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Field visit of the Biomass-Fuel Crop in Vietnam

In early 2024, the author had the opportunity to visit the demonstration fields and the seed processing facility for the biomass-fuel crop in Vietnam, where the Japan Agricultural Design Institute (JADI) was conducting field adoptation trials and seed multiplicatiom.

Based on the philosophy of contributing to the creation of sustainable and prosperous communities, JADI is engaged in developing technologies for biomass-fuel crops, primarily *Erianthus arundinaceu*s, as prospective crops for regional revitalization through the effective use of uncultivated land. They also develop crop varieties suited for the purpose of use and its cultivation environment, propagate and distribute seeds and seedlings, and provide technical guidance on their cultivation methods.

Demationof *Erianthus*

Erianthus is a perennial, high-yielding graminaceous crop native to the Middle East and India. It was developed as a promising cellulosic biomass-crop by the National Agriculture and Food Research Organization (NARO) in Japan, based on genetic resources collected in the 1980s by sugarcane breeders for crossbreeding purposes. Erianthus exhibited the ability to be cultivated efficiently in harsh environments where food production is difficult.

Its characteristics include: ① high dry matter production, ② high CO2 fixation capacity, ③ tolerance to adverse environments, ④ low labor requirements, and ⑤ low production costs. It was estimated that the annual dry matter production of Erianthus, and therefore its net carbon dioxide sequestration, significantly surpasses that of woody plants.

Many biomass-fuel crops are tropical plants, and most of them cannot survive the Japanese winter. However, this species, which is suitable for warmer climates, and Miscanthus (Miscanthus spp.), which includes Japanese silvergrass and reed grass suitable for colder climates, has been selected as domestically produced biomass-fuel crops. Compared to woody plants, they have a shorter growth period until harvest, can be fully utilized from the third year onwards, have an economic lifespan of nearly 20 years, are suitable for mechanical harvesting, allow for low-moisture harvesting through field drying, and have excellent storage and transportation properties.

In Japan, JADI has conducted demonstration and feasibility trials, such as utilizing Erianthus as a fiber source for animal feed at the request of a livestock farmer in Shimabara, Nagasaki Prefecture. Other potential uses include raw materials for biogas production, bedding material for livestock, mushroom cultivation media, and substitution of raw materials of plastic.

The demonstration and exhibition fields we visited in the central part of Vietnam was a 1.0 hectare plot where 4,000 plants were transplanted. The plants showed stable establishment, healthy growth, and vigorous development, with no signs of damages caused by pesst and diseases.

At the same time, we observed the preparation of seeds for the next planting season, which is part of the plan to expand the production fields. The seeds, which had been collected from field dried ears between November 2023 and January 2024, were being extracted by workers, and technical guidance was being provided on this seed preparation process.

Instructing seed extraction and processing

This field visit provided us with many insights into the potential for applying the knowledge accumulated in Japan regarding these biomass-fuel plants. It implied the effective utilization of land unsuitable for food crop cultivation in this region, as well as their potential use as energy resources.

(July 2024, Niide)

The Impact of Social Approaches on Agricultural Technology Dissemination <Part 4>

Effects on Securing Cultivation Funds and Maintaining Motivation

The Northern Uganda Farmers' Livelihood Improvement Project (NUFLIP), in which AAI was involved from 2015 to 2021, focused on two core pillars: Market-Oriented Agriculture (MOA) and Quality of Life (QOL) Improvement. This series highlights how the social approach, Improvement of Quality of Life, affected the adoption and dissemination of MOA technologies.

Securing Cultivation Funds

Market-oriented vegetable production requires certain financial inputs such as seeds, fertilizers, and pesticides. Therefore, securing funds for these inputs from the sales of the previous season is essential to continue market-oriented vegetable cultivation. However, local farmers originally had little concept of "investing money in agriculture." Many farmers used all their income to purchase daily necessities or livestock at the beginning. Even some farmers who kept money for seeds tended to postpone buying fertilizers and pesticides, saying, "We'll buy them later."

In vegetable cultivation, however, the timing of fertilizer application and pest and disease control is crucial. Once the need arises, it is already too late to prepare the funds. Changing this mindset took considerable effort.

