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JIRCAS Newsletter for INTERNATIONAL COLLABORATION

High-level dialogue entitled “How can we achieve a water and food secure future?” at the 7th World Water Forum in South Korea

In This Issue

JIRCAS
JAPAN INTERNATIONAL RESEARCH CENTER FOR AGRICULTURAL SCIENCES

Productive Discussions on Contentious Water-Related Issues

Last year, China proposed to establish a new international lending institution that will exclusively lend money for the construction of large-scale infrastructure projects in Asia. The proposed institution was tentatively named the Asian Infrastructure Investment Bank (AIIB). Many countries expressed their willingness to participate as founding members, and the high expectations for this new lending institution remind us of the fact that there still exists a huge need for large-scale infrastructure in the region. Anybody who has ever been to developing countries, regardless if they visited urban areas or rural areas, could understand those countries' acute need for new and modern infrastructure in many sectors, particularly, transportation, energy, education, agriculture, and so forth.

As for the agricultural sector, investing in irrigation is the most powerful way to improve agricultural productivity. However, planning and construction of large scale irrigation facilities, including dams, reservoirs, intake facilities, and conveyance canals/pipelines, require huge financial resources. Water resource allocation among sectors (household, irrigation, power generation, industrial, and so forth) is a highly contentious topic not only in developing countries in arid/semi-arid areas but also in developed countries. In such cases, international society groups expect the United Nations to provide an international forum or international organization for that purpose. But, as of now, no such forum or organization has been facilitated by the UN.

This issue of JIRCAS Newsletter highlights the World Water Forum (WWF), an international water-related event financed and managed by the World Water Council, a nonprofit think tank based in Marseille, France. The WWF has provided a solid platform for international discussions regarding water, and has been enjoying considerable worldwide media coverage in recent years.

Last April, JIRCAS President Masa Iwanaga and several staff members attended the 7th World Water Forum in Korea to present JIRCAS's research results and exchange views with participants from all over the world. As many readers have known well, JIRCAS's mission is to implement agricultural researches in developing areas overseas. To facilitate fruitful and productive discussions on water-related issues, discussions should be backed by solid data and reliable scientific insights, including technically and economically feasible options. It would be our great pleasure if this issue provides our readers hints about JIRCAS's contribution to discussions related to the wise and sustainable use of water.

Nobuyoshi Fujiwara
Director
Rural Development Division

International Movement on Water at the 7th World Water Forum

The World Water Forum is the largest water-related international conference in the world. People involved in water assemble in one place once every three years to mount exhibits and discuss solutions to global water problems. The 7th World Water Forum (WWF7), themed "Water for Our Future," was held from 12 to 17 April 2015 in Daegu City and Gyeongbuk Province including Gyeongju City in Korea, taking place 12 years after the last forum in East Asia (WWF3), held in Kyoto, Shiga, and Osaka in Japan. WWF7 was co-organized by the World Water Council (WWC), which was established in Marseille in France, and the host country of Korea (led by the Ministry of Land Infrastructure and Transport, the Ministry of Foreign Affairs, and the local governments of Daegu City and Gyeongbuk Province). It was managed by the WWF7 International Steering Committee composed of representatives from the WWC and the Korean National Committee.

Over the course of the week-long Forum, 10 leaders at the level of heads of state and government, 80 ministers of state from 75 nations, and 71 parliamentarians and 32 mayors from 27 countries came to participate. A total of 46,382 visitors from 168 countries attended the sessions and exhibitions in Daegu and Gyeongju. The participants joined the dialogues and debates through more than 400 program events, making this the most successful Forum so far. Major political agreements were made, and the effects of the Forum will continue to ripple through the international community, thanks notably to the Implementation Roadmaps, which will be delivered over the next three years, paving the way to the 8th World Water Forum in Brazil (2018).

The World Water Forum has the advantage of holding not only sessions in the 'thematic process,' where multi-stakeholders discuss and reach a conclusion on cross-cutting issues for each theme (16 themes in the case of WWF7), but also a ministerial meeting in the 'political process,' where politicians and officials in countries concerned participate and put their visions together during high level discussions. The ministerial declaration has no binding force but is expected to wield influence over each country's policy as well as its course of action following the discussions in international societies such as the United Nations System of Organizations. The Forum also features the 'regional process,' where people discuss region-specific issues, and the 'science and technology process,' where people summarize S&T-related issues. Furthermore, it provides a powerful platform for disseminating information by means of exhibitions in pavilions set up individually by participating countries, international organizations, and private companies.

On the first day, the opening and welcome ceremonies were held. The day began with welcome speeches by South Korean President Park Geun Hye, Daegu Mayor Kwon Young-jin, and Gyeongbuk Governor Kim Kwan-yong. Five heads of states also gave speeches in behalf of the distinguished guests and participants. The speeches were followed by a ceremony awarding the King Hassan II Great World Water Prize. More than 100 media people from all over the world converged into the press conference room after the ceremony.

