big fruits” “Beautiful and big fruits with a very sweet taste” “Equal to urea”	“Longer harvesting time”
<b>Onion</b>	“Very good yield with big	“Big bulbs, beautiful compared	-

	bulbs, and I swear that everyone was surprised, and people came around to see! “	to urea”	
<b>Lettuce</b>	“Very good yield”	“Big and beautiful heads” “When my wife cooked all the neighbours came to taste, and you will see that next season many will apply the Takin Ruwa”	-
<b>Pepper</b>	“Good yield” “Many of my friends bought some pepper from me to put on top of their own in the bag in order to win clients” “In Nigeria I could easier sell the Takin Ruwa pepper than the urea pepper”	“BIG fruits that attracts customers, with a sweet taste, early maturation and longer shelf life for Takin Ruwa” “Big fruits, good taste and odour – I mixed them with the ones from urea to sell”	“The harvest is continuous and after three days the Takin Ruwa peppers are still fresh while the ones with urea shrink the day after harvest” “Prolonged harvest, but needs a lot of water” “I did 15 harvests with Takin Ruwa compared to 9 with urea”
<b>Summary of the survey</b>	32/33 farmers in favour of Takin Ruwa when it comes to yield	32/33 farmers in favour of Takin Ruwa when it comes to size	18 farmers had grown tomatoes and pepper with extended harvest. Of these, 16/16 who answered were in favour of Takin Ruwa when it comes to extended harvest

### *Inter farmer visits*

Several inter farmer visits were arranged to share the results. The first visit concerned all test-farmers from the five villages. The second visit was organized for 15 farmers from three new villages.



The first inter farmer visit with the 25 pilot farmers and another 231 participants.



New farmers are initiated to the experience from using Takin Ruwa.

### *Sharing of the results in the villages*

The test results were presented on general meetings in all five villages.





Sharing the results from the vegetable season with farmers in Saja Manja



Presentation of the results to the women in Dan Bidé

***Key benefits of sharing results in the villages:***

- Confirming the efficiency of urine as a fertilizer
- Satisfaction of the pilot farmers to show their results to the others
- The meeting was also an occasion for the farmers to manifest their interest in repeating this experience on cereals as well.

***Taste tests***

Sessions were organized with the help of a consultant in four villages to evaluate the taste and visual quality of the crops fertilized with urine compared to urea. Blind test was conducted where the participants should evaluate the taste, and declare which of the products they would buy on the basis of taste and on the basis of appearance.



Figure 24

**Table 7.** Results from taste tests in four villages in the Aguié province

Vegetable	Taste		Preference buying based on taste		Preference buying based on appearance	
	Urine	Urea	Urine	Urea	Urine	Urea
<b>Onion (n=40)*</b>	Sweet/spicy	Spicy	45%	55%	100%	
<b>Pepper (n=30)</b>	Sweet/spicy	Spicy	50%	50%	93%	7%
<b>Cabbage (n=20)</b>	Sweet	Thick aftertaste	100%		95%	5%
<b>Carrot (n=10)</b>	Sweet	Thick aftertaste	100%		100%	
<b>Tomato (n=10)</b>	Sweet	Sour	100%		100%	

\*Number of people participating in the test

The urine fertilized vegetables were more generally more attractive when it comes to taste and appearance. The taste with the Takin Ruwa fertilized vegetables was mostly described as “sweet”. In the case of onion and pepper the sweet taste was not always preferred by the panellists, compared to the spicier taste that urea gave. For cabbage, carrot and tomato there was a 100% taste preference for fruits fertilized with Takin Ruwa.

## Cereal season 2009

### Results

The cereal results were also quite convincing regarding the fertilizing effect of human urine, both for millet and sorghumf.



**Table 8** Millet harvests (kg/ha) at four farmer field schools in Aguié.

Village	Millet Kg/ha				Sorghum (kg/ha)	
	Dan Bidé	Tsamiya Bakoye	Malloumey Saboua	Zabon Moussou	Dogoraoua	Milli
Variety	Zatib	Zatib	Zatib	Ct6	L724	L724
T0 (OM)	781	660	1244	1209	1689	1024
T1 (OM+SSP+Urea)	1160	893	1318	1000	2358	(1098)*
T2 (OM+SSP+Urine)	1257	1072	1637	1111	3293	1851
T3 (OM + Urine)	1161	948	1773	1399	2933	1383
<b>Surplus yield T2 compared to T1 (%)</b>	<b>8</b>	<b>20</b>	<b>24</b>	<b>11</b>	<b>40</b>	
<b>Surplus yield T3 compared to T0 (%)</b>	<b>49</b>	<b>44</b>	<b>42</b>	<b>16</b>	<b>74</b>	<b>35</b>

\*Animals ravaged a part of this field at Milli

### *Inter farmer visits*

Three inter farmer visits were organized. The procedure during these visits is as follows:

- First the introduction by the CDA (surface and limit of the plots, type of crop, variety)
- Secondly the different tests plots are described by the agriculture technician
- Thirdly the pilot farmers describe the different stages and the different applications on the crops and the observations on the effect on the growth of the different plots
- Finally the participants give their impression and there is the possibility for questions and answers etc.

The three inter farmer visits was attended by 431 participants (including 137 women). Participants from eight new villages, a part from the eight test villages, have been present on these visits.



Participants of the inter farmer visit to Maifarou



The inter farmer visit in Dan Bidé



The women of Dogoraoua explain the test to the Director of PPILDA



T0 : OM



T1:OM+SSP+Urea



T2 : OM+SSP+TR



T3 : OM+TR

The major problems were the long dry spell in July (23 days), the late time of sowing in the north of Aguié and the attack by criocerles on the millet and larva on the sorghum.

### Taste test

Also during the cereal season a survey of the appreciation of the growth as well as taste were organized with 102 participants regarding millet and 15 participants regarding sorghum:



### Millet

Aspect	n=102	Affirmative	%
Vigour of the plants	Millet TR (Takin Ruwa) more vigorous than the control	102	<b>100,0</b>
	Millet TR is more vigorous than the millet fertilized with urea	102	<b>100,0</b>
Quality of leaves	Millet TR has a better leaf quality than the control	102	<b>100,0</b>
	Millet TR has a better leaf quality than the millet fertilized with urea	102	<b>100,0</b>
Taste	Millet TR has a better taste compared to millet fertilized with urea	75	<b>73,5</b>
	Mille fertilized with urea has a better taste than millet TR	25	<b>24,5</b>
	Same taste	2	<b>2,0</b>
Intention of purchase	On the basis of taste I would buy the millet TR	77	<b>75,5</b>
	On the basis of taste I would buy the millet fertilized with urea	25	<b>24,5</b>

## Sorghum

Aspect	n=15	Affirmative	%
Vigour of the plants	Sorghum TR more vigorous than the control	15	<b>100,0</b>
	Sorghum TR is more vigorous than the millet fertilized with urea	15	<b>100,0</b>
Quality of leaves	Sorghum TR has a better leaf quality than the control	15	<b>100,0</b>
	Sorghum TR has a better leaf quality than the sorghum fertilized with urea	15	<b>100,0</b>
Taste	Sorghum TR has a better taste compared to sorghum fertilized with urea	12	<b>80,0</b>
	Sorghum fertilized with urea has a better taste than sorghum TR	3	<b>20,0</b>
	Same taste	0	<b>0,0</b>
Intention of purchase	On the basis of taste I would buy the sorghum TR	11	<b>73,3</b>
	On the basis of taste I would buy the sorghum fertilized with urea	4	<b>26,7</b>

### 3.5.6 Regular follow up on use of the sanitation installations

The village facilitator visits each household at least twice per month to check up on the good use of the installations and also on the production of Takin Ruwa. The toilet use and jerry can storage is evaluated by certain criteria (see the Monitoring and Evaluation document listed in Annex 1). By the end of the project 97,5% of the toilets were correctly used and more than 5000 jerry cans of urine had been filled (>125 m3).



Mr Boda, facilitator in Saja Manja, verifies the pit with a flash light. The pit content should not be too humid.

### 3.6 Activity 4. Evaluation and dissemination of project results

#### 3.6.1 Conducting agro-economic and health studies as well as study on urine and soil quality

##### Analyzing urine characteristics

Sampling was done on several occasions to get an idea of the general composition of urine in Aguié (Table 9).

**Table 9** The characteristics of urine from samples in Aguié during 2009

Parameter (n=number of jerry cans analysed)	N (n=37)	P (n=33)	K (n=28)	Na (n=9)	Mg (n=3)	Ca (n=3)	pH (n=29)
Unit	g/l	g/l	g/l	g/l	mg/l	mg/l	
Average	6,0	0,8	0,9	3,1	20	36	8,8
Standard deviation	1,1	0,2	0,3	0,2	1,6	3,1	0,2

The urine is especially rich in nitrogen, and is in the higher range of the 3-7 gN/l given as indicative values in Jönsson et al. (2004). It can also be noted that sodium concentration is much higher than magnesium and calcium. In irrigation water where the concentration of sodium salts is high relative to other types of salt, a sodic soil may develop, which is characterized by a poor soil structure: they have a low infiltration rate, they are poorly aerated and difficult to cultivate (FAO, 1985). Even though the salt concentration is quite high in urine, the total salt quantity applied per year is not high when compared to irrigation water. However salinity is complex and further research on urine use and salinity would be welcome to avoid long term problems.

