

Hybrid Rice: Breeding by Design Project



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Background

Rice consumption is increasing at about 8 percent a year in many Sub-Saharan African countries. However, the increase in yield per year is less than 6 percent, and in some cases it is decreasing. Consumption in East Africa is also going up, especially in Tanzania, and probably relates to a significant expansion of the area planted under rice, and to some degree the yields, which have gone up about 1.3 percent per year, the most in East Africa. According to the United Nations Food and Agriculture Organisation, there has also been a dramatic increase in total rice imports for East and Southern Africa.

8 percent...
*annual increase in rice
consumption in many
African countries*

Developing hybrid rice with yield advantage

Rice consumption in Africa is increasing by about 8 percent while yield is increasing at 6 percent and in some areas decreasing

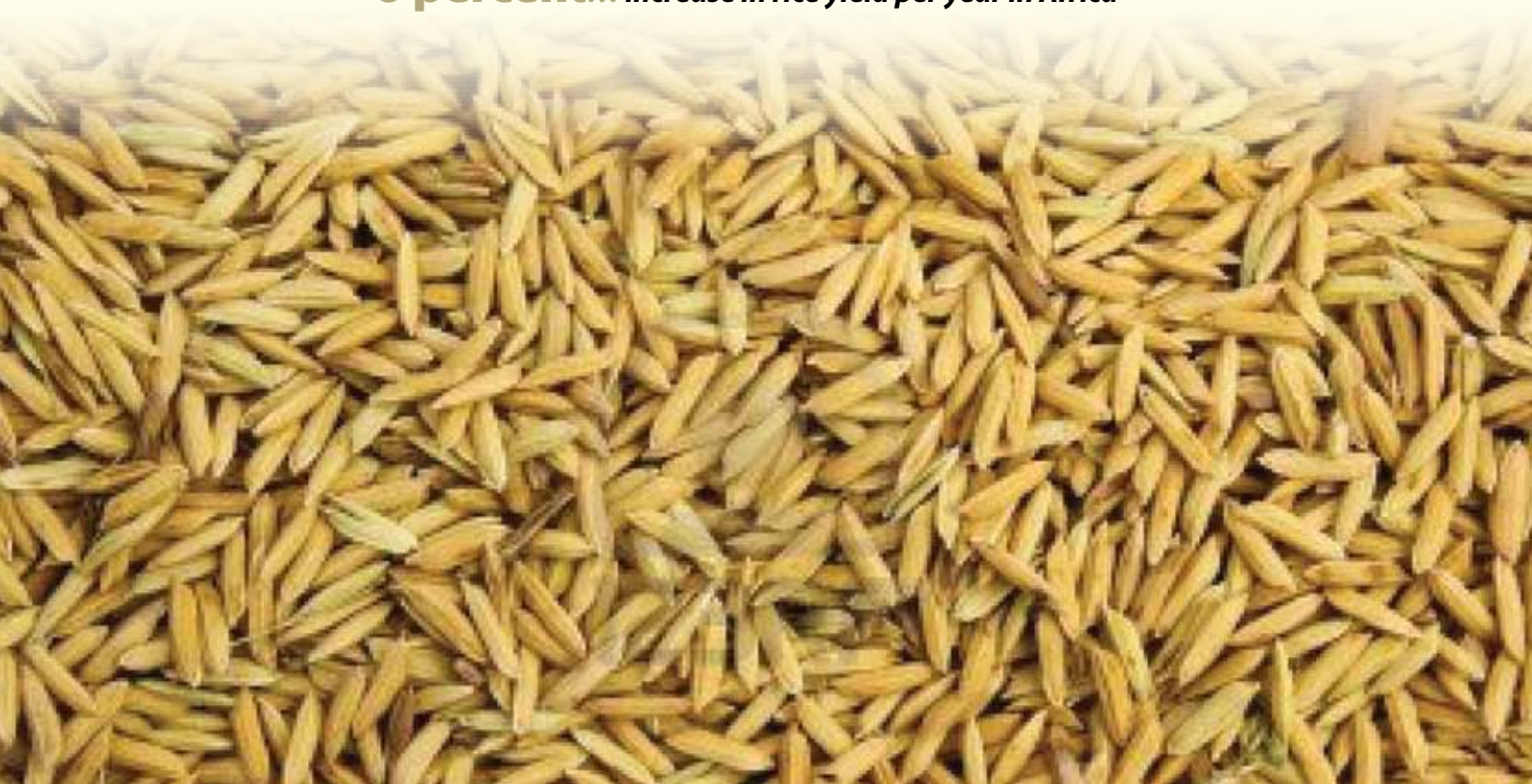
Rice consumption and imports are increasing at a rate higher than yields per unit area. In addition, not much work has been done on the development of rice hybrids for Africa.

