

Indigenous Knowledge Behind the Sinhala System of Agriculture

Mr. Nanda Kumara Senevirathna



The agriculture methods and practices that have evolved in accordance with the climate and geographical diversity associated with the land in Sri Lanka is known as the agriculture of the Sinhala people. It is possible to observe that the basis has been to pay a great deal of attention to maintain the wealth and well being of the people, through food production and food security practices. However during the later stages of the Anuradhapura period the surplus of the food produced was used to pay the taxes and also for export. This can be seen as the development of an economic system and commercial attitude which was not in keeping with the basic objectives. However there were no significant changes in the agricultural technologies. If there were any transformations they were seen only with respect to irrigational aspects. There is a distinct difference between this traditional Sinhala system

of agriculture and the ‘chemical’ agriculture as practiced today. The purpose of this document is to point out these difference and their eco-friendly effects on the environment.

Weed control and Application of fertilizer

When we consider the traditional knowledge embodied in the cultivation of paddy, which is the main economic crop of Sri Lanka, we can understand the many principles associated with it. One of these is the effortless manner by which weed control and incorporation of fertilizer was carried out. Weed control was based mainly on land preparation. The basic methods followed in weed control are, keeping the cultivated land separated into small plots (*liyadda*), submerging the plots with about one inch depth of water (this is called ‘*bisnān bedeema*’ or maintaining the water level so as to partly

submerge the rice plant in water) and draining the water intermittently.

The ancient farmer carried out digging the mud with the mammoth, ploughing, and treading by cattle as a means of land preparation. With digging shallow rows are made in the mud. The same thing happens with ploughing. During treading by cattle spaces are created to retain a certain amount of water when the hoof sinks into the mud. The farmer did not keep the field completely covered with water. The shallow rows were filled with water only to half their depth, so that after a few days micro organisms begin to grow under anaerobic conditions.



Due to the anaerobic condition the soil becomes alkaline. The farmer recognize the condition by splashing into the field a mouthful of betel chew kept in his mouth. The farmer observes the extent of 'conditioning' (*padamveema*) of the mud depending on how the red colour of the betel chew changes due to the alkaline nature of the betel, arecanut and the chunamb mixture of the betel chew. The alkaline environment prevents the growth of weeds and inhibits harmful micro organisms. It is customary to keep the plots submerged with water after the second round of ploughing and sow the paddy soon afterwards. The soil returns to the natural state after sowing the paddy. Two days after sowing the plot is submerged with water for about 12 hours; then four days later it is submerged with water for about 12 hours. Then two days later it is submerged for 24 hours; after 7 more days the plot is flooded with water for a duration of 3 days and once again after 14 days the plot is flooded with water for 7 days. This process helps to control the emergance of weeds such as '*keudametta*' (*Timbri stylis spp*). By this time as the paddy plants have grown tall weeds do not emerge as they do not receive

sunlight. The field develops an acidic condition because the field is flooded and then drained empty again and again. More attention is paid to the proper laying of the 'saline canals' (*Kivul Ela*) when sowing is done so that the alkalinity or acidity is made to flow and drain down three canals. During this period earthworms

and enhances the fertile nature of the soil. During the treading (*Medaweema*) by buffaloes their hooves mix the mud and bury the weeds in the mud.

Weeding by hand (*Neleema*) is done about two weeks after sowing the paddy, which is the traditional practice and during this process when the mud is loosened, it is observed that the paddy plants begin to form tillers. Some farmers mix carbon dust (soot) scraped off the traditional chimney shelves (*Dum messa*) and put it into the water outlets (*Wakkada*) of the plots. The farmers in the Gampaha district claim that this is a method of weed control. When applied to the paddy field the soot is trapped

in the water amongst the paddy plants, and temporarily prevents the growth of weeds.

However, when chemical weedication are used weeds are completely

destroyed. By this 'deadly' process beneficial microorganisms are also destroyed. Using this type of destructive methods render the soil infertile.

