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Title : Innovation, Implementation and Extension of the Water saving Integrated Smart Farming - AWDI technique in Thailand

By :

International Network for Water and Ecosystem in Paddy Fields,

THAILAND
Contents

Introduction

Describe the innovation

Describe how the innovation saves water

How is water saving achieved

Describe the scope for future expansion of the innovation

Role of individual nominee

Va-son Boonkird (Chair) INWEPF Thai Committee

Appendix 1: Photo Gallery
Introduction

Thailand is one of eleven founding countries of the International Commission on Irrigation and Drainage, (ICID) in 1950. Thailand later established the Thai National Committee on Irrigation and Drainage (THAICID) to ensure that ICID policy is implemented correctly. Coherently, the Director General of the Royal Irrigation Department (RID) serves as the chairman of THAICID overseeing this process. The members of THAICID are not only from the RID, but also from academies, entrepreneurs, and other government sectors concerned in irrigation or agricultural water management, cooperating to study and understand academic publications, to increase efficiency and ensure that best irrigation practice is understood and implemented.

In 2004, Japan and other countries including Thailand instigated the creation of a new body; International Network for Water and Ecosystem in Paddy Fields, (INWEPF). The broad goal of INWEPF is to increase rice yield in sustainable and ecologically sound manner. This organization also now falls under the purview of THAICID under the title of INWEPF Thai Committee.

Describe the Innovation

In August of 2012, INWEPF Thai Committee together with RID and Kasetsart University held the 3rd Thailand INWEPF Symposium seminar session. During the Symposium, the group called Weekend Farmers presented the best practice of Alternate Wet and Dry Irrigation (AWDI) technique. INWEPF Thai incorporated the Weekend Farmer AWDI with Smart Farming innovations to produce a new model of best practice merging practicalities in the real world, such as minimized labor intensity, with maximum water saving. It is the refined model of best practice presented here.

After the seminar an extensive series of experiments were carried out to establish the water-saving potential of the Weekend Farmer technique. Previously AWDI techniques called for four alternate wet and dry periods, but the method presented here was reduced to only two as illustrated in fig.1

The conclusions were demonstrated at the Experimental Station for Water Management and Cutting Edge Technology regulated in partnerships by Irrigation Development Institute (under RID), the private sector from Siam Kubota Corporation, and Pathumthani professional farmer Mr. Tawee Kumraksa.
The experiments showed that the Weekend Farmer AWDI technique demonstrated water saving of 20-33%.

**Describe how the innovation saves water**

Conventional AWDI technique used many periods of alternating wet and dry which is complicated and labor intensive. The Weekend Farmers technique cut the alternating periods down to two dry periods which is significantly easier to implement.

Under this adapted method rice is submerged to a depth of 5cm above ground level until the pollinated plant starts to bloom, then water depth is increased to 7-10cm above the ground. The next stage takes place when the plant is 35-45 days old; at this time the cultivation area is not irrigated for a period of 14 days. This period is referred to as the first dry period and the water level in the paddy field would be expected to drop to 10-15cm below ground level. Then the ground gets dry and cracks appear at the surface. After the first dry period the area is irrigated again until water level reaches 7-10 cm. above the ground. This wet period continues until the rice plant is 60-65 days old. Then begin the 14 days of the second dry period following the same procedure as the first dry period. After the second dry period the field is once again irrigated to 7-10cm above-ground and this level is maintained until harvest; approx. another 40 days. During the two dry periods the plant will become stressed and struggle for survival, stimulating and therefore strengthening and fundamentally changing both the root structure and the above-ground parts of the plant leading to increased yields whilst at the same time saving a significant amount of irrigation water.

The Integrated Smart Farming - AWDI technique is an evolvement to meet the challenges of the modern world; increasing demand, water scarcity, and the negative effects of chemical fertilizers. The Integrated Smart Farming - AWDI technique reduces irrigation water use by one-third and cuts the need for chemical fertilizers by 70-100%. Overall this method can cut the cultivation budget by half whilst increasing yield. Usually a yield of 5000 kg per hectare would be expected, but under this technique this number grew by 25% to 6250kg. This innovative water management technique is easily shared with and implemented by members of the farming community. INWEPF Thai has produced and distributed this knowledge as illustrated in fig 1 & 2.
Figure 1: The Integrated Smart Farming - AWDI technique

Figure 2: Benefits of the Integrated Smart Farming - AWDI technique
Describe how the innovation was introduced and spread

Following the results of the INWEPF commissioned study, the following activities were undertaken to introduce and spread the benefits of the Integrated Smart Farming – AWDI to the wider community;

1. Disseminate the knowledge of the Integrated Smart Farming – AWDI technique through training and seminars. To date this technique is trained in the course for the Project Directors to be and more than 700 persons have been trained and work in their communities to introduce and extend the knowledge to the farmers directly.

