

Sugarcane Farming

We grow 250 hectares of sugar cane. This is reputed to be some of the best sugar cane in the country with yields of over 100 tonnes per hectare and averaging 8 ratoons. Most of this cane is sold to nearby millers but some is now processed on site into jaggery (gur, pannela, raspadura, panocha), an unrefined form of sugar that has many positive health benefits and is processed without use of chemicals.

The Homa Lime Sugarcane Story

The Beginning

Cane has been grown on Homa Lime land since 1964.

The initial assessments by the experts of the day was that it could not be grown successfully at our altitude (1500 metres) with our temperatures (max 28 °C min 15°C).

In most parts of the world, including Kenya the aim is to get 2 or 3 ratoons before ploughing out the old crop and replanting. Homa Lime up until the end of the 1990s averaged 8 ratoons achieving 105 tonnes per ha. over an 18 month growing season. Being on the equator and close to Lake Victoria, we do not have marked wet and dry seasons with varied seasonal temperatures, which is one of the reasons why cane does not mature any quicker. Another is the variety of cane used. We do not irrigate the cane. From the above, it can be seen that the cane except for short occasional periods with break crops between plantings, we are practicing a monoculture. Although other crops do grow, the financial returns from cane exceed any other crop tried, for example, maize, stevia, tobacco, sunflower and coffee. Towards the end of the 1990s, it was realised that soils were deteriorating and we were the first growers in Kenya to change from burning cane before harvesting and then burning trash post harvest. Instead all of the leaves both green and dry were trashlined in every 3rd row. These trashlines were alternated every harvest to try to build up organic matter between the rows. In the meantime we continued to cultivate and subsoil in the remaining two rows, thus leaving these open to sunlight, overheating and drying. We are fortunate that with our relatively high rainfall of 1600 mm per year, we usually get some rain every month but this appears to be changing with higher temperatures in the hot season and longer dry spells.

Chemical controls.

Weeding using various herbicides continued until 2020. In the past couch (*Digitaria scalarum*), *Imperata cylindrica*, *Panicum sp.* Bindweed (*Convolvulus sp.*), *Commelina sp.* and *Portulaca sp.* have been problem weeds.

Fortunately, the main fungal problem we have had has been only with Smut, which is hand rogued regularly. However our neighbours do not do this so there is re-infection occurring all the time due to fungal spores being carried in the wind.

Insects have never been a problem until 2019 when we saw the first outbreak of Yellow Sugarcane Aphid which has continued into 2020 and 2021. The initial response was to spray the affected areas with

insecticides. This aphid is not indigenous to Kenya, as far as we know, so there were no predators of the aphid and using insecticides obviously killed any potential predators. The insecticides are no longer in use and we hope that predators may be learning about this new food source since infections have reduced in the last few months.

Fertilisers have been used since the beginning. Compounds at planting at the rate of 125 kg per ha and then nitrogen for second application in the form of urea (100 kg per ha), sulphate of ammonia or calcium ammonium nitrate, at rates of up to 400 kg per ha. Latterly soil testing has called for additional potassium and magnesium in some fields. We have also used some foliar applications of compounds. As can be expected, being a limestone mining company, we have also limed regularly and in many cases in excess of the amounts recommended by the soil analysts. This has proven to be to the benefit of the cane, not to its detriment.

Ethics of growing sugarcane.

Sugar is currently getting very bad press and rightly so when concerning many processed foods. However, humans do need dietary energy and sugar is one of the ways to supply it.

All sugar, to be produced, has to be processed in some way. Our jaggery is processed by crushing cane and boiling the juice until the raw sugar can be dried into solid blocks. No chemicals and no additives except juice from an indigenous plant which is used to help clean the dirt out of the juice. This same plant is eaten as a vegetable by local people. Jaggery has been used in Ayurvedic medicine for millennia. The bulk of cane sugar is processed in bigger mills which use more technology to separate the sugar from water and to crystallise it but very few chemicals are involved, unlike other sweeteners which are all synthetic. Some use ridiculous amounts of water in the production process, while most are pure laboratory chemical products.

We need sugar to preserve produce such as fruit which are seasonal. Surely this is environmentally a better way than shipping vast amounts of fresh produce around the world throughout the year, Sugar is needed in the kitchen for confectionary and baking. While we should perhaps reduce the amount of such products eaten we will never completely eliminate the demand for these.

Lastly sugarcane is one of the most efficient crops at converting sunlight into biomass and this can be used for many other products apart from just sugar – paper and packaging materials, animal feeds and alcohol, to name a few. Additionally, as a good user of sunlight it has enormous potential to restore carbon to the soil which is of paramount importance to the survival of humanity.

The way forward.

It is now obvious that we cannot continue growing cane as a monoculture in the conventional manner. By the simple methods of the smut rouging mentioned above and filling in gaps in the field, either by splits from existing stools or in drier weather using setts from a seedcane plantation, which together are very much cheaper than ploughing and replanting, we can maintain our crops indefinitely by filling in gaps in the fields to maintain plant population. We have now reached 16 ratoons with yields in excess of 125 tonnes per ha. This is of course using conventional methods as described above previously. For the last 10 years we have been preaching the necessity of looking after the soil. This means we must look at improving our soils even further by better mulching to increase carbon in the soil. This means no subsoiling and interrow cultivation using tractors, except in exceptional circumstances.

It has been realised that inter row crops such as beans, cowpeas, sunflower and sunn hemp (*Crotalaria juncea*) can all be grown to benefit the crop and cut back to provide a mulch. All maintenance and harvesting of these crops has been done by hand as obviously machinery cannot go into the growing cane field. Harvesting the grain from these crops is not worthwhile as yields do not justify the labour costs but certainly as part of a cover crop mixture, we see value when the crop matures, if it is cut down and left as a mulch. We are hoping to benefit from the sub-surface interactions with mycorrhiza in the root zone.

The cane trash is now being spread all over the field, instead of being lined, to protect the soil from the sunlight and overheating. This trash blanket reduces weed germination to some extent. For those that do come through, we will use no herbicides, instead we are using labour with hand hoes and slashers to weed the farm. While hoeing does disturb the mulch and soil to some extent, the usual effect is to slice off the top of the weeds and leave much of the root system in-situ. Similarly slashing just removes the tops of the plants. Inevitably we still get weed growth but it is hoped that this will stimulate bioactivity in the soil with a mixture of plants. The use of hoes and slashers will have the effect of killing some roots but will also add further plant material to rot down. It is hoped that this will also have a similar effect to the hooves and grazing by animals in causing a small amount of soil disturbance. Weeds will then be suppressed by the cane as it grows and the weeds are shaded out. Of great importance is the fact that no chemicals will be added which could possibly pass into the food chain and will not poison the soil micro fauna and flora.

Inorganic fertilisers will not be used. For the last 20 years, when fields have been dry enough, we have spread slurry from biogas digesters. The slurry has undoubtedly benefitted the land but perhaps not as much as if we had not been using the inorganic fertilisers at the same time. We will continue to apply the slurry as well as farmyard manure, earthworm leachate and wood vinegar (pyroligneous acid) all produced on farm which stimulate bio-activity in the soil, along with some bought in humates.

Conventionally, heavy trailers go into the fields at harvest to be loaded using cane loaders. We do not allow this. At harvesting, which is done by hand, cane is stacked into roughly 2.5 tonne bundles. These are winched onto trailers using the tractor power take off and removed from the field one at a time to a central loading point where they are then loaded mechanically into trucks for transport to the mills. This results in a great reduction in compaction of the soil and far less damage to the cane stools.

By using above methods we attempt to regenerate the soil. We do expect an initial reduction in yield which may be permanent but costs are also reduced. Increasing soil carbon should allow us to continue with our monoculture of sugarcane as a healthier crop for many years to come. A work in progress!