

# NEGOTIATING CHANGE: FARMER ADOPTION OF POSTHARVEST INTERVENTIONS IN CAMBODIA<sup>1</sup>

(Draft)

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## The postharvest development discourse in Cambodia

A major economic activity for Cambodian farmers is marketing their rice (Helmert 1996). While this is only a fragment of the activities that households engage in, many factors shape it and many issues hinge upon it. For one, national policies on rice production and market targets shape the way that farmers and other actors interact with each other (MAFF 2009). Secondly, the social construction of the situation of farmers contributes to the development discourse in which projects are written. For example, in the 1990s it was documented that policy and market constraints leading to fragmentation and inefficiency in the market results to low returns for farmers (Cameron and Twyford-Jones 1995). It was also documented that limitations in postharvest technologies affect operations of the rice market and leads to losses (Helmert 1996). The discourse on losses in value, on profits accruing more to traders rather than farmers, and on lack of postharvest technologies is the context in which recent postharvest development projects stand upon (Nesbitt 1996, Visal 2006).

The project, *Improving Poor Farmers Livelihoods through Improved Rice Postharvest Management*, implemented in 2005-2008 connected with the discourse. It aimed to (i) improve rice post harvest technologies; (ii) enhance understanding of the rice markets in which farmers operate; (iii) provide farmers opportunities for more equitable participation in the rice market chain; and (iv) establish a network of rice post harvest practitioners that will exchange rice post harvest information and technology, and share rice market intelligence (Crenn 2007, Gummert 2008). The project introduced postharvest interventions namely, mini-combine harvesters, 4-ton flat bed dryers, moisture meters, hermetic super bags (airtight storage bags), 5-ton cube or cocoons, granary improvements, rice mill improvements and a market information system that provides updated information in village market boards. The project was seen as a pilot in the sense that it aimed at trying out what may be 'better ways to do things' in specific locations as in the idea of technological change (MacDonald 1975).

## Documenting adoption of postharvest technologies

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This study aimed at documenting the process of adoption, to bring out insights on how farmers and communities deal with postharvest technologies and interventions. It draws upon results of informal interviews and focus group discussions in 8 project villages and 4 non-intervention villages in Battambang and Prey Veng province. A survey among 185 farmers from these villages was also done to obtain a quantified sense of aspects observed in the qualitative study as well as for economic costs and returns.

In this documentation, we view technologies, whether seen as knowledge, skills, materials or processes, to not exist in a vacuum (Bray 1986). These are mediated by people and their interactions. We keep in mind that the adoption or spread of the different innovations involves a complex process with different levels of success (van Egmond-deWilde de Ligny and Erkelens 2008). Long (1996) further described this process as negotiation, adaptation and translation of meaning between actors; and we kept in mind this key point as we made sense of the results of the process documentation.

### **The case of hermetic super bags**

The technology that many farmers in the project sites knew more about and were able to try is hermetic storage or super bags. In the survey, 99% of project site farmers had heard about it; and of these, 92% had tried it. The knowledge has also spread to non-project sites; 17% of respondents in non-project sites had heard about it through their relatives, friends and the extension staff. The technology spread faster in the villages because the farmers obtained about 2-3 of these 50-kg storage bags for free when they joined the project activities and indicated they wanted to try the technology. There were 5 farmers who said they did not get the bags for free. Of those who heard, 94% are planning to use the bags again, with 93% willing to pay on the average 0.5 USD (Riel 2035) for super bags.

The super bags were also introduced in the context of communities where farmers are cultivating about 1.8 hectares, and producing an average of 2.5 tons per hectare. Most of the farmers sell their grains after harvesting, but store 47% of their produce for household consumption and seeds. It is observable in the communities that farmers are interested in storage innovations. Common storage for seeds is in polypropylene bags stored inside the homes as protection for rats and other pests. For grains, some farmers have small storage sheds outside their houses (Fig. 1). There are also farmers who use large basket type storage. These are placed outside or under the houses in open air conditions. Some enclose their storage with wire mesh. There were also others who plastered cattle manure on the walls and holes of their storage sheds to protect grains from too much moisture and from insect pests. Project implementers and local extension staff mentioned that although farmers have some knowledge about storage, they still need to be made aware of 'better management practices' especially about moisture and pests. To this end, parallel innovations were also introduced to help farmers improve their granaries through proper sanitation and use of materials that would prevent pest infestation.



**Fig. 1. Commonly practice storage options of farmers in Cambodia.**

What is also notable in this case of farmers trying an introduced innovation is that the discourse (of losses, of needing postharvest technologies) is also being transferred. This echoes Ferguson's (1990) observations on the constructed realities in the making of innovations. As part of this discourse of development, it was assumed that farmers would then want to try the technology for storing their grains. At the point of data gathering, while farmers were interested in storage innovations, this discourse did not correspond to their reality. They were observing results of their trials with hermetic storage and their experience with it was for storing seeds. Their key interest in the technology was on increasing seed germination rate. At that point, none of the farmers interviewed or surveyed were planning to use super bags to store all of their grain (use the technology to prevent losses) but they found the technology beneficial in getting higher germination and reducing their seed rate (for details on this, see Maligalig et al. 2010).

