

# Scaling out communication to rural farmers: lessons from the “Three Reductions, Three Gains” campaign in Vietnam

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Scaling out communication of resource management information to be adopted by millions of farmers requires the integration of agricultural and social sciences. Agricultural technical information needs to be distilled and communicated in a format that is well understood and motivating to be effective. Scaling out involves multiple stakeholders ranging from research and extension to governments (both central and local), mass media, and civil societies. The “Three Reductions, Three Gains” campaign in Vietnam initiated in 2003 enjoyed success in reaching millions of rice farmers, motivating them to change their attitudes and practices. The Ministry of Agriculture and Rural Development had also adopted the “Three Reductions” practices as national policy, provided new resources for its implementation, and also extended it to “Five Reductions.” We used a multistakeholder process to develop high-quality partnerships, build social capital, and formulate project objectives within institutional objectives. To facilitate the development of communication strategies, we integrated theories and frameworks from social marketing, strategic extension campaigns, behavioral decision making, and social psychology with agricultural sciences. In this chapter, we describe the processes, theories, and frameworks used and the key lessons learned.

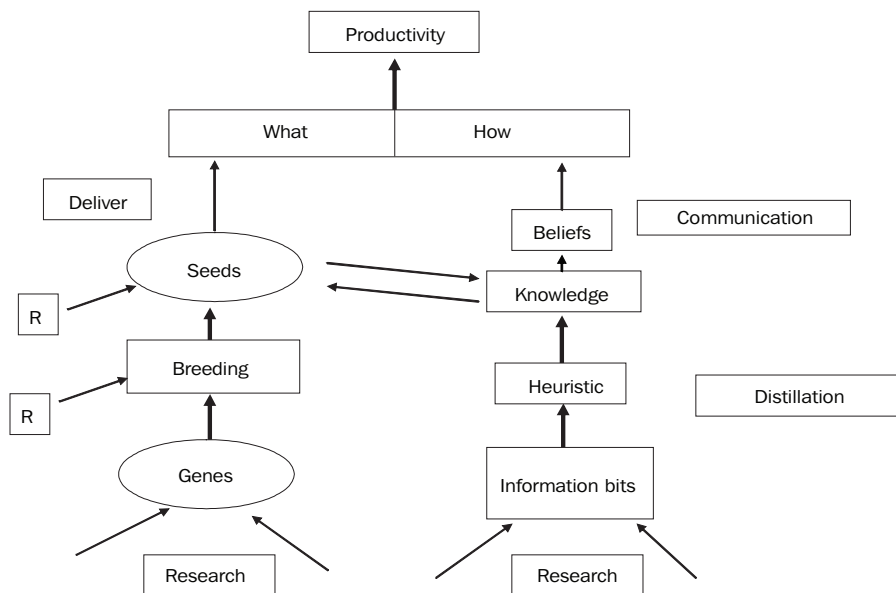
The wide knowledge gap between what rice farmers know and what they should know often translates into poor and inefficient management of resources, resulting in reduced profits, exposing them to unnecessary health risks and environmental pollution. Most modern rice cultivars, if well managed, can easily yield more than 5 tons per hectare when grown in favorable environments, but millions of farmers in these favorable environments often get less than 5 tons using the same inputs. In other cases, farmers use resources suboptimally, causing wastage and pollution from runoff. Rice farms in China, for instance, apply more than 300 kg of nitrogen ha<sup>-1</sup> but have poor recovery rates. Witt (2003) estimated that about 70% of the fertilizers Chinese farmers apply are lost into the environment. Most farmers believe that more fertilizer is better, perhaps since the local terms for fertilizer are often translated to mean “fattening” in many countries. Similarly, in the case of seeds, farmers often believe that higher seed

rates will give higher yields. In pest management, rice farmers often use pesticides unnecessarily because they apply them as prophylactics or they base their decisions on visual cues, which often lead to a more than tenfold overestimation of potential damage by pests (Heong and Escalada 1999). In the Philippines, about 80% of farmers' insecticide sprays were unnecessary because they were applied at the wrong time, for the wrong pests, or both (Heong et al 1995). Using the wrong chemicals at the wrong dosages is also common. Highly visible symptoms such as leaf damage are often cues that stimulate farmers to spray.

