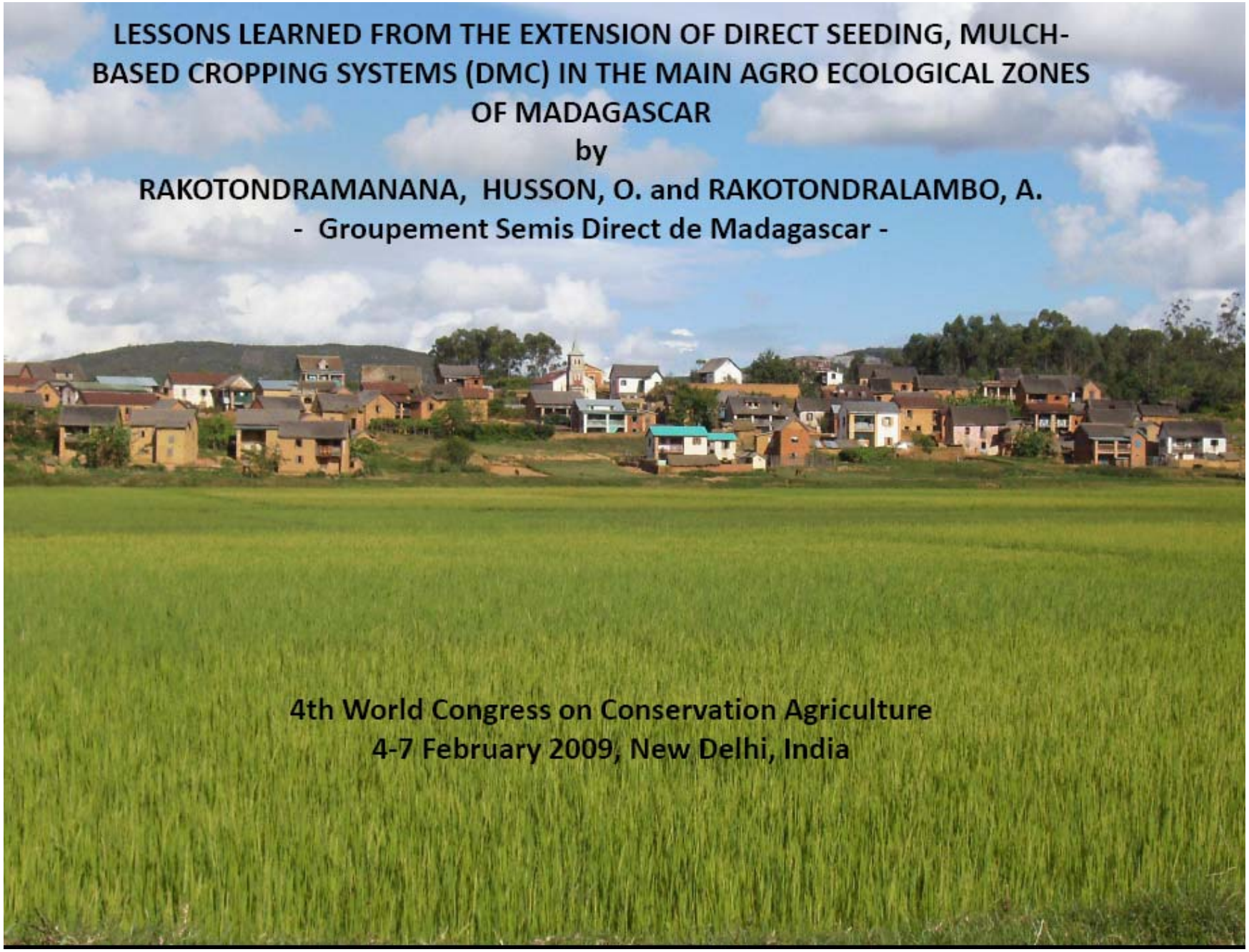


MADAGASIKARA

- Island of 587 040 km^2

- Annual rainfall:

  - High plateaus 1 200 - 1 500 mm
  - East coast 3 000 - 5 000 mm
  - West & South 600 - 270 mm

(The rainfalls are very uneven over the years)

- Dry season: April to November

Outline

Background: - Madagascar
- Agriculture
- Water Resources

Agriculture Problems

Objectives

Methodology

Results

Lessons learned from DMC extension in Madagascar

Conclusion

Background

Agriculture

- Madagascar main sector: Agriculture
- Agriculture consumes 95% of water resources at a national level
- Cultivable area: 8 millions of Ha (14% of total surface)
- Cultivated area: 3,55 millions of Ha (4% of total size and 31% of cultivable areas)