Set under the United Nations' framework in 2000, the Millennium Development Goals (MDGs) refer to globally shared targets for international development such as the eradication of poverty and hunger. However, it has reached its target year (2015), hence a new proposal, the Sustainable Development Goals (SDGs), shall be forwarded to take over the MDGs and overcome these global issues. The WWF7's slogan, "Water for Our Future," appropriately emphasized the word 'future' so that people are made conscious of the expected SDGs amid threats of global climate change and rapid population explosion, and as countries enter a more critical phase in water-related problems that come with economic development. Incorporating the outcome of WWF7 into the agenda of the United Nations General Assembly to be held in New York in September this year will contribute greatly in the formulation of targets for the SDG framework on water and its adoption. The general assembly is also a timely venue for discussing and showing the Implementation Roadmaps.

After that, the 21st Session of the Conference of the Parties (COP21) to the United Nations Framework Convention on Climate Change (UNFCCC) will be held in Paris in December 2015 to make a framework agreement for countermeasures against climate change and global warming (after 2020). The Implementation Roadmap on water developed in WWF7 is also intended to contribute to the water sector discussion in COP21. Indeed, this year's holding of the WWF7 proved timely and significant because 2015 is an important year for charting the course of these

international movements toward better water management in the future.

On the second day, the Ministerial Meeting was held in Gyeongju and the three-page long Ministerial Declaration was developed. In the declaration, the ministers recognized that sustainable management of water resources is a collective responsibility of all stakeholders that has to be implemented now. They showed political will, expressing that the commitments must be translated into national policies, plans, and actions and that their joint efforts must be intensified to advance water-related cooperation at a global scale.

Other highlights of the declaration include the following: The ministers promised to support the inclusion of one dedicated water goal in SDGs and noted the importance of Integrated Water Resources Management (IWRM) and its balanced relation with food and energy; they reaffirmed their commitment to the human right to safe drinking water and sanitation and to the successful outcome at COP21; they recognized the transboundary water cooperation to enhance resilience and preparedness towards water-related disasters at national, regional, and international levels; and they highlighted the partnership between public and private sectors in Green Growth and stressed the importance of convergence of information and communications technologies (ICT) on smart water management and planning. Moreover, it must be mentioned especially that "appropriate investments are needed for the modernization of irrigation schemes to increase food security, rural prosperity and poverty eradication" and that "enhancing understanding of the values and benefits as well as appropriate investments are necessary to secure and develop multiple functionality of agricultural water because of its importance for preservation of biodiversity and natural environment," were clearly written in the "Daegu-Gyeongbuk Recommendations to the Ministers at the 7th World Water Forum," which the Ministerial Declaration took into consideration and viewed as appropriate.

On the same day, Japanese, Korean, and Chinese ministers in charge of water policy released a joint statement under the theme "Collaborative Actions for Innovation of Water Policy." It was also presented as a topic under 'food sector' at a workshop sponsored by the International Network for Water and Ecosystem in Paddy Fields (INWEPF), which consist of 17 countries in Monsoon Asia and 8 international organizations. A summary of the panel discussion, titled "A message from INWEPF to WWF7," was delivered to wrap up the meeting.

On the third day, a special session was sponsored by the High-level Experts and Leaders Panel on Water and Disasters (HELP) chaired by Mr. Han Seung-Soo, ex-prime minister of Korea and special envoy for Disaster Risk Reduction and Water. A special issue of Water Policy Journal on Water and Disasters was also published. His Imperial Highness Crown Prince Naruhito of Japan, meanwhile, presented a video message in the special session. At the food sector session, JIRCAS President Masa Iwanaga served as a panelist during the "High Level Panel on Water for Food Security" discussion, which was jointly sponsored by FAO and WWC.

Over the next three days, six more 'food sector' sessions, including a wrap-up session on Day 6, were held under Theme 2.1: "Water for Food" in the thematic process. JIRCAS sponsored a side event under the theme "Communal Water Management for Coherence and Resilience," with Dr. Saeed Nairizi, president of the International Commission on Irrigation and Drainage (ICID), presenting the concept behind the World Water System Heritage program.

As can be expected, international movements on water such as WWF7 elicit cooperation and a constructive attitude from conventional participants like state governments, academics, and international NGOs as well as new actors including private companies. A more refreshing development, however, and something that attracted wide attention, was the increased presence of local NPOs, academics/engineers/citizens' groups from fields outside the water sector as well as new participants from developing countries in Asia, Africa, and Latin America. Accordingly, the discussion also expanded and included relevant topics such as water rights, sanitation, prevention of water disasters (more promoted by the Japanese government after the 2011 Great East Japan Earthquake), water quality control and reuse of wastewater, transboundary water management, water and culture/education, city development and water, green growth/industry and water, water-food-energy nexus, water valuing, IWRM, and water governance/investment/financing.

Kazumi Yamaoka
Rural Development Division / Research Strategy Office

JIRCAS Activities at the 7th World Water Forum

Water is becoming an international issue as manifested by tight water supplies, the deterioration of water quality, adverse effects of climate change, and so on. To help find solutions to water-related issues, the World Water Council (WWC) created and organized the World Water Forum, an international conference held once every three years. This year, the 7th World Water Forum took place in the cities of Gyeongju and Daegu in South Korea on April 12-17, with 46,382 people from 168 countries in attendance.

JIRCAS participated at the 6th World Water Forum in Marseille City, France and also in this year's convention in Korea. In the 7th Forum, conferences and sessions covering four processes (Thematic, Political, Regional, and Science & Technology) were held, in addition to Expo and Side events. JIRCAS participated in the Thematic Process and the Japan Pavilion in the Expo and Side events. Panel posters were displayed and the research results were explained to the visitors at the exhibition booth.

1. Exhibition at the Expo event

Under the theme of "Water for Food," JIRCAS researchers exhibited a desalination machine at JIRCAS's booth and explained their research activities regarding irrigation and water resources development in Lao PDR, Marshall Islands, Niger, and Ghana to 949 visitors using slide shows and leaflets. The visitors consisted not only researchers and government staffs from various countries but also ordinary citizens and students (from elementary to university level) of Daegu City. Most especially, Mr. Kourou Bessho, the Japanese ambassador to Korea, came by to visit. A TV crew also covered the JIRCAS booth. All in all, the exhibition was completed successfully.

2. Participation at the High Level Panel Discussion at the Thematic Process

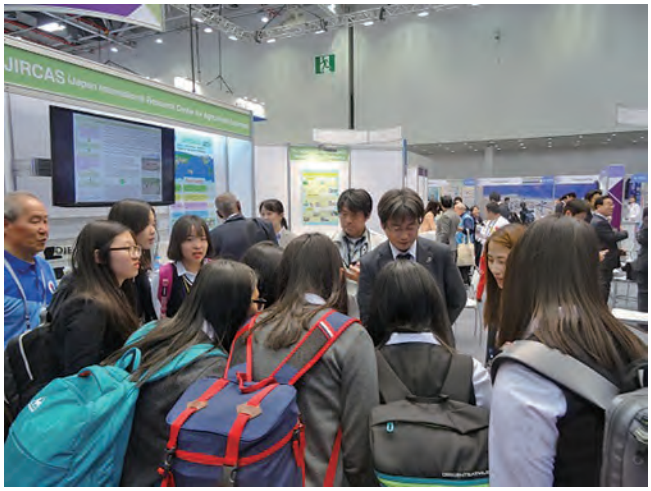
Dr. Masa Iwanaga, president of JIRCAS, participated at the High Level Panel Discussion under the title of "How can we achieve a water and food secure future." The discussion was led by FAO in coordination with WWC on April 14.

3. Participation in side events

Dr. Iwanaga delivered a presentation and participated as panelist at the side event under the title of "Water for food security and nutrition" organized by FAO on April 13. Also, seven researchers from JIRCAS made presentations regarding irrigation and water resources development in Lao PDR, Marshall Islands, Niger, and Ghana at a side event organized by JIRCAS. The contents of these presentations are described in this issue of the newsletter.

To sum up, the forum provided an opportunity for JIRCAS to inform a global audience of stakeholders about its activities, thus making its participation at the Thematic Process and Expo/Side events fruitful.

Hideki Furihata
Rural Development Division



The atmosphere at JIRCAS's exhibition booth

Efficient Use of Cyclic Water Resources in Niger

Global water consumption has rapidly increased to 1.5 times in the past 30 years. Solving water-related problems, therefore, has become the decisive challenge for achieving sustainable development in the 21st century. These issues were re-acknowledged at the 4th World Water Forum (Mexico 2006), and on the basis of such global discussions on water scarcity problems, JIRCAS carried out a 5-year research project (2007-2012).

Cyclic water resources in Niger

There is a huge amount of water (approx. 1,400 million km^3) on Earth, but only very little of it is fresh water (at 2.5% of the total), and those available for agriculture use (such as rivers and ponds) occupy less than 1% of the total.

Niger in the Sahara region of West Africa is a landlocked semiarid country with an annual precipitation of approximately 600mm. The rainy season only lasts for around 4 months while the rest of the year is dry. Moreover, annual precipitation fluctuates a lot, causing severe droughts to hit the country every 10 years or so. Consequently, it is very difficult to use cyclic water efficiently because many rivers are seasonal, which means they appear only for several days during rainy season.

Efficient use of cyclic water resources

Some possible measures to promote agriculture in areas with limited water resources would be to develop dams, install canals and establish groundwater pumping facilities. However, it requires large-scale financial investments, which are difficult to obtain in Niger. Even if new water resources are developed with international support, many difficult problems remain, such as issues on ownership of the land used for development and the coordination of benefits with stakeholders on the new water resources. Furthermore, there are cases where water resources cannot be used sustainably because of the occasional equipment and mechanical breakdown due to deterioration and lack of maintenance.

To address this issue, a JIRCAS research project on the adoption and expansion of small scale but dispersed support activities focusing on water resources development was initiated so that the natural ponds would be utilized effectively.

Importance of vegetable cultivation during dry season

It is not realistic for the government and farmers to constantly rely on food imports (except emergency food aid following a drought) to compensate for the lack of supply. Therefore, maximizing the use of natural ponds as a water resource is critical for cultivating vegetables and becomes the most effective starvation measure at the end of dry season when lack of food is the most serious problem. It is important, from the viewpoint of food mileage, that food is produced and consumed in the same region where natural ponds, however small, are scattered throughout. It is also important because it decreases reliance on imported food items, thus reducing the financial burden of many developing countries in West Africa.

For the above reason, JIRCAS implemented a research project promoting support activities that focused on vegetable cultivation during dry season using cyclic water.

Outcome and dissemination of JIRCAS research project

It is important to create an environment where farmers, who play major roles in food production, can continue to engage in farming so that vegetable cultivation utilizing cyclic water becomes established in rural areas, thus ensuring its sustainability. With the approval of the Ministry of Agriculture, JIRCAS consequently published a technical manual that includes illustrations that local agricultural extension workers can easily interpret. These series of JIRCAS activities have been highly valued by the Minister of Agriculture of Niger, and the corresponding outcomes are currently being disseminated.

Haruyuki Dan
JIRCAS Africa Liaison Office
Research Strategy Office

Photo 1. Manual for vegetable cultivation during dry season

Development of Low-Cost Water Facilities Applicable to Africa

Background of the study

In Africa, poverty and lack of food prevail owing to the delay in economic development and high rate of population growth. In Sub-Saharan Africa, particularly, the amount of rice imports from Asia and North America has been increasing each year because rice production in these countries has not been able to meet the increasing domestic consumption (Fig. 1).

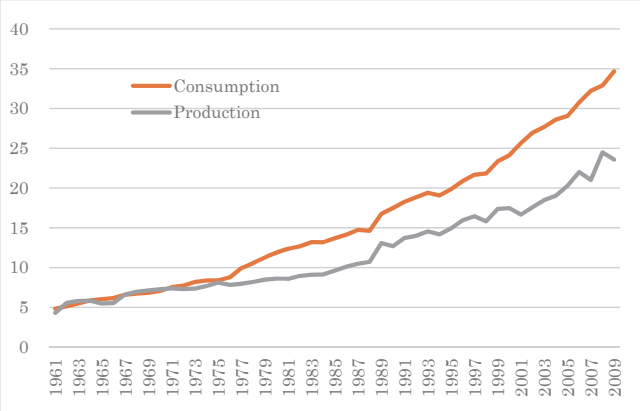


Fig. 1. Production and consumption of rice in Africa (Source: FAOSTAT)

Based on this situation, the Japanese government announced the establishment of the Coalition for African Rice Development (CARD) at the Fourth Tokyo International Conference on African Development (TICAD IV). This effort aims to double rice production in Africa in ten years (JICA, 2008); therefore, it is essential to grow rice on these low lands efficiently and in a sustainable manner in order to realize the goal of CARD.

The present condition and problems of paddy field

Land preparation and water control activities (e.g., land leveling, levee construction, and irrigation) are necessary to improve yields in many rain-fed rice cultivation areas in Ghana. It is commonly seen, however, that strong rains, typical in the tropics, can cause the destruction of water intake facilities, drainage canals, and levees through running water and rainfall.

In order to examine the present conditions of the earth canals in Ghana, a field survey was conducted. The survey results showed that the functions of the earth canal are diminished through various processes as shown in Fig. 2.

The functions of the canal decline when the levee slopes collapse.

To prevent the diminishment of earth canal functions, the introduction of canals that require less maintenance is considered.

Development concept

The diminishment of earth canal functions occurs due to erosion caused by running water and rainfall. The proposed canals, which can reduce the labor required for maintenance, should be able to mitigate these factors to overcome the decline in function. Concrete canals are one

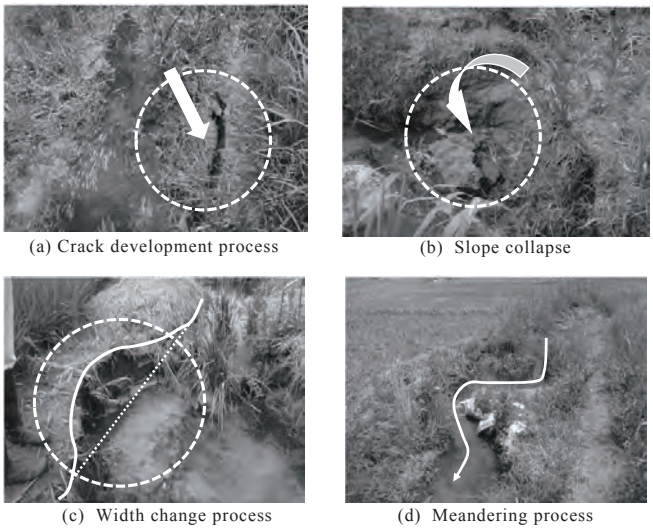


Fig. 2. Canal erosion processes

example. However, the cost required to build a concrete canal is high, and it would be difficult for farmers in developing countries to repair the canal (in terms of cost and technology) once the function declines. Therefore, it is necessary to develop a technology that has a low life-cycle cost, including facility installment and maintenance. Also, the farmers must be able to adopt this technology so they can easily construct and repair the facility.

In order to prevent erosion caused by running water, it is necessary to 1) make the structure robust in the presence of water flow, or 2) prevent water flow from contacting the structure.

To make the structure robust in the presence of water flow, the erosion resistance of the canal walls and levees are reinforced by making soil hardening materials from sea shell and plant ash (Fig. 3).

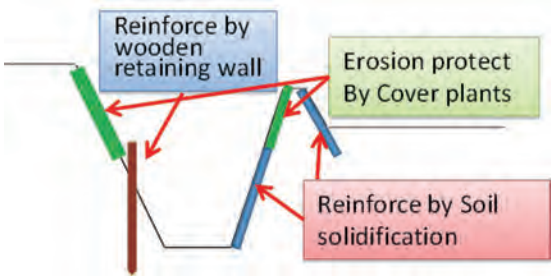


Fig. 3. Proposed countermeasure techniques

To prevent water flow from contacting the structure, the canal walls and levees are effectively protected using materials other than soil. As a measure against rain drop erosion, plants on site are grown to cover canal walls and levees. Similarly, wooden boards available on site for building wooden fences are repurposed as retaining walls to prevent water flow from directly striking canal walls.

Shinji Hirouchi
Rural Development Division

Calculation of Water Resources Stored in Small Reservoirs for Rice Cultivation in Northern Ghana

Background

In Sub-Saharan Africa, rice production falls short of consumption. As a result, the region's imports of rice from Asia or North America have been increasing year by year. However, even in Africa's inland wetlands, which hold big potential for rice cultivation, the average rice yield is only 2 t/ha as farmers usually rely only on rainwater for their crops. In such a situation, introducing some irrigation facilities is necessary to improve water supply stability.

In Northern Ghana, water from a small reservoir, called a dugout, is used primarily for domestic purposes. In this present work, the potential of using the storage water in dugouts for irrigation was studied.

What is a "dugout"?

The Ghanaian term "dugout" refers to a small pond (diameter about 100-150m) without intake facilities. Commonly found in Sub-Saharan countries, it is constructed by digging the ground and piling up the excavated soil downstream for embankment. The height of the embankment is around 2 to 3 meters and is constructed in a semicircle around the dugout. Dugouts were said to have been installed to ensure the availability of domestic water during the 1970s to 80s. According to the Ministry of Food and Agriculture (MoFA) in Ghana, 2600 dugouts had been developed in Northern Ghana. Dugout water is used year-round for domestic/household purposes and livestock production as well as for small-scale vegetable cultivation in dry season; however, it is not used for rice cultivation even in rainy season.

Possibility of supplemental irrigation using a "dugout"

In this study, the water storage change of a dugout in Northern Ghana has been estimated using the water balance equation, which analyzes how the water volume changes by rainfall and usage. There are two inflow elements and four outflow elements of water balance. Inflow is composed of rainfall and runoff on the lake surface whereas outflow is composed of evaporation, water uses, leakages, and dead outflow. For the inflow, runoff is calculated by the curve number method (USDA-SCS, 1972) while rainfall on the lake surface is calculated by area and daily precipitation. A 10-year recurrence value for the minimum rainfall was applied for this trial calculation. For the outflow, evaporation is calculated by the modified Penman method; domestic and livestock watering is calculated by counting the number of users and cattle; leakage is estimated by water level change during dry spell; and dead outflow is counted as the excess water at full capacity.

As a result, it was found that the dugout is filled with water during rainy season from August to October and that more than half of the flowing water overflows the dugout embankments and become unutilized (i.e., dead outflow). Nevertheless, even if the dead outflow is utilized for agriculture, it does not influence the current volume of water use and livestock drinking water. Thus, there is every possibility that dugout water can be used as supplemental irrigation water for rice cultivation.

※ This project is subsidized by the Ministry of Agriculture, Forestry and Fisheries (MAFF), Japan.