Farmers usually rely on their own beliefs and perceptions as most technical information, although transmitted through extension services, may not be appropriately framed for comprehensive reception. Although there are strengths in farmers' indigenous knowledge, there are also weaknesses and what farmers do not know cannot help them (Bentley 1989). If some of these misperceptions are modified through well-planned communication strategies, farmers' resource management decisions and skills can be improved. Thus, discovering the key weaknesses in their decision making is a vital first step in order to develop the appropriate intervention and communication strategy to introduce new information to reach and help the millions of rice farmers. The "Three Reductions, Three Gains" (in Vietnamese, *Ba Giam, Ba Tang*)<sup>1</sup> campaign in Vietnam launched in 2003 had significant impact on seed, fertilizer, and insecticide use by farmers in the Mekong Delta (Huan et al 2008). The campaign was planned as an incremental extension to a "no early spray" campaign launched in 1994 in the Mekong Delta that reduced farmers' insecticide use by 53% (Heong et al 1998, Escalada et al 1999) and spread throughout the Mekong, reducing farmers' insecticide use by as much as 70% in some provinces (Huan et al 1999). Similarly, the *Ba Giam, Ba Tang* campaign reached more than 2 million farmers and reduced their use of seeds, fertilizer, and insecticides by 10%, 7%, and 30%, respectively. Huelgas and Templeton (this volume) estimated that farmers adopting 3R had US\$44 per ha profit. In 2006, the Vietnamese minister of agriculture and rural development, Dr. Cao Duc Phat, proclaimed "*Ba Giam, Ba Tang*" a national priority and provided additional resources to all provincial governments for its implementation. This policy contributed to scaling up "*Ba Giam, Ba Tang*" to the whole of Vietnam. In this chapter, we discuss the theoretical frameworks and implementation processes we used to facilitate the development of the quality partnerships that had been vital to the policy adoption and scaling up. We will also discuss our experiences and the lessons we learned.

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<sup>1</sup>The "Three Reductions, Three Gains" program in Vietnam was selected as a "Best Practice" in 2008 by the Dubai International Award for Best Practices. Other awards received by the program were the Ministry's Golden Rice Award in 2004 and Can Tho City's Best Technology Award in 2005. See <http://cps-connex/irribulletin/bulletin/2009.03/default.asp#Three>.



**Fig. 1. Seeds and knowledge. Farmers require both seeds and knowledge for increasing productivity. Integrating them requires different mechanisms.**

## Seeds and knowledge

In their efforts to increase productivity, farmers often encounter two major sets of decisions: “what” varieties to use for the season and “how” to grow them (Fig. 1). Varieties are developed through research to discover genes and understand their functions. Plant breeders then incorporate these genes through plant breeding processes into new varieties. The new seeds are then delivered to farmers through normal extension channels or seed growers. Many of the modern rice varieties are capable of yielding more than 5 t ha<sup>-1</sup> and making reasonable profits when the crop is well managed. However, most farmers obtain lesser yields and profits even though their input resources are adequate, probably because of inefficient management practices due to knowledge gaps and poor decision making (Mumford and Norton 1984).