##### MSc thesis

Four students have been doing their Master's thesis in Aguié on PS-related themes:

**Table 10.** Studies carried out by students in the PS-Aguié project

Student	Theme	Interest for PS-Aguié
Moussa Bouzou (Faculty of Agronomy, Université of Niamey)	Evaluation of the fertilizing effect of applying urine enriched compost to millet	Urine storage is a major problem. One option is to apply the urine in composting pits to enrich the compost without losing too much nitrogen. The study compared the compost quality when urine enriched compost and "normal" compost. The compost is also added to millet in different doses to compare the fertilizing effect.
Ilyas (Faculty of Agronomy, Université of Niamey)	Evaluation of periodic application of urine to millet	Another option to urine storage in recipients, which is costly when large volumes need to be stored, is to incorporate the urine into the soil during the dry season. Four test plots were given the same amount of organic base fertilizer. The first plot did not receive any urine (control plot). 1 liter of urine/pocket was applied to the second test plot in April and the third test plot in May. Sowing was done in June on all plots and on the fourth plot the same quantity of urine was applied during the recommended period. The difference in harvest gives an indication of losses due to evaporation/infiltration of applying urine to the soil

		<p>already during the dry season. The results showed small losses for the May application but quite high losses for the April application. Further studies are needed to deepen the understanding.</p>
<p>Saidou Laminou (2iE, Ouagadougou)</p>	<p>Identification of sanitary risks and opportunities of fertilizer production in the urine collection system of the “Productive Sanitation project” in Aguié, Niger</p>	<p>The study was supposed to follow the die off of pathogens in urine from urinals compared to urine from toilets. Normally the urinals should have less faecal cross contamination so the storage time might be reduced. However due to an incompetent laboratory it was not possible to get reliable results for the first three weeks of analysis. The lab was changed for the fourth week. All pathogens were eliminated, but sulfite reductor bacteria remained.</p> <p>Laminou also followed the volume of urine generated from 10 men, 10 women and 10 children (~10 years old) in two villages in Aguié. On average the men produced 1,7 l/day, the women 1,9 l/day and the children 0,9 l/day. With 50% of the population under 15 years, the average daily urine production would be ~1,35 litres per person. Using the concentrations in Table 9 gives that the average person in Aguié urinates annually ~ 3 kg N, 0,4 kg P and 0,45 kg K with the urine, which is higher than expected, except for potassium. It should be noted though that the study was made just after harvest time when people have plenty to eat.</p> <p>Laminou also analyzed the sanitization of urine after 30 days of storage, and found no micro-organisms except for anaerobic sulphite reducers that were present in 3 out of 9 samples. Clostridium Perfringens is one bacteria of this type that can cause food poisoning. However, the infective dose is quite high and clostridium is frequently present in the intestines of both humans and animals and also widely distributed in the environment due to its spore forming capability (FDA, 2009)<sup>16</sup>.</p>
<p>Djariri Laouali (2iE, Ouagadougou)</p>	<p>Cost reduction of the sanitary installations in the “Productive Sanitation Project” in Aguié, Niger</p>	<p>The latrines promoted in Aguié are relatively cheap with a subsidy of around 20-25000 CFA (40-50 \$). However to reach the large scale it is important to even further reduce costs of the toilets and also for the storage of urine. This study came up with proposals that cut the subsidy of the composting latrine with 28 %. Also a technique for storing urine in plastic tube sheets was tested, which seems promising for the storage of larger quantities of urine.</p>

<sup>16</sup> FDA, (2009): Bad Bug Book – Foodborne Pathogenic Micro-organisms and Natural Toxins Handbook,  
<http://www.fda.gov/Food/FoodSafety/FoodborneIllness/FoodborneIllnessFoodbornePathogensNaturalToxins/BadBugBook/default.htm>



Ilyas and Bozou, the two students from Niamey University

Laminou and Djariri on village meetings to present their themes



A san-plat slab does not need iron bars for reinforcement, which lowers the cost



The ventpipe is made from recycled bottles, old cloth and cement



Testing alternative ways to store urine

All four students got good grades from their universities for their thesis work. The reports are available on [www.ecosanres.org/aguie/theses.htm](http://www.ecosanres.org/aguie/theses.htm)

#### *Other studies*

- A taste test study on vegetables was carried out by a consultant (Mahamne Saley). The full report is available on [www.ecosanres.org/aguie/researchstudies.htm](http://www.ecosanres.org/aguie/researchstudies.htm)
- A gender evaluation was also carried out by Mme Nana from CREPA HQ in the beginning of February. This study was financed by SEI.
- The economic evaluation of the different fertilizer approaches for growing cereals could not be concluded, in spite of some good intentions. The data collected by the agriculture extension officers on costs of the whole chain, from collection to application of urine compared to buying and applying urea were difficult to compare, but the approach could be used in a further study.

### **3.6.2 Evaluation of the project implementation process**

PPILDA assisted the project team with the elaboration of a monitoring and evaluation manual.



The monitoring of activities has been facilitated by a good planning. The project has been working according to sub domains such as “Agro”, “Tech”, “Socio”, “Communication/Monitoring” and “General”. For each domain a planning of activities was done with clear responsibilities.

The local team made a monthly report submitted to the project partners on the progress made in the three domains “Agro”, “Tech” and “Socio”. The communication between the project partners was mainly done via an email group (using yahoo groups).

Several missions have been made by personnel at CREPA HQ, CREPA Niger and the University of Niamey to support and follow up on the project activities. Two specific occasions has been devoted to evaluation, which is the midterm evaluation in June 2009 and the final project workshop in December 2009. Here follows a short description of the different missions:

### **Launching mission in October 2008**

This mission included all project partners and besides informing the local actors and villagers on the project and its objectives, an initial planning and budget was elaborated.

### **Planning mission in February 2009**

This mission was carried out by CREPA Niger and the coordinator from CREPA HQ to deliver equipment to the local team, to build two demonstration latrines at PPILDA and to guide the planning process for the period February-June (until the half way evaluation). Professor Baragé from the Agronomic Faculty at the University of Niamey was also present to support the local team and CDA in deciding on the period/dose of fertilizers in the vegetable trials.

Time was also devoted to visit the villages and see the progress with the first vegetable tests. Initial sampling of the urine collected was done to evaluate the nutrient content.

The project team also got assistance by the monitoring and evaluation team at PPILDA to elaborate a first draft of the M/E manual of the PS-Aguié project.

A contract between CREPA Niger and PPILDA was also elaborated to define the roles and responsibilities of each institution for the rest of the project.

### **Support mission in March 2009**

The project coordinator from CREPA HQ shared the findings from the baseline study with the local actors and the villagers, and also finished the M/E plan. The sociologist from CREPA Niger held a training in participatory methods (SARAR/PHAST) and developed locally adapted sensitization tools. The CREPA Niger engineer had a training of masons on the construction of composting and dry toilets.

### **Mission to support the implementation of agronomic studies in April 2009**

A mission was carried out by CREPA Niger to help the agronomy students to start their experimentation in two villages, and also to supervise the consultant hired for the organo-leptic study.

### Mid-term evaluation in June 2009

A mission was carried out by CREPA Niger + CREPA HQ with support from Professor Baragé at the university of Niamey for the mid term evaluation of the project. A one day information workshop (2<sup>nd</sup> of June) was organized to inform the local stakeholders in Aguié on the progress of the PS-project followed by a two day evaluation and planning workshop (3<sup>rd</sup> and 4<sup>th</sup> of June) with the project team and the local technical partners (CDA, Rural Engineer, Health, Education, NGO). It was also the occasion to validate the sensitization tools and to discuss on possible implication of the different partners in a scaling up phase.



Information workshop with local stakeholders

### Visit by the Director and accountant of CREPA Niger 26<sup>th</sup> -28<sup>th</sup> of July

This mission was important in that the Director of PPILDA and the Director of CREPA Niger could discuss the terms around the partnership. It also provided the Director of CREPA Niger with the occasion to visit the pilot villages first hand and have some impressions from the local population.



The Director of CREPA Niger (in blue) visiting Milli

### Support mission September 2009

A support mission was carried out by CREPA HQ to follow up on the four studies that were ongoing and initiate the data collection needed for the SEI's more complex model. An extra effort was made to advance the work regarding capitalization and a rough planning for the rest of the project was made.

### Support mission 5<sup>th</sup> -8<sup>th</sup> of October 2009

This mission the communications agent at CREPA Niger was done to support the big open house event that was organized in Maifarou to inform high level people from the region and the general public (TV and radio were there) on the results of the project.

### Support mission 14<sup>th</sup> – 18<sup>th</sup> of October

This mission by CREPA Niger was done to evaluate the state of technical and financial expenditures and make a detailed program for the three months November-January.

### Support mission for final workshop December 2009

This mission was carried out by the project coordinator from CREPA HQ. The project results were shared at the final project workshop with more than 50 participants. The different representatives discussed in groups on how the initiative could be sustained and the role of each one in the future.

During the mission the three capitalization notes were being developed, in order to capture the the process and lessons learnt from the project.

The project team also started the preparations for the study visit in January 2010.

### Study visit by IFAD project representatives, January 2010

This three day study visit was organized to share the results with national and international partners, especially representatives from other IFAD financed projects

(Mauretania, Uganda, Rwanda and Madagascar). CREPA HQ had the main responsibility of this study trip and was represented by the head of research Dr Klutsé as well as the project coordinator Linus Dagerskog and the gender expert Mme Nana. CREPA Niger was represented by the Director Zabeirou, the engineer Kailou and the communications officer Aminata.

### **Review of sensitization tools February 2010**

CREPA Niger's sociologist organized a two day review workshop with the local facilitators in Aguié to strengthen their capacity and to get their opinion on the different sensitization tools that were given to each facilitator in June. They also gave their feedback on the drawings that had been made for the poster explaining the productive sanitation system.

### **3.6.3 Local dissemination of the study results**

The results from the studies were shared on several occasions with local as well as national and international partners, both at the half time evaluation workshop in June 2009, at the workshop in September 2009, at the final workshop in December 2009 and during the study trip arranged in January 2010.

