Rice Science FOR DECISION-MAKERS

VOL. 11 • SEPTEMBER 2022 • ISSN 2094-8409

POLICY IMPERATIVES TO INCREASE UPTAKE OF THE ALTERNATE WETTING AND DRYING TECHNOLOGY

INTRODUCTION

Managing water resources has become extremely important with respect to major climate woes. In the Philippines, occurrences of El Niño have been more frequent in recent years, making it even more difficult for rice farmers to secure the irrigation water they need.

Rice paddies swimming in water all throughout the 3-to-4-month cropping season are not uncommon. Agronomists have long lamented this practice as wasteful, let alone unnecessary.

The Alternate Wetting and Drying (AWD) technology manages water for use in the rice farm. It is done by putting observation wells in the rice field and ensuring that required water levels, which are indicated on the tube depending on the season of cropping, are met. AWD experiments

KEY POINTS

- The Alternate Wetting and Drying technology has been in existence for decades. Its use has been proven to result in significant water savings in various studies in many rice-producing countries.
- Despite its host of advantages, AWD uptake in the Philippines is unimpressive. Among the reasons are: it is laborious, lack of incentive to save water, and the difficulty of breaking the long-standing practice of leaving the rice paddies swimming in water.
- Among the proposed measures to optimize benefits from AWD are the use of participatory approaches in agricultural extension, review of some provisions of the Free Irrigation Service Act, and to improve irrigation water governance to modernize tool to practice AWD.

across rice-producing countries in Asia have shown that its use can result in up to 38% savings in water with no corresponding yield penalty (Lampayan et al., 2015). Additionally, use of AWD significantly reduces labor and fuel consumption (Palis et al., 2017). AWD was developed by the International Rice Research Institute, and PhilRice is a partner agency in technology promotion. DA-PhilRice has expanded this technology to mean water savings from land preparation to harvest as opposed to AWD from planting to harvest (Palis et al., 2017). AWD has a host of advantages. Among them are the following (Palis et al., 2017, pp. 305-306):

- More food available to farmers and community with the increase in yield, though this is not consistent across types of irrigation systems.
- Less fuel used and time spent in irrigation that opens up opportunity cost for other sources of income, and possible increase in net returns from rice farming.
- Increase in knowledge about AWD from experiential learning resulting in farmer adaptation.
- Local materials developed as tools for need-based irrigation.

This technology has been in existence for decades. In fact, two policy supports were issued to promote safe AWD in the national irrigation system. Hence, the question that merits discussion is: if the technology is good, how come its uptake is unimpressive? There are many possible responses to this question. From the literature, below are among the key reasons:

- **No incentive to save water.** Unlike in the pump irrigation system that directly reduces fuel for irrigation, water savings under a large public-managed gravity irrigation system may be less enticing among farmers who needed to pay only a minimal fee regardless of the volume of water used. The Free Irrigation Service Act aggravates this scenario.
- **Unreliable water supply in the canal due to imposed rotational irrigation scheduling in a gravity-type irrigation system.** Farmers are more likely to implement water-saving irrigation methods when the irrigation water supply is reliable and can be controlled separately for each field or farm (Pascual et al. 2022)

- **The technology is laborious.** Many farmers find AWD to be so difficult to practice. The technology, as described, requires one to put observation wells and observe them all throughout the cropping season. This complaint may have already been addressed, with some limitations, with the use of the AutoMon or automated monitoring system (Regalado et al., 2019), where farmers are spared from looking after the wells, and irrigation managers can remotely monitor the status of the field water level. Additionally, based on some assessments by PhilRice experts, farmers would have already gained some mastery of the technology after two seasons.

- **AWD is knowledge-intensive (Palis et al., 2017)**. The technology is accessible to end users in a less tangible form as opposed to physical products (e.g. seeds and machinery).

- **Seeing a paddy swimming in water is a long-standing practice that is difficult to break.**

- **Farmers are risk-averse.** The perception of farmers on AWD exacerbating weed problems deters them from practicing this technology (Pascual et al. 2022).

- **Limited control structures and poor maintenance of irrigation canals.** This has been a perennial issue. Over the years, proper coordination and strong leadership among irrigators' associations have been proposed as solutions. Incentivizing the associations may also address this issue by allocating funds from proceeds of carbon trading.

CONCLUSION

With the increasing need to optimize the use of water, it is imperative that technologies like AWD must be adopted on the ground. Experiments here and in many countries have shown that employed appropriately, AWD can significantly reduce irrigation input and enable farmers to save on fuel and time. With the soaring prices of fuel, use of AWD could mean significant cost reduction for farmers who rely on pumping water from the ground for their irrigation source. Under the National Irrigation System, saving water would mean more farms are irrigated especially at the tail-end.

CALL FOR ACTION

- **Participatory approach in extension, not top-down.** The study of Palis et al. (2017) showed that if farmers are involved in technology development and they see the advantages for themselves, they will become champions of the technology. The chance for technology adaptation is very high. For example, Palis et al. saw that farmers replaced the AWD plastic tube with bamboo tube. Impacts of participatory approaches have been seen in pump irrigation areas, but not so much in gravity irrigation systems where water is free.