Agriculture

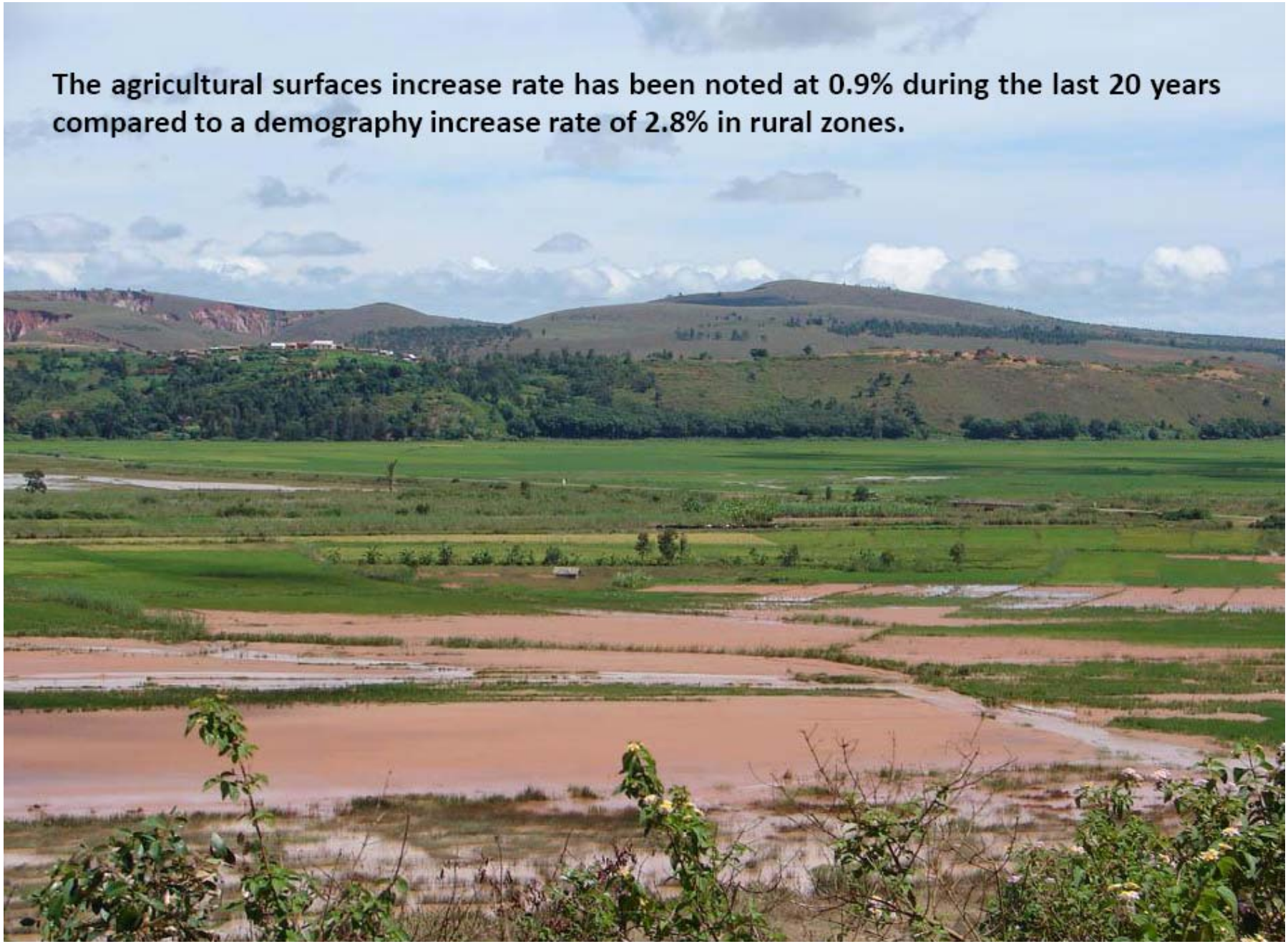
Due to a rapid population growth, the hills known as *tanety*, which generally have low fertility, high acidity and are very susceptible to erosion, are used for crop production.