However the major event with the largest outreach was organized by the local project team in the village of Maifarou the 6<sup>th</sup> of October. Authorities, NGO's, associations, villagers and media were invited to take part of the productive sanitation message through speeches and music as well as visits to the fields and the toilets. The mobilisation was impressive with around 2000 participants when the activities started off, which increased to around 3500 people at the end of the day. Important participants were:

#### ***Farmers:***

- - 80 test farmers from 8 villages
- - 5 representatives from the CD (Champs de Diversité)
- - 11 representatives from farmers' associations

#### ***Administrative and traditional authorities:***

- 1 representative for the Prefect of Aguié Province
- 3 Heads of Canton or their representatives
- 5 Mayors
- The military chief of Gazaoua

#### ***Technical partners :***

- 1 Regional Director of Agriculture
- 2 Provincial Directors of Agriculture Development (Aguié and Guidan Rourji)
- 1 Provincial Director for Rural Engineering
- 1 Provincial Director for Environment
- 1 Provincial Director for Community Development
- 1 Provincial Director for Livestock
- 1 Provincial Director for Health
- 1 Inspector for Primary Education
- 6 Heads of Agriculture District
- 2 Health agents
- 1 Rural Engineer
- 5 representatives from NGO's
- 1 representative for the Director of CREPA Niger

- 15 persons from the PS-team and PPILDA
- 15 vehicules of which 4 belonged to PPILDA

**Entertainment :**

- Musical group from Gazori (performing a special song on the PS-theme)
- The local group of Maifarou
- The griots
- A team of traditional wrestlers
- A charro-team



The guests of honour



The Imam blesses the meeting



Mr Marou du PPILDA was the Master of Ceremony



Several speeches were delivered, amongst them the Mayor of Gazaoua



Mdm Hadidjatou Issoufou, the local Coordinator of the project, explains the resource in urine



The musical group from Gazori

- A team camel racing team

**Communication :**

- The communicator of CREPA Niger
- The journalists from ORTN (National television, Maradi office)
- The journalist from the local Aguié radio
- The cameraman from PPILDA



Visit to the experimental field in Maifarou



The afternoon gave the opportunity for questions and sharing.  
*“My name is Mariama. I am the president of a womens association. I am very happy with this innovation, but unfortunately the project is not in our village. However now that I have heard the news, I will directly find some jerry cans and start to collect urine. I also hope the project will take us into account and help us women to use the Takin Ruwa during the next vegetable season”*



Abass de Dan Bidé, a test farmer and facilitator shares his experience: *“Productive sanitation has several advantages. It gives you the opportunity to have a toilet, to clean up your environment, to protect your health and to*



The Health Worker at Aguié: *“You can be sure that there is no risk in consuming the crops fertilized with Takin Ruwa. Analysis has shown that after the storage time, there are no more microbes, and more studies are under way”*



Rabi Moussa from Saja Manja: *“ I have made a test. On one part of the field I used the Takin Ruwa and on the other I used urea. Where I used the Takin Ruwa I harvested 15 bundles compared to 9 bundles where I used urea”*

### 3.6.4 Dissemination of results to IFAD Programme Managers

As part of the dissemination work representatives from IFAD-financed projects in four countries as well as representatives from NGO’s and Ministries (Agriculture, Health, Hydraulics) on national and regional level in Niger were invited for a three day study visit/workshop in Aguié. The objective was to give a good understanding of productive sanitation, see the demonstration fields and exchange with the local

population and project partners. The workshop was also the opportunity to evaluate the perspectives for productive sanitation on local, national and international level.

The workshop had three main parts – introduction to PS, field visits and perspectives. The first day was dedicated to the introduction of the PS concept and sharing of the results from the PS-Aguié project. The international participants from Rwanda, Uganda, Madagascar, Mauritania and Sweden also shared their experience.



Participants at the first day workshop in Maradi



The opening podium



Speech by the joint Secretary General of Maradi



Facilitation by Saley Kanta from PPIIDA



Presentation by the local project coordinator Hadidjatou on the agro results of the PS-Aguié project

After the presentations, the discussions had to be cut short to allow for a first field visit to the village of Dan Bidé which is one of the first 5 villages where the concept was introduced in the beginning of 2009.



Abbas from Dan Bidé explains the demonstration plots with urine



Tasting the urine fertilized carrots!



Abass show his composting latrine with urine diversion.

**Day 2.** The village Saja Manja was the destination of the first visit of the second day. Here urine is collected at 105 out of 109 households. In addition around 40 households have had support to build the composting latrine with urine diversion. Three vegetable sites in Saja Manja were visited:

The first with men from an association who have done trials with urine as a liquid fertilizer. At the second site an individual farmer had tried urine on his own initiative and at the third site a women's association made a demonstration of how urine can be applied as fertilizer.



Visiting demonstration plots in Saja Manja



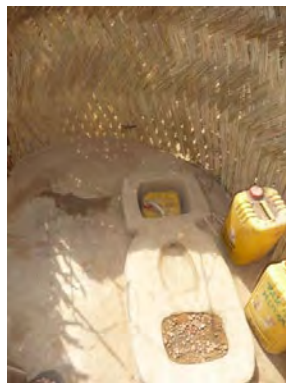
The cabbage of a farmer who has applied urine on his own initiative



The women show how they apply urine to cabbage



Demonstration of how the shallow composting latrines are built



An improved urinal at the house of one of the masons



The PS-song by Ayouba Gazori and his dance group



The workshop participants join the dance!



Dogoraoua in the north of the Aguié province was visited in the afternoon. This visit also showed some difficulties in the project. The idea was to show that it is possible to cultivate vegetables also in the sandy areas with deep groundwater, using drip irrigation. Unfortunately the drip irrigation kits had not yet been installed on the main gardening site, but a couple of households had installed the kits by the house.

The visitors could also witness a problem with the use of urine as a liquid fertilizer. In one neighbouring village a man had applied urine to his tomatoes some days before, and the plants were in a very poor state. In the extremely dry climate of Aguié, good watering is important immediately after and during a couple of days following urine application. As urine is concentrated it has a tendency to extract water from the roots through osmosis which can make it dry out completely. Especially in a sandy dry soil it is better to apply urine in several smaller fractions and increase the watering.



Dogoraoua in the north of Aguié



Drip irrigation kit in on household level



Simple urinal – a jerry can dug down with a funnel



Dried out tomatoe plants

Some impressions from the population collected at the field visit:

**Women gardeners in Dogoraoua**

- After having used Takin Ruwa (liquid fertilizer), what can you say about the results?
- *The Takin Ruwa is very different from other fertilizers, regarding the yields and also the taste of the products. The « To » from millet that have been fertilized with Takin Ruwa has a delicious taste !*



**Women's Association « Hadin Kai » who wishes to try Takin Ruwa as a fertilizer**

- *It is our first test, and we think it will work because we have seen the example in our neighbouring village.*



**Farmers in Saja Manja :**

- What can you say about the yields with Takin Ruwa?
- *About Takin Ruwa we say "Alhamdoulalahi" (Thank God)! We thank god that the PS-Aguié project has initiated us to this approach. And we will continue to use Takin Ruwa. There is no way we will let this go now !*
- What do other people think?
- Other people come and ask us how to do it – they also want to use the Takin Ruwa when they have seen the results



**Farmers in Dan Bidé :**

- What is your satisfaction with the Takin Ruwa?
- *We are very satisfied with the yields we have gotten by using Takin Ruwa. And also the urine collection has helped to improve our environment. There are no more bad smells in our compounds!*



**Day 3:** After presenting the results from the different studies in the project, it was time to answer all questions that were left from day 1. This was followed by a presentation on the PS-Guide for the agriculture extension worker by Pr Baragé and Mme Nana introduced the importance of gender in sanitation. Linus presented briefly the WHO guidelines before Dr Klutsé introduced the « institutional challenge » for a multi-disciplinary approach like productive sanitation. Mr Zabeirou went on to describe the institutional situation in Niger, and the opportunities for productive sanitation.

A group-work finished off the workshop. The participants discussed the perspectives for productive sanitation on regional, national and international level with the following results:

**Regional group** (PPILDA, PS Aguié team, KKM, UNICEF, CARE, Regional Ministries):

**Results:**

- The positive results of the field trials in 11 villages
- The advantages with productive sanitation are much greater than the disadvantages
- The keen interest for reuse shown by the populations
- The fact that there is already a case of someone buying urine (Saja Manja) is very illustrative
- A positive sanitation triggering of the population due to the low soil fertility of the region
- PS makes available low cost fertilizer
- Behaviour change of the population – using latrines, collecting urine, reuse

**Insufficiencies:**

- The short duration of the experimentation (1 year)
- We need to study the long term use of the latrines and hand washing
- Greater involvement of the state actors in the project
- No research on solid fertilizer since the faeces have not yet been sanitized

**Perspectives**

- Continue the experimentation in the same villages and extend to more villages within the PPILDA project
- Initiate collaboration with partners like l'UNICEF, le CARE, le KKM etc...
- Deepen the research on use of urine during the dry season (in compost or on the field)
- Go from the farmer field school demos to pilot fields
- Initiation of experimentation in 2010 with liquid fertilizer in villages in the project zone of KKM
- Identify more partners for extension of the experimentation
- Initiate the capitalisation of the use of the liquid fertilizer

**National group** (CREPA Niger, Pr Baragé, National Ministries, Dr Klutsé)

**Step 1 :**

- The participants need to report back at their respective department about the possibilities with productive sanitation
- Sharing the results in the water-hygiene-sanitation sector via the decentralized state services

