

A close-up photograph of a hand holding a large quantity of white rice grains. The hand is positioned at the top, with fingers slightly curled, and the rice fills the lower two-thirds of the frame. The background is blurred, showing green foliage and a wooden surface. The text is overlaid on the image, following the curve of the hand and rice.

**Addressing threats to biodiversity: the
risks and rewards of diversifying
agricultural practices in Guinea-
Bissau**

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Abstract

- The purpose of this study is to explore of the ongoing threats to biodiversity in Guinea-Bissau; specifically, the environmental, economic, and cultural costs associated with the loss of a native species such as African rice, as well as the loss of its future potential. The next step in this project will be to work alongside host country nationals to develop a curriculum geared toward addressing these pressing environmental issues in Guinea-Bissau.

Biodiversity in Guinea-Bissau

- The economy of Guinea-Bissau relies heavily on agriculture along with some fishing and forestry
- Primary crops include cashews, coconuts, palm oil, and rice

Pressing Threats:

- Soil erosion
- Fire
- Drought
- Acidification/salinization

A background image of rice plants in a field, with green stalks and golden-brown panicles. A dark grey semi-transparent box is overlaid on the left side, containing the title and a list of bullet points.

Rice Agriculture

- Rice is a major staple crop in Guinea-Bissau
- “Rice is the main staple of Guinea-Bissau, to the extent that farmers speak of “hunger” when they face rice shortages, even if there are plenty of other food alternatives available” (Temudo, 2011).
- There are two cultivated species: *Oryza Sativa* (Asian rice) and *Oryza glabberima* (African rice)
- Slight morphological differences separate the two species of rice, making them difficult to tell apart in the field
- *Oryza glaberrima* was first domesticated and grown in West Africa and is a part of many local traditions
- “Some West African farmers, including the Jola of southern Senegal, still grow African rice for use in ritual contexts” (Linares, 2002).

African Rice

Oryza Glaberrima

- Tall rice plant (typically under 120 cm but some floating varieties grow up to 5 meters)
 - Small pear-shaped grain, reddish bran and green to black hulls
 - Straight, simply branched panicles and short round ligules
 - Drought and deep water resistant
 - More tolerant to human neglect
 - Profuse vegetative growth, out competing weeds
 - More resistant to pests disease (greater resistance to biotic and abiotic stresses)
 - Generally red skinned – cannot be mixed with conventional rice in bulk handling
- Disadvantages:**
- Most African rice shatters more than Asian rice; on average about half the grains are lost
 - Greater height and weaker stems makes it more prone to lodge
 - More brittle grains compared to Asian rice

