Evidences

Study #2936

Contributing Projects:
- P1584 - IRRI Contribution to RICE Flagship Project 1
- P1578 - AfricaRice contribution to RICE Flagship Project 3
- P1569 - AfricaRice Contribution to RICE Flagship Project 1
- P1808 - CIAT contribution to FP3
- P1571 - CIAT Contribution to RICE Flagship project 1
- P1581 - IRRI contribution to RICE Flagship Project 3

Part I: Public communications

Type: OICR: Outcome Impact Case Report

Status: On-going

Year: 2020

Title: Dissemination and Adoption of Bundled Agronomic Practices in Vietnam, Benin, Togo, Nigeria and Brazil

Short outcome/impact statement:
In the previous two decades, members of the RICE CRP, including created and disseminated regionally-designed and locally-appropriate portfolios of agronomic practices in collaboration with local partners. we find that previously published levels of dissemination and adoption tend to be inflated. However, this does not mean that the adoption of these technologies is limited. We document reliable sources of data on adoption for each technology and, where appropriate, use these data to estimate adoption rates in the regions of interest.

Outcome story for communications use:
The methods used to cultivate rice are evolving as researchers innovate and develop agronomic practices to increase yield and farmer income. In the previous two decades, members of the RICE CRP, including IRRI, CIAT, and AfricaRice created and disseminated regionally-designed and locally-appropriate portfolios of agronomic practices in collaboration with local partners. These agronomic practices include 3 Reductions, 3 Gains (3R3G) and 1 Must Do, 5 Reductions (1M5R) in Vietnam; 10 and 10+ Practices in Brazil; and Smart-Valley or Sawah in West Africa. This paper presents the current available evidence on the diffusion and adoption of these technologies. While much has been written about these technologies, we find that previously published levels of dissemination and adoption tend to be inflated. However, this does not mean that the adoption of these technologies is limited. We document reliable sources of data on adoption for each technology and, where appropriate, use these data to estimate adoption rates in the regions of interest.

Links to any communications materials relating to this outcome:
- https://tinyurl.com/ya6fobku

Part II: CGIAR system level reporting

Link to Common Results Reporting Indicator of Policies : No

Stage of maturity of change reported: Stage 1

Links to the Strategic Results Framework:
Sub-IDOs:
- Adoption of CGIAR materials with enhanced genetic gains
- Increased value capture by producers
- More efficient use of inputs

Is this OICR linked to some SRF 2022/2030 target?: Yes

SRF 2022/2030 targets:
- Increased rate of yield for major food staples from current 1%/year
- Increase in water and nutrient (inorganic, biological) use efficiency in agro-ecosystems, including through recycling and reuse

Description of activity / study: <Not Defined>

Geographic scope:
- Multi-national

Country(ies):
- Nigeria
- The Socialist Republic of Viet Nam
- Brazil
- Benin
- Togo

Comments: <Not Defined>

Key Contributors:
Contributing CRPs/Platforms:
- CCAFS - Climate Change, Agriculture and Food Security
- Rice - Rice

Contributing Flagships:
- F3: Sustainable farming systems
- F5: New rice varieties

Contributing Regional programs: <Not Defined>
Contributing external partners: <Not Defined>

