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Climate change and rice production:

Biodiversity is the answer

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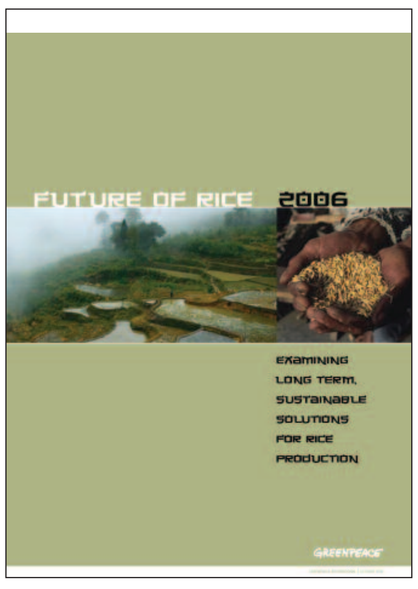
Reference 1

Reference 2

Reference 3



Reference 4

Agriculture must be able to cope with climate change

Human-induced climate change is resulting in erratic weather and changed pest dynamics, especially in regions where food security is very low. These regions require cheap and accessible strategies to adapt agriculture to cope with extreme weather events such as floods and drought.

GE rice is not a solution for agriculture

Genetically engineered (GE) rice is sometimes proposed as a solution to the impacts of climate change, although there is no evidence that GE crops can play a role in increasing food security under a changing climate. In addition, there are health and environmental concerns associated with GE rice. Contamination of conventional rice supplies is a major problem – even from field trials[1].

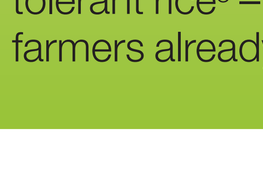
Ecological farming and biodiversity are the solution

Ecological farming methods - based on good husbandry of natural resources, including maintaining biodiversity at all levels from genetic to landscape - are vitally important for rice production in a world impacted by climate change. However, they are often overlooked, even though they are readily available.

Conclusion

Ecological farming and the building and maintaining of healthy agri-ecosystems are the proven, effective strategies that are readily available.

Genetic engineering is not a viable option for developing new varieties resistant to abiotic stresses.



GE rice: not the best option for food security

Marker-assisted selection: a better option

Tolerance to abiotic stresses, e.g. drought and flooding, are complex traits that often involve the interaction of many genes, but genetic engineering is based on the crude over-expression of only one or very few genes[2]. Genetic engineering is therefore not well suited for developing such seeds. In contrast, marker assisted selection is a breeding tool that has already produced non-GE rice varieties that are flood and drought tolerant – for example, IRRI's highly successful flood-tolerant rice[3] – from which farmers already benefit.

Traditional methods of controlling pests can be effective

Examples[4] of ecological farming methods

- controlling rice pests by maintaining a complex and rich web of predators through the reduction or elimination of insecticides;
- maintaining a balance of nutrients in the soil, e.g. by utilising compost or green manures that release nutrients slowly, rather than synthetic fertilisers; and
- following the traditional duck-rice system, which not only enhances biocontrol of pests but also oxygenates the water (reducing methane production), fertilises the soil and provides additional protein (meat).

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References (reviews of the peer-reviewed literature)

(1) See www.gmcontaminationregister.org for a history of GM rice contamination

(2) Vogel, B. 2009. Smart Breeding. Marker-Assisted Selection: a non-invasive biotechnology alternative to genetic engineering of plant varieties. Report prepared for Greenpeace International http://www.greenpeace.org/international/en/press/reports/smart-breeding/

(3) Tirado R & Cotter J. 2010. Ecological farming: drought-resistant agriculture. Greenpeace Research Laboratories GRL-TN 02/2010. http://www.greenpeace.org/international/en/publications/reports/Ecological-farming-Drought-resistant-agriculture/

(4) Borromeo E & Deb D. 2006. The future of rice. Report prepared for Greenpeace International http://www.greenpeace.org/international/en/publications/reports/future-of-rice/