Unlike seeds, which can be easily delivered and received by farmers, knowledge is acquired differently and requires different communication strategies. Resource management research often ends up with research reports or scientific papers, highly specific to a discipline, such as entomology, plant pathology, and agronomy. Such information per se, although contributing to the scientific community, does not contribute much to improve farmer knowledge. These are important “bits” to be integrated into decisions. For these information bits to be useful, we need to synthesize and “distill” them into entities that can be used in decision making and practice. Since most decision makers use simple heuristics or decision rules in making decisions (Gigerenzer et al 1999), the entity may be developed into a heuristic that is simple, testable, and

easy to communicate. For instance, research has shown that the leafhopper damages leaves in the early crop stages but seldom causes yield loss because of plant compensation effects and natural biological control regulating the insect's population growth (Graf et al 1992, Heong and Schoenly 1998). Spraying to control this apparent pest will instead destroy the pest regulatory service in the rice ecosystem, rendering the rice crop vulnerable to invading adult leafhoppers and planthoppers after the sprays. All of this information was synthesized and distilled into a heuristic, "Spraying for leafhoppers in the first 40 days of the crop is not necessary." Farmers who tested this heuristic resolved their cognitive dissonance, modified their perceptions, and reduced insecticide use (Heong and Escalada 1997).

### Decision making, bounded rationality, and heuristics

Literature from the 1970s on agricultural decision making (e.g., Raiffa 1970, Halter and Dean 1971, Anderson et al 1977) focused on the prescriptive aspects that indicate how decisions should be made according to a set of well-defined criteria. Studies on human judgment and choices have shown that these prescriptive models are unable to account for how people make decisions (Slovic et al 1977, Simon 1978). Most people violate these prescriptive principles because decision making is behavioral in nature (Einhorn and Hogarth 1981). Behavioral decision research is increasingly being used in fields such as public health management, business management, and public policy management, making important contributions in the design of services, information environments, and decision systems (Payne et al 1992), and we applied these principles to quantify and understand farmers' decisions (Heong and Escalada 1999).

In making resource management decisions, farmers always face uncertainty and often adopt the bounded rationality approach, just like most decision makers. In this approach, as opposed to unbounded rationality, farmers will tend to "satisfice" rather than "optimize." Satisficing, a combination of sufficing and satisfying, is a word of Scottish origin used by Simon (1956, 1982) to characterize decision making in conditions of limited time, knowledge, and computational capacities using simple rules. "Heuristic" is a term introduced by Tversky and Kahneman (1974) to refer to an informal rule-of-thumb used in decision making. Heuristics are developed through experience and guesswork about possible outcomes and may thus have inherent faults and biases. Research to understand farmers' current heuristics and reasons for their adoption will help scientists frame new heuristics that are "actionable." For instance, in the leafhopper example, farmers spray insecticides to control the larvae (often called "worms") because of the highly visible symptoms. They strongly believe that leaf damages will lead to yield loss and that the worms will multiply quickly and thus need to be killed immediately. These beliefs might stem from farmers overestimating potential losses and their loss aversion behavior as described in the Prospect Theory (Kahneman and Tversky 1979), in which the potential of loss has a disproportionately higher influence on decisions.

From the ecological and sociological information, three heuristics were developed for "*Ba Giam, Ba Tang*": "no early spray for leafhoppers" and "reduced

recommended seed rates" and "reduced recommended fertilizer rates" that were communicated to farmers to motivate them to adjust their resource inputs.

