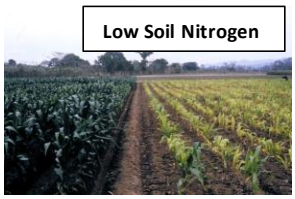
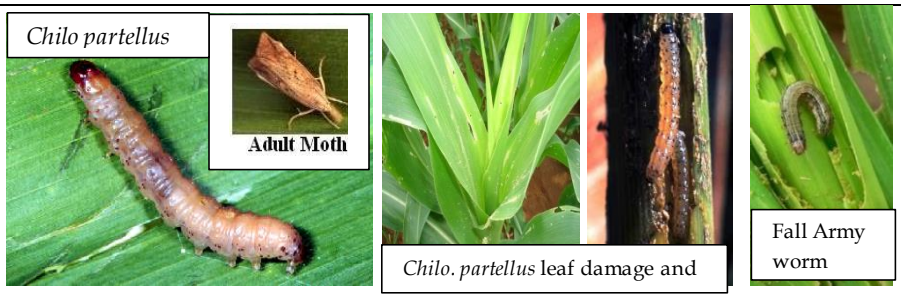
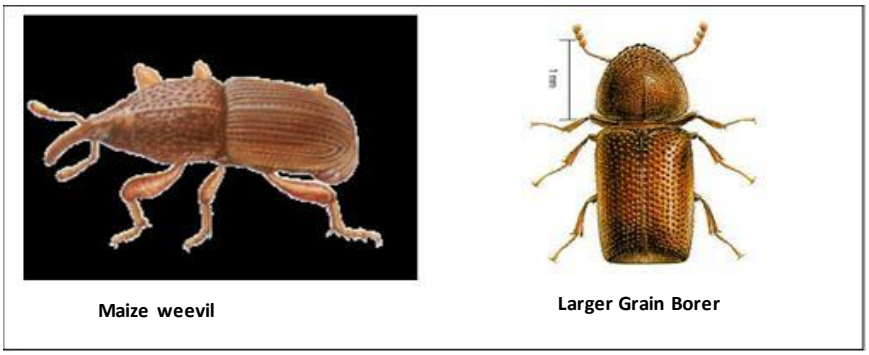
Maize Research Brief	Maize remains the staple food crop for majority of households. The AMRI-Katumani maize program was started in 1966 with mandate to develop maize varieties suited for drylands ecologies and therefore contribute to improved food security. Some of the outputs of the program over the years include development and deployment of the world famous Katumani Composite B (KCB), with desirable characteristics of early maturity and drought escaping. The program also carries out research on good agronomic practises for improved maize yields. The mandate region is challenged with various constraints which include unreliable rainfall ranging 800-1200mm which is unevenly distributed, among other constraints. These lower the potential maize yields of estimated 3-5 tonnes per hectare to the recorded 0.5-2.0 t/ha.
Constraints	Constraints fall into three major categories: Abiotic, biotic and social-economic constraints. The abiotic constraints are random drought and low nitrogen levels, while insect pest and maize diseases are noted major biotic constraints to maize production. 1. **Abiotic Constraints**  Random drought   Low Soil Nitrogen The region experiences random drought and little or no supplemental irrigation due to seasonal rivers and water shortages which often times leads to crop failure. In the good season when rainfall is substantial, most soils are prone to erosion and are low in nitrogen leading to yellowing of leaves and poor photosynthesis which translates to poor crop yields. 2. **Biotic Constraints** Two major types biotic stresses are insect pest and diseases. The insect pest falls largely into two categories which include Lepidoptera field pest stem borers and storage pests. • **Field insect pest**



The field pests include spotted stem borer, *Chilo partellus*, and the new pest fall army worm, *Spodoptera frugiperda*.

- **Storage insect pest**

The most common storage insect pests include maize weevil, *Sitophilus zeamais* and the larger grain borer, *Prostephanus truncatus*.



- Maize diseases

Diseases affecting maize include maize streak virus, common rust, smut of maize and the more recent maize lethal necrosis (MLN).

Breeding methods to address these constraints have employed both conventional as well as biotechnology tools. These methods have been used in collaboration with other partners who include the International Maize and Wheat Improvement Centre (CIMMYT) via collaborative Projects for example the Drought Tolerant maize for Africa (DTMA). The outcome of this collaboration led to release of drought tolerant varieties marketed by various seed companies among them DryLands Seeds Company LTD. Another

	CIMMYT/KALRO collaborative Project was Insect Resistant Maize for Africa (IRMA) Project. This project carried out breeding work particularly addressing insect pest both field and postharvest storage pests. The outcome was a total of nine hybrids with host plant resistance to insect pest. Out of these released hybrids, five are suited for the AMRI-Katumani mandate region and four are suited for production in other maize ecologies. Water Efficient Maize for Africa (WEMA) Project is a public-private partnership for development of drought-tolerant and insect-protected maize using both conventional and biotechnology breeding approaches. The project is managed by the African Agricultural Technology Foundation (AATF), with Monsanto as the private partner, CIMMYT and National Agricultural Research Services (NARS) from six African Countries (Kenya, Uganda, Mozambique, South Africa, Tanzania and Ethiopia).