**Step 2 :**

- CREPA should elaborate an advocacy strategy
- Capitalize all the tools relative to productive sanitation
- Organise meetings with different partners (like the sector group Water-Hygiene-Sanitation)
- Organize a national productive sanitation workshop to share the results
- Involve the media for mass sensitisation on the approach

**International Group** (Patient Maganya, Fred Semyalo, Lassina Mariko, Mamadou Gueye, Feno Andriamanalino, Cecilia Ruben)

Country	Lessons learnt from Niger	Obstacles in your country	Opportunities in your country	Individual actions	National actions
Rwanda (Patient Maganya)	<ul style="list-style-type: none"> <li>- Technical aspects have been a great lesson</li> <li>- It is possible to break the socio-cultural barriers</li> </ul>	<ul style="list-style-type: none"> <li>- Lack of research on productive sanitation</li> <li>- Lack of knowledge amongst all stakeholders</li> <li>- Taboos on urine and faeces</li> <li>- Absence of PS in the sanitation policies</li> <li>- High cost of ecosan latrines</li> </ul>	<ul style="list-style-type: none"> <li>- The organic matter and phosphorous in faeces</li> <li>- Mineral nutrients in urine</li> <li>- Fertilizers available at a reduced cost</li> </ul>	<ul style="list-style-type: none"> <li>- Make the mission report</li> <li>- Assure that at least 10 hh in the intervention zone has a productive toilet</li> <li>- Formulate and submit PS project proposals for APEPARWA and CEAR</li> <li>- Inform the ministry of Agriculture on the potential of PS for agricultural production in Rwanda</li> </ul>	<ul style="list-style-type: none"> <li>- Propose pilot projects on PS in Rwanda, integrating different ministries (Minagri, Minisanté, Mininfra, Minitere, Rema, etc.)</li> <li>- Integrate PS in national development programmes</li> </ul>
Uganda (Fred Semyalo)	<ul style="list-style-type: none"> <li>- PS is possible</li> <li>- it is possible to overcome sociocultural barriers. Remarcable interest by the women.</li> </ul>	Same like Rwanda	Inclusion of PS in the Ugandan sanitation network. This network is also a node for EcoSanRes	<ul style="list-style-type: none"> <li>- Mission report</li> <li>- Take PS from the school were i am working to the surrounding individual households</li> <li>- Include PS as a component to each project submitted</li> </ul>	Propose PS in the monthly meeting in the prime ministers cabinet with FAO, WFP and WB on food security
Mauritania (Mamadou et Lassina)	L'AP est tout nouveau, le tout est une école	Same like Rwanda	Idem	<ul style="list-style-type: none"> <li>- Mission report</li> <li>- Hold village meetings on PS in all 28 villages were AuW is present</li> </ul>	<ul style="list-style-type: none"> <li>- Integrate PS in the different governmental institutions</li> <li>- find financial partners for PS</li> </ul>
Madagascar (Feno Andriamanalina)	Les leçons apprises vont aider à raffiner les stratégies de l'AP	Same like Rwanda	Idem	<ul style="list-style-type: none"> <li>- Mission report</li> <li>- Identify key actors for PS</li> <li>- Develop a communication tool</li> <li>- Improve the existing technical sheet</li> </ul>	<ul style="list-style-type: none"> <li>- The political situation is unstable, which makes national initiatives difficult.</li> <li>- at the moment accompanying beneficiaries</li> </ul>
World (Cecilia Ruben, SEI)		Lack of synergi between the international actors (UNICEF, UNDP, FAO, WFP, WHO, etc.)	Idem	<ul style="list-style-type: none"> <li>- Mission report</li> <li>- Promote the link between PS and climate change</li> </ul>	<ul style="list-style-type: none"> <li>- Demand IFAD to translate documentation on PS-Aguié ito english in order to make it accessible to more people</li> </ul>



The Prefect of Aguié holds the opening speech



Mr Maganya from Rwanda share the international group results



Group photo



Director Guéro from PPILDA close the workshop

## Conclusion

This sharing event was an excellent opportunity for stakeholders from the sanitation and agriculture sector meet and understand the interest of working together in order to improve health and agriculture. The field visits and exchange with the local population was capital and reinforced the message that PS is possible both from a social, economical and technical point of view. On institutional level there is a lot to do:

- **On local level** it is important that PPILDA takes this approach further in Aguié, and together with CREPA Niger supports other actors, like KKM, who want to implement PS in 2010. The dissemination needs to be based on a thorough capitalization of the existing project results. PPILDA has taken the initiative to finance a capitalization study, to have some good base documents for the up-scaling phase.

- **On national level** the PS concept needs to find its way into the formal development strategies, like the SDR (Rural Development Strategy) and the PNAEPA (National Water and Sanitation Program). SEI and CREPA Niger has a responsibility to continue the advocacy and sensitization. For 2010 SEI will finance a research project in collaboration with the agriculture department at Niamey University to look on the synergy between rainwater harvesting techniques and PS for crop production. CREPA Niger will finish off the pilot project in Torodi, and organize a national workshop on PS at the end of 2010.

- **On international level** the different IFAD project representatives at the workshop will need to work together with the sanitation professionals to take the approach further. As Feno

Andriamanalino the representative from Madagascar said “We are agronomists and don’t know anything about sanitation. We have used urinals in our project but if we want to build toilets as well to get the “solid fertilizer” – we need help!”. The same thing goes for sanitation professionals; we need help to manage the produced fertilizer!

**Conclusion: Let’s work together !**

**List of participants:**

N°	Name	First name	Organization	Country
01	Baragé	Moussa	CREPA Agronomist, Professor at the University	Niger
02	Chetima	Moustapha	UNICEF	Niger
03	Klutsé	Amah	CREPA HQ, Head of research	Burkina Faso
04	Saidou	Laminou	PPILDA, consultant	Niger
05	Issoufou	Zakari	DEP/MDA (Ministry of Agricultural Development)	Niger
06	Mamoudou	Gueye	AUW, General Secretary	Mauritania
07	Lassana	Mariko	AUW, Farmer	Mauritania
08	Abdoulaye	Mahaman	CARE	Niger
09	Abass Tougiani	Amadou	INRAN/CERRA	Niger
10	Ruben	Cecilia	SEI/ESR, Recherche Fellow Networking Manager	Sweden
11	Guéro	Chaibou	PPILDA Aguié, Director	Niger
12	Dagerskog	Linus	CREPA Siège, Coordinator PS Aguié	Burkina Faso
13	Zabeirou	Yacouba	CREPA Niger, Director	Niger
14	Issoufou	Souley	DHP/ES-MSP (Ministry of Health)	Niger
15	Hamadou	Zakari	MH/DHUSU/A	Niger
16	Nana	Catherine	CREPA HQ, Gender expert	Burkina Faso
17	Maganya	Patience	Agriculture Expert	Rwanda
18	Semyalo	Fred	UWESO Food security+Nutrition Program Manager	Uganda
19	Mahaman Nourou	Sanoussi	DRH/Maradi (Ministry of Hydraulics)	Niger
20	Chekarao	Hamza	DRSP/MIPF/PC	Niger
21	Mme Issoufou	Hadidjatou	Coordinatrice locale APAguié	Niger
22	Mahaman	Nouri	INRAN/KKM	Niger
23	hamadou	Kailou	CREPA Niger, Head of research	Niger
24	Bagnan.Ousmane	Salifou	PPILDA, Technician	Niger
25	Andriamanalina	Feno	AVSF, Responsable SCAMPIS	Madagascar
26	Ayouba Arzika	Arzika	DRDA-Maradi	Niger
27	Issa	Hassane	PPILDA	Niger
28	Mahaman	Adamou	PPILDA, Agriculture technician	Niger
29	Saley	kanta	PPILDA, Head of composant1	Niger
30	Alassane	Kané	PS/Aguié, Sociologist	Niger
31	Sayabou.A	Ibrahim	PS/Aguié, Technician	Niger
32	Abdoulaye Diouf	Aminatou	CREPA Niger, Communications officer	Niger
33	Sani	Nafiou	DDDA/Aguié, Adjoint DDDA	Niger
34	Mamadou Traoré	Harouna	PPILDA/Aguié, Responsable M&E	Niger
35	Tassiou	Moussa	PPILDA, Technician	Niger

### Evaluation of the study trip

	1	2	3	4	5	Average
Knowledge of PS before the workshop	6	6	5	5	4	2,8
Knowledge of PS after the workshop	0	0	4	10	12	4,3
Satisfaction compared to the expectations on the workshop	0	0	5	9	12	4,3
Relevance of the PS approach to Niger (or to your country)	0	0	3	10	13	4,4
Relevance of the PS approach to your organization	0	0	0	12	14	4,5
Satisfaction of the organization	0	0	1	10	15	4,5

Participants : 35 ; Evaluation forms filled in : 26

### 3.7 Activity 5. Development of tools and materials to facilitate replication and up-scaling

#### 3.7.1 Production of a simplified PSS model

Based on the results from the urine trials in Aguié, SEI developed two models for simulating the effect of using urine as a fertilizer.

The more advanced model was developed by Dr Louise Karlberg. Urine fertilized millet, and a non-fertilized millet crop grown in Niger, was used to predict yields under three different climate scenarios. Results indicate that urine fertilization causes large yield improvements (on average 60%) also under a changing climate. The uncertainties in these estimates are large due to the lack of measured data from the field.

Ian Caldwell at SEI developed a second model in Excel. This model is a more user friendly tool that can provide information on crop productivity increases from using treated urine (Takin Ruwa) as fertilizer as compared unfertilized for growing millet. The model requires two input variables to function. The input variables are a combination of number of people, amount of urine, cropping area and application rate. Using these input variables, the model calculates the potential crop productivity for millet. The output is given in two groupings, one for millet without fertilizer and one for millet with Takin Ruwa fertilizer. Both the crop productivity and the yield are given, including a range that is based on the standard deviation for the source data.

