



KENYAN MAASAI PASTORALISTS LEARN TO CHERISH HORTICULTURE AS CROPS THRIVE DESPITE DROUGHT

WORKING FOR Maasai pastoralists facing frequent and severe drought

WORK TO introduce crop production and small-scale drip irrigation technologies to the Maasai

WORKING WITH Kenya Agricultural Research Institute (KARI) and the Green Belt Movement

WORKING THANKS TO KARI, the Green Belt Movement and local initiatives



For the Maasai, livestock is more than their primary source of income. It is a cultural necessity. When Maasai greet each other, they do not ask about the other person's family. They ask about their animals. A Maasai prayer translates as "May the Creator give us cattle and children."

In the Maasai culture, the men herd the animals. When there is a drought, they must take their herds greater and greater distances searching for water and pasture, leaving women and children behind. Their pastoralist culture never included growing crops because they always relied on meat, milk and blood from cattle for their protein and calories. However, as drought has worsened across Kenya and Tanzania, a huge number of animals have died, herds are smaller than ever and the Maasai have had to rely on purchasing rice, maize and potatoes produced in other areas.

At the request of the Green Belt Movement, an NGO working in the area, the Joint FAO/IAEA Division of Nuclear Techniques in Food and

Throughout their history, the semi-nomadic Maasai people have relied solely on herding for survival, viewing their livestock as both a sign and source of wealth. However, increasingly frequent and severe drought across southern Kenya and northern Tanzania – along with a lack of land, has meant devastating losses to cattle herds. In response, the government has initiated programmes to introduce the Maasai to a new survival strategy – crop production. The Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture is working to introduce small-scale, drip-irrigation technologies to the Maasai. The people have no tradition of crop production but recognize that survival depends on making the most efficient use of scarce water resources.

Agriculture has coordinated with the Kenya Agricultural Research Institute (KARI) to introduce the Maasai to cropping, as a way to help them grow their own food and improve their nutrition. As they have no tradition of growing crops, the programme started by teaching horticulture techniques, introducing crops such as kale, as well as fruit trees that provide nutrition but also have market value.

Enormous loss of animals due to drought has led many Maasai to turn to crop production for bridging food shortages.



The Maasai are using nuclear techniques to make efficient use of their scarce water resources and optimize production.



NUCLEAR TECHNIQUES IMPROVE WATER-USE EFFICIENCY

However, success requires more than learning how to farm. Due to the difficult agricultural conditions in the area, the Joint FAO/IAEA Division works with KARI to identify simple but sophisticated nuclear techniques that enable the Maasai to make the most efficient use of their scarce water resources and have optimum production.

While it might seem far-fetched to imagine Maasai pastoralists employing nuclear techniques to start agriculture in the arid landscape of East Africa, the Joint FAO/IAEA Division has supported KARI in developing low-cost, small-scale irrigation technologies based on the use of neutron probes and isotope tracers that are specifically designed to meet the needs of the Maasai. The Joint Division provides fellowship training to ensure that KARI scientists are able to use the techniques and then KARI passes the technology on to the Maasai.

In this case, the techniques focus on drip irrigation, which increases water-use efficiency. This calls for applying water directly to the plant roots through a network of pipes and tubes, thus reducing water losses through evaporation or due

to water draining away below the plant's root. KARI scientists assist the farmers, using a neutron probe to measure soil moisture. The neutron probe is not a new technology – in fact it was developed in the 1950s, but the technology is still the best.

DELIVERING WATER AND FERTILIZER TOGETHER: FERTIGATION

Going a step further, this irrigation system also can be used to target use of nitrogen fertilizers. Nitrogen is critical for agriculture, but is also an expensive commodity and can cause severe environmental problems if not used correctly. If too much is spread on the soil, the extra that is not taken up by the plant is released into the atmosphere as a greenhouse gas, making it a climate hazard. If too much goes into the soil, nitrogen leaching can occur. The excess drains through the soil and, if it reaches the level of the ground water, makes the water unsuitable for human consumption. This can amount to a substantial financial loss for the poor farmers.

By delivering nitrogen fertilizer through the same pipes as the irrigation water, the fertilizer also goes directly to the area of the plant root where it is needed. Known as "fertigation", it relies on stable isotope tracers to test how well the

nitrogen is taken up by the plants. With this information, the farmers know exactly how much fertilizer and water is needed and can adjust the amount accordingly.

For traditional pastoralists such as the Maasai, there is no question that times have changed. Population pressure has increased the need for agricultural land. At the same time however, changes in land tenure allow personal rather than tribal ownership and new owners have fenced off traditionally communal lands. This, combined with the enormous loss of animals due to drought, has led many Maasai to appreciate the importance of crop production in bridging food shortages and improving family nutrition. In addition, vegetable farming has encouraged men to stay closer to the family so they can help with the crops. Thanks to the success in the pilot area, other Maasai communities have begun vegetable farming, knowing that they have more potential for success, thanks to the application of nuclear techniques.