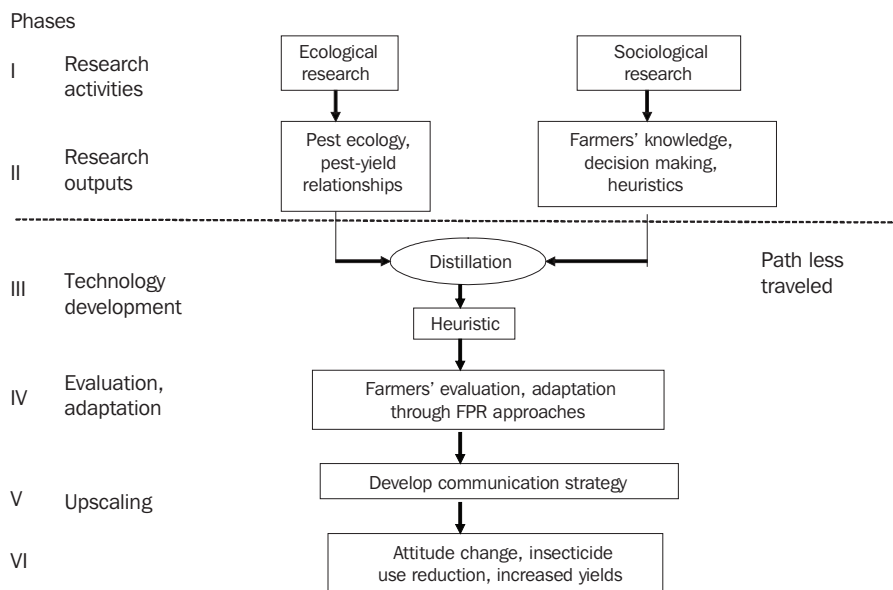
## Theoretical frameworks

In developing the campaign approach and media materials, we drew largely from theoretical frameworks such as the strategic communication campaign framework (Adhikarya 1994), behavioral decision-making theories (Einhorn and Hogarth 1981), and the Theory of Planned Behavior (TpB) (Ajzen 1988). The TpB asserts that an intention to perform a certain behavior is determined by the individual's attitude toward performing the behavior and by the subjective norm held by the individual. This theory has been applied to determine which factors influence individuals to act in certain ways and to identify better ways of effectively communicating the message in campaigns relating to health, breastfeeding, AIDS, anti-smoking, seat belt usage, and anti-drugs. TpB helps to explain why some media campaigns have limited success. Increasing knowledge alone does not help to change behavior, whereas campaigns aimed at attitudes and perceived norms in making decisions produce better results. Studies of behavioral intentions suggest that we can predict the likelihood of the intended audiences' adopting desired practices. By assessing and understanding the factors, we can then develop messages to modify their attitudes and perceptions of benefits of the practices and how their peers will view their new behavior. Research by Fishbein and Ajzen (1975) supports the idea that individuals' and society's (perceived) attitudes are important determinants of action. Therefore, an important step toward influencing behavior is an assessment of the attitudes of the intended audience. We continued to monitor these attitudinal changes together with changes in practices at the beginning and some months after the launch of *Ba Giam, Ba Tang* to determine adoption.

## Implementation phases

To facilitate the development of quality partnerships and local ownership, we adopted a multistakeholder participatory planning and review process involving research, extension, mass media, universities, NGOs, and local governments. This process involved a series of workshops in five phases of the project cycle (Fig. 2) focusing on jointly identifying problems, needs, and opportunities, developing and evaluating intervention options and prototype materials, and developing hypotheses, instruments, and data for research (see Snapp and Heong 2003 and Heong and Escalada 2005 for more details).

The initial phase is identifying the problem and the associated ecological and sociological issues, and conducting research to better understand them. This first workshop reviews the research information on farmers' current attitudes and practices, and the potential of modified practices. The group then brainstorms for intervention ideas and develops a consensus on using a mass media approach. Understanding the root causes besides the direct causes of the problem is important. It is also important



**Fig. 2. Pathways to impact. Most research and development programs focus on the first two phases. The remaining phases are often “paths less traveled.”**

at this phase for all stakeholders to gain a common understanding of the various issues.

The findings are then used as inputs into the second and third phase, “technology development,” in which technical information is distilled into actionable entities expressed in the form of a heuristic. The three heuristics for communication in *Ba Giam*, *Ba Tang*, no early spray for leaffolders and reduced seed and fertilizer rates, were established from scientific rationality described in Huan et al (2008). In most cases, research and development place more emphasis on these two phases, leaving the other phases as “paths less traveled.” We found that increased emphases on or investments in the next three phases can add a lot more value to research.