CGIAR innovation(s) or findings that have resulted in this outcome or impact:
(1) Two programs were developed at different points in time to mitigate these concerns. The first, “3 Reductions, 3 Gains” (3R3G), was disseminated to farmers in 2003. 3R3G built on IRRI’s earlier work in developing a system of integrated pest management (IPM) to reduce pests without increasing pesticide use. IRRI expanded the IPM system to include reduced seed rates and reduced fertilizer application rates. 3R3G specifically advocates for reducing seed rates to 100 kg per hectare, reducing fertilizer application rates to 130 kg of nitrogen per hectare, and reducing pesticide application to no more than four times per year. The rational is that by reducing seed rates, farmers can reduce the existence of pest-breeding microclimates that form below the dense canopy of closely sewn plants. With the reduced number of plants per hectare, farmers no longer need to apply as much fertilizer, thereby reducing the amount of nutrients pests can feed upon. Overall, the result is a reduced need for pesticides, as the first two reductions help eliminate environments favorable to the breeding of pests. Ultimately, all three reductions lead to higher yields (through few pest infestations), better quality rice (through less chemical residue), and higher profits (through lower production costs). Around 2009, the second program “1 Must Do, Five Reductions” (1M5R) was introduced, to expand on 3R3G. Under 1M5R, the objectives were the same: to have higher yields, better quality rice, and higher profits, with improvements in human and environmental health. However, the particulars of the program changed: one practice was set apart as a ”must do” and there were five reductions, instead of three. The “1 must do” represents the use of certified seed. The five reductions, include the three from 3R3G: (1) fertilizer, (2) pesticide, and (3) seeding rates, as well as two additional reductions. Farmers were now encouraged to (4) reduce water use, through the application of alternate wetting and drying (AWD), and to (5) reduce post-harvest loss, through the use of combine harvesters. (2) Historically, rice production in West Africa has been limited of insufficient water to meet the crop’s water requirements. Sawah or Smart-Valley is a set of practices that adapt natural rainfall basins (inland valleys) through relatively low-cost infrastructure to control seasonal rains for rice production (Zwart, 2014; Rodenburg, 2013). Sawahs are rice fields that have been leveled, puddled (small depressions made around the rice plants), and bunded (retaining walls). Canals are also part of Sawah as they redirect water from dams, rivers, or reservoirs to fields. Sawah encourages the use of nurseries to develop seedlings instead of scattering seed into the field. Nurseries improve the rate of germination and each rice crop, once transplanted to the field, can be evenly spaced to reduce overcrowding. Sawah has been introduced to inland valleys in Togo, Benin, Nigeria, and Ghana because of a prevalence of rainfed agriculture in those countries. (3) Project 10 was initiated by the Latin American Fund for Irrigated Rice (FLAR), CIAT and the Rio Grandense Rice Institute (IRGA) to increase rice production for rice farmers across the South Rio Grande. Project 10 emphasized a variety of different agronomic practices including: sowing date, plant nutritional status, soil fertilization, management of irrigation water and weed control, soil adequacy practice, cultivar selection, and insect and disease management

Innovations: <Not Defined>

Elaboration of Outcome/Impact Statement:
While much has been written about these technologies, we find that reliable data on dissemination and adoption is often lacking. Some of this is due to the age of these agronomic practices. Standards of
academic rigor have changed in the two or more decades since these technologies were first introduced.
What sufficed for evidence of adoption in 2002 is no longer sufficient in 2020. Based on our critical reading
of the literature and our own data collection efforts, we find that previously published levels of dissemination and adoption for all of the technologies under consideration are inflated. That is not to say
that adoption of several of these technologies is limited. Based on monitoring data from four of the 13
provinces in the Mekong River Delta in Vietnam, we find nearly 70,000 hectares qualify as fully adopting
3R3G or 1M5R (eight percent of total rice area). Using project monitoring data from the state of Rio Grande
do Sul in Brazil, we find total land area under Project 10 or 10+ to be over 60,000 hectares (six percent of
total rice area). Across Nigeria, Ghana, Benin, and Togo, we are able to confirm that Smart-Valley or Sawah
has been adopted on about 3,000 hectares (0.04 percent of potential inland valleys).
In all cases, these numbers represent a lower bound, based on data we could verify or corroborate.
They represent the number of confirmed full adopters, or confirmed hectares under adoption, as a share of
total farmers or land area in the region. In many cases, these confirmed adoption numbers come from representative samples, so one could extrapolate from them to estimate much higher, though still reasonable, adoption rates. We refrain from presenting these estimated adoption rates until the conclusion.
In the following sections we review each technology, beginning with a description of the technology, followed by a presentation of the results on dissemination and adoption. We begin with 3R3G
and 1M5R in Vietnam, followed by Sawah/Smart Valley in West Africa, and conclude with Project 10/10+
in Brazil.

References cited:
Reference:
Josephson, A.; Kee-Tui, E.; Michler, J. D.; Perez, S. (2020). "Dissemination and Adoption of Bundled Agronomic Practices. Research Paper Number 202002. Department of Agricultural & Resource Economics. University of Arizona.
https://economics.arizona.edu/dissemination-and-adoption-bundled-agronomic-practices
https://economics.arizona.edu/research/cardon-working-papers-series

Quantification: <Not Defined>

Gender, Youth, Capacity Development and Climate Change:
Gender relevance: 0 - Not Targeted
Youth relevance: 0 - Not Targeted
CapDev relevance: 0 - Not Targeted
Climate Change relevance: 0 - Not Targeted

Other cross-cutting dimensions: NA

Other cross-cutting dimensions description: N/A

Outcome Impact Case Report link: Study #2936

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