The relationship between the amount of urine and crop productivity is close to linear and a linear equation is used to interpolate the data for urine application rates between 0 and 10000 litres per hectare. Additionally, the output data are given for three different climate scenarios: normal, wet and dry.

**Niger Crop Model for Millet**

Click here to begin! >>

Variable 1:

Variable 2:

Optional Data:

Market Value of Takin Ruwa	<input type="text"/>	USD/litre	
Cost of Urea fertilizer	<input type="text" value="35"/>	USD/50 kg bag	<< 30 - 40
Market Price for Millet	<input type="text" value="153"/>	USD/tonne	153

Suggested Values:

Number of people - enter value as number of people  
(For example, the 2009 population of Niger is 15,290,000)  
Amount of urine - enter quantity of Takin Ruwa (urine) in litres  
Cropping area - enter area in hectares  
(For example, the arable land of Niger is 14,720,000 ha in 2007)  
Rate of application - enter Takin Ruwa (urine) in litres per hectare  
(For rate, maximum value is 10,000 litres/ha - model limitation!)  
(Suggested Millet price is 2007 FAOStat price)

Input Data:

Number of People	<input type="text"/>	people
Cropping Area	<input type="text"/>	hectares
Amount of Urine	<input type="text"/>	litres
Rate of application	<input type="text"/>	litres per hectare

Climate normal: base climate of average year  
Climate wet: +2 °C and +10% prec  
Climate dry: +2 °C and -10% prec

Ranges are based on the standard deviation from the model.

Millet - no fertilizer:  Normal Wet Dry

Millet - Takin Ruwa (Urine) Fertilizer:  Normal Wet Dry

Optional Outputs - Value and Savings of using Takin Ruwa:

Climate	Normal	Wet	Dry
Crop Productivity Improvement (%)			
Crop Productivity Improvement (tonnes)			
Value of Productivity Improvement (US\$)			
Cost for equivalent amount of Urea (US\$)			



The model with further detailed information is found at:

<http://www.ecosanres.org/aguie/model.htm>

### 3.7.2 Production of PSS dissemination and policy dialogue materials

A range of different dissemination materials were produced during the course of the project.

#### Guide for the agriculture extension officer

The contents of this guide is summarized below:

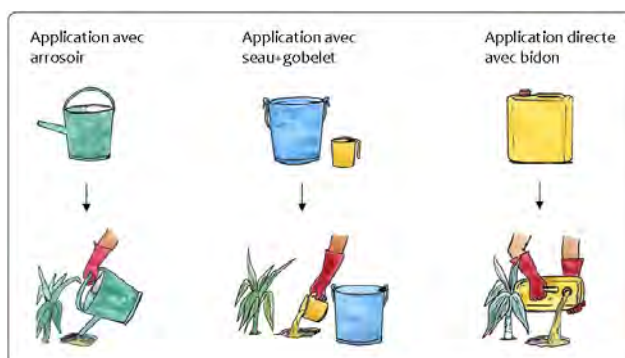
- |     |   |
|-----|---|
| 1   | Introduction  |
| 2   | Aim   |
| 3   | The potential of human urine as a fertilizer                  |
| 3.1 | The quantity of fertilizers excreted by humans                |
| 3.2 | The characteristics of urine as a fertilizer                  |
| 4   | Urine collection  |
| 5   | Mode of Takin Ruwa (sanitized urine) application              |
| 5.1 | Application material  |
| 5.2 | Application to crops with space between the plants            |
| 5.3 | Application to crops planted densely                          |
| 5.4 | Fruit trees   |
| 6   | Recommended application periods and doses for different crops |
| 7   | Security measures   |
| 8   | Bibliography  |

The guide is richly illustrated and is one of the first guidelines in the world on urine-application in agriculture.

It was therefore included as an example of a local guideline in the newly published “Practical Guidance on the Use of Urine in Crop Production<sup>17</sup>”.

The Niger guideline is available on the project website:

<http://www.ecosanres.org/aguie/documents/FicheTechniqueApplicationUrine-BARAGE.pdf>



<sup>17</sup> Richert et al., 2010. This guide is a SEI production in collaboration with SuSanA partners. Available at [http://www.ecosanres.org/pdf\\_files/ESR2010-1-PracticalGuidanceOnTheUseOfUrineInCropProduction.pdf](http://www.ecosanres.org/pdf_files/ESR2010-1-PracticalGuidanceOnTheUseOfUrineInCropProduction.pdf)

## PS-guide for the mayor

With the decentralization process in Niger, the mayor is the main responsible for sanitation on his territory. In discussions with the local stakeholders in Aguié it was decided that a Productive Sanitation guide for the mayors would be a useful tool to develop during the project.

The guide was developed by the independent consultant Mr Mamane Barage in collaboration with CREPA Niger, SEI and local experts in Niger. The target groups are mayors and development agents working with municipalities. It gives basic notions on productive sanitation and some orientation on implementation methodology.

The guide proposes a process of introducing productive sanitation in a municipality and also the legal framework that should accompany a new sanitation system – where the focus is not on technology, but on function. The main emphasis of the legal framework should be on the treatment and reuse of human excreta.

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## Policy report

One part of the project concerned the policy situation in Niger in relation to productive sanitation, both from an agricultural and a sanitation perspective. Therefore a study was commissioned to Patrick Bracken, independent consultant, to capture the current situation and identify obstacles and potentials for productive sanitation to become part of national politics in Niger.

The study found that:

- On a country level: Niger has an exploding population and an economy that is extremely dependent on agricultural production. The available statistics for access to improved sanitation are among the lowest in the as is fertilizer use per unit surface areas in agriculture.

- On a regulatory ad policy level: Existing

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regulations and policy do not pose significant obstacles to the wider uptake of PSS. Indeed national programs and strategies clearly support the objectives of PS systems.

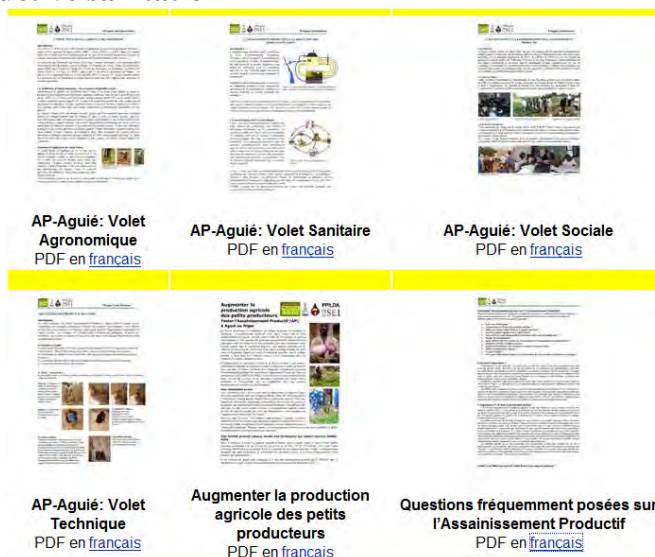
- On an institutional level: For sanitation there is still some degree of confusion over the allocation of responsibilities between 4 different ministries, whereas for agriculture this is much clearer. The decentralization process has however created a situation of some confusion as the decentralized authorities have been granted responsibility for activities for which they have neither the capacity nor the financing.
- A wider uptake of PSS may be encouraged if three recommendations are followed. These are:
  - Support other actors
  - Frame PSS in ongoing national strategies and programs
  - Promote flexible PSS

### Factsheets on different aspects of productive sanitation

Several factsheets were developed that were share with the participants of the study trip to Aguié and also posted on the website:

- Agricultural aspects (3 pages)
- Social aspects (2 pages)
- Technical aspects (2 pages)
- Sanitary aspects (4 pages)
- Project overview (2 pages)
- Frequently asked questions (4 pages)

These factsheets are available on the project website: [www.ecosanres.org/aguie](http://www.ecosanres.org/aguie)



### Films

Six short films were made in the project, which were useful at workshops, and also available on line for others to be inspired by. The films were shot by the local team together with a local camera-man and then edited by Linus Dagerskog at CREPA HQ and Ian Caldwell at SEI.

- Latrine construction (length: 9:54, 687 views on Youtube)
- Sorghum and millet harvest (length: 8:09, 313 views on Youtube)
- Collection and application of urine (length: 9:29, 803 views on Youtube)
- The productive sanitation song in Aguié (length: 5:23, 171 views Youtube)
- Productive sanitation sketch by the women in Dan Bidé (length: 2:40, )
- Voices from Aguié (length: 9:54)

They are available on the website: [www.ecosanres.org/aguie/films-en.htm](http://www.ecosanres.org/aguie/films-en.htm)



Film with impression from local stakeholders



Sketch with women in Dan Bidé

### Posters

Three posters were conceived during the project:



A poster for use during local workshops



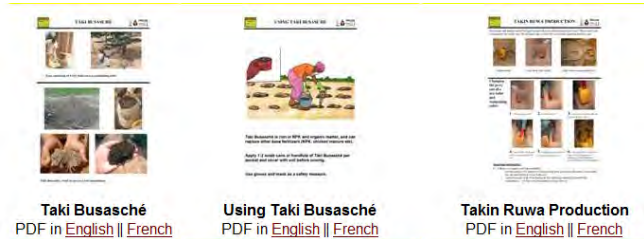
A poster on productive sanitation presented at the World Dry Toilet conference in Tampere, Finland in August 2009



A poster summarizing the main components of productive sanitation. Available both in French and the local language Hausa.

**Aide memoires**

Nine aide memoires were produced that describes the various technologies, the treatment and the reuse. They target the local facilitators and others who want to have a quick overview of the system.



