

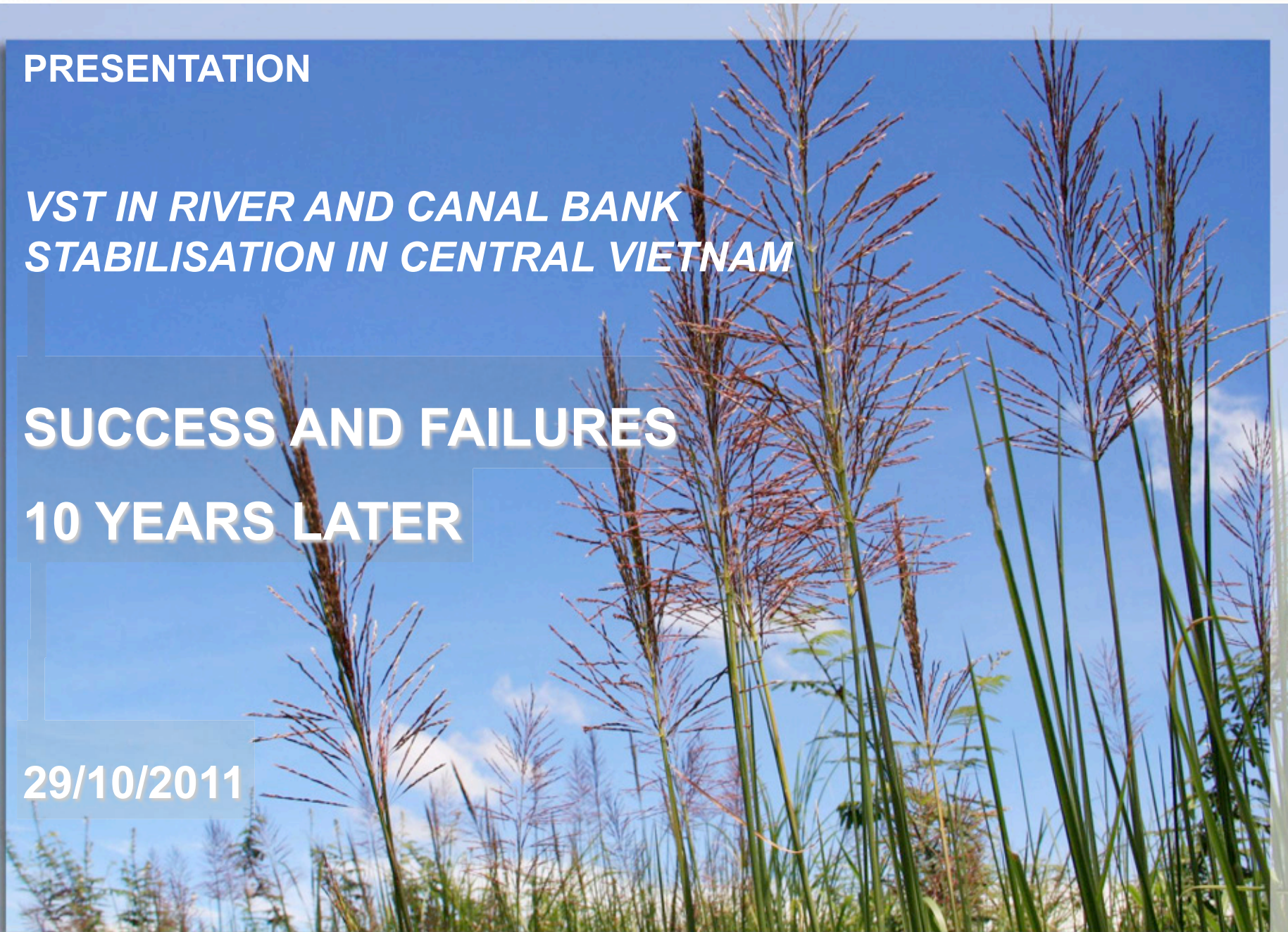
## PRESENTATION

# *VST IN RIVER AND CANAL BANK STABILISATION IN CENTRAL VIETNAM*

## SUCCESS AND FAILURES

## 10 YEARS LATER

29/10/2011



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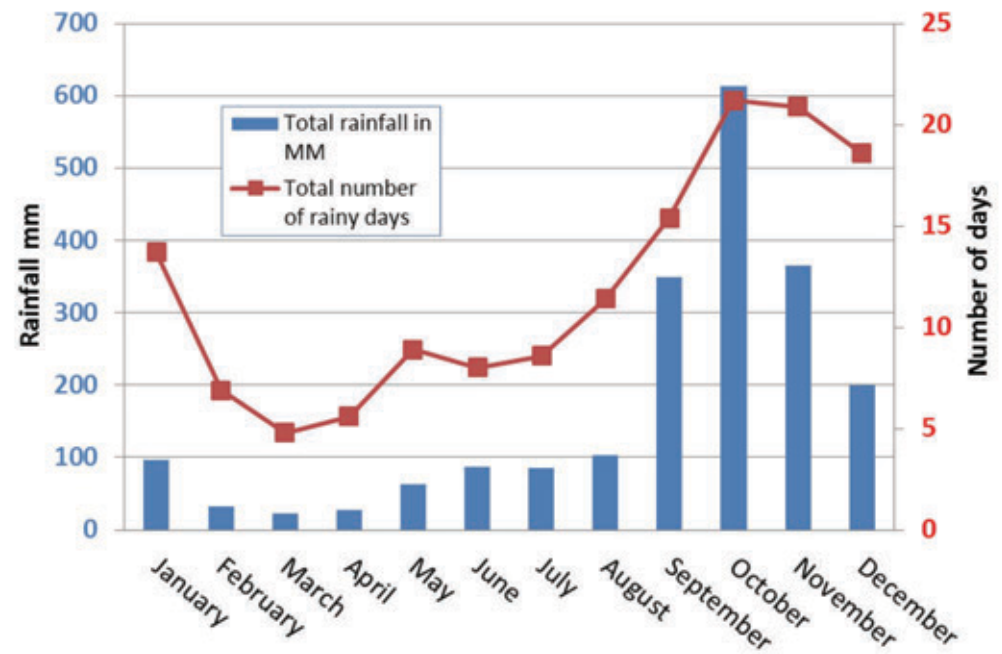
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## THE CLIMATE CONDITION IN THE CENTRAL PROVINCE