While there are a number of factors limiting rice production in East Africa, improved genetic potential through hybridity is a big opportunity for impact and, coupled with a rigorous seed quality mechanism, the prospect of creating a viable local hybrid rice agri-business is of tremendous potential and value.

Project goal

The goal of the Hybrid Rice: Breeding by Design Project is to improve food security and rural livelihood among small-scale rice producers in Africa, by developing hybrid rice, with significant yield advantage and creating sustainable hybrid rice agro-businesses to support rice farming in East, West and Southern Africa by determining precise relationships between yield, environment and genetics.

6 percent... increase in rice yield per year in Africa



Implementing the Hybrid Rice:Breeding by Design Project



Facts and figures on 2 line hybrid rice system

- 2-line rice hybrid system technology uses only 2-breeding lines to produce hybrids.
- The 2-line system is reliant on temperature for the switch from fertile to sterile females

AATF is working with partners to develop hybrid rice, with significant yield advantage.

The partnership is developing hybrid rice germplasm that is adapted to African conditions using the 2-line rice hybrid system technology, which uses only 2-breeding lines to produce hybrids. The female line uses a temperature modulated single gene system which is easy to breed, but requires significant skill and experience to get to hybrid seed production. The male in this system can be virtually any other line, thus opening up significant opportunities for improved heterosis through genetic diversity in the hybrids.

The partnership is also developing an information technology tool with interpolated weather surfaces to predict temperature regimes and manage 2-line hybrid rice production risk and also establish and train a network of researchers and seed production specialists interested in 2-line hybrid rice. Hybrid rice breeding

and production offers a means to achieve significant yield gains in the region while building a viable agri-business.

The Project will develop and distribute hybrids and hybrid parental lines for use by smallholder farmers in selected African countries. The broad objective of the partnership is to develop and expand 2-line hybrid rice technology in selected African countries, and ensure that through private companies and public institutions in Africa that the technology reaches farmers and increases their rice yields and income streams.

The project will help build the capacity of private firms to use the technology by training breeders and seed production specialists, establishing testing and technology exchange networks, and providing other technology required to help ensure the success of the partners. Resulting trial data will be shared by all in the network, and the general breeding community.

2... *number of breeding lines used to produce 2-line hybrid rice*

Benefits of Hybrid Rice Project

- Development of 2-line hybrid rice germplasm that is adapted to African conditions.
- Increased yields of at least one tonne over the best commercial varieties available for use by smallholder farmers.



The Hybrid Rice: Breeding by Design Project Partnership



- AATF is coordinating project activities, ensuring outputs of the project, contribute to Global Public Goods. It is also providing linkages to the African seed sector and researchers.
- Hybrids East Africa Limited (HEAL) is a hybrid rice breeding company that is developing and distributing seed to the global rice breeding community without restriction.
- aWhere, Inc. of the USA is developing web based tools which will allow partners to determine when and where to conduct various breeding operations, seed multiplication and seed production. aWhere is also conducting training on their weather analysis programme.
- The Kenya Agricultural and Livestock Research Organisation, Agricultural Research Institute, Tanzania and private seed companies in East Africa are carrying out technology and product testing as well as using the technology to develop their own hybrid system.

Investors

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