- **Change farmers' perceptions on flooded paddy fields.** The low uptake of AWD could be due to the farmers' old practices of keeping rice paddies flooded all throughout the cropping season. Palis et al. found that farmers could change this practice, and tolerate cracked soils. The climate change mitigation potentials of AWD in rice cultivation could also be highlighted.

- **Strengthen interagency collaboration.** AWD was successfully introduced in the Upper Pampanga River Integrated Irrigation System and the Tarlac Groundwater Irrigation Systems Reactivation Project because of collaborations among NIA, PhilRice, and the BSWM. Funds must be available for capacity building of agency partners in support of efforts to change farmers' misplaced attitudes.

- **Revisit sections of the Free Irrigation Service Act.** Pascual et al. (2022) advance the following mechanisms to integrate AWD into the law's implementing rules and regulations: allocate larger operation and maintenance (O&M) subsidy for IAs that adopt the AWD; make the adoption of AWD as a criterion for the bigger O&M subsidy; develop an affordable payment scheme for all unpaid irrigation service fees, amortization and equity payments (before the law) for IAs that adopt AWD; and link AWD adopters to opportunities to further build their skills to improve their crop management practices. NIA can also reward district offices that can implement proper rotational irrigation.

- **Improve irrigation water governance.** Rola (2019) notes that irrigation governance in the country is fragmented as the 13 agencies involved in it are not necessarily linked to each other. Harmonizing the roles of concerned agencies would give a more cohesive direction for the sector.

- **Enabling environments must be developed to boost AWD adoption.** Proper land preparation that leads to appropriate weed management must be overly emphasized in farmers' crop management practices (Pascual et al. 2022).

- **Rotational irrigation scheduling in the National Irrigation System must be fine-tuned with safe AWD.** It pays to invest in and institutionalize the use of decision-support tools using internet-of-things to estimate the water demand and amount of water to be released, and to monitor, verify, and provide irrigation water to a specific region on time (Pascual et al., 2022). With less than 1% contribution to greenhouse gas emissions, and with the Philippines having an approved standardized baseline by the United Nations Framework Convention on Climate Change, our potential to raise funds for capacity building is in generating Internationally Transferable Mitigation Outcomes from AWD practice with at least 11 million tons of CO_2 annually from irrigated rice cultivation alone.

REFERENCES

Lampayan, R.M., Rejesus, R.M., Singleton, G.R., & Bouman, B.A.M. (2015). Adoption and economics of alternate wetting and drying water management for irrigated lowland rice. Field Crops Research. 170, 95-108.

Palis, F.G., Lampayan, R.M., Flor, R.J., & Sibayan, E. (2017). A multi-stakeholder partnership for the dissemination of alternate wetting and drying water-saving technology for rice farmers in the Philippines. Agriculture and Food, 2 (3), 290-309.

Pandey, S., Yadav, S., Hellin, J., Balie, J., Bhandari, H., Kumar, A., & Mondal, M.K. (2020). Why technologies often fail to scale: Policy and market failures behind limited scaling of alternate wetting and drying in rice in Bangladesh. Water, 12, 1510. DOI: 10.3390/w12051510

Pascual, K.S; Yadav, S.; Evangelista, G.; Burac, M.A.; Rafael, M.; Cabangon, R.; Tokida, T.; Mizoguchi, M.; Regalado, M.J. (2022). Determinants in the Adoption of Alternate Wetting and Drying Technique for Rice Production in a Gravity Surface Irrigation System in the Philippines. Water, 14, 5. https://doi.org/10.3390/w14010005.

Regalado, M.J.C., Yadaw, S., Samoy-Pascual, K., de Dios, J. L., Evangelista, G.K., Rafael, M.L., Dorado, J., Cabangon, R.J. (2019). Irrigation advisory service: A comprehensive solution toward sustainable water management for rice production in the Philippines. Paper presented during the 2019 ASABE Annual International Meeting in Boston, Massachusetts, July 7-10.

Rola, A. (2019). Strengthening institutional links for irrigation water governance. PIDS Policy Notes, 2019-09. Retrieved 17 July 2019 from https://pids.gov.ph/publication/policy-notes/strengthening-institutional-links-for-irrigation-water-governance

ABOUT THE MATERIAL

Rice Science for Decision-Makers is published by the Department of Agriculture-Philippine Rice Research Institute (PhilRice). It synthesizes findings in rice science to help craft decisions relating to rice production and technology adoption and adaptation. It also provides recommendations that may offer policy triggers to relevant rice stakeholders in search of opportunities to share their knowledge on rice-related products.

The articles featured here aim to improve the competitiveness of the Filipino rice farmers and the Philippine rice industry through policy research and advocacy.

This issue outlines ways to optimize the benefits from Alternate Wetting and Drying, a water management technology. Its use has been shown to result in up to 38% water savings, not to mention the significant reduction in fuel cost.

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Rice Science for Decision-Makers • September 2022
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Published by PhilRice as a policy advocacy material.

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