Chikako Hirose
Rural Development Division

Photo 1. Harvesting water for domestic use

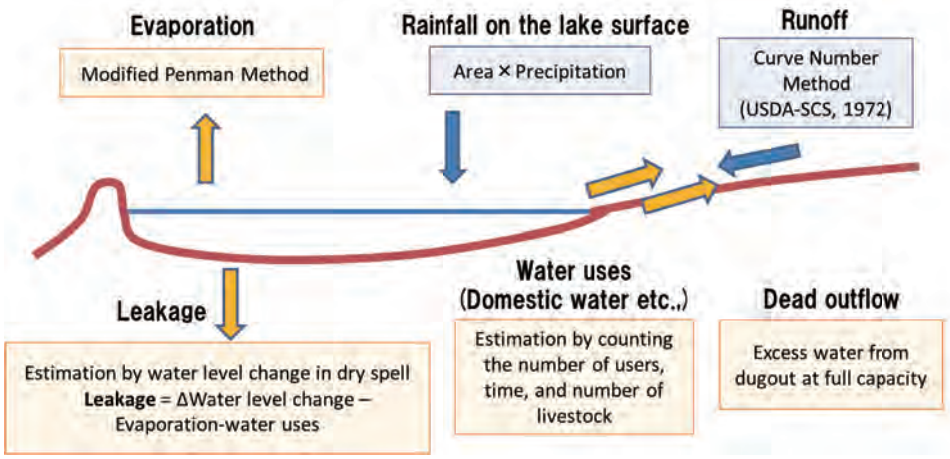


Fig. 1. Components of water balance in the dugout

Improvement of Rice Production and Intensive Use of Lowland Fields in Lao PDR

I attended the 7th World Water Forum and made a presentation on the research activities of the JIRCAS project, titled "Establishment of a Sustainable and Independent Farm Household Economy in the Rural Areas of Indo-China," currently being implemented in Lao People's Democratic Republic (hereinafter referred to as "Laos"). The following is a summary of that presentation.

1. Lowland farming in Laos

Laos is a landlocked country located at the center of Indochina peninsula in Southeast Asia. The annual precipitation of Laos, a small country roughly 63% of Japan in terms of land area, varies by province, ranging from 1,300 to 3,300 mm. There is a distinct rainy season (May to October) and dry season (November and April), with 90% of annual rainfall occurring during rainy season.

Rice is the major agricultural product in Laos, 70% of which is produced in lowland fields in rainy season. However, there are differences in the productivity of rainy-season rice among fields. In dry season, rice is planted in lowland fields equipped with irrigation facilities; however, most of the rainfed lowlands are used mainly as pasture lands for livestock.

2. Research activities and results

i) Outline of study site

We conducted a field survey on improving the productivity in lowlands at a semi-mountainous village 90 km northwest of Vientiane Capital, Laos. In this village, the lowland is used only for rainy-season rice production. Irrigation canals have been developed only from the reservoirs to the upper part of the lowland, with water subsequently distributed plot-to-plot from the upper to the lower part of the lowland.

ii) Factors affecting yield reduction of rainy-season rice

In order to understand the situation of rainy-season rice production, a survey on water distribution, time of transplanting, and rice yield was done in each field. Field ponding was started from the upper and middle parts of the lowland area and transplanting was completed in most of the ponded fields by the middle of July. On the other hand, in the lower fields, transplanting was delayed due to lack of water, and it was completed in the middle of August. After transplanting, there were no serious drought stresses with the crop until harvest time.

Average rice grain yield in the survey area was 3.5 tons per hectare, and low yield was observed in the lower parts of the area where transplanting was delayed. This result indicated that preparatory irrigation is necessary from the end of June to the beginning of July to accelerate early transplanting and improve rice yield.

iii) Potential of dry-season cropping

In order to evaluate the potential of dry-season cropping and the availability of remaining soil moisture, soybean, maize, mung bean, and upland rice were planted without irrigation. The results showed that only soybean survived until harvest; however, the yield was only 1/40 of the national average in Laos. Based on the soil moisture fluctuation and evapotranspiration data, almost 200 mm of water should be supplied into the field at 3-week intervals to produce soybean in dry season.

iv) Water resources in the village and its usage

We focused on the existing reservoirs in the village as water sources for preparatory irrigation in rainy-season rice and irrigation for dry-season cropping. The canal inlets were opened at the upper part of the reservoir dike but the water below the inlet was not used due to lack of facilities. If irrigation facilities such as pumps or siphons were available, the water can be used for preparatory irrigation in early rainy season and dry season. However, these reservoirs were originally built for private fish culture, which means that the fish culture water requirement limits the volume of water available for irrigation. We are currently designing an irrigation plan that can efficiently use limited water resources by optimizing multi-purpose water use (e.g., by coordinating irrigation and fish culture, among others).

Hiroshi Ikeura
Rural Development Division

Growing conditions of rice at the study area (30 Sept 2015).
Left photo: Transplanted in early July; heading
Right photo: Transplanted in early August; plant height was still less than 50 cm.