2. Panel discussion about “Water Saving Cultivations” in RID 111th Anniversary Event. This high profile event included guest speakers from the Weekend Farmers Society. The discussion generated a significant interest from farmers from several provinces in Thailand.
3. Outreach educational field trips. The Integrated Smart Farming - AWDI technique has been taken into communities throughout Thailand. So far more than 400 people have attended these forums. Participants have included Regional Farmers’ Council Presidents, who, upon recognizing the potential of this innovative water management technique to ensure the viability of current irrigation infrastructure, have since actively supported its implementation.

4. International knowledge sharing. INWEPF Thai hosted the 10th INWEPF Steering Meeting and Symposium event in November 2013 in which the delegates from all the INWEPF member countries attended. Technical papers related to this technique were presented to the participants. The participants also visited the demonstration rice field currently using the Integrated Smart Farming – AWDI technique at Mae Kuang Udom Thara Dam Operation and Maintenance Project, Chiang Mai province. Separately African countries officials attended a cooperation seminar organized with African Countries under the South to South Cooperation (SSC) of INWEPF Thai in March 2014 at the demonstration paddy field in Khlong Wang Bon reservoir project, Nakhon Nayok province.
5. Pilot projects extension. Farmers and related agencies in provincial areas have extended research into actual practice in four provinces including Chiang Mai and Ubon Ratchathani. Local farmers have used the Integrated Smart Farming - AWDI technique in the areas cumulatively covering 1,120 hectares. It is a very interesting case study with the following results;

Under the Integrated Smart Farming - AWDI technique:

- 23% less water required.
- 67% less initial seed required
- 38% less fertilizer required
- 50% less pesticide application time
- 19% yield increase
- Half cultivation budget
6. Due to Thailand’s severe drought crisis in 2015, implementation of the Integrated Smart Farming - AWDI technique was fast-tracked in the Reang Rang Operation and Maintenance Project, Saraburi Province, where it was known as the “Joining Hands for Drought Survival Program”. The program included more than 14,000 households in five water scarcity districts cumulatively covering approximately 14,400 hectares of paddy fields. This program was directly responsible for preventing serious drought damage that might have been devastated communities for years to come. In fact under the program paddy fields produced yields between 6,250-9,375kg/ha.

7. At the 12th INWEPF Steering Meeting and Symposium Conference held in Sri Lanka between 2-5 November 2015, INWEPF Thai presented the conclusive results from the extensive studies and implementations of the Integrated Smart Farming - AWDI technique. This presentation matched the theme of the symposium which was to share knowledge and experience in improving land and water productivity as well as protecting the related ecosystems.
International on stage presentation during the 12th INWEPF Steering Meeting and Symposium

8. The Integrated Smart Farming - AWDI technique has been included into the Course syllabus of the Thai Irrigation College, “Fundamentals of Irrigation” thus ensuring that future generations will continue to have benefit from this method.
9. Publicity and information on the technique has been disseminated through various media such as newspapers, journals and the INWEPF website.
Describe the scope for future expansion of the innovation

Thailand has an area of more than 51 million hectares with wet season paddy rice area covering more than 11.20 million hectares. The 1.6 million hectares of dry season paddy field which are fed by more than 12,500 million cubic meters of irrigation water will have the benefit from this technique.

Therefore, if the Integrated Smart Farming - AWDI technique is applied throughout the country we can expect an irrigated-water saving during the dry season by 33% or more than 4,100 million cubic meter. This would open the potential to extend the irrigated dry season paddy field area from 1.6 to 2.16 million hectares.

According to the United Nations Framework Convention on Climate Change “Conference of Parties No.21” to which 196 countries including Thailand are signatories, there is an international commitment of keeping global warming below a 2°C increase. Consequently Thailand has to achieve 20% Greenhouse Gas Emissions (GHGs) reduction by the year 2030. The Integrated Smart Farming - AWDI technique greatly reduces GHGs and can therefore provide major factor to Thailand in fulfilling its legal obligations. More important perhaps, this technique has proven itself to significantly contribute to making the world a healthier and more sustainable resource for future generations.