Overview of the climate smart Brachiaria grass programme

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This overview provides the rationale and genesis for conducting research on Brachiaria grasses for improving livestock productivity in Kenya.

Importance of livestock in Kenya

Livestock contributes about 30% of the agricultural gross domestic product (GDP) and up to 10% of Kenya’s total GDP. About 40% of the total labour force in the agricultural sector is employed in livestock production. Over 70% of all the livestock in the country are found in the arid and semi-arid lands (ASALs) and the sub-sector employ 90% of population (7 million people) who live in these regions and contribute 95% of their income and livelihoods. In the humid and sub-humid areas where 80% of smallholder crop-livestock farmers are located, livestock are source of cash, provide milk, meat, manure and draught power in crop production.

In the smallholder mixed crop livestock system, Napier grass (Pennisetum purpureum Schum.), the most widely grown fodder for the cut-and-carry production system, is threatened Napier stunt and smut diseases. Rhodes grass (Chloris gayana L.), one of the cultivated pastures has a narrow genetic base and limited ecological adaptation. Crop residues principally maize stovers which are highly lignified form the bulk of livestock feed during the dry season. Their crude protein is generally low; below 7%, the minimum required for animal production and are not fortified with minerals or vitamins during feeding. In the extensive livestock production systems, common with the pastoral communities, within ASALs region, livestock subsist mainly on natural pastures that are of low quality and productivity decline rapidly during the dry season. Lack of adapted forages, frequent and prolonged drought and low rainfall are major factors contributing to inadequate quantity and quality of feeds. Increased population and opening of pastoral land for crop production and other non-agricultural uses has aggravated the situation on feed scarcity. In both mixed crop-livestock farming and pastoral systems, livestock are characterised by a low productivity.

The rising interest in livestock development fueled by increased demands of animal products has led to the demand for productive and high quality forages to bridge feed deficit. Consequently, there is need for research to develop forage options to increase livestock productivity in order to meet the growing demand for livestock products. A collaborative research project between Kenya Agricultural and Livestock Research Organization (KALRO) and Biosciences eastern and central Africa - International Livestock Research Institute (BecA-ILRI) Hub was initiated in 2012 with financial support from the Swedish International Development Cooperation Agency (Sida). The aim was to explore superior feeds resources for increasing animal productivity and for generation of income from smallholder farmers through the use of Brachiaria grass.
Research on Climate smart Brachiaria grass

Interest on Brachiaria research was spurred by the exceptional performance of livestock production on Brachiaria pasture in South America. Millions of hectares of Brachiaria species have been sown as improved pastures in South and Central America with estimated acreage of 99 million hectares in Brazil alone (Jank et al., 2014), supporting a highly vibrant beef industry.

Grasses in the genus Brachiaria have advantage over those in other genera including adaptation to drought and low fertility soils, ability to sequester carbon; increase nitrogen use efficiency through biological nitrification inhibition (BNI) and arrest greenhouse gas emissions. The genus Brachiaria consists of about 100 species distributed across tropical and sub-tropical region (Renvoize et al., 1996). Africa is the centre of origin of Brachiaria grasses and are thus adaptable in Kenya and can be well integrated in the existing farming systems. Despite the immense benefits demonstrated of these grasses in South America, the potential of improved Brachiaria grass in Kenya to address the challenge of livestock feed scarcity remain unexploited.

The climate smart Brachiaria programme is a larger initiative of BecA-ILRI Hub in partnership with KALRO, Rwanda Agriculture Board, International Centre for Tropical Agriculture, of Colombia, Grasslanz Technology Limited and AgResearch of New Zealand that focus on integrating improved Brachiaria grass into smallholder mixed crop-livestock systems for increasing livestock productivity (milk and meat) and seed production in East Africa. The objectives of the BecA-ILRI Hub - KALRO component of the program were to; (a) investigate the role of endophytes and plant associated microbes in enhancing adaptation to drought and low fertility soils, (b) increase the production of milk by 30% and/or meat by 20% in integrated smallholder crop-livestock systems while improving soil quality and (c) develop seed production systems for increased availability of seeds and generation of income.

Laboratory and greenhouse experiments on endophytes were conducted at BecA-ILRI Hub, and field evaluations of the grasses in four regions with distinct agro-ecological zones; coastal lowlands (Kwale and Kilifi Counties), mid-altitude eastern region (Machakos and Makueni), central highlands (Nyandarua Nyeri and Embu) and western (Trans-Nzoia, Uasin Gishu, Elgeyo Marakwet and Busia) Kenya. The project ended in 2016 culminating in a two days’ end of project workshop whose proceedings are reported.

References