The training on household cash management, conducted under the QOL component, was very effective in addressing this issue. This training was originally designed to help families identify their expenses and use income from vegetable production wisely for their household needs. By including "necessary costs for vegetable production" in the list of expected expenditures, the training also contributed greatly to the sustainability of vegetable cultivation practices.

A scene from household financial management training.

Maintaining Motivation

For local farmers, market-oriented vegetable cultivation promoted by NUFLIP was very different from their traditional food crop production such as maize or sesame. It required intensive management, higher risk, and greater financial investment. Although the project was designed to keep these within acceptable limits for smallholder farmers, it still required a major shift in mindset for those used to traditional crops. Therefore, maintaining motivation—to learn new techniques, manage fields intensively, and continue vegetable production after the project ended—was key to ensuring that the introduced technologies would take root.

The family goal setting training under the QOL component played an important role in enhancing and sustaining motivation. Participants were asked to draw their family's "dreams for the next five and ten years." Under the theme "How will you use the income from vegetable production?" families discussed and drew their dreams together, then presented them to the group.

In the local culture men traditionally decided how to use household income, but many lacked a clear understanding of expenses, leading to poor planning and little saving for the future. The training aimed to let family members, both men and women, have an opportunity to discuss how to use vegetable income more effectively for their happiness. Rather than changing traditional gender roles, it encouraged families to make decisions and plan together.

The training also helped raise motivation for vegetable cultivation by allowing families to share and visualize their dreams. It was held shortly before sowing, when expectations were high. By picturing a better future together, participants became more enthusiastic and cooperative in their work. The impact lasted for years. When the project visited them later, many proudly said, "Just as we drew back then, we built a house with vegetable income!" Some even still displayed those drawings on their home walls as a reminder of their shared dream.

A scene from "Family Goal Setting" training, where family members discuss and draw their dreams together.

Our Concept of Resource Management and Its Technical Development (Part 1)

Introduction

In human history, agriculture—together with pastoralism—is considered a livelihood system that began roughly ten thousand years ago in the Middle East. These sequential developments are often called the *Food Production Revolution*, which made stable food supplies possible, led to population growth, and accelerated the transition to sedentary life. The evolution of agriculture became the foundation for the formation of cities and complex social structures, accompanied by irrigation technology, the invention of farming tools, and crop improvement. Such advances promoted technological progress and increased productivity. Moreover, the development of agriculture in different regions generated cultural diversity and gave rise to various agricultural civilizations. On the other hand, it is also widely known that the expansion of agriculture has had negative impacts: climate change due to deforestation and ecosystem destruction, land degradation and soil erosion, depletion and pollution of water resources, and the loss of biodiversity.

Focusing instead on the period *before* the Food Production Revolution, we find a long era dominated by hunter-gatherer livelihoods. This stage is characterized by a highly mobile lifestyle, diverse utilization and dependence on local natural resources, small-scale and communitarian social structures, and cultural and spiritual development rooted in deep connections with nature. However, although hunter gatherer societies are often considered to exert low environmental pressure due to their low population density, it is possible that overexploitation of local resources sometimes caused ecological changes.

Comparing the periods before and after the Food Production Revolution, the shift from hunter -gathering to agriculture and pastoralism fundamentally transformed how humans produced food, while also bringing changes in settlement patterns and social structures. At the same time, this shift altered the degree and intensity of land use, resulting in different forms of environmental degradation or modification.

Nevertheless, despite differences in the degree of human-induced environmental change, we can identify a common issue throughout the history of human interaction with the environment. Te central idea is likely the perspective of “resource management”—with sustainability at its core.

Having taken a brief overview of humanity’s historical trajectory, let us shift to contemporary agriculture and pastoralism.

In this new AAI News series, we wish to revisit the keywords “resource management.” Our aim is to highlight the specific and practical efforts that AAI staff have encountered while carrying out livelihood-improvement activities for farmers in developing countries and in Japan’s agricultural and rural contexts.

The cases we plan to introduce are expected to cover technical topics such as organic fertilizers, weed management, pest and disease control, and no-tillage cultivation. Furthermore, for each case, we will not merely describe what happened but will also address key points in the technology development process, technical innovations that contribute to sustainability in the field, and prospects for the future. This corresponds to the second keyword of this series: “technical development”—viewed through a lens oriented toward the future of humankind.