Screening of new rice varieties by the FOFIFA (National Institute of Agricultural Research and Development) has allowed rice production in many part of the Country under rainfed conditions (Alaotra Lake, vast areas of the Mid West, part of the Highlands...).

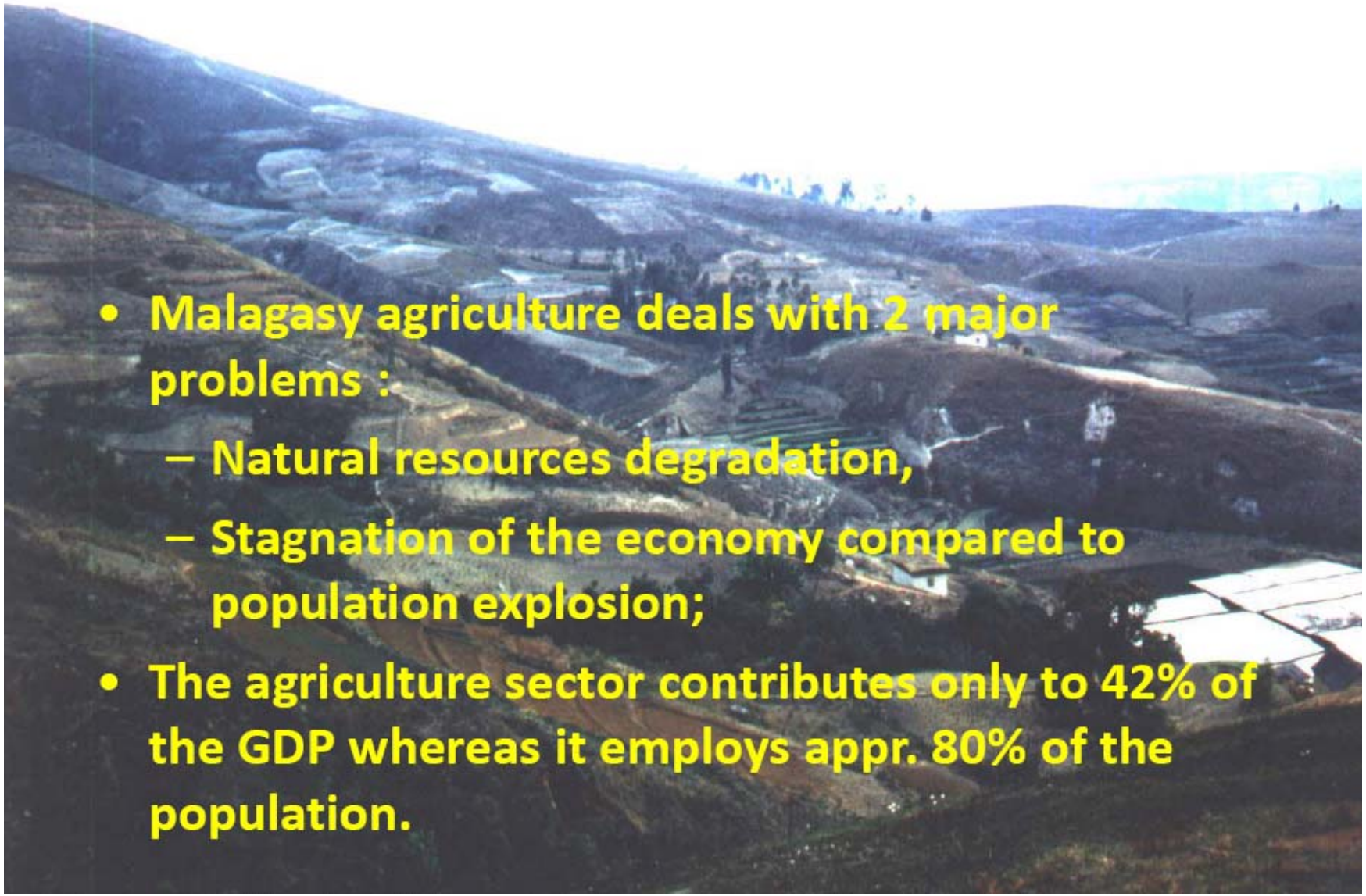
However, fertilizer use is very limited (less than 10 kg/ha/year on average) and its cost is increasing, when yields of most food crops on the *tanety* are generally low without high input of fertilizer, lime and organic manure.

