



The Vetiver Network International

La Plantation Bemasoandro SUARL

# **The Vetiver System, a biological solution for development and conservation in Madagascar**

## **How Vetiver System applications can attenuate climate change impacts**

*Fifth International Conference on the Vetiver System  
« VETIVER USE FACING CLIMATE CHANGE »*

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# Summary



## CONTEXT:

- Madagascar, Island of high biodiversity
- Environmental context and problems

## VETIVER SYSTEM APPLICATIONS:

- 1-Vetiver System for **sustainable agriculture**
- 2-Vetiver System for **floods and sediments impacts alleviation**
- 3-Vetiver System for **infrastructures protection**
- 4-Vetiver System for **poverty alleviation**
- 5-Vetiver System for **waste water treatment**
- 6-Vetiver System for **handicraft and other uses**

## CONCLUSION:

Contribution of the Vetiver System use facing climate change

# Madagascar, island of high biodiversity



The Island is separated from the African continent, and was populated by humans only 2,000 years ago.

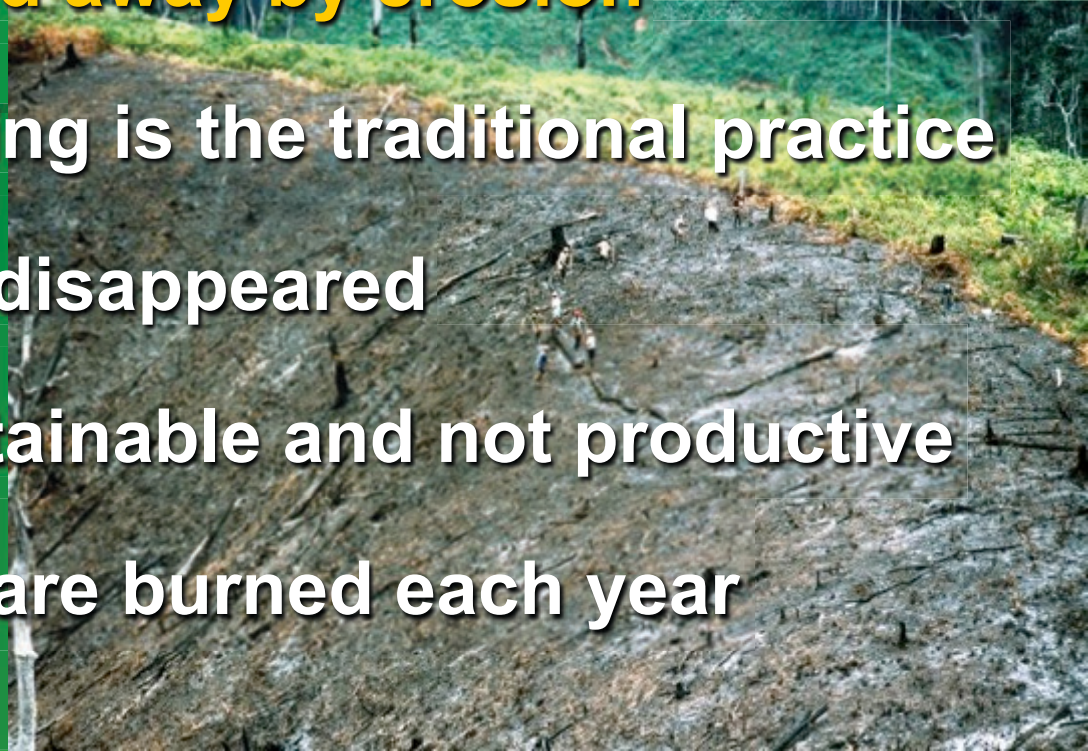
The « Great Island » contains old species and the highest endemic level (average 75% of fauna and flora are endemic)



Under these rich ecosystems, the soil has remained very fertile, but only on a thin topsoil

# Environmental context

- 80% of population living in the countryside
- 3000T/ha still of cultivable layer
- 400T/ha/year is washed away by erosion
- Slash and burn cropping is the traditional practice
- 85% of rainforest has disappeared
- Agriculture is not sustainable and not productive
- More than 300.000 ha are burned each year



# Environmental problems

Consequences=

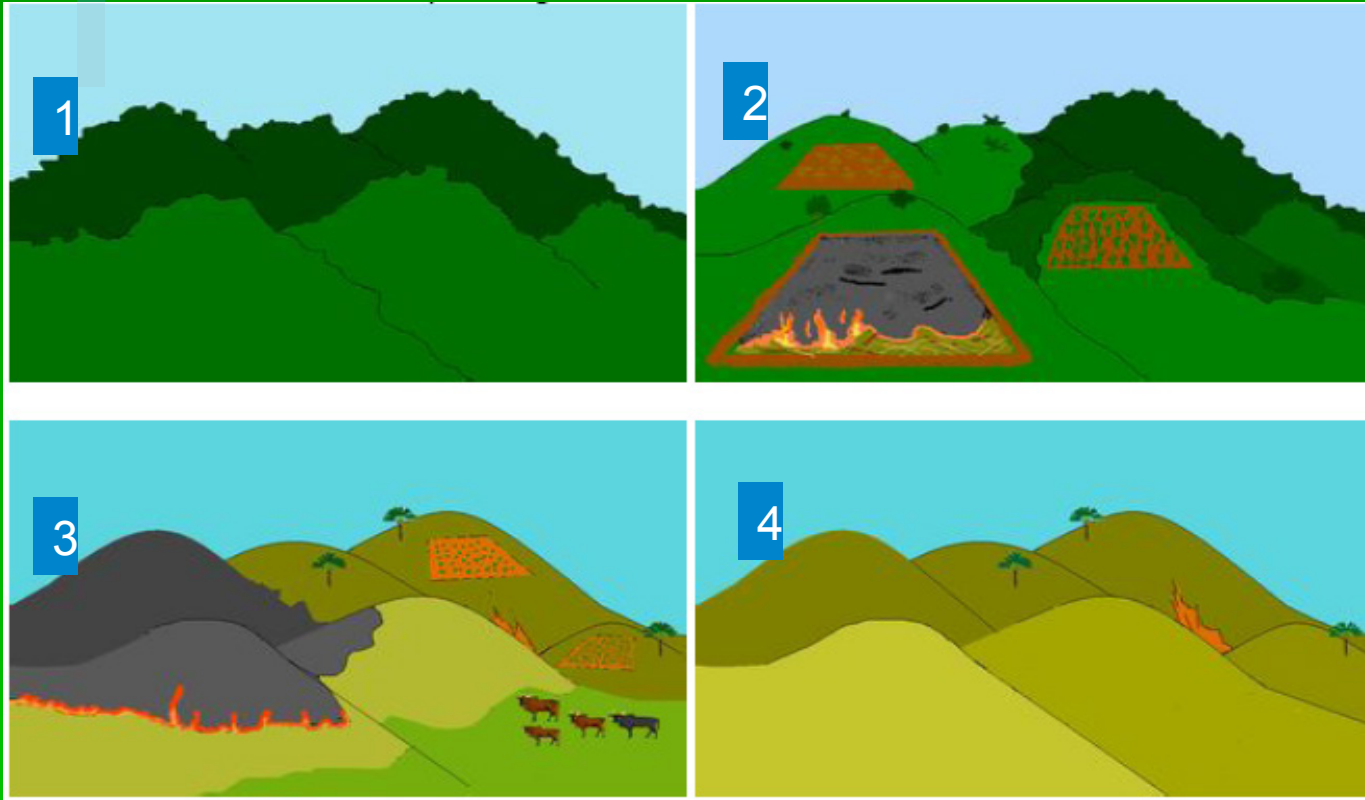
-**erosion** (loss of soil fertility and sediments, loss of moisture, deteriorated lands and infrastructures, gully erosion called LAVAKA...)

-**sediments** (loss of rice-fields, water quality decrease, loss of mangroves and coral reefs...)

-**floods** (infrastructure degradation and damages for crops, health and others activities)



# Agricultural practices



1: The soil is still fertile, under vegetation cover

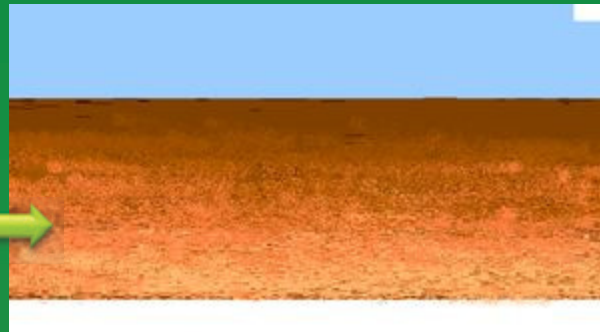
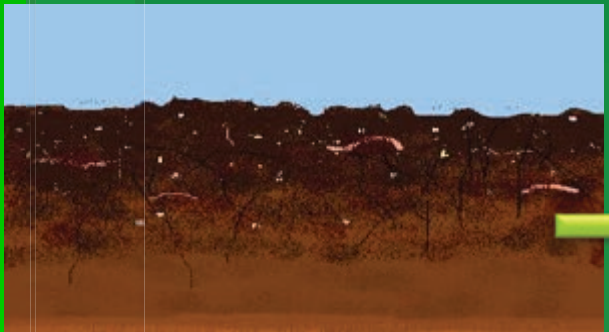
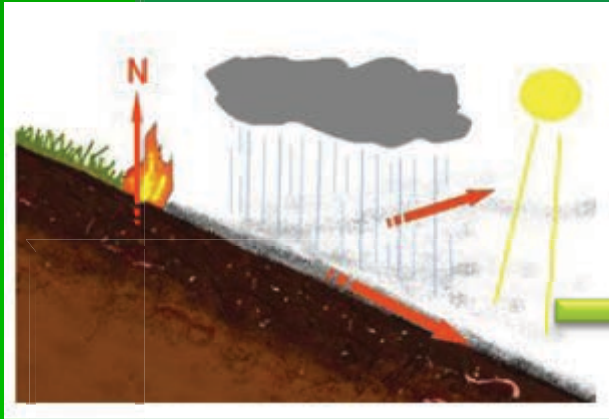
2: With the high soil fertility, farmers sow upland rice after slashed and burned the lands. After the nutrients are washed away by erosion, every year they have to clear another parcel of land

3: Set fire for fodder

4: No crop is able to grow on this severely deteriorated land

Slash and burn cropping force the farmers to clear another parcel of land each year and results to a severely deteriorated land

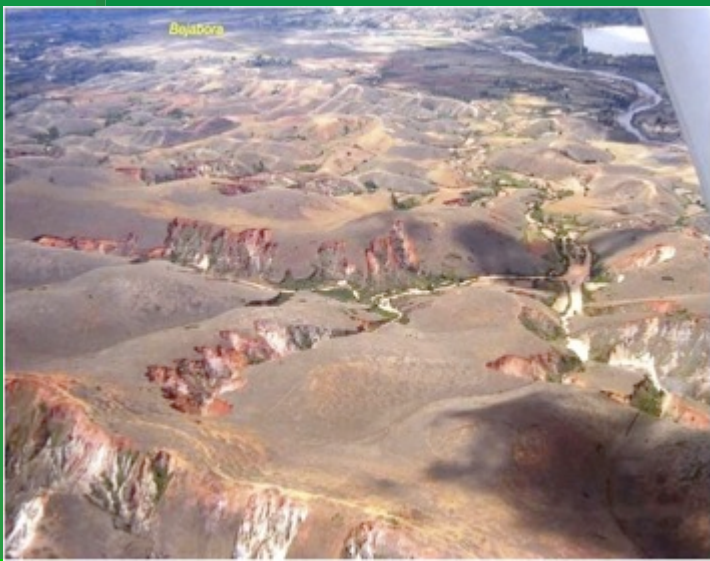
# Erosion due to agriculture practices and a lack of protection



The nutrients are washed away by erosion (bare hill just before rainy season).

After a few years the soil has definitely lost its fertility.

# Erosion, gully erosion (lavaka) and sediments due to lack of protection

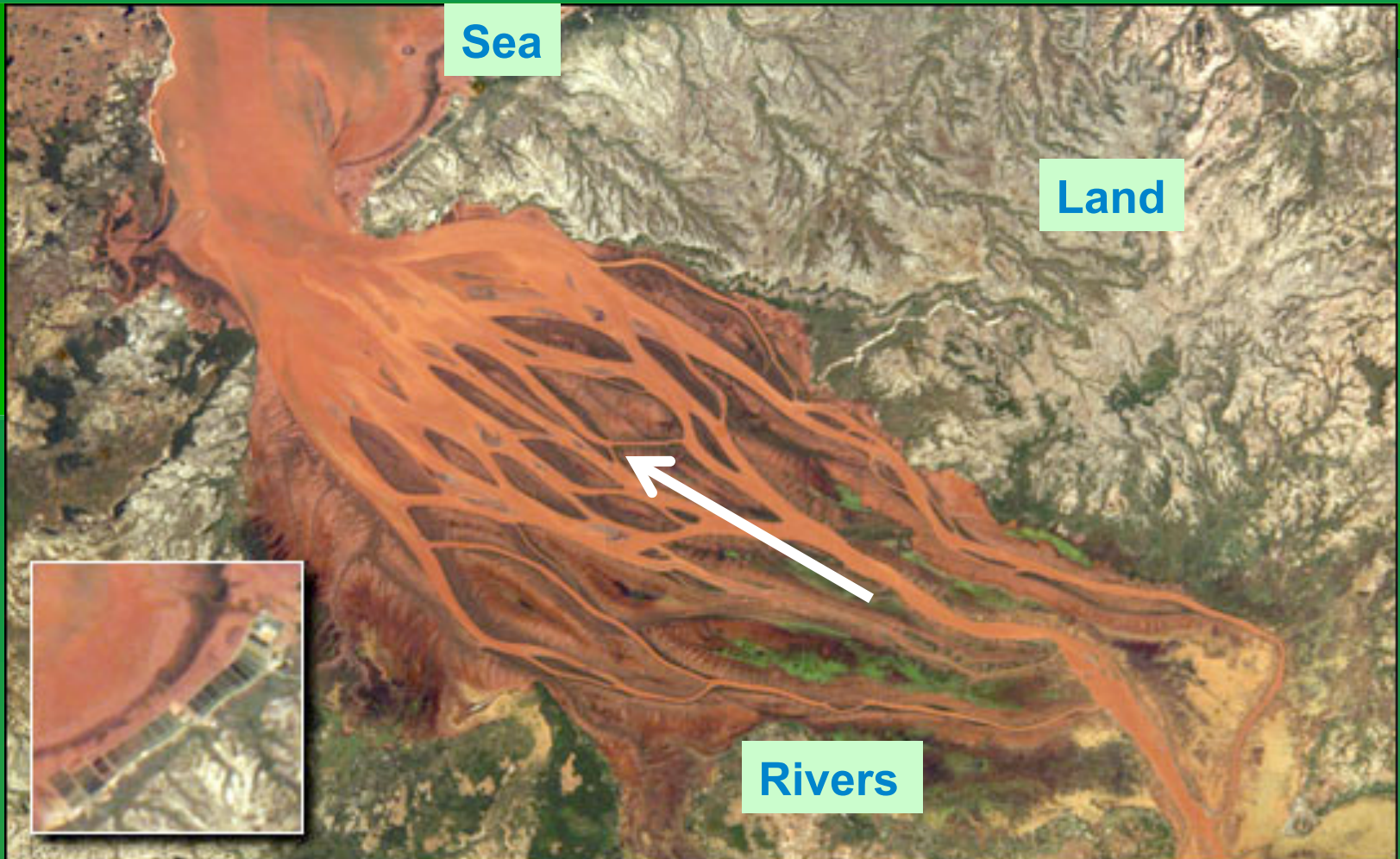




# **View from the plane of sediments washed away and carried by rivers**



# View from space of sediments washed away and carried by rivers



March 25, 2004 (ISS008-E-19233)

# Field view of lavakas and its sediments washed away, carried by « sandy rivers »



# Fieldview of erosion impacts on infrastructures



## **Why the Vetiver System is the best answer?**

- Efficient and sustainable for erosion control, soil&water conservation, slopes stabilization, environmental rehabilitation**
- Easy to promote the technique on a large scale and to propagate the grass by farmers**
- Adaptable to all conditions in Madagascar**
- Promote sustainable farming: farmers can cultivate the same part of land for many years with improved yields, without having to move their fields every year in order to find fertile soil.**

22/02/2009

# 1-Vetiver System for sustainable agriculture and rainforest conservation

Once the soil fertility is maintained, farmers will not have to clear another parcel of land every year, then it saves forests, water&soil, and ricefields from sediments



# Agricultural practice and popularisation of VS use: case study of Vohimana



Bare slope and erosion on slash-and-burn land for rainfed rice



Due to this practice, the loss of soil fertility is so high that the farmers have to clear a new parcel of land every year. The rainfed rice can not grow a second year on these severely eroded lands.



**Here are some VS uses by the farmers for sustainable agriculture, after the VS was popularized during few years**







**These terraces are established only by VS action, planted few years ago for vegetable culture**



**Results: sustainable agriculture with better fertility and moisture, mulching, no soil loss**

# 2-Vetiver System for flood and sediment impact alleviation




# 2-Vetiver System for flood and sediment impact alleviation



# 3-VS for infrastructures protection

The VS offers many solutions for infrastructures protection such as:

- Roads and railways
- Hydro-agricultural infrastructures
- Pipelines, pylons,...
- Buildings and property
- Riverbanks, bridges
- Dune, littoral, etc...

The VS has to be applied under technical criteria to be effective. 



13/04/2010

# Vetiver System Application for dyke's banks stabilization:

1) During the  
work



2) Bank just  
planted



3) After 6  
months



4) After 1  
year



# Vetiver System Application for dyke's banks stabilization: during the plantation's work progress



# Vetiver System Application for dyke's banks stabilization: before/during/after the plantation's work



# Vetiver System Application for infrastructure stabilization (railway): before/during/after the plantation's work







**Vetiver System Application for infrastructure stabilization (railway):  
before/after the plantation's work**







**Vetiver System Application for infrastructure stabilization (railway): before/after the plantation's work**





# Vetiver System Application for infrastructure stabilization with combined measures: fascines, soil cover, grassing



# 4- Vetiver System for poverty alleviation

## Vetiver capacity:

- 90% of sediments stopped
- 70% of water runoff reduced
- 50% of fertility improvement
- Better moisture, recharge of groundwater and water quality



## Popularization of Vetiver:

- Help-agency or NGO
- Private company

## Application by the farmers:

- Improvement of the yields
- Slash-and-burn practice change to sustainable agriculture, then protection of the lands, forests, water&soil
- Opportunities with Vetiver: handicraft, fodder, mulching, thatch, selling material plants,...

# Vetiver System for poverty alleviation



To sell the material plants, to produce and to propagate the Vetiver in nurseries are good opportunities for farmers. The way of management must be adapted to the poverty level.





# Vetiver System for poverty alleviation

The nurseries can be set up near and along the end user site, and the propagation and maintenance works are delegated to the local farmers. Then they benefit from training, materials, know-how, employment, and they can understand the interests of using VGT.





# **Vetiver System for poverty alleviation**

## **Positive Impacts from a project using VS for erosion control implying local communities:**

- gives employment and revenues during the work
- farmers acquire know-how on VGT application for land conservation and crop protection
- farmers catch the interests of using VGT and can reproduce it on their fields without needed help
- good opportunities from by-products: selling planting materials, handicraft, mulching, thatch, fodder,...
- setting-up a sustainable agriculture

21/09/2007

# Vetiver System for poverty alleviation



Training in the field and in room, for propagation and plantation of Vetiver through the « VHR » technique (« Vetiver-Hedge-Row »), strip of one meter long grown for 3 months in nurseries.

# 5-Vetiver System for waste water depollution

## L'insalubrité frappe la population

L'insalubrité commence à miner le quotidien des habitants des bas quartiers. Les grosses pluies entraînent plusieurs infections.

**L**ES pluies de ces derniers jours aggravent l'insalubrité dans les bas quartiers de la capitale. L'eau n'est pas évacuée et se masse dans les ruelles, comme à Andavamamba, Manarintsoa, Antohomadinika et autres. La circulation devient même impossible. Les habitants doivent utiliser le système D pour traverser d'un lieu à l'autre. Des ordures se mélangent même avec ces eaux impropres. L'odeur qui s'en dégage devient insupportable. A ce problème s'ajoute le déversement des eaux des tinettes, faute de vidange.

« La situation n'évolue pas depuis des années, c'est comme si on était condamnés à vivre avec l'insalubrité », se plaint Lambahoany, un septuagénaire habitant le quartier de Manarintsoa centre. A Ampasika, le niveau



Il n'est pas toujours facile de se déplacer dans certains quartiers avec les présentes averses.

Antananarivo, with 2 million inhabitants, has no proper water treatment facilities. Thus, the water quality is very contaminated and highly polluted. During rainy season, floods, erosion, sediments generate many problems.

# Highly polluted water



However this capital is also an agricultural town, with rice fields, vegetables and cattle farming, fishing...and many activities depend on the water network of the city, even if polluted.

# 5-Vetiver System for waste water depollution



# Promotion for VS use

First window of VS to improve water quality



# Vetiver System for Handicraft



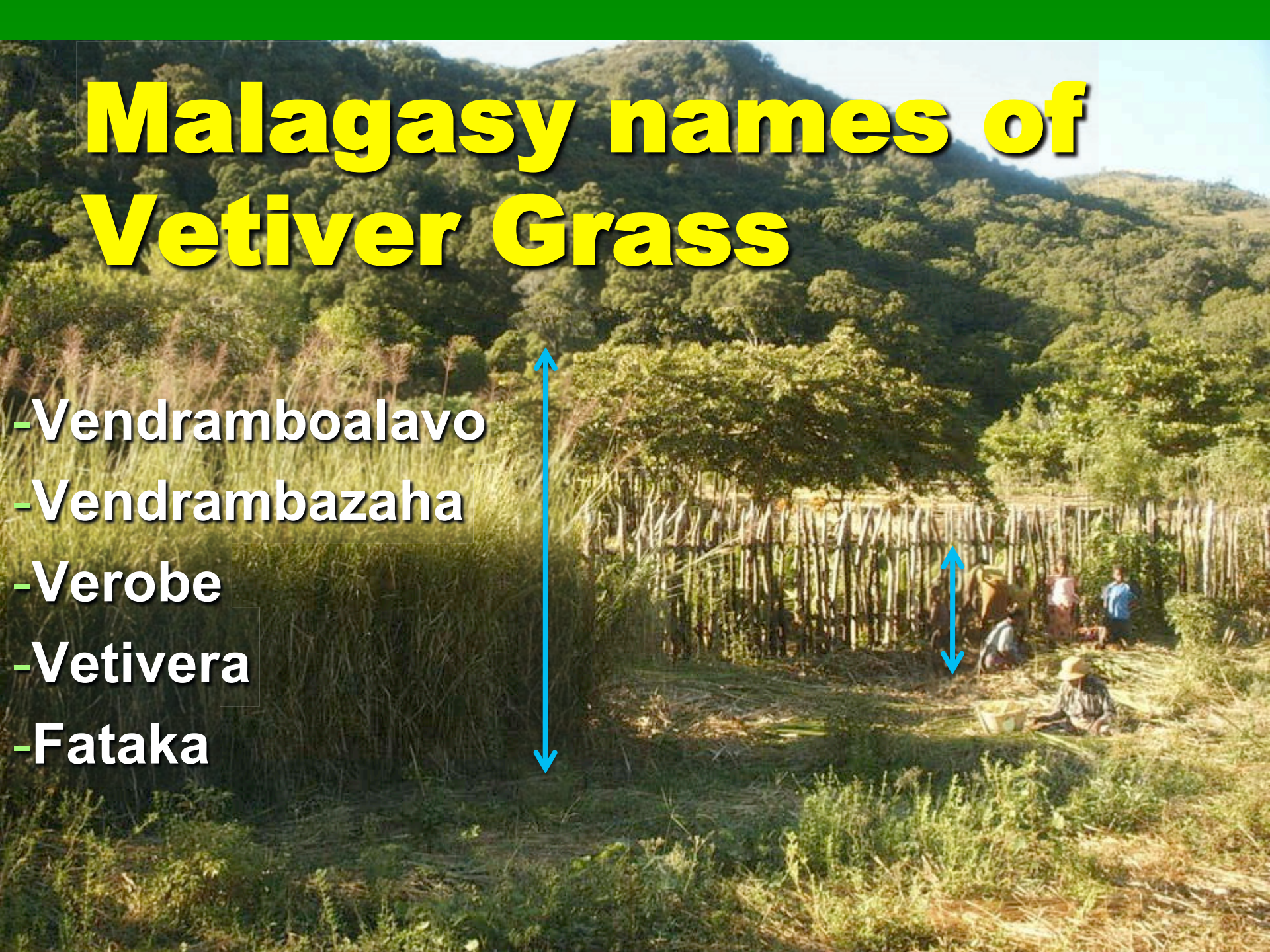


# **Constraints to expansion of the Vetiver System**

- Customs, mentality**
- Traditional and ancestral practices**
- Wrong and incorrect applications by some**
- Prejudice about the grass**
- Corruption and method of awarding contracts**
- Slowness to act from NGO, GO and administrations**
- Lack of openmind to change practices**

# Malagasy names of Vetiver Grass

- Vendramboalavo
- Vendrambazaha
- Verobe
- Vetivera
- Fataka



# **Conclusion: Contribution of the Vetiver System use facing climate change**

- Madagascar is the most eroded country in the world with an average of 300T/ha disappearing in the Indian Ocean each year!
  - The ground should be considered as a non-renewable natural resource. It is urgent to act, efficiently and sustainably.
  - La Plantation Bemasoandro SARLU has planted more than 5 million Vetiver plants in Madagascar since 2003.
  - By reducing soil loss and runoff impacts,
  - By improving water infiltration into the soil and groundwater recharge,
  - By alleviating flood and sediment damage,
- our activities with the Vetiver System are bringing a contribution to the necessary adaptation facing climate change (desertification, droughts and floods are more intense, water quality is decreasing, cyclones are stronger...).



**Thank you for  
your attention**



24/02/2009

24/02/2009