The fourth phase encourages farmers to evaluate whether the *Ba Giam*, *Ba Tang* heuristics are true through farmer participatory research. This is equivalent to providing samples to consumers for testing in marketing campaigns. Heong and Escalada (1997) found changes in farmers’ perceptions after evaluating conflicting information. We developed a simple field experiment that farmers themselves can conduct in their own fields. Next, we invited farmers to perform the experiment. The motivations of *Ba Giam*, *Ba Tang* were reduced input costs, increased profit, less work, and reduced exposure to toxic pesticides. In this process, the heuristics may also be modified and adapted to suit local conditions. Some 951 volunteer farmers in several provinces participated and they found that the reduced inputs had no effect on yields and gave them higher incomes—about US\$58 per ha in the winter-spring and \$35 in the summer-autumn seasons, respectively (Huan et al 2005). After farm-

ers' evaluations, the new heuristics are then ready for scaling out, especially in areas where applications of seed, fertilizers, and pesticides are in excess.

The fifth phase is developing a communication strategy and selecting a pilot site. It is important to conduct this pilot project through partnership with local research, extension, mass media, local government, NGOs, and other implementing agencies. The key stakeholders participated in a "Message Design Workshop" (Fig. 3). They used the research results and baseline data to develop, first, a strategy for scaling out the message, and, second, the media and prototype materials required for motivating farmers into action. The messages were positioned in "gain" frames in the media materials to have higher motivational effects. For instance, increased profits are emphasized and the symbol of a "piggy bank" or a stack of bank notes was used. These prototypes were pretested before the final versions were mass produced and distributed. In addition, we emphasized the "trialability" of new practices. Interviews with farmers who had carried out the experiment were broadcast over radio and TV to encourage other farmers to test the three messages. An important element of the strategy is to hold a high-profile launch day to coincide with significant events, such as World Environment Day or Earth Day or a local festival, at which government officials, such as the vice minister, provincial governor, and directors of agriculture, and the media are invited to attend. Farmers who have carried out the evaluation experiments are also invited to share their experiences. Such publicity will help to focus attention of the campaign and can have significant multiplier effects by motivating neighboring provinces to conduct similar campaigns. The *Ba Giam, Ba Tang* pilot campaign in Can Tho Province stimulated local governments of the Mekong provinces to provide about \$345,000 additional resources to launch similar campaigns (Huan et al 2008).

The sixth phase is documenting the impact, which is conducted in parallel with the fourth phase. A rigorous research framework was planned at this phase to accurately quantify effects of the intervention. A management monitoring survey (MMS) was carried out about 2 months after the launch to enable the team to make adjustments as needed. Baseline and posttest data (collected before and after the launch) relating to farmers' beliefs, attitudes, and practices were then analyzed and documented. A show-and-tell press conference or workshop is another important event that can enhance adoption by other provinces and create multiplier effects. By involving policymakers in these high-profile events, policy change that can favor widespread adoption is also enhanced.

The mass media approach to scaling out can be highly successful when it communicates a single or only a few interventions or messages. One can start with one intervention and, when success is obtained, the incremental approach can be applied by adding one or two heuristics. It is also useful to "brand" the new intervention for easy communication and recall. In the campaign to reduce insecticide use in the first 40 days, we branded it "*No early spray*" (Escalada et al 1999). In the subsequent campaign to include the reduction of seeds and fertilizers, we branded it "*Three Reductions, Three Gains.*" Since savings from insecticide reduction constituted a high proportion of farmer earnings (Huan et al 2005), the campaign motivated farmers to further reduce insecticides by using less seed and fertilizer at the new recommended



**Fig. 3.** Artist employed in Message Design Workshops to develop prototype materials.

rates. High seed rates tend to promote a denser crop canopy. Coupled with high fertilizer rates, the crop canopy would become conducive to the development of pests and diseases. Thus, farmers using the new seed and fertilizer rates would tend to observe fewer pest and disease symptoms and spray less. The three gains from the campaign are profits, improved human health, and improved environmental health. Because of the credibility built from the earlier "no early spray" campaign, farmers readily adopted the "*Three reductions, three gains*" practices. Rigorous research is an imperative before establishing a new heuristