No. 104 June 2020

AAINews

Connecting people, agriculture and the environment through appropriate technologies

Appropriate Agriculture International Co., Ltd.
1-2-3-403 Haramachida, Machida, Tokyo, JAPAN 194-0013
TEL/FAX: 042-725-6250
E-mail: aai@koushu.co.jp
Website: http://www.koushu.co.jp

The Sun in Uganda (2)

Continuing from the last issue, I will introduce some more stories related to the sun in Uganda, which is, as you know, an equatorial country.

The day length is 12 hours and is constant throughout the year in Kampala.

Rice is basically a short-day plant. Many rice varieties have the property of forming panicles in response to the seasonal change in the day length (photosensitivity) and this ability is more common in traditional varieties. In Cambodia and Sri Lanka, where I have experience, the maximum differences in annual day length are 1 hr. 28 min. in Phnom Penh and 54 min. in Colombo, respectively. These maximum day length differences are significantly shorter than those in Tokyo (4 hr. 50 min.), but there are native rice varieties that are sensitive to these slight differences and through the long history of rice cultivation of those countries, the traditional rice cultivation patterns have been developed using a combination of rainfall patterns and these native varieties. It is known that tropical varieties are more sensitive than temperate varieties to small differences in day length. For example, in Melaka, Malaysia, located on 2°N, the maximum day length difference is only 14 min. but there is a traditional rice variety that is sensitive to that slight difference in day length. However, in Uganda, no rice cultivation pattern utilizing the special characteristics of photosensitivity is found. Maybe it is because Uganda has only a short history of rice cultivation and has had no chance to develop traditional varieties. But it is also an important factor that Kampala is located at 0°19‘N, and the maximum difference of day length is only 2 min. I believe rice can't detect such small differences. Arua district is located at a latitude of 3°N, about 500 km north of Kampala. The difference in day length is about 20 min there, so photosensitivity might be exploited if using a sensitive variety. It may be possible to find a variety that shows a different growth reaction at Kampala in the future.

The Sun moves north and south.

Around February one year, a young Japanese colleague planted an upland NERICA variety in a sunny open south facing area in front of our office. He had sought to make it an effective demonstration for office visitors. Initially, upland rice was exposed to the sun and grew satisfactorily. And then, by the Spring equinox in March, the sun passed just above the building and the sunshine became weaker, and after April, the sun passed to the north side of the building and the upland rice was in the shade all day long and the rice growth stagnated. In Japan, which is north of the Tropic of Cancer, the sun is always visible to the south, but in the equatorial region, it tilts north in the Summer Solstice and south in the Winter Solstice. Although the equatorial region has little seasonal change, the sun on the equator exhibits a dramatic change from south to north.

Strong ultraviolet radiation

When conducting experimental cultivation using pots in Uganda, it is convenient to use plastic buckets as pots. However, this requires careful handling. The bucket deteriorates quickly, and when you try to hold the rim of the bucket to move it, it cracks easily. Ultraviolet rays become higher at lower latitudes and at higher altitudes, so it seems that ultraviolet rays are particularly strong at Kampala with an altitude of 1000 m or more almost on the equator. I believe that this strong ultraviolet light accelerates the deterioration of the buckets.

At one point, I met a doctor at a party and he pointed out the redness and the pterygium of my eyes and kindly explained that it was highly possible that this was the effect of ultraviolet ray exposure due to working outdoors. At the time of flowering of rice, I always got rice pollen allergy and my eyes were red, so I had thought that my eyes were red because of rice pollen. My eyes, however exhibit symptoms of hyperemia even when the rice is not flowering, so it may be because of the sun in Uganda.

(Kojima, February 2019)

Ingenuity of demonstration fields <Part 2>

Evolutionary Demonstration

A demonstration field is a place to show new techniques for farmers and finally verify the applicability of the technology exhibited. To select themes for demonstration & verification is the first important step in establishing such a field. In Palestine, we participated in a project called 'The Project for Strengthening Support System Focusing on Sustainable Agriculture in the Jordan River Rift Valley (ASAP)' during 2007-2010. Regarding the problems faced by local farmers, we narrowed down the issues by discussing with the C/Ps such as research centers and extension departments.

In Palestine, there were several restrictions under the occupation policy of Israel which lead to inconvenience and disadvantages for farmers. Therefore, the project aimed to increase farmers' incomes by introducing multi technologies such as grafting, compost, silage, dairy products etc. under the concept of cycle-oriented and market-oriented agriculture. The developed and introduced technologies above were adopted in 'The project on Improved Extension for Value-added Agriculture in the Jordan River Rift Valley (EVAP)' during 2011-2014, leading to full scale adoption. In this article, we would like to introduce the transition of technical demonstration and methodologies focusing on some practical actions taken on silage (preservative fermented fodder) making.

The First Generation

Since practical silage making techniques were not popular and not well known even for extension officers and researchers, the project team tried to start steps from ABC. Small scale demonstration activities were conducted in front of farmers by using drums stuffed with vegetables and crop residues just like a cooking school. The important point here was to let farmers know the idea of silage making clearly through showing process and procedures.

The Second Generation

The farmers' reactions to the above demonstration was reasonably good and it seemed the interest in new technology was sufficiently stimulated. The 'appropriate scale' was the next issue to facilitate introduction and practice for farmers. Production amounts of silage in balance with livestock numbers and labor input were essential. No matter how motivated they are, it will not be practical unless these issues are resolved. The project team studied using large-scale machinery and shifted to mass production using the trench silage method. Although it was still at the stage of trial, we succeeded in producing a large amount of quality silage.

Large-scale harvester

Trench method

The Third Generation

The second generation technology opened the door to mass production. However, it was still difficult for farmers to deal with silage. After a series of trials and innovation, the project decideded to adopt the plastic barrel method. Mechanization for mass production was an issue, and after studying the barrel-stuffing machine, there was finally the prospect of practical technology. Stuffing materials were also expanded from merely using the residues of vegetable and crops to include the leaves of date palms.

Plastic Barrel method

In this way, in the demonstration activities on silage making, the contents and methods of the demonstration were evolved through ingenuity and improvements in the technology while taking in requests and opinions, through interactive communication between the project team and farmers. Looking back, the first-generation technology demonstrated at the beginning did not adequately answer the needs of, and challenges facing, farmers, but it can be said that the technology has been adapted and refined in stages. We subsequently received the happy news that silage making had become popular among farmers and was being called the 'silage revolution' in Palestine. This was a case in which the recycling technology was successfully disseminated over several years and became common practice among farmers through the continuous improvement of the demonstration technology for eventual practical application.

Explore the world of beekeeping <Part 2>

Traditional beekeeping and challenges in Ethiopia

The South-western part of Ethiopia where local people collect coffee from wild trees is known as the birthplace of Arabica coffee. By utilizing the biodiversity of coffee forests, traditional beekeeping has been conducted in this area. We can see some beehives hung on big trees even along the road. These traditional beehives have been made by hollowing out the inside of a tree trunk. But currently, it has become common practice to use tree bark from native trees mostly from a tree called Baya in the local parlance, which is in the Oleaceae family, and is formed into a cylindrical shape before being is covered with bamboo skin. In the highlands, where bamboo grows at around 2000 m in altitude, production and sales of beehives are one of the cash incomes sources. We see many people walking about holding dozens of beehives on a local market day.

It is said that a beehive can attract bees by fumigating its inside with smoke before hanging it on a tree. Beekeepers who have the traditional right to use coffee forests often set more than 100 hives at once depending on their appointed area or the number of big trees. However, it is necessary to use ropes to hang them under the branches in order to prevent them from being destroyed by baboons and monkeys.

A preferred source of nectar is the locally named Buto tree, which is in the Araliaceae family, which provides fragrant white honey, popular in Ethiopia and also exported, even to Japan.

Traditional beehive hung on branch of a big tree

To collect honey from beehives on trees, smoke is used to calm bees even though it has not been used much in the past. That practice with smoke sometimes accidentally causes fires and deforestation. In addition, this work is often performed at night, and accidents due to falling from high trees are increasing. Those generations who practice traditional beekeeping are aging. Immature young beekeepers tend to set up unreasonable numbers of beehives in order to earn more income, and it is becoming a situation close to gambling. According to a survey conducted in the area, only 10 to 20 % of bee colonies actually enter and settle down even if many beehives are set up. Another factor to consider is that honey production from one traditional beehive is about 5 to 10 kg while other beekeepers who practice modern beekeeping methods produce more than 10 times the amount of honey with a single box.

As long as skilled beekeepers use their knowledge and experience to produce honey in appropriate volume by using locally available materials, it would be an ideal livelihood which utilizes non-timber forest products in harmony with forest management. However, beekeeping is now the second largest source of income for the local people after coffee collection. And, even selling of traditional beehives becomes a cash focused enterprise and leads to the devastation of natural forests. It also causes forest fires, destruction of bee colonies, and carries with it the risk of injury due to falling. Under these difficult conditions, there is a demand among beekeepers for shifting from traditional beekeeping to the modern way. Actually, sometimes a beekeeper does not have any knowledge on how to use a modern beekeeping box even though he has purchased and set it up in his home garden.

As a part of the JICA's project activities, local beekeepers have been trained for practicing with a transitional beehive, called the Kenyan type, and have begun demonstrating with it. This transitional beehive is made by combining tree branches and mud, both available locally. If well managed, it is possible to expect a yield similar to that of using modern beekeeping boxes. However, appropriate management and measures need to be applied while observing the conditions of bee colonies and queen bees, and these are different to previous practices that just involved hanging hives on trees and leaving them until the time of honey collection without any management. We will support the beekeepers in learning about the transitional beehives, to increase honey production and harmonize with forest conservation by providing technical training and regular monitoring in the field.

Trainee demonstrates transferring bee colony from traditional beehive to transitional one.

AAI and Me – Yoshihisa Zaitsu <Part-2>

Daily activities in AAI

As I wrote in the previous issue, the launch of AAI was relatively smooth. It was agreed to continue to participate in the project I had been involved in since the time of CKC and to include Onuma in this project. At about that time, Mr. Sakaba established Ecoplan (Forestry Consultant) and shared the office with us and he provided us with a foothold to participate in domestic activities. It was essential for me at that time to absorb expertise on a daily basis. In addition to that, daily clerical work such as receipt arrangement and business coordination with other companies was extremely useful for subsequent AAI operations.

Upon joining AAI, by the way, I had a dream as participant in development consulting work; I yearned to engage in long-term assignment work, and the opportunity came earlier than I expected. After joining the company in 1989, I went on to work as a specialist in erosion control, forestation, and water-saving agriculture in 1991 in a joint research program of Shizuoka University and UAE University. Since 1996, I have been dispatched to the Agricultural Research Institute established in Nejd, southern Oman to provide technical guidance to young researchers. In this way, my dream was achieved rapidly.

My experience as a long-term expert greatly helped to accumulate and build on my expertise and to expand new specialized areas and such experience really reinforced the technical management capacity of AAI. In addition, a lot of human interaction with local technical staff, technicians visiting from Japan, and university personnel have become an indispensable asset for the subsequent activities of the AAI, a group of experts aiming at dryland agriculture. During this dispatch period, Koto joined AAI and the Onuma / Koto / Zaitsu structure was established.

Onuma and Koto used to work together on the same project, but I had almost never worked on a project with any of my colleagues including them for about 30 years. It was my destiny. My assignment was always either a reinforcement of other companies' projects or a stand-alone dispatch. I once thought that I would like to work together with Onuma and Koto under the same project, but now I have no regrets. Among many leaders and experts of other companies, I was trained technically and as a human being, and I was able to absorb a lot of specialized technology. I also always had a sense of tension, a feeling that I shouldn't disturb the project. I think that this kind of diligent application has become the cornerstone of self-development and that we have also gained a certain level of trust from outside the company.

Technology accumulation has expanded from the original work focusing on soil and land use to satellite image analysis, GIS, irrigation water quality, project cost calculation, and basic cultivation technology. One of the most fulfilling projects in which all these acquired technologies were utilized was the "The Third Country Training Program for Iraq" held in Jordan. Under the scenario to construct an irrigation facility by a WUA in the Karbala area in southwestern Baghdad and to form a vegetable cultivation centered farming system, we tried to form a project plan through continuous technical training for related engineers and local farmers gathered in Jordan. Local human resources were utilized as instructors in each specialized field, and I participated as a general coordinator. This was a remarkably interesting role. I supervised various lectures, searched for substitutes in the fields without instructors, and gave lectures by myself in the case of no substitutes being available. I also attended training and inspection tours. In the evening, we confirmed the work progress by each specialized group and made a local information collection list before returning home. When the training was resumed, I arranged the presentation of collected data and accompanied the training in Japan. At last, the project plan was completed. I will never forget the pleasure I experienced working with the excellent Iraqi trainees.

I am grateful to have been able to work with local farmers, extension workers, officials, and researchers in many countries. I would like to use my experience of human interaction in different projects in different countries for my future activities ... and the responsibility to guide the next generation in this fascinating activity still remains in my heart. (to be continued)

With the participants of
The Third Country Training Program for Iraq