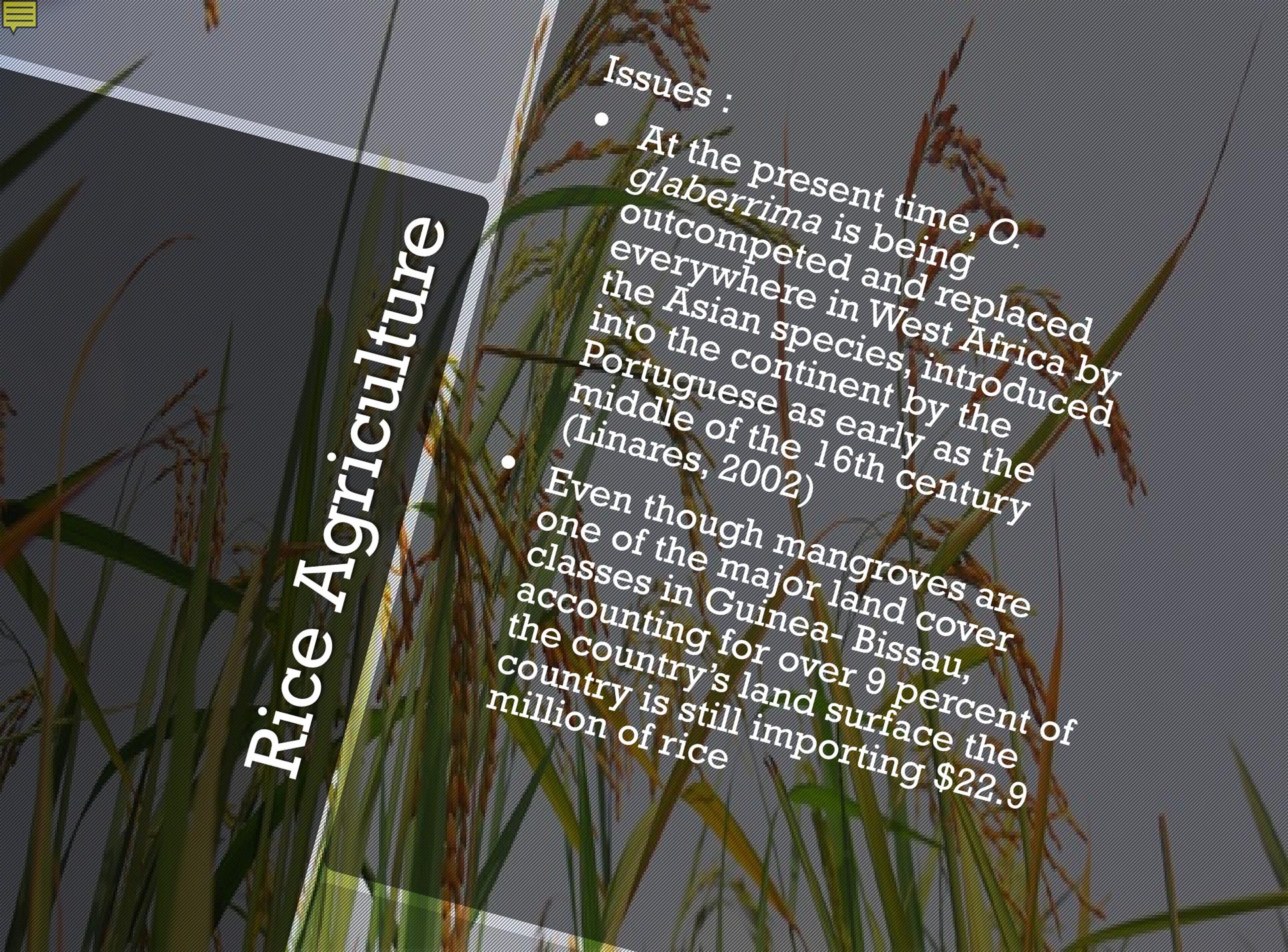
Oryza sativa

- Typically grow in a tuft of upright culms (stems)
- Up to 2m tall or more, long, flat leaf blades
- Environmental tolerance/seasonality
- Categorized generally as either Valley rice, Upland, Spring rice, or Summer rice,
- Generally grown in fields that are flooded for part of the growing season
- Variety of colors

Advantages:

- Generally higher yield
- Less brittle - easier to mill
- Industrial and shipping preference
- Economically advantageous

Asian Rice

A background image of a rice field with green stalks and golden-brown panicles. A dark grey semi-transparent box is overlaid on the left side, containing the title 'Rice Agriculture' in white text.

Rice Agriculture

Issues :

- At the present time, *O. glaberrima* is being outcompeted and replaced everywhere in West Africa by the Asian species, introduced into the continent by the Portuguese as early as the middle of the 16th century (Linares, 2002)
- Even though mangroves are one of the major land cover classes in Guinea-Bissau, accounting for over 9 percent of the country's land surface the country is still importing \$22.9 million of rice



Addressing the Issues

- Understanding the cultural value and preference
- “An understanding of farmers’ criteria for variety selection is key to promoting effective plant breeding and achieving broader aims of food security and food sovereignty (Temudo, 2011).”
- Educating people about the importance of biodiversity
- Influencing policy

Curriculum Project



Established Goals

- Outline Bio-diversity; what it is; who it affects; how it affects us
- Educate students about the importance of Bio-diversity
- Address the underlying cultural and economic aspects of biodiversity
- Students will be able to recognize the cultural and economic consequences associated with the loss of native species
- Students will be able to identify specific threats to biodiversity in their environment
- Students will then be able to strategize how to address these threats with supporting evidence

Understandings/ Take Away

- Students will understand how they can foster biodiversity in their environment
- Students will recognize and understand the significance of establishing healthy biodiversity

References

- <https://atlas.media.mit.edu/en/profile/country/gnb/>
- <https://borgenproject.org/sustainable-agriculture-in-guinea-bissau/>
- <https://eros.usgs.gov/west-africa/land-cover/land-use-land-cover-and-trends-guinea-bissau>

Image References

- <https://sites.tufts.edu/uepblog/files/2016/05/download.jpeg>
- <http://africanleadership.co.uk/namibia-experiment-chinese-rice-varieties-boost-quality-rice-production/>
- <http://www.downtoearth.org.in/news/about-100-districts-have-suffered-drought-conditions-for-15-years-50993>
- <http://www.fao.org/emergencies/countries/detail/en/c/161542>
- <http://amexdc.com/success-stories/guinea-bissau-trade-and-investment-promotion-support-project-success-story.html>
- <https://en.wikipedia.org/wiki/Guinea-Bissau>