Water Resources

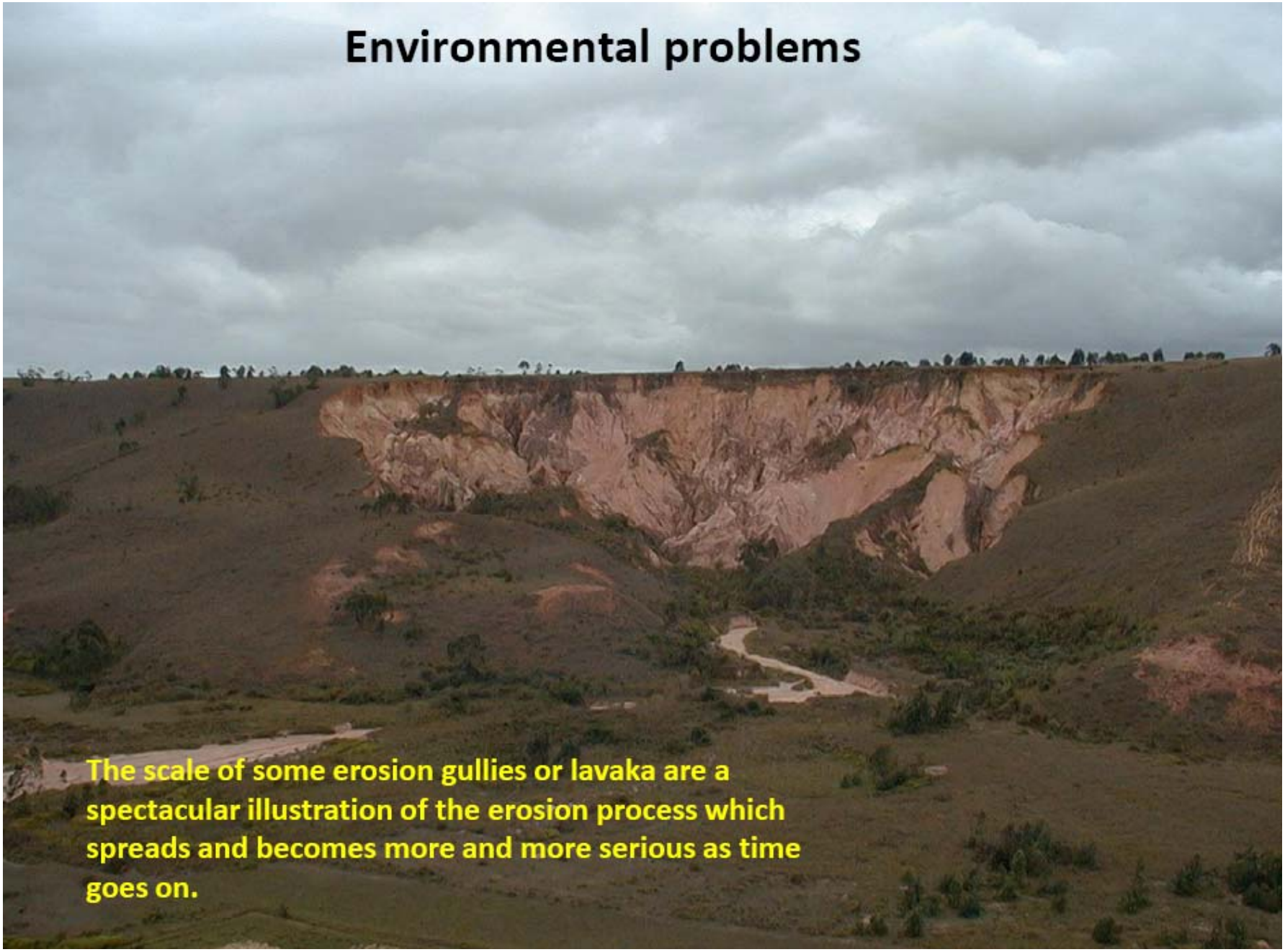
- Reneweable water resources around 337 km^3 per year
- Water use estimated at 16,3 km^3 of which 16,1 for Agriculture
- 99% of managed areas in hydro-agricultural domain equipped by irrigation infrastructures
- 1 200 000 ha of cultivable lands are irrigated, representing 30,6% of cultivable areas
- Main irrigation system used is the gravitating one using derivating dams along stream or retention basins. The irrigation water is drained from surface water (rivers, stream, lake).