Pest control

From a study of the ancient ola leal records we can discern that the farmers were in possession of a vast body of traditional knowledge to control pests



pertaining to paddy cultivation. In addition, the farmers also communicated their knowledge by word of mouth, from generation to generation. The main means of communicating this knowledge was through folk songs (*Seepada*) recited to overcome the loneliness and solitude while engaged in agricultural activities. In the collection of folk verses called '*Kamath Hella*' the following is mentioned regarding pests.

“There is the disease of the yams
'*Kokekanawa*' is a disease
Unapathaya is mother disease
Observe these various diseases”
The chances of the rice plants being infected with worm disease are many. With the infestation by the caseworm or '*Kokekanawa*' the



leaf turns white and is destroyed. The retention of water in the soil with excessive rain is a reason for the growth of these worms. This worm is about 6mm long and is basically the larval stage of a moth. The larvae are hatched out of the eggs after about 4 days and then spends about 20 days in the larval stage. They are transmitted by water.

Chemical Methods Scientists use strong pesticides containing the active ingredient dimethoate to destroy this harmless moth.

Applying this chemical also destroys the beneficial organisms such as the dragon fly and the lady bird beetles which feed on some pests of the rice plants. Thus the biological population of the paddy field is reduced and in turn the damage caused to the rice plants by the pests is increased. If due to some reason an epidemic of leaf hoppers suddenly develops, in an environment devoid of the useful organisms,

then the leaf hoppers will multiply in an invasive manner. The ultimate result would be that the entire field of rice plants will turn brown and will be destroyed.

Application of ash as a traditional pest control measure

Traditionally ash treatment was employed to control pests such as the case worm, leaf rolling caterpillar and stem borer. This method involved draining the

water out of the paddy field, allowing it to dry, and early morning of the following day strewing the ash on to the rice plants, while the morning dew is still on the leaves. The ash from the fire place (hearth) is sieved and used for this purpose. The ash sticks to the rice plants as well as to the body of the case worms. When the ash sticks to the worm, specially in between its body segments, the worm is unable to control itself and falls off the plants to the soil, or it collects towards the basal parts of the plants. When the field is flooded with water the next morning after the ash treatment, most of the worms die. In the olden days there were plenty of fresh water fish in the paddy fields, and they fed on the worms. Usually on the third day the farmer sweeps

or brushes over the rice plants starting from the higher plots to the lower plots, with a bunch of croton (*C.laccifer*) branches. The rough hairs of the croton branches weaken the worms, and they as well as their eggs fall in to the water and are eaten by the fish.

Damage by the shootfly causes the “silver shoot” disease or '*Unapathaya*' disease. This is not a serious problem in traditional agriculture. The life span of the shoot fly is four days. The

beneficial organisms living among the rice plants eat up these flies and their larvae. What is required is to maintain the environmental conditions of the paddy field so as to retain their population. This can be understood further by turning our attention to the folk songs popular among the Sinhalese. The singing of the *Goyam Kavi*, *Nelum Kavi* (Weeding Songs) and *Kamath Kavi* (Threshing Songs) with their various rhythms stimulate the various energy sources such as mental energy of the farmers. The objective is to make the work easier and lighter, and dispel tiredness. The other method is to stimulate the energy sources by the chanting of 'Manthra'. There are a few other methods such as lighting of lamps and the use of plants emitting various chemical substances. For these we use the term 'Kem Paban' when referring to such activities. The traditional agriculture knowledge is quite varied. The objective is to achieve productive result by unifying or coordinating this knowledge. If it is a paddy field the main objective is to bring unification between the farmer and the field. If this is not brought about there will not be an useful result of the 'Kem Practice' (*Kem Krama*) employed. This is essential in order to use the astrological principles such as 'Karanaya' to avoid damage by wild animals. For this to be successful with good results it is necessary to prepare a 'cultivation calender'



for the whole field as an entirety. The ancient people cultivated the habit of identifying the various behavioural characteristic of

animals. The veddhas have a good understanding of the behaviour of wild animals because of their relationship with the environment. The animal that causes most damage to chena cultivation is the wild boar. The farmers developed a detailed understanding of the behavior of the wild boar. Chanting of 'Manthra' was a key component is *kem* practices that were frequently used to ward off herds of wild elephants. This became a necessary protection when persons encounter wild elephants on their way to a chena. Cattle also damage paddy fields and vegetable plots due to the negligence of the owner of the cattle. Farmers had various methods of protection in such instances.

Two methods are mentioned for

seeking protection of the farm, by the practice called 'Kem Paban'.

There is a belief that *Kem* practice should be performed on Wednesdays and Saturdays which are the days set out for this ritual (*Kemmura* days). In this methods by lighting of lamps the insects are attracted to these and cause their death naturally.

It is said that in order to get protection from wild animals the following 'Kem' should be performed on 'Kemmura' days.

Branches of the plants *wara* (*Calotropin gigontea*) *Jak* (*Artocarpus helerophyllus*) *Indi* (*Phoenix zeylanica*) and *Midi* (*Premna obtusitobia*) are used for this purpose. These are referred to as *Kemini* (*Kem stakes*) in the stanzar of the publication title 'Kamath Hella'. The first stage of this process is to smoke these branches at a height above the height of a man. The smoke is produced by burning coconut shells and a resin in a pan. The following morning smoking is done again by using the three branches mentioned above. (each bunch should contain one type of branch only). Then the three bundles of branches are fixed or 'planted' in three places at the edge of the field. This has to be done in such a manner that the bundles are placed along the path of wind direction and then in the opposite direction. It should be ensured that the person remain silent while holding the bundles of branches. The farmer should also refrain from visiting the field

for a period of 24 hours (*Wara Thunak*). If it is a paddy field it is better to perform this ‘*Kem*’ when the rice plants have just begun to produce the spathes. It is necessary that the spathe has at that stage split open exposing at least a minimum of three sprigs of paddy seeds. Those having experience say that if it is a chena plantation of cereals such as millet, all the plants should begin to form the ears simultaneously. When this ‘*Kema*’ is carried out, damage by flies is also prevented. Other ‘*Kem* chantings’ against flies are also said to be successful through this same procedure. It is important to understand the special characteristics of the leafy branches that are used here. Plants with latex such as calotropis and Jak generally possess insecticidal properties. Using all three types of branches together enhances this property. Directing the smoke windwards facilitates the newly generated energy to be directed outwards. The subsequent “planting” of the branches against the wind prevents the real odours from spreading outside. Then the energy inducted is not lost. It may be a little difficult to logically understand this action. However there is evidence to show that the farm was protected from many dangers by fortifying it with this “energy”. Many types of “*manthrams*” were recited to

prevent damage caused by wild animals. It is generally recognized that the energy inducted by the chanting of these ‘*Manthra*’ prevented harm by insects and diseases. This ancient knowledge has been developed as a process of retaining the unifying basis of nature.



A logical explanation about “*Manthra*”

Four Palmyrah (*Borassm flabellifer*) leaves partly eaten by beetles are taken and the *manthram* ‘*ohm Namō Neela Neela Eswahang*’ is etched on the leaves with a stylus and carbon dust is applied to the etching, and then the ‘*manthram*’ is recited 324 times. Then the four pieces of leaves are placed in four cylinders of bamboo stem. These are then closed with stoppers turned out of morinda wood. Then they are buried in the four corners of the chena or the paddy field. This should be done between 12 midnight and 1 am. After that one should refrain from going to the field for the next 18

hours (or three *warumas*). Modern day society does not have much faith or belief in these *manthrams*. However everyone knows about the effectiveness of pirith chanting and of the pirith threads. But people are reluctant to make use of *manthrams*. They are considered as superstitious beliefs or are looked down upon as condemned sciences.

Masaru Imato living in Japan has published a book Titled “The Message of Water”. As mentioned in this book, in an experiment where various types of music was played near the waters of the Fujivara dam, a change in the water has been observed. Subsequently the Pirith chanted to various samples of water by the Buddhist monk Kato Hokai have been examined. It is reported that they were able to observe the water becoming bright and turning into crystals. In a subsequent experiment when rough music and unpleasant words were used, the brightness of the water disappeared. This is a new discovery. It can be considered the effectiveness of the power of *manthrams*. All this confirms that the vast knowledge possessed by the ancient farmers has been developed and maintained on a systematic basis.

Mr Nanda Kumara Senevirathna
0714287695 / 0775384914