They are also available on the project website: <http://www.ecosanres.org/aguie/factsheets.htm>

**Articles**

*Article in RUAF magazine # 23*  
RUAF magazine published a shorter article on the experience in Aguié. The magazine concerns urban agriculture and a special issue will be dedicated to nutrient recycling. The article can be found on RUAF’s website: <http://www.ruaf.org/node/2217>



*Article in Sustainable Sanitation Practices*

The article “Opening minds and closing loops – productive sanitation initiatives in Burkina Faso and Niger was published in the peer reviewed online journal “Sustainable Sanitation Practices”. It gives an overview of the results and methods that CREPA has used in two projects (PS-Aguié in Niger and ECOSAN\_UE 2 in Burkina Faso) for introducing urine as a fertilizer.

Dagerskog, L., Bonzi, M., 2010, *Opening minds and closing loops – productive sanitation initiatives in Burkina Faso and Niger*, Sustainable Sanitation Practices no. 3 – Use of urine, pp 4-11  
<http://www.ecosan.at/spp/issue-03-use-of-urine/article-1/view>

*CREPA ECOSAN Info*

A two page article was included in the ECOSAN Info 15/16. ECOSAN info is published each trimester by CREPA within the regional ECOSAN program.

Article in the GTZ ecosan newsletter:



- Article on the website of the « Swedish Water House »

The project coordinator was invited to write a chronicle for the website of the “Swedish Water House” and wrote « Closing the loop – When life is at stake ». The importance to use all available resources was emphasized. For poor farmers who live in food insecurity, productive sanitation can be a matter of life or death both from a health and food security perspective.



[http://www.swedishwaterhouse.se/opencms/en/News\\_Stream/Water\\_Chronicle/Closing\\_the\\_loop.html](http://www.swedishwaterhouse.se/opencms/en/News_Stream/Water_Chronicle/Closing_the_loop.html)

Radio/TV

Radio France International (RFI) had a half an hour program on the productive sanitation experience in Aguié, the 29<sup>th</sup> of May 2010.

The radio-emission is available on

Le coq chante

ACCUEIL | DIFFUSION | PODCAST | NOUS ÉCRIRE

SAMEDI 29 MAI 2010

L'Assainissement Productif à Aguié (APA) au Niger

Écouter (26:31) | Ajouter à ma playlist | Télécharger | Embed

Par Sayouba Traoré

Nous allons aujourd'hui dans le quartier « Cité chinoise » de Niamey, dans la ville de Aguié dans la région de Maradi, et dans le village de Sajamanja dans la commune de Aguié au Niger. Avec les responsables de l'antenne locale du Centre Régional pour l'Eau Potable et l'Assainissement à faible coût (Crepa) et ceux du Projet de promotion de l'initiative locale pour le développement à Aguié (PPILDA), nous allons voir l'utilisation de l'urine et des déjections humaines dans l'agriculture. L'idée centrale, c'est d'assainir le cadre de vie et se procurer de l'engrais à faible coût.

Le siège du CREPA Niger à Niamey, RFI

line: <http://www.rfi.fr/contenu/20100529-assainissement-productif-aguie-apa-niger>

The local and national radios were covering the open house event in October 2009. The national television was covering both the open house event in October 2009 and the study visit organized for national and international partners in January 2010.

### Capitalization notes

Three main capitalization notes were compiled to capture the learning during the project.

Note de capitalisation 1: Introduction à l'Assainissement Productif à Aguié (35 p.)

Note de capitalisation 2: Résultats du Volet Agronomique (32 p.)

Note de capitalisation 3: Approche AP au Niveau Village – Volet Socio/Tech (31 p.)

They are also available on the project website [www.ecosanres.org/aguie](http://www.ecosanres.org/aguie).

## 3.8 Activity 6. Development of an international learning platform

This activity was reoriented to outreach at international conferences. The main activity was the organization of a side event at the World Water Week in Stockholm, but the project experiences were also exposed during the World Dry Toilet conference in Tampere and at the Hygiene and Sanitation Symposium in Ghana.

### *World Water Week Stockholm 19<sup>th</sup> of August 2009*

IFAD/CREPA and SEI organized a learning event, as a side event, under World Water Week in Stockholm. The side event, named “Big, Sweet Tomatoes” attracted approximately 100 attendees and raised a lot of interest among the attendees some of which have been reluctant earlier to see the merits of productive sanitation, which can be considered as a great achievement in itself.

During the Session it was made clear that there are several prerequisites for successful testing of PSS. Agricultural extension workers are key to reaching farmers, an enabling environment is necessary, capacity development and institutional issues have to be dealt with, and attitudes, especially among intellectuals, have to be overcome. In concluding the session, there are three questions to this win-win approach, namely: How to mainstream the results? How to deal with logistics? How to overcome mindset obstacles?



The event flyer

Presentation by Anna Richert from SEI on the different tools developed in the project

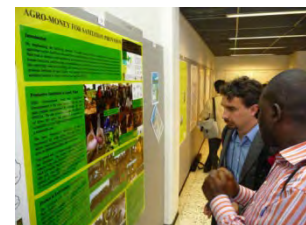
A fact sheet on the project was also handed out during the World Water Week conference. This fact sheet was also translated into French for use in Niger.



The presentations from the event are available at:  
[http://www.ecosanres.org/aguie/big\\_sweet\\_tomatoes.htm](http://www.ecosanres.org/aguie/big_sweet_tomatoes.htm)

*World Dry Conference, Finland 12-15 of August 2009*

The Aguié project was part of a poster exposed by CREPA at the world dry toilet conference in Finland.  
Klutsé, A., Dagerskog, L., 2009, *Agro money for sanitation provision – examples from Niger, Burkina Faso and Côte d'Ivoire*, 3rd International Dry Toilet Conference, 12-15 Aug 2009, Tempere,



Finland [http://huussi.net/tapahtumat/DT2009/pdf/poster\\_Linus\\_and\\_Amah.pdf](http://huussi.net/tapahtumat/DT2009/pdf/poster_Linus_and_Amah.pdf)

*Hygiene and sanitation symposium Accra 3-5 November 2009*

An article “Productive Sanitation in Aguié, Niger – The agriculture sector takes the lead”, was submitted and accepted for the conference on hygiene and sanitation in Ghana in November 2009. The article and presentation are available at the website of IRC:



<http://www.irc.nl/page/50820>

## 4 Costs

### 4.1 The budget

The total budget of the project was 272000 \$, of which 200 000 \$ was the IFAD grant and 72000 \$ was the partners' contributions. During the course of the project a reallocation of the budget categories had to be made which was endorsed by IFAD (the reallocation was formally agreed on the 14<sup>th</sup> of Jan 2010).

**Table 11.** Original total budget with partner contributions (\$ US)

Category	Total amount	IFAD	PPILDA	CREPA	SEI	UWESO
<b>I. Staff costs</b>	105 000	80 000		25 000		
<b>II. Travel cost/perdiem</b>	83 400	68 400	10 000			5000
<b>III. Subsidy for equipment and research</b>	42 200	27 200	15 000			
<b>IV Knowledge management</b>	20 000	3 000			17000	
<b>V. Administrative costs and monitoring/evaluation</b>	21 400	21 400				
<b>TOTAL</b>	<b>272 000</b>	<b>200 000</b>	<b>25 000</b>	<b>25 000</b>	<b>17 000</b>	<b>5 000</b>

**Table 12** Revised total budget with partner contributions (\$ US)

Category	Total amount (USD)	IFAD	PPILDA	CREPA	SEI	UWESO
<b>I. Staff costs</b>	110 652	68652		25 000	17 000	
<b>II. Travel cost/perdiem</b>	66 333	54333	7 000			5000
<b>III. Subsidy for equipment and research</b>	47 916	29916	18 000			
<b>IV Knowledge management</b>	25 699	25699				
<b>V. Administrative costs and monitoring/evaluation</b>	21 400	21400				
<b>TOTAL</b>	<b>272 000</b>	<b>200 000</b>	<b>25 000</b>	<b>25 000</b>	<b>17 000</b>	<b>5 000</b>

## 4.2 The expenditures of the project

CREPA HQ was the recipient of the IFAD grant. However, some of the activities financed with the IFAD grant were carried out by CREPA Niger and SEI. At the time of writing this report, the expenditures by CREPA Niger and SEI were being registered at CREPA HQ for the final audit, and could not yet with precision be attributed to individual budget lines. The following table is therefore based on the CREPA HQ expenditures:

**Table 13.** CREPAs expenditures of the IFAD grant + contribution to the project

	IFAD grant		CREPA Contribution
	CFA	\$	\$
Human resources	2061250	4250	25000
Travel/per diem	16574194	34174	
Equipment and research	1925538	3970	
Knowledge management	1824220	3761	
Evaluation and audit (budgeted)	2425000	5000	
Administrative costs at CREPA	6563990	13534	
Funds transferred to CREPA Niger	49256355	101559	
Funds transferred to SEI (including admin costs)	16281450	33570	
<b>TOTAL SPENDING IFAD GRANT</b>	<b>96911997</b>	<b>199818</b>	
<b>TOTAL GRANT</b>	<b>97000000</b>	<b>200000</b>	
<b>Outstanding</b>	<b>88003</b>	<b>182</b>	

Before the final overview of the expenditures by CREPA Niger and SEI it is difficult to give precise costs and details for individual budget lines. The section below is a description of staff involved in the project, but the exact costs could not be given at this stage.