Agriculture Problems



Forest is replaced with pastoral land. Frequent fires, covering 200 000 Ha/yr prevent the regrowth of woodland and increase soil erosion in which 2 to 3 mm of soil is lost every year.



Objectives

- The GSDM, a group of institutions involved in the diffusion and research on DMC was created with the objectives of ***capitalizing research*** and ***extension results on DMC and finding means to scale up the extension in the main areas of the Country.***

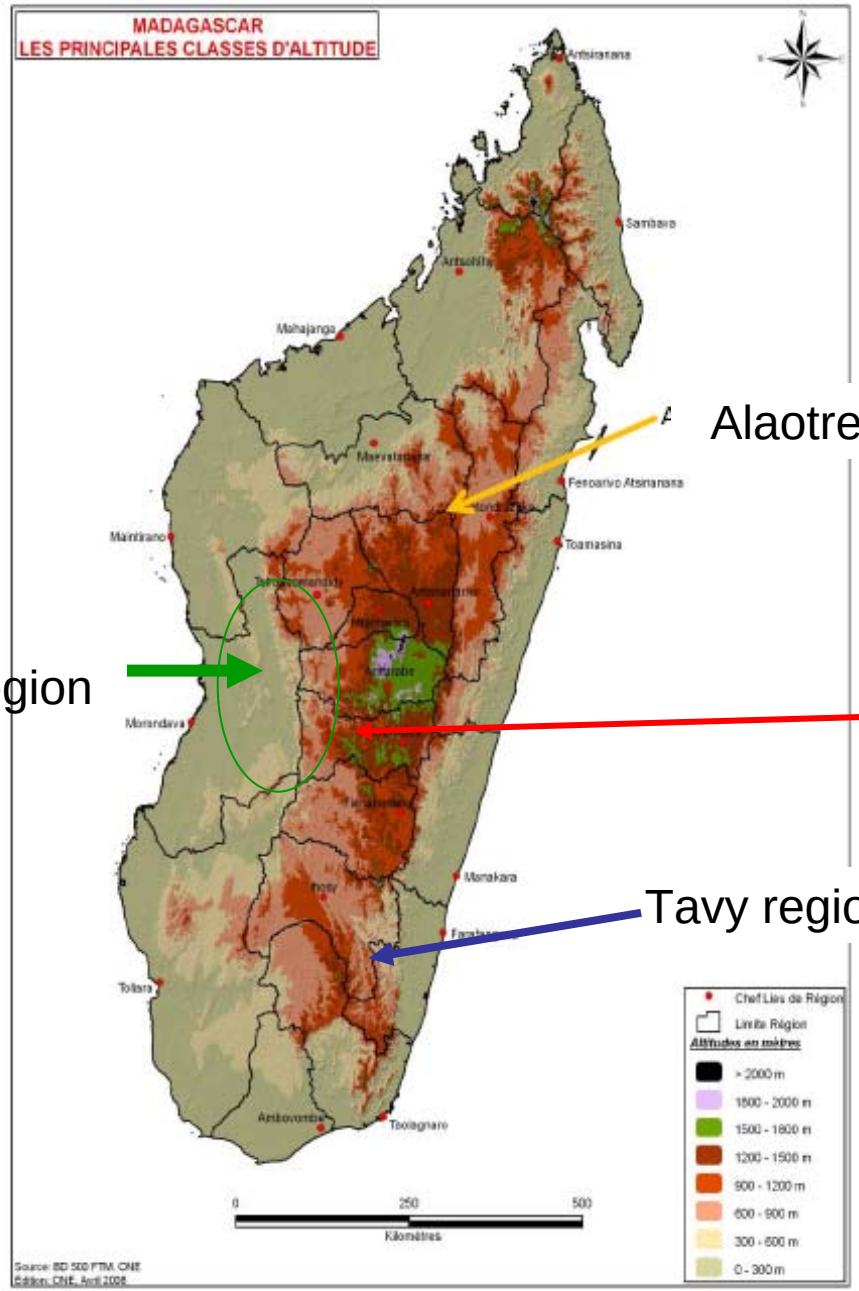
  GSDM : Groupement Semis Direct de Madagascar (Direct Seeding Group of Madagascar)

Methodology

Adaptation of DMC (Direct Seeding Mulch-Based Cropping systems) for the main agro ecological zones of Madagascar:

- The high altitude zones (1000 m to 1500 m
- The dry climate of the South West (rainfall: 300 to 600 mm/ year)
- The warm and humid climate of the eastern coast (1500 to 2500 mm/year of rain)
- The medium altitude climate (Alaotra Lake, 800 to 900 m) with 600 to 1200 mm/year of rain

A large set of DMC systems was created in each zone, trying to fit as well as possible in the local environment and to propose a range of options for farmers with different means, constraints and ambitions.