### **The case of flat bed dryers and combine harvesters**

Unlike, hermetic storage, flat bed dryers were not as widely heard of; more so with combine harvesters (Table 1). This has something to do with what Bray (1986) describes as considerable difficulties in technical change and 'skill-oriented technologies'. She conceives the change to require communities or individuals to shift in allocating significant resources. When the study was implemented, farmers had not had much experience with these technologies. Only one project village had a dryer in working condition, and another village where installation was in progress. One unit of combine harvester had been brought into Cambodia for the first time for demonstration and was not really 'used' by farmers.

**Table 1. Percent of farmers with status of knowledge, experience and willingness to use and pay for dryers and harvesters.**

| Status | Site | % of Farmers |
|--------|------|--------------|
|--------|------|--------------|

|                           |                    | <b>Flat bed dryer</b> | <b>Combine harvester</b> |
|---------------------------|--------------------|-----------------------|--------------------------|
| Know about the technology | Project (n=122)    | 64.8                  | 11.5                     |
|                           | Non-project (n=60) | 11.7                  |                          |
| Have used it              | Project (n=122)    | 8.2                   |                          |
|                           | Non-project (n=60) |                       |                          |
| Will use it in the future | Project (n=122)    | 16.4                  |                          |
|                           | Non-project (n=60) |                       |                          |
| Are willing to pay        | Project (n=122)    | 54.1                  |                          |
|                           | Non-project (n=60) | 26.7                  |                          |

The outcome of the introduction of these technologies was the increased awareness of these technologies as possible options. Those who heard or have tried it, discussed the technology with others in the community. Many farmers interviewed said they heard interesting comments about it, and the survey captured what those who had knowledge shared to others (Table 2).

**Table 2. Comments shared by farmers on use of dryers.**

| <b>What they told other people about dryers</b>    | <b>Frequency</b> | <b>Percent</b> |
|--|------------------|----------------|
| It protects grains from being damaged or destroyed | 10               | 55.6           |
| How to use/it is easy to use                       | 9                | 50.0           |
| Results to high germination of seeds               | 3                | 16.7           |
| High yield grain (rice after milling)              | 1                | 5.6            |
| It is better than sun drying                       | 2                | 11.1           |

These comments show the influence of the discourse that was translated into the communities by the project. Although farmers said these, in reality, there was no change in their practices. Farmers still continued with field drying for 7-10 days after manual harvesting, and selling their produce in fresh weight. Those who used the dryers used it only for their sticky rice which was harvested during a rainy period. They used their conventional practice for most of their produce.

### **The case of market information boards**

There was one market information board in each of the project villages and all project site farmers were aware of it. The board has data on rice prices from three different markets (village, provincial, and in Phnom Penh). This data is collected every three days and a summary of which months the prices are higher is also shown in the board. Some 87.1% of farmers said they use the market information board. None of these are from outside the project sites.

Observations on the use of the boards show a disconnect between how the boards were perceived by other actors (implementers, extension agents) and

by the farmers. In the development discourse, the board was to help farmers get higher bargaining power with traders. This was not the way that farmers would translate this market information mechanism. In fact, they still said they do not negotiate much with the traders. To farmers the board was a way to 'police' the traders in that they also knew that farmers may have an idea of the prices. The prices are still largely decided upon by the buyer but it cannot be lower than what is on the board. Despite the disconnect, both sides observe that farmers in project villages get higher prices for their grains. In the survey, these farmers got significantly higher (at 1%) price by 92 Riel or 0.023 USD. The prices range from 0.17-0.20 USD/kg (700-800 Riel/kg).

## **Conclusion**

The technologies introduced were tried by farmers with positive results. Adoption in the sense of technical change, as in Bray's definition of change in low-capital labour and management skills, is also observed to be starting. However, technological change or the development of capital-intensive equipment and machinery, which was one of the objectives of the project, was not yet clear.

One of the key insights from this study is that the adoption of postharvest technologies given the discourse of development is not a linear journey into modernity as in paradigms that associate mechanization and technology adoption with development. In fact, farmers navigating through a complex system where information can actually be obtained, would not as easily change practice in the way that the transfer of technology paradigm may predict. Arrangements that allow time for experimentation and innovation must be present before expecting any tangible results in planned change (Hagmann et al. 2003). It was realized at the end of the pilot project that there is far more that is going on in the ground, with multiple realities perceived by different actors. To this end social mechanisms in relation to the innovation needed to be created and sustained. This concurs with findings of Lewis (1998) on development as process. What these findings have led to is the implementation of another project that works in a postharvest innovation systems perspective.

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