### Staff involved in the project

#### CREPA contracts for project

Name	Institution	Role in the project	Time of contract	Period of working contract
Linus Dagerskog	CREPA HQ	Main coordinator	10 months	Ten months within the period 15 Jan 2009 – 15 Jan 2010
Issoufou Hadidjatou	CREPA Niger	Local coordinator/agronomist	12 months (+1 month salary for holiday)	1 Dec 2008 – 30 Nov 2009
Alassane Kane	CREPA Niger	Sociologist	10 months + 10 days (+26 days salary for holiday)	21 Dec 2008 – 31 Oct 2009
Ibrahim Sayabou	CREPA Niger	Technician	10 months + 10 days (+26 days salary for holiday)	First contract 7 months: 21 Dec 2008 – 30 June 2009 Second contract 3 months: 1 July 2009 – 31 October 2009

#### CREPA Niger expertise (total of 3,5 months during the project)

Name	Role	Interventions
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Hamadou Kailou	Sanitary Engineer	<ul style="list-style-type: none"> <li>- Preparatory mission Oct 2008</li> <li>- Supervision/support mission Feb 2009</li> <li>- Training of artisans March 2009</li> <li>- Support mission April 2009</li> <li>- Evaluation mission June 2009</li> <li>- Planning mission October 2009</li> <li>- General supervision of the local team – CREPA Niger’s respondent</li> <li>- General supervision/support of studies</li> <li>- Support during organization of IFAD learning trip</li> </ul>
Abdul Kader Timbo	Sociologist	<ul style="list-style-type: none"> <li>- Training of local facilitators+PPILDA+PS-Aguié+CDA on participative methods March 2009</li> <li>- Conception of awareness raising tools and facilitation manual April/Mai 2009</li> <li>- Training of local facilitators on the new tools June 2009</li> <li>- Recycling of local facilitators February 2010</li> </ul>
Aminata Diouf	Communicator	<ul style="list-style-type: none"> <li>- Supervision/support mission Feb 2009</li> <li>- Support mission September 2009 (capitalization + film)</li> <li>- Support mission October 2009 (Open house event)</li> <li>- Assisting during the IFAD learning trip</li> </ul>
Zabeirou Yacouba	Director	<ul style="list-style-type: none"> <li>- Support mission July 2009 (Discussing the partnership with PPILDA)</li> <li>- Co-organizing the IFAD learning trip</li> </ul>
Hadjaratou Balo	Accountant	<ul style="list-style-type: none"> <li>- Accounting/handling all monetary demands from the local team</li> <li>- Support mission July 2009 (Acquaintance with the field)</li> <li>- Planning mission October 2009 (Financial evaluation/planning)</li> </ul>

### CREPA HQ Expertise

Name	Role	Interventions
Dr Moussa Bonzi	Agriculture expert	4 days of expertise during launching
Dr Amah Klutse	Sanitary Expert	3 days of support during IFAD study trip
Catherine Nana	Gender expert	<ul style="list-style-type: none"> <li>- 3 days of support during IFAD study trip</li> <li>- Gender evaluation of the project paid by SEI (outside the project budget)</li> </ul>

### SEI (total of 6 months during the project)

Name	Position at SEI	Role in the project
Elisabeth Kvarnström	Senior Research fellow	Project leader for SEI activities, actively involved in policy paper, guidelines and learning event
Cecilia Ruben	Research fellow	Learning event/communications
Ian Caldwell	Research fellow	Home page and model
Håkan Jönsson	Senior Research fellow	Agricultural backstopping, model and guidelines
Anna Richert	Consultant	Agricultural backstopping, model and guidelines
Louise Karlgren	Researcher	Advanced modelling
SEI Policy and Institutions Group	Researchers	Support in elaborating ToR for policy paper
Local consultants in Niger	Consultant	<ul style="list-style-type: none"> <li>Policy analysis report</li> <li>PS-Guideline for agriculture extension officer</li> <li>PS-Guideline for mayors</li> </ul>

### The following contracts have been signed to carry out the studies in the project:

Name	Role	Comment
Laminou Saidou	Masters student	4 months internship contract

Djariri Laouali	Masters student	4 months internship contract
Pr Moussa Barage	Supervisor	- Contract for supervision and implementation of the agronomic studies by two master's students from the University of Niamey - Contracts for support during three missions in February 2009, June 2009 and IFAD study trip in January
Mahaman Saley	Consultant	Contract for organo-leptic study on vegetables fertilized with urine and urea

A contract was also signed with the rural engineering department of Aguié to support the supervision of the construction of latrines:

Name	Role	Comment
Hamissou Malam Manzo	Consultant	Monitoring of the quality of construction work in the villages

Contracts were also signed with the local village facilitators for awareness raising and follow up on village level.

#### **PPILDA (Staff involved but not paid on the project budget)**

Name	Position at PPILDA	Role in the project
Saley Kanta	Head of Component 1: Local innovations	The respondent at the PPILDA project. Followed the PS-Aguié project to eventually integrate productive sanitation as a component of PPILDA interventions
Adamou Mahamane	Agent in Component 1	Worked in close collaboration with the local team
Agriculture Technicians of the Aguié department	General contract to support the PIP tests that PPILDA implements in the villages	Within the general framework of collaboration with PPILDA, five Agriculture Technicians were involved in the supervision of the participative tests that have been carried out with the pilot farmers.

## 5 Level of accomplishment of project objectives

The project's overall goal was to improve agricultural productivity to ensure more food security and health for smallholder farmers through Productive Sanitation Systems (PSS). The evaluation of the level of accomplishment of project objectives and outputs is summarized in Table 14. For definitions of indicators see the project M/E manual.

**Table 14 .** The logical framework and evaluation of project objectives

<b>Result hierarchy</b>	<b>Indicator</b>	<b>Result</b>
<b>Overall goal :</b> Improved food security and health for small holder farmers	-	
<b>Project Objective 1 :</b> Productive sanitation systems are accepted and have measurable effects on food production in the pilot communities (comparative analysis with other fertilizers or non fertilizers)	At least 4/5 villages accept the concept of PSS	Out of 9 villages where the project did participative tests, 8 villages accepted the approach of which : - 4 villages during the dry season and also during the rainy season (PIP) - 4 « new » villages during the rainy season (PIP) One village (Aguié town) was difficult, with low engagement from the test farmers and the local facilitators.
	Correct use of PSS by at least 80% of participating households in the villages where PSS is accepted	End of January 2010 : 97,5% of latrines were well used
	At least 80 % of farmers involved in participative training confirm equal or better yields when replacing urea by hygienized urine	For vegetable season : 32/33 farmers = 97% For cereal season : 102/102 respondents confirm a more vigorous growth with urine compared to urea.
	At least 80% of farmers involved in participative training confirm longer fruit bearing period and larger fruits when replacing urea by hygienized urine	For the vegetable season : 32/33 farmers (97%) confirm larger fruits with urine 16/16 (100%) of the respondents confirm longer fruit bearing time with urine
	Study confirm hygienic and agricultural quality of urine	An MSc thesis on the « Identification of risks and resources in treated urine in Augié » was defended at 2iE in Ouagadougou with a good note
<b>Project Objective 2 :</b> Other actors in the field of sanitation/agriculture integrate the ideas of PSS into their work	Expressed interest of 4 out of 6 IFAD co-funded project managers in participant-observer countries to disseminate and replicate PSS findings in their respective projects.	Statements by the representatives from the four countries taking part in the study trip: Rwanda: Assure that at least 10 households in the intervention zone has a productive toilet + formulate and submit PS project proposals Uganda: Take PS from school to surrounding households + include PS in all project proposals Mauretania: Hold village meetings on PS in all 28 villages

Result hierarchy	Indicator	Result
		<p>Madagascar: Identify key actors for PS and develop a communications tool + improve existing fact sheet.</p> <p>From the evaluation of the study visit, an average note of 4,5 was given (26 respondents) when asked to state the relevance of the PS approach to the participants' respective organization.</p>
	At least two actors in the sanitation and/or agricultural sector in Niger adopt PSS in their work following the workshop series	<p>Two large projects in the Maradi region, KKM and PPILDA, included PS in their 2010 budget.</p> <p>The PS approach has also been included in several projects during 2011: CARE, CRS, UICN are partners in the Global Water Initiative (GWI financed by Fondation Buffet) implement an Integrated Water Resource Management project in Madaoua. CREPA has been contracted to work on sanitation and fertilization, and count on building 300 composting latrines (50 were built this year), after having organized study visits to Aguié with farmers from Madaoua. The project partners have submitted a proposal to EU, including a construction of another 1000 composting latrines.</p> <p>At Filingué et Illela CREPA is partner in a USAID financed sanitation project. 180 villages will be triggered for latrine building via « Community Lead Total Sanitation » and visits to Aguié is planned with representatives from the triggered communities.</p>
	75% of the institutions participating in the learning event at the World Water Week manifest interest for PSS	The learning event "Big Sweet Tomatos" was organized as a side event during the World Water Week in Stockholm. It was an open event that attracted approximately 100 attendees. The event raised a lot of interest among the attendees, some of which have been reluctant earlier to see the merits of productive sanitation, which can be considered as a great achievement in itself.
<b>Product 1:</b> PSS promoted and provided to 300 households in Maradi (activity 1-3)	Type and number of installations provided	170 toilets finalized with 18 under construction at the end of the project 1143 households with urinals 4822 jerry-cans distributed
	Quantity of urine collected from urinals and toilets	>125 m3
	Number of vegetable farmers trained on the application of urine and the use of drip irrigation	25 vegetable farmers involved in tests (21 men and 4 women)
	Number of farmers trained on the	130 farmers trained on the PIP (farmer field

Result hierarchy	Indicator	Result
	application of urine on cereals	schools)
	Number of artisans and facilitators trained	20 masons (men) 15 facilitators (all men – in the beginning there were two women among the facilitators, but one had to stop because of childbirth and one because of lack of dynamism )
<b>Product 2:</b> Pilot project results evaluated and disseminated (activity 4)	Number and type of studies made	- Organo-leptic study - Urine application to compost - Urine application to the field during the dry season - Reducing costs for latrines and urine storage - Identifying risks and resources in Aguié urine - Gender study
	Number of dissemination workshops held	6 inter farmer visits: - 3 during vegetable season - 3 during cereal season One « open house » event Final local workshop (Dec 2010) Final study visit (Jan 2010)
	Number and type of partner having visited the PSS sites	- Visit to Meifarou by the Regional Director of Agriculture (June) - Visite by Pr Barage from university of Niamey to the villages Meifarou and Saja Manja (August 2009) - Visit by three representatives for the FBS (Fonds Belge de Survie) (July 2009)
<b>Product 3:</b> PSS tools available and spread to facilitate replication (activity 5)	A simplified model to facilitate the choice of PSS in relation to local conditions	The simplified model has been elaborated and can give estimates of production based on available urine/population or urine needed based on surface to fertilize: harvest relation between population
	Dissemination material related to different components of PSS	PHAST tools : - Transmission routes - Sanitary barriers - Fields close and far from teh village - One family = two bags of fertilizer - The fertilizer circuit - Histoire hiatus (latrine maintenance) - Three piles of cards (storage and application of Takin Ruwa) Picture fact sheets on the toilets/urinals and the production and use of Takin Ruwa and Taki Bussasché Poster PS-Aguié for local use Logo PS-Aguié Three capitalization documents  Three strategic documents are being elaborated by consultants, piloted by SEI: - Policy dialogue paper - Mayor's PS guide

Result hierarchy	Indicator	Result
		- Farmer's PS guide  Articles have been published in: - Sustainable Sanitation Journal (#3) - RUAF (#23) - Poster/article for World Dry Toilet Conference 2009 in Tampere, Finland - Presentation/article for Hygiene and Sanitation Symposium in Accra, Ghana (IRC)
	The dissemination material is available on various websites such as the Rural Poverty Portal	The first material is available on the projects web site ( <a href="http://www.ecosanres.org/apaguie">www.ecosanres.org/apaguie</a> ) The Rural Poverty Portal was contacted but with no return.
<b>Product 4:</b> International learning platform established involving key institutions (activity 6)	At least 100 visitors per month on the PS web site at the end of November 2009.	In total there has been 2165 unique page views on the website by 305 unique visitors The most popular pages have been: /aguie/aidememoirs.htm - 107 unique visitors /aguie/learning_trip.htm - 97 unique visitors /aguie/factsheets.htm - 93 unique visitors
	At least 40 people participate in the learning event at the World Water Week 2009 in Stockholm	The event attracted around 100 participants

## 6 Benefits from the project

The benefits from the project are on several levels:

### On village level

The villagers involved in the project have an increased awareness on both the danger and the resources present in human excreta. With the good use of productive toilets and urinals both health and food production can be improved. The direct benefits on the local level include:

- The annual quantity of human fertilizer that can be collected from the average family of nine persons corresponds roughly to one 50 kg bag of urea and one 50 kg bag of NPK, which is worth around 80\$ on the local market.
- Increase in crop production for a variety of vegetables and cereals using human urine as a fast acting nitrogen fertilizer. Each jerry can of urine (25 litres) gave 2-3 kg extra millet grains compared with only base fertilizer.
- Productive sanitation helps to optimize the use of locally available fertilizing resources, which is important in a context where chemical fertilizers are out of reach for many farmers. The price of chemical fertilizers is likely to continue to be variable, and probably increase with peak oil and peak phosphorous in view. Thus, productive sanitation can contribute to reduce the vulnerability of poor farmers.
- Urine collection on household level reduced the nuisance of urine odours in the traditional shower and ablution area, which especially women appreciated.
- Villagers also emphasise the comfort, dignity and pride of having access to a latrine that, if well used, does not have odours or flies.



- The pilot village animators, masons and farmers constitute a local knowledge base that can be used in an up scaling phase. PPILDA count on using these competences, via the formation of a “productive sanitation association”, in the continued work with productive sanitation.
- In two of the villages there is an emerging market for urine, with several hundred jerry cans of urine having been bought by more well off farmers. This potential market for urine could potentially be a motor for the spread of this approach.

#### **On departmental/regional level**

- The advantages of collaboration between sanitation and agriculture actors have been clear in the department of Aguié. The trainings have strengthened capacity of especially the agriculture extension officers, the rural engineer and the health official in Aguié. These actors are capable to play an active role in a further promotion on local level.
- The project has created certain “productive sanitation tourism” to Aguié, with several study visits that have taken place during and after the project.

#### **On national level**

- Information about productive sanitation is now available in Niger, with local guidelines and tools produced in the project. New knowledge has also been developed with the research (4 MSc) work in the project.
- Representatives from the ministries of health, hydraulics and agriculture participated in the final study visit. These are key persons that can support advocacy initiatives for a further up-scaling of the approach.
- The total annual value of N, P, K in urine and faeces in Niger has been calculated to be worth around 120 million \$. This is a considerable sum, and shows the fertilizing potential of human excreta that can be used safely given that the urine and faeces are treated and applied in a conscious way.

#### **On international level**

- The international study trip was appreciated and will hopefully bear fruit in Mauretania, Rwanda, Uganda and Madagascar.
- The project has had good outreach via several activities and articles on international level. The originality of the project lies in the methodology, with agriculture extension workers promoting treated urine and faeces as fertilizers, triggering demand for sanitation via participative tests in agriculture. There has been a strong focus on low cost technologies, which puts emphasis on local material. Combining the composting pit latrine with urine diversion is a new approach that seems promising and that could be of interest elsewhere.

#### **On the partners' level:**

- CREPA has benefitted as an organization by having the opportunity to develop, implement and do research on productive sanitation. The collaboration with PPILDA and the methodology of farmer field schools and inter village visits are important aspects when implementing productive sanitation. This experience has created opportunities for CREPA Niger, with support to other NGOs on capacity building and implementation of productive sanitation.

- PPILDA has added a successful “innovation” to their menu of technologies that are made available in the farmer field schools. The staff has benefitted from the trainings and workshops, and have the capacity to continue the implementation.
- With the Aguié project SEI has had a concrete example to feed into the advocacy work on international level for more sustainable sanitation. In the international urine guideline that SEI published in 2010, the Aguié project is referred to and many of the photos in the guideline are from the Aguié project. This project has also been a bridge-builder within SEI, since the sanitation group has collaborated with both the policy group and the water group (modelling).

## 7 Conclusion

- The project PS-Aguié has clearly shown the benefice of using urine as a fertilizer. In the Aguié region there is now a widespread knowledge on how urine and faeces can be collected, treated and reused in a safe way. The project has also shown that it is possible to overcome the mental barriers, if a good methodology is used, and trainings and information are given by competent actors.
- Productive sanitation provides the necessary link between sanitation and agriculture. However given that urine contain the majority of the nutrients; the most cost-effective and simplest way to scale up recycling of human excreta would be to focus on urine collection. In the absence of having possibility to store large quantities of urine during the dry season, it is possible to enrich a compost or to incorporate it into the field during the dry season. Focus on urine would not solve the sanitation problem, but significantly contribute to local nutrient management.
- The composting latrine with urine diversion is an innovation that has been popular in Aguié. However, urine diversion on the slab is a complexity that could be avoided using a normal latrine slab and complement the latrine with a simple urinal. More organic matter should then be added to the pit, to compensate for the urine entering the pit.
- It is important to emphasise that the farmers don't stop using other fertilizers that are available and also necessary in order to reduce the loss of soil fertility. Urine and faeces complements other existing fertilizers. It is also important that urine is accompanied by application of organic matter as a base fertilizer. This will also reduce the risk of salinization.
- Linking this type of pilot project to an existing large rural development project like PPILDA, has been very helpful in facilitating the implementation of the project and also for sustaining the project results.
- The project has had a good outreach in the sanitation sector, but the approach also needs to be spread and be understood in the agriculture sector. IFAD has the possibility to support capacity building and implementation of productive sanitation to the benefit of small holder farmers around the world.

## Annex 1. Documents available from the project

Documents	Available on project website
<b>Reports</b>	
Monitoring and Evaluation Manual	-
Progress report 1	-
Progress report 2	-
Base line study	-
Open house event	-
Mission reports by CREPA	-
Monthly reports by local team	-
Report on the IFAD study visit	Yes
Action plan PS-Aguié	-
Training of masons	-
Training of facilitators	-
Training of agriculture extension officers	-
Report from the side event at World Water Week in Stockholm	-
<b>Studies/articles</b>	
Étude organo-leptique : produits de maraichage	Yes
Article for Sanitation and hygiene symposium in Ghana	Yes
MSc reports (4)	Yes
Article dans le RUAF	Yes
Chronique sur le site web du SWH	Yes
Étude institutionnelle	Yes
Étude genre	-
<b>Facilitation/dissemination tools</b>	
Facilitation guide	-
Capitalization note 1. Introducing PS	Yes
Capitalization note 2. Agro	Yes
Capitalization note 3. Socio/tech	Yes
Fact sheet on project	Yes
Fact sheets on different aspects of PS	Yes
FAQs	Yes
Poster 1. Assainir pour produire plus	Yes
Poster 2 Agro-money for sanitation	Yes
Poster 3. Aide mémoire for the villagers	-
Aide mémoires for the local facilitators	Yes
Guide AP pour le vulgarisateur agricole	Yes
Guide AP pour le Maire	Yes
Films from the project (6)	Yes
Explicative note on the advanced model	Yes
Explicative note on the simplified model	Yes
<b>Other documents</b>	
Convention between CREPA Niger and PPILDA	-
Convention between CREPA HQ and SEI	-
Contrat between CREPA and IFAD	-