Alaotre lake

West subhumid region

Antsirabe

Tavy region

Aridity

Humid

Technology creation & adoption

1996 -1999 : first experiments by NGO TAFA & CIRAD
Year 2002 : only few champions farmers
creation of GSDM who initiate DMC projects

Year 2008 : DMC adoption on 4000 ha
around 8000 farmers…

a step by step farmer's first, farmer's last

learning process…

DMC systems are taking off in Madagascar

Results

Before 2000

The first experiences of extension of these systems, with very limited means, showed that:

DMC systems needed to be locally adapted, to the bio-physical conditions and to the socio-economic environment,

Training, capacity building and sensitization of top level managers, technicians and farmers were key issues

There was a need for better information and communication,

Monitoring extension was important

Results

In 2000

The GSDM was created to address these issues, gathering the main organisms involved in research, training and extension of DMC in Madagascar, aiming at:

the coordination and programming of research, training and extension activities on DMC;

the capitalization of all scientific knowledge related to DMC;

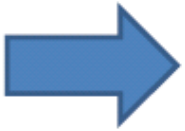
the definition of strategies for training of all stakeholders and extension of DMC;

and the monitoring of all activities in the DMC extension.

Results

From 2000 : Extension of DMC in Madagascar

From 2004, with the funding of important projects on DMC mainly by AFD (French Agency for Development) and the Ministry of Agriculture, Livestock and Fisheries, and latter other projects (funded by EU, KfW, World Bank, etc.) with large scale extension of DMC systems could really start, most of these projects being under the umbrella of a large national programme called BV-PI (Bassins Versants-Périmètres irrigués/ Watershed and Irrigated Perimeters).



However, high variations exist between the many kinds of systems and the different agro ecological zones. Although some very efficient systems show a fast improvement, it usually takes 2 to 3 years to observe marked differences in yield.

Lessons learned from DMC extension in Madagascar

The rate of DMC adoption by farmers largely varies between the different regions .

Some lessons can be learned from these experiences:

The techniques/systems must be locally adapted to fit the bio-physical conditions and the socio-economic environment.

In any cases, in such conditions, the proposed systems/techniques should aim at reducing risk (especially when risks of failure are high: unreliable climate, thieve, pests,…) putting emphasis on low inputs systems to succeed with small scale farmers .

Lessons learned from DMC extension in Madagascar (1)

Some situations can be very favorable for the extension of DMC, when a major constraint (which can be overcome by DMC) limits the efficiency of traditional systems. The very rapid extension of DMC in the middle west can be largely explained by the fact that these systems provide a very attractive solution to the very severe problems of striga, with a rapid impact on yield and profits.

Human resources are a key issue. DMC systems/techniques are knowledge intensive. They are not a simple recipe and the choice of the system but should be carefully identified from a clear diagnosis (agronomic, but also socio-economic). Without well trained extension staff, any attempt to extend such techniques cannot be successful.

Lessons learned from DMC extension in Madagascar (2)

Apart from extension staff training, sensitization of policy makers, top managers and researchers also is important.

When credit and input provision is organized by development projects, it should be done very carefully, and only on a temporary basis being just an incentive for the first years of transition from traditional to DMC systems.