By placing these keywords side by side—resource management and technical development—we hope to launch this relay-style series written by AAI staff members.

In past AAI News issues, between 2005 and 2006, we published a series titled “Changes in Syrian Pastoral Societies and Resource Management, ” which examined pastoral livelihoods, environmental use, resource management practices, and future perspectives. In this new series as well, we hope to create a space for multifaceted discussion on “resource management” and “technical development.” Through the fundamental work of examining various technical cases, we aim to reaffirm what the future form of “technical development” related to “resource management” should be. If this series can convey the intellectual excitement involved in shaping technologies for agriculture and the environment, we would be delighted.

Farm visiting reports <Part 7>

Future of Local Communities ~Reflections from Manazuru~

After visiting Tanokura Farm, which we introduced in the previous issue (AAI News No. 125), we continued our tour in Manazuru, guided by our colleague.

Small Town Attracting Newcomers

Manazuru is the second smallest town in Kanagawa Prefecture by area, located on a peninsula. Under Japan's Depopulation Countermeasures Act, it is the only area in the prefecture designated as "depopulated." Despite its small size, the town has recently experienced an increase of residents—particularly younger generations—who are drawn to Manazuru and choose to settle there. What is it about this town that attracts people?

People Creating New Momentum

At Manazuru Olive Garden, which we visited, the owners have been converting abandoned mandarin orchards—left unmanaged due to the aging of the growers—into olive groves since 2019. With the concept of creating a "third place of comfort," Mr. and Mrs. Yamahira have been developing spaces for community interaction within the garden. The olive leaves they cultivate are also processed into products such as tea and confectionery. They are working hard to establish olives as a new crop and integrate them into the local agricultural landscape.

Our second stop was Mr. Yamashita, who renovated vacant houses and launched Rockin' Village in 2019, a facility where visitors can experience local community life. Over the years, he has been involved in projects across Japan addressing population decline, including attracting corporate satellite offices and promoting the relocation of urban residents to rural areas. Currently in Manazuru, he is actively working to address local challenges by creating spaces for interaction between "outsiders" and local residents through his accommodation, coworking, and dining facilities.

Our last stop, Kusayanagi Liquor Store, has been a family-run business deeply rooted in the local community for generations. The fourth-generation owner, Mr. Kusayanagi, who is full of love for Manazuru, has organized a variety of events, including "kaku-uchi" (standing bar) hours in the store, street food tours along the main shopping street, and local music festivals. His unique personality, deep knowledge of the town, and warm hospitality toward visitors has earned him many fans of Manazuru.

"Standards of Beauty"

Visiting Manazuru, we felt greeted by the beautiful landscapes of cultivated orchards and the nostalgic scenery of a traditional port town, which conveyed the warmth of the community. After the visit, we learned that Manazuru has a scenic ordinance called the "Standards of Beauty," which helped prevent uncontrolled resort condominium developments during Japan's economic bubble in the late 1980s and early 1990s.

The Standards of Beauty was established in 1993 as part of the town planning regulations. It set out eight criteria and a design code for town planning and architecture development. Instead of using numerical standards and limitations, the ordinance presents 69 keywords; such as "mixed households," "shops as schools," and "small gatherings of people" to describe the local culture and character that should be preserved.

The Future of Local Communities

For many regions, aging populations and declining numbers of residents are major challenges, and local governments are stepping up their efforts to attract newcomers.

In Manazuru, the town has faced challenges such as resort development and the resulting depletion of water resources. These experiences prompted residents to reassess local assets and define standards of living that reflect their community identity. Thirty years after the establishment of the Standards of Beauty, the preserved natural environment, everyday landscapes, and local communities have become key attractions, drawing people who value these qualities and wish to engage with the town.

The new perspectives and involvement of "outsiders" can blend effectively with the unique character of the local community, creating fresh momentum for change. For this to succeed, however, mutual communication and the presence of intermediary actors are essential. During our visit, we could sense that such initiatives are already taking root in Manazuru, gradually forming a growing wave of community revitalization.