### Danang Rainfall in 2010



## THE CLIMATE CONDITION IN THE CENTRAL PROVINCE





## THE CLIMATE CONDITION IN THE CENTRAL PROVINCE





## THE CLIMATE CONDITION IN THE CENTRAL PROVINCE



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- Ketsana, 1999
- \$340 million lost
- Thousands of deaths

**In 2001 Halliburton KBR Pty Ltd were commissioned by AusAID to prepare a Project Design Document for a project to be based in the central provinces and to act as a demonstration project for the concept of an integrated approach to the mitigation of natural disasters.**

## VETIVER TRIALS IN QUANGNGAI



← Before

After →





## VETIVER TRIALS IN QUANGNGAI





## VETIVER TRIALS IN QUANGNGAI



← Before

After →





## VETIVER TRIALS IN QUANGNGAI



← Before

After →



## OUTCOME OF VETIVER TRIALS

- **Vetiver can be established in a wide variety of soil conditions from loose sand to compacted laterite fill.**
- **Vetiver adapts well with the climatic conditions in the central regions of Vietnam and is tolerant to the dry season.**
- **Vetiver is not suitable for all conditions. It was found that the roots did not penetrate sandy soil with saline ground water.**
- **Local salt tolerant species may be planted at the toe of slopes in saline conditions to provide toe protection allowing vetiver to be planted on the higher slopes for scour protection.**
- **In reasonable growing conditions vetiver can be established to resist flood flows within three months of planting.**



## OUTCOME OF VETIVER TRIALS

- **Even young beds of vetiver encourage silt deposition from flood flows.**
- **Vetiver should be cut to approximately 100 mm above the ground to encourage fresh growth. Care needs to be taken in the timing of the cutting to ensure adequate regrowth prior to the expected flood season.**
- **Vetiver can be used as a fodder crop particularly while young.**
- **Livestock will graze on vetiver if other food supply is limited.**
- **Other fodder crops may be inter-planted with vetiver to maximise the utilisation of the protected ground.**



## CHALLENGES

- **From the outset of the project, counterpart agencies were resistant to widespread use of vetiver for riverbank and dike erosion control.**
- **While recognising that vetiver was effective in slope stabilisation for roadwork and for river bank protection in the northern and southern river deltas of Vietnam, they considered that the flood characteristics of the major rivers in the central provinces were significantly different with higher velocity flows and rapid rise of floods levels.**
- **On this basis these agencies firmly believed that experience in the northern and southern deltas was not transferable to the central provinces therefore there was no technical basis for the design of significant hydraulic structures incorporating vetiver as the principal stabilising factor and erosion protection**







## OFFICIAL RECOGNIZATION OF VETIVER IN DANANG





## OFFICIAL RECOGNIZATION OF VETIVER IN DANANG



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## OFFICIAL RECOGNIZATION OF VETIVER IN DANANG



**The result of this project has been officially certificated by National Agency for Science and Technology Information of the Ministry of Science and Technology**



## OFFICIAL RECOGNIZATION OF VETIVER IN DANANG





## OFFICIAL RECOGNIZATION OF VETIVER IN DANANG



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## OFFICIAL RECOGNIZATION OF VETIVER IN DANANG







# **EVALUATION TEN YEARS LATER**



## EVALUATION TEN YEARS LATER



← Before

After →





## EVALUATION TEN YEARS LATER





## EVALUATION TEN YEARS LATER





## EVALUATION TEN YEARS LATER





## EVALUATION TEN YEARS LATER





## CONCLUSION

- **These projects have promoted the utilisation of vetiver as an economic and environmentally friendly methodology for slope protection and erosion control on hydraulic structures. The projects have supported this view through the implementation of demonstration trials funded by the project.**
- **Through these trials and the continued advocacy of national and international specialists, the advantages of using the vetiver system as an economic and environmentally friendly solution for slope protection and erosion control on hydraulic structures has been recognised by concerned agencies in Quang Ngai.**
- **As an important milestone, Vetiver has been certified as an official solution for erosion and landslide control in Danang. This also confirms the adaption of vetiver in central region condition and encourages bioengineering development in Vietnam.**
- **At the community level, there has been strong interest generated and a high degree of willingness to adopt the technology as an economic solution to many community problems.**
- **Limitations to the wider uptake of these techniques appear to be the absence of any nationally recognised standard guidelines that a project designer can use as a basis for design.**





**THANK YOU FOR YOUR ATTENTION!**