Sustainable Use of Water from Freshwater Lenses in Laura Island

The Pacific Islands are prone to droughts because of El Nino, and the effects of droughts manifest themselves strongly in atolls (ring-shaped coral reefs), where water sources are limited to rainwater and groundwater. Atolls are low, flat islands with an altitude of only a few meters. Underground freshwater floats on saltwater in the shape of a lens due to the difference in density between freshwater and saltwater. This floating body of groundwater is known as a freshwater lens.

Freshwater lenses play an important role in the stable supply of water resources in Laura Island. However, when freshwater is (over)pumped from a freshwater lens, saltwater rises from the bottom, forming a saltwater cone and introducing saltwater to well water. This phenomenon (called 'upconing') pumps groundwater into the surrounding shallow wells, allowing saltwater intrusion and making such water unsuitable for drinking and irrigation. The sustainable use of water from freshwater lenses is, therefore, an important issue in atolls.

The Republic of the Marshall Islands is an island country consisting of 29 atolls and five islands. In the capital Majuro (7°N, 171°E), the population (and consequently, the water demands) has been increasing. Laura Island, a low, flat island with an area of 1.8 km^2 and an altitude of several meters, is situated approximately 50 km west of a densely populated downtown area. A freshwater lens on Laura Island supplies water to the urban area via pipeline, and an increasing burden is apparently being imposed on the lens. Groundwater intake systems (each consisting of seven water intake facilities, one pumping station, and a pipeline) have been installed on top of the freshwater lens. Each water intake facility consists of a well, a pump, a shaft (such as a perforated polyvinyl chloride pipe installed horizontally to the well) buried below the surface of the groundwater, and other components.

To develop a method that allows the sustainable use of water from the freshwater lens at Laura Island, a numerical simulation was carried out using SEAWAT, a model developed by the US Geological Survey, to numerically simulate groundwater flow accompanied by saltwater intrusion. A calculation area was set according to a cross section of the central part of Laura Island. In the simulation, actual measured values and calculated values of the freshwater lens' shape before and after upconing, as well as the measured fresh water head from observation well (groundwater energy), were compared.

Intensive and excessive pumping from intake wells during droughts has resulted in upconing in the freshwater lens. The numerical simulation showed that if water was pumped from two intake wells instead of one, the depth of an upconing was reduced by half. In addition, the pressure gradient of the deformed part of the freshwater lens became rather leveled. It was observed that by adding an extra intake well, thereby reducing pumpage per well, the range of water pumping increases due to a change in water balance around the intake wells, thus allowing the intake from wider and shallower freshwater lens.

From literature review and numerical simulation, a method that enables sustainable extraction of groundwater from a freshwater lens in Laura Island was developed. The author devised a new groundwater intake system in which water intake intensity is reduced by pumping water from multiple intake wells (i.e., by distributed pumping). To evaluate the validity of the results of this numerical simulation, the movement of groundwater and the behavior of the freshwater lens must be observed and monitored following the implementation of this method.

Kazuhisa Koda
Rural Development Division

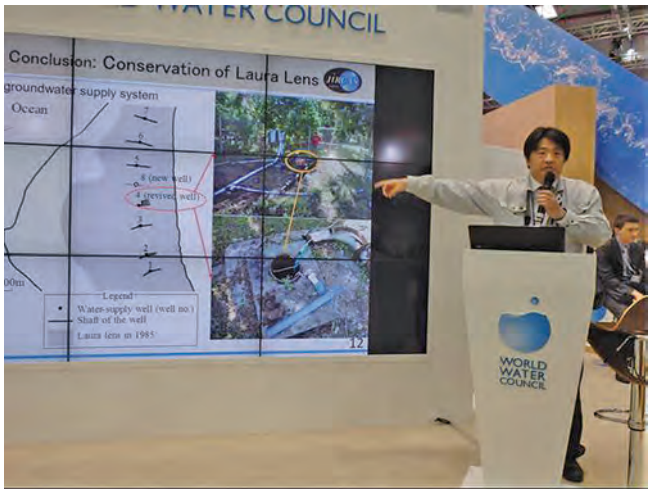


Photo 1. Presentation of results obtained by numerical simulation at the JIRCAS-organized side event at the World Water Forum

Photo 2. A presentation on the desalination system was delivered at JIRCAS's side event. (Details of the desalination system are provided on JIRCAS's website.)

JIRCAS TODAY

"Ingenuity Merit Award" from the Ministry of Education, Culture, Sports, Science and Technology (MEXT)

Two technical support staff of JIRCAS Tropical Agriculture Research Front (TARF) had been commended with the "2015 Ingenuity Merit Award" in the field of Science and Technology by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) for constructing an "improved flat-type net greenhouse that is inexpensive and has excellent workability." JIRCAS Vice President Osamu Koyama awarded the certificates in a simple ceremony at TARF on May 21, 2015.

The award is given to those who have achieved remarkable results that lead toward improvement in technology in the workplace, in the hopes of motivating workers to raise the level of science and technology capability in the country. The names of the fiscal year 2015 winners were announced on April 7, 2015.

JIRCAS Vice President Osamu Koyama (center) together with the winners, Mr. Masato Shimajiri (left) and Mr. Yasuteru Shikina (right)

Participation at the Ministry of Agriculture, Forestry and Fisheries (MAFF) Special Exhibit

On March 9-13, 2015, a special exhibit, themed "Connect to the Future: Tohoku's Blessings (Steps Toward Revitalization)," was held at the Consumers' Room of the Ministry of Agriculture, Forestry and Fisheries (MAFF) as part of the reconstruction efforts for the agriculture, forestry and fisheries sectors in the region.

MAFF Minister Yoshimasa Hayashi (left) talks with JIRCAS Senior Researcher Yuzo Manpuku (right).

JIRCAS Senior Researcher Yuzo Manpuku explains to his audience at the science café.

Mr. Yuzo Manpuku, senior researcher at JIRCAS, conducted a science café, an informal discussion about science, on March 12. The theme was "Toward agricultural recovery from radioactive contamination! [The reality and the future as seen by a worker of Iitate Village]." He talked openly about radioactive materials and explained the various activities relevant to agricultural land decontamination.

MAFF Minister Yoshimasa Hayashi visited the venue following the science café and listened to Mr. Manpuku's updates on farmland decontamination technologies and ongoing activities at Iitate Village.

Signing of agreement with Hokkaido University

On March 17, 2015, JIRCAS President Masa Iwanaga signed a collaboration and cooperation agreement with Dr. Tomomi Marutani, dean of the Research Faculty of Agriculture, Hokkaido University, for the purpose of "research and development and education." The signing ceremony took place at the JIRCAS International Conference Room.

Future plans include the creation of a comprehensive human resource development system, which will be implemented by increasing experience opportunities for students to conduct research at overseas study sites and by promoting personnel exchanges and joint research between the two organizations.

Dr. Masa Iwanaga, president of JIRCAS (left), and Dr. Tomomi Marutani, dean of the Research Faculty of Agriculture, Hokkaido University (right)

Lecture by the International Institute of Tropical Agriculture (IITA) Director General

On April 6, 2015, Dr. Nteranya Sanginga, director general of the International Institute of Tropical Agriculture (IITA), visited JIRCAS to deliver a lecture, titled "The Leading Research Partner in Africa - Repositioning IITA for Impact in Africa." Dr. Sanginga gave his presentation and had a round table discussion with senior officials of JIRCAS, including President Masa Iwanaga and Vice President Osamu Koyama, about the future of research cooperation.

IITA is one of the affiliated research institutes of the Consultative Group on International Agricultural Research (CGIAR). The institute has its headquarters in Nigeria and expands its coverage through its offices in central and southern Africa. It conducts research on the wet and semi-arid areas of Africa, with the aim of eradicating hunger and poverty in the region.

Dr. Nteranya Sanginga, director general of the International Institute of Tropical Agriculture (IITA)

JIRCAS recognizes the importance of IITA's research. Accordingly, JIRCAS's cooperative relationship with IITA remains strong after many years as evidenced by the ongoing joint research on yam and cowpea.

Round table discussion

Announcements and Upcoming Events

*2015 Japan International Award for Young Agricultural Researchers

The commendation ceremony of the 2015 Japan International Award for Young Agricultural Researchers will be held at the U Thant International Conference Hall, the United Nations University in Tokyo, Japan on October 20 (Tue), from 3:30-5:00 pm. Attendance is free of charge but registration is required (starts at 3:00 pm).

This annual award is organized and presented by the Ministry of Agriculture, Forestry and Fisheries (MAFF) of Japan. Three outstanding non-Japanese researchers from developing countries who are under age 40, affiliated with a non-Japanese research institute or university, and engaged in research and development in agriculture, forestry, fisheries and related industries in developing countries, will receive testimonials and cash prizes. They will also present their research achievements at the commendation ceremony. JIRCAS serves as award secretariat and handles the nomination process and the staging of the commendation ceremony.

Last year's winners together with members of the selection committee and other officials

Nominations for this year have closed on May 15. For the announcement of winners and details about the commendation ceremony (program, registration procedures, etc.), please check the JIRCAS website at http://www.jircas.affrc.go.jp/index.html around late September.

*2015 JIRCAS International Symposium

The 2015 JIRCAS International Symposium will be held at the U Thant International Conference Hall, the United Nations University in Tokyo, Japan on October 28 (Wed), from 9:30 am to 5:00 pm. Registration starts at 9:00 am. This year's theme is "Why 'Quality' Matters in International Agricultural Research."

Details of the 2015 JIRCAS International Symposium (program, registration procedures, etc.) will be posted at http://www.jircas.affrc.go.jp/index.html around September.

Speakers, moderators, and panelists at last year's symposium

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