New rice for Africa (NERICA varieties)

Solution Holder is **Ernest Asiedu** and can be contacted through **e.asiedu@cgiar.org**

Summary

Improved rice cultivars for a broad range of growing areas in Africa have been developed by breeders through crossing of natural landraces from the continent with lines of Asian rice. These NERICA varieties get a greater yield and are more resistant to weeds and diseases compared common non-improved varieties. Having inherited the ability from African types of rice to grow under nutrient and water limiting conditions the new genetic resource is ideally suited for enhancing the productivity and profitability of rice farmers, and decreasing imports of the staple food. There are two main new rice varieties that have been released in Sub-Saharan African countries, i.e., lowland NERICA for cultivation at valleys and low-lying floodplains where water and nutrient stress are less frequent, and upland NERICA suitable for cultivation on hilltops or elevated plateaus where the crop is faces with limiting conditions more often.

Technical Description

Lowland NERICA has a yield potential of 3 to 6 ton grain per hectare under non-water limiting conditions and upland NERICA a yield potential of 2 to 3 ton grain per hectare under water limiting conditions. The new rice varieties have low levels of weed infestation, are tolerant to short-term drought, can thrive in poor soils, and have moderate levels of resistance to major diseases like rust and leaf blight pests, and pests like nematodes and leafminers. Grain head of NERICA typically hold 300 to 400 grains compared to the 75 to 100 grains of traditional varieties grown in the region, and its stems and heads are strong which prevents shattering, and grow tall which make it easier for farmers to harvest. NERICA lines are early maturing that take only three months to ripen as opposed to six months for the common non-improved varieties, thus allow farmers to grow a second crop of rice or vegetable on the same piece of land. A further nutritional benefit of NERICA is that the lines contain up to 12 percent protein, compared to about 10 percent in the imported rice sold in the local market.

Uses

The new rice cultivars are specifically developed for production zones in Africa where water is derived only from rainfall which causes paddies to face intermittent drying of soils, unlike irrigated or flooded fields. Upland NERICA types have the benefit that it is not restricted to cultivation in paddies with continuous supply of water which enables farmers to expand production to places not previously thought possible. A large selection

of NERICA is available from seed suppliers in Sub-Saharan Africa that have been adapted to particular conditions on the continent giving farmers the ability to find a suitable variety for their purpose. Farmers in Africa are widely using the new rice cultivars, with more than 800,000 hectares of farmland in seven West African countries reportedly cultivating NERICA varieties, and a total of 1.4 million hectare across all of Sub-Saharan Africa.

Composition

More than 82 NERICA varieties have been released to farmers in Sub-Saharan Africa, which includes 60 types for lowland paddies, 18 for upland cultivation and 4 for irrigated systems. NERICA-4, which is tolerant to drought and phosphorus deficiency, is the most widely adopted upland variety, grown in more than 10 countries across the continent.

Means of application

NERICA varieties are cultivated as any normal rice crop following best soil and fertilizer management prescribed for particular growing areas and conditions. Rice can be planted manually or mechanically by sowing seed directly in the fields (drill/dibble/broadcast), or through transplantation of seedlings from seedbeds into fields which requires additional labour but is very effective in controlling weeds. Fields in both lowland and uplands areas are usually divided into lines or rectangles by constructing bunds, i.e., low embankments made of soil or stones, which enable to rain water accumulation and good drainage.

Agroecologies	All Agroecologies.
Regions	Africa.
Developed in Countries	Mozambique, Malawi, Uganda, Tanzania, Sierra Leone, Rwanda, Nigeria, Mali, Kenya, Guinea, Ghana, Gambia, Democratic Republic of the Congo, Cameroon, Burundi, Benin.
Available in	Mozambique, Malawi, Uganda, Tanzania, Sierra Leone, Rwanda, Nigeria, Mali, Kenya, Guinea, Ghana, Gambia, Democratic Republic of the Congo, Cameroon, Burundi, Benin.
Solution Forms	Genetics.
Solution Applications	Improved variety, Disease control.
Agricultural Commodities	Rice.

Target Beneficiaries	Small-scale farmers, Commercial farmers.

Commercialization

Commercialization Category

Commercially available

Startup Requirements

1) Breeders and seed suppliers need to develop NERICA varieties that are adapted to conditions in growing areas, 2) Awareness-raising with farmers about benefits of planting the improved type of rice on food production and risk mitigation, and 3) Creating equitable access and financial support for local suppliers and smallholder farmers that catalyzes investments and purchases of NERICA rice.

Production Costs

Development of NERICA varieties involves advanced breeding techniques in the lab and screen house, and extensive testing in the field that require significant investment from commercial and non-commercial breeders. The costs associated with producing NERICA are not substantially different from common improved rice varieties, and large agro-input suppliers are currently selling these resilient seed technologies at USD 0.8 to 1.2 per kilogram (TBC).

Customer Segmentation

Seed manufacturers and multipliers, Commercial and subsistence rice growers

Potential Profitability

Surveys have demonstrated that farmers in Nigeria who cultivate NERICA varieties are harvesting substantially more than those growing common non-improved types of rice, with average grain yield gains of 0.7 ton per hectare without fertilizers and 1.7 ton hectare with input of fertilizers. Scaling programs for community-based multiplication and marketing of NERICA varieties in Benin, Gambia, Ghana, Guinea, Nigeria, Mali and Sierra Leone found that such enterprises can achieve a rate of return on initial investments ranging from 25% to 39%. Evidence from Uganda shows that the release of NERICA varieties has played a major role in the nine-fold increase in the number of farmers growing the crop, which has almost halved its rice imports from 60,000 tonnes in 2005 to 35,000 in 2007, saving roughly US$30 million in the process.

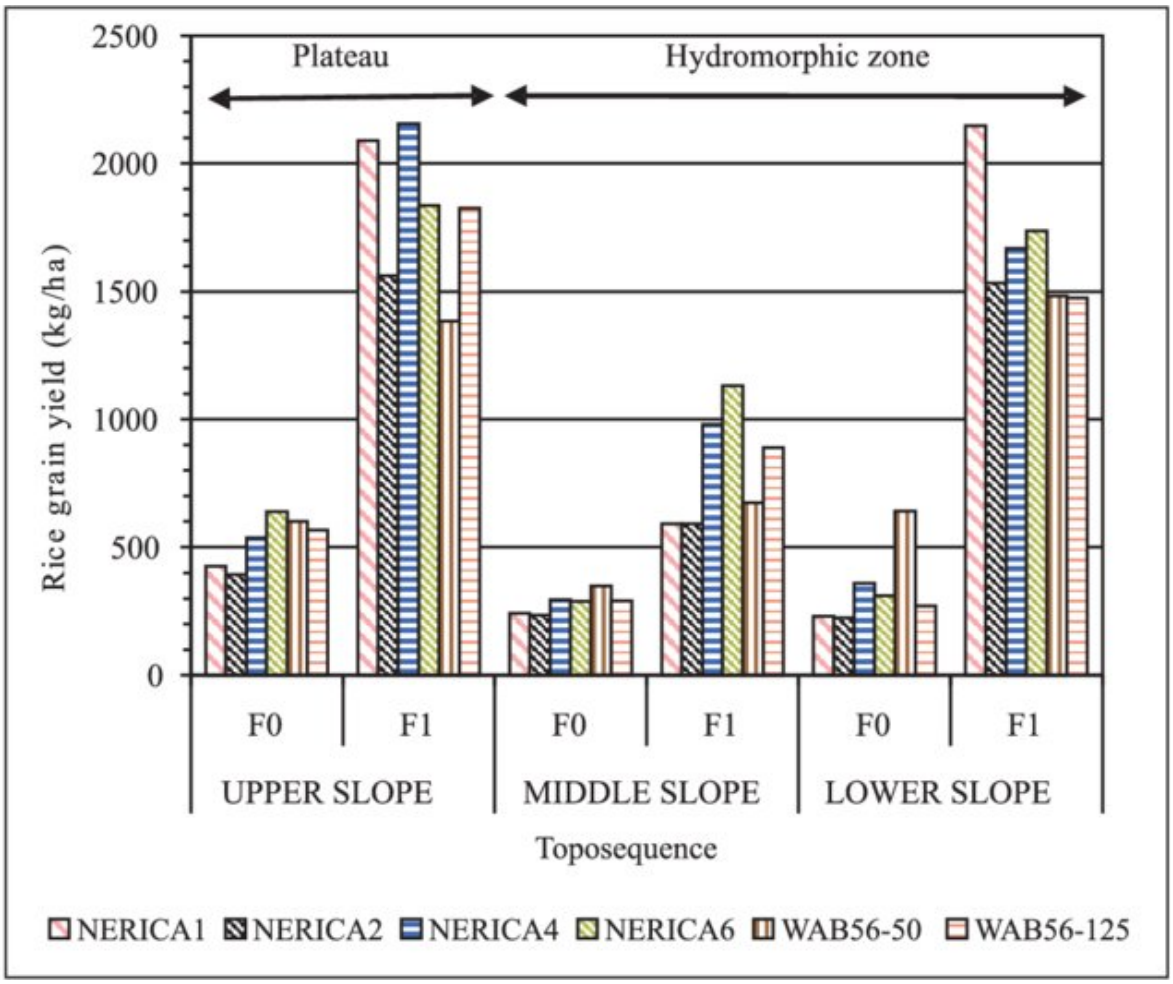
Licensing Requirements

A certificate for the multiplication of NERICA varieties has to be obtained by multipliers. Each country in Sub-Saharan Africa has licensing requirements for seed multipliers to produce and sell certified seeds on local markets.

Innovation as Public Good

NERICA varieties are free of royalty, and AfricaRice is the custodian of public investments for developing and scaling of new rice varieties across Sub-Saharan Africa.

Solution Images




KENYA SEED COMPANY LTD.
UPLAND RICE SEED
NERICA 10
Production Altitude: 0 - 1700 m
Above Sea Level
Rainfall Requirement: 800 - 1200 mm
during the growth period
Soil PH: 5.5 - 6.5
Temperature: 21 - 37°C
Ideal soil type: Black cotton
2 kg



Institutions



Accompanying Solutions

Deep urea placement (nitrogen management), Foliar micronutrient addition, Engineered irrigation surfacing (and water lifting), Motorized weeders (cut and bury paddy weeds), RiceAdvice digital support