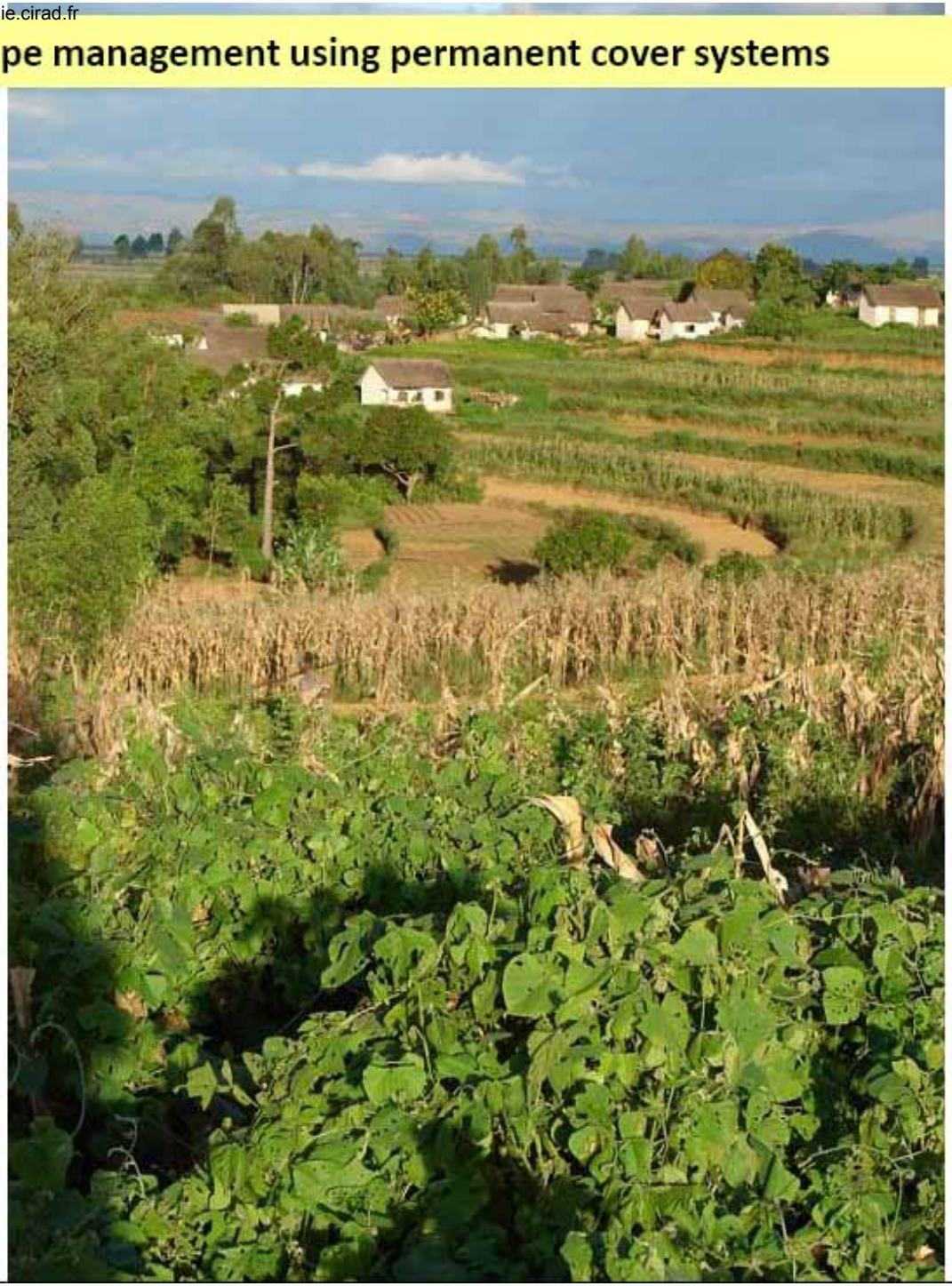
A major difficulty in extending DMC systems is the availability of the biomass needed for covering the soil. The global biomass production can be increased by several means: plants association, succession, use of fertilizer or soil smouldering, reclamation of abandoned land, etc.

Lessons learned from DMC extension in Madagascar (3)

Production of seeds and planting material for large scale extension should be organized from the beginning as their lack can be a serious obstacle to rapid extension. They should be produced locally as much as possible, by farmers themselves.

Land tenure, when very unsecure, can be a major problem which should be address cautiously (facilitating the provision of land titles when possible, negotiating long term renting contracts, etc.).

Slope management using permanent cover systems



Conclusions

Extension of DMC in Madagascar is going on, but large differences exist between regions. The best results are obtained when a conjunction of factors is achieved: Well adapted DMC systems, providing attractive solutions to major problems faced by farmers (shortage of paddy field, striga, etc.) with limited risk, well trained and motivated extension staff, rather secure land tenure, rather favorable conditions (climate, market opportunities, etc.).

In any case integration with livestock is a big challenge because crop residues are part of the animal forages especially during the dry season.
Furthermore, extension of such techniques is a long term process. The important needs for training and technical support of farmers during the first years (at least 3 years) of transition to DMC systems is costly, especially with small scale farmers. This extension cost is expected to decrease from the 4th year onwards.