

Targeting the needs of producers and consumers in rice post-production systems research

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Abstract

In the Philippines, the adoption and utilisation of new technologies for post-production handling of rice have not kept pace with increased volumes of grain, handling requirements of wet harvest, and the growing demands for higher rice quality. To date, the Philippine post-production sector is characterised by a lack of drying capacity, the presence of antiquated milling systems, and a lack of adequate storage facilities. The current state of affairs can be partly attributed to wrongful targeting of potential users in technology design and development, and a weak collaboration between the public and private sectors. Furthermore, agencies involved in research and development have historically approached problems from an inward-looking perspective.

In 1998, the International Rice Research Institute (IRRI) convened a workshop involving representatives of all interest groups in the rice post-production industry to review the current situation in the Philippines, and to jointly identify priority problems. In response, four national agricultural research organisations and IRRI together identified opportunities for research and launched a collaborative research programme to increase the effectiveness of post-production research in the Philippines. Initial collaborative efforts are focusing on a variety of research activities, including more detailed needs assessment studies, packaging relevant information on post-production technologies, the organisation of a national grains post-harvest policy workshop, and initiation of a partnership with the private manufacturing industry.

Introduction

The introduction of modern rice varieties to Asia in the 1960s has led to year-round harvest of rice, increasing harvest volumes, and new methods for threshing rice under wet conditions. While farmers have revolutionised rice production, consumers have developed demands for higher quality rice. Modernisation in the post-production of rice, however, has not firmly taken root. In the Philippines, for instance, difficulties in rice handling and processing are experienced every year due to the continuing lack of drying capacity for wet harvest, and the use of antiquated milling systems. As a result, physical losses occur, and the quality of milled rice is poor. The problems are compounded by the growing scarcity of inexpensive labour in agricultural areas, which has accelerated the need for labour-saving post-production technologies.

The current situation in the Philippines can be attributed to a number of factors. During the 1970s, technologies from industrialised countries were introduced that were not suitable either for use in humid climates, or for processing high moisture grain. Moreover, these technologies were based on large capacity, continuous-flow handling of grain and therefore not adjustable to the fragmented delivery of grain that is typical of small farming systems in Asia. In later years, significant investments in grain drying research led to a better understanding of the technical and socioeconomic issues involved in crop handling in the region, and the development of smaller, 'appropriate' farm-level drying technologies (de Padua 1988). These activities, however, did not lead to a sustained adoption of more 'efficient' drying technologies by farmers in the Philippines. For example, the acceptance of a low-cost, batch-type grain dryer among Filipino farmers was low (Frio and Manilay 1984). The main reason was that the cost of drying was too high compared to the traditional solar-drying method, i.e. there was no economic incentive to invest in a dryer. The economic feasibility of farm-level

grain drying suffered from the fact that harvest volumes were too small to successfully own and operate the technology at this level. In the 1980s it was recognised that feasibility of grain drying was more favourable at the cooperative level, and as a result larger drying and processing systems were installed at farmer cooperatives. Due to mismanagement and insufficient farmer participation, only two out of twelve grain processing facilities are still operational.

In many rice-growing areas of the Philippines, millers and traders have now taken on the responsibility for drying. Selling wet grain forms an intricate part of the agricultural credit system, as many farmers obtain their credit from millers or traders, and must sell at harvest. Drying wet grain intended for the consumer market is shifting from farmers to the private, post-production sector and, as a result, there is a high demand for drying facilities among rice traders and millers. Interestingly, their demand is largely met by imported dryer designs, even though local research and development (R&D) institutions claim that they have developed many designs available for local manufacture. A quick survey of rice millers found that none of the locally developed dryer designs met the millers' requirements (de Padua 1999). Apparently there was no real need for the technologies developed, at least not in the Philippines.

The unsatisfactory impact of R&D in the Philippines in post-production technologies suggests a certain confusion with regards to the beneficiary of the research activities. Historically, smallholder farmers have been the target of R&D at international and national agricultural research centres. In handling and processing of grain, however, farmers are increasingly not the key players. As agricultural production has modernised, grain post-production has gradually moved away from the farm to the post-production sector, including traders, millers, wholesalers and retailers. The public-sector R&D community has largely disregarded the vital role of the post-production sector, keeping the sector that handles the bulk of agricultural production away from the potential benefits of engineering R&D.

Low R&D impact can also be attributed to a lack of systems-based research. Many engineering research centres are focused largely, if not exclusively, on technology development, with little understanding of the system in which their hardware is supposed to operate. Researchers often operate in an environment that is isolated from the private sector. This impedes the successful commercialisation of the developed technology, as was illustrated by the following quote

from a previous GASGA seminar (Gomez and Abejuela 1988):

Good researchers are usually poor communicators. Some of the problems in utilization are caused simply by lack of information about the technology and/or its potential consequences. This may be due to the purposeful isolation of research. Because of this isolation, there is no flow of information from the users to the researchers and vice versa. Researchers are often cloistered in their laboratories, shielded from commercial pressures, and research projects usually produce results that are not directed towards solving problems of commercial significance.

Recognising the need for more demand-responsive, systems-based, and collaborative post-production research (see also Bell and Dawe 1998), the International Rice Research Institute (IRRI) in association with the primary national research organisations of the Philippines convened a workshop with the objective to determine the priority problems and concerns in the rice post-production sector. The desired outcome of the workshop was the initiation of a collaborative research programme that would increase the efficiency of post-production R&D by meeting the real needs of the rice industry in the Philippines.

Initial workshop: interest groups identify their roles and needs

During the initial workshop held at IRRI, representatives of the different interest groups in the rice industry were invited to review the current state of affairs of the Philippine rice post-production sector, to identify priority problems, and to map out possible responses to the problems. The workshop also served to draw out interests of different institutions involved in post-production R&D. The planning and implementation of the workshop was based on a logical framework approach described by Schubert et al. (1991). This methodology involves holding an initial workshop for all stakeholders in the industry, succeeded by a follow-up meeting of research organisations.

Three interdependent subsectors of the rice industry were represented at the initial workshop: (1) farmers, farmer groups and farm service contractors; (2) processors, traders, wholesalers and retailers; and (3) consumers. In addition, workshop participants included representatives of equipment dealers and manufacturers, financing institutions, and government agricultural services. Participants prepared a comprehensive list of problems and constraints of the rice industry. The workshop secretariat then sorted the issues into

categories based on the subsectors, analysed the problems further to try to determine their root causes, and to figure out where the research opportunities were. The complete results of this exercise are described in workshop proceedings that are currently in press (de Padua et al. 2000).

In summary, the *farming sector* pointed out the scarcity of available information regarding new and appropriate technology. The information could help farmers produce better quality grain that is preferred by consumers. The difficulties of farmers with small landholdings or farmer groups to acquire expensive post-production facilities necessary to handle harvest during wet seasons were raised. The low farm-gate price of paddy due to the distribution of cheap, imported rice by the government was also pointed out.

The *rice processors and traders* cited the low quality of milled rice produced. This could be traced to a variety of reasons including the lack of good seeds, the more than 20 rice varieties with different milling characteristics planted by farmers, the poor management of the rice fields, the lack of timeliness in crop harvesting, the inability to handle wet harvest, the poor state of milling machinery, pest infestation of rice in storage, the apparent lack of price incentives to produce better quality rice, and the lack of operator skills and understanding of what it takes to produce higher quality rice. The processors railed against the rice distribution practice of government, which has upset pricing of paddy and milled rice, reducing their slim profit margins.

For *consumers*, mislabelling of rice by retailers was cited. Also, milled rice grades and standards used by the Philippine government are not accepted by consumers, because the standards do not reflect what consumers prefer. Consumers look for affordable milled rice with good cooking and eating qualities, and generally prefer white, well-milled rice, with few broken and no contaminants.

Equipment manufacturers complained about the lack of incentives to produce post-production machinery in the Philippines. They pointed out that while complete machines can be imported with a low tariff rate, spare parts and raw materials are subject to a higher tariff. Therefore, developing a service industry based on localised production, product support and supply of spare parts is difficult due to the high price of the raw materials.

In a follow-up meeting, the national research organisations and IRRI further clarified the roles and needs of different interest groups in the post-production sector, and identified interests and research priorities. Table 1 presents an overview of the identified needs per interest group. During the follow-up meeting, the researchers felt that a collaborative research programme should be inaugurated where the comparative advantage of each institution could be harnessed and a more synergistic project could be undertaken. The five organisations agreed to form a post-production research consortium that would take a more comprehensive approach to the research, facilitate better communication of results, and lead to an increase in the participation of technology end users.

The Philippine Rice Postproduction Consortium

Five principal institutions in the Philippines concerned with rice post-production research participate in the consortium, namely: the Philippine Rice Research Institute (PhilRice), the Department of Agriculture's Bureau of Post-harvest Research and Extension (BPRE, formerly known as NAPHIRE), the University of the Philippines Los Baños-College of Engineering and Agro-Industrial Technology (UPLB-CEAT), the National Food Authority (NFA), and IRRI's Agricultural Engineering Division.

A memorandum of agreement (MOA) has recently been approved by the legal authorities of each institution. The adoption of the MOA by the respective organisations is important as it allows staff members to commit time to consortium activities. It is proposed that the strategic and operational planning of research activities be done jointly by the agencies interested. The consortium is to meet at least once a quarter to monitor the progress of collaborative projects. Special meetings may be arranged by researchers to discuss specific problems such as research methodologies. The implementation of such activities is to be done using the resources of each collaborating institution, however it is expected that the consortium will tap government's research funds or seek the endorsement of external donors and investors in the future.

Current collaborative research efforts of the consortium concentrate on a number of different activities. *Needs assessment studies* are jointly undertaken in order to validate the technology needs of the different sectors of the industry as they were identified during the initial workshop. *Information systems and packages* (e.g.

technology database, technical information bulletins) on post-production technologies and management are being assembled and distributed in order to overcome the general lack of available information among rice industry stakeholders. Together, consortium members have organised and participated in a *grain post-production policy workshop* for government officials with the objective to enhance knowledge and awareness among policy makers on current constraints in the post-production sector. Finally, the consortium has launched a *partnership* with the Metals Industry Association of the Philippines (MIAP) with the ultimate goal to manufacture the needed post-production technology in the Philippines. One of the proposed projects to have received a favourable response from the private manufacturing sector is the localisation of grain dryer production. The idea is for the consortium to work out

the designs based on careful needs assessment of prospective end users, and for MIAP to produce prototypes for testing, and eventually standardise parts for mass production under a subcontracting scheme. The consortium is actively seeking support from the Philippine Department of Agriculture for this activity.

Conclusion

As the Philippine Rice Postproduction Consortium has only been in operation for seven months, it is too early for a detailed impact assessment. However, the consortium has already produced a number of positive outcomes, including:

1. peer review and evaluation of the relevance of present public-sector research and development (R&D) activities of all agencies involved;

Table 1. Needs assessment of different stakeholders in production and post-production systems (in part from Bell and Dawe 1998).

Stakeholder	Needs
<i>Rice farmers</i>	<ol style="list-style-type: none"> 1. Mechanised harvesting technology, competitive with current practices. 2. Guaranteed farm-gate prices. 3. Premium prices for good quality paddy harvest. 4. Threshing and transport services to remove burden from farmers, particularly during periods of inclement weather.
<i>Rice processors and traders</i>	<ol style="list-style-type: none"> 1. Local options for upgrading processing plants (specifically: choice of drying plants with the capacity to dry the volumes purchased during the rainy season, with the cost of drying competitive with sun drying). 2. The hardware and software for producing better quality rice products. 3. The technology for utilising rice hull as a source of energy for drying. 4. Milling technology that gives better total and head rice recoveries. 5. Standardised varieties in terms of physical and biochemical properties. 6. Bulk handling technology for lower handling costs. 7. Cost-effective pest control technology.
<i>Extension engineers</i>	<ol style="list-style-type: none"> 1. Information bulletins. 2. Training on post-production sector technologies.
<i>Manufacturers</i>	<ol style="list-style-type: none"> 1. Lower cost of raw materials — steel products. 2. Hardware designs. 3. Marketing assistance.
<i>Farmer-based cooperative enterprises</i>	<ol style="list-style-type: none"> 1. Better management skills, both technical and financial. 2. Better procedures, both technical and financial. 3. System designs.
<i>Consumers</i>	<ol style="list-style-type: none"> 1. Graded and packaged rice at reasonable prices. 2. More consistent quality for varietal brands. 3. More choices of products. 4. Longer shelf life of rice products. 5. Less contaminants.
<i>Researchers</i>	<ol style="list-style-type: none"> 1. More experience in commercial processing and business operations. 2. More training on research instrumentation.
<i>Policy makers</i>	<ol style="list-style-type: none"> 1. More economic information. 2. Better understanding of the workings of the industry.

2. identification of opportunities to improve R&D agendas in order to better align them with post-production sector problems;
3. development of collaborative partnerships between interested government parties, who traditionally did not enjoy such close linkages;
4. inclusion of the private sector as a true collaborating partner in public sector R&D;
5. recognition of the private sector by the government as a legitimate beneficiary of public sector goods; and
6. recognition of knowledge gaps on available post-production technologies in addition to correct operation as major limitations to advances within the sector.

At this stage, the Philippine Rice Postproduction Consortium serves as an example of at least one model for how research partners can arrive at a list of identified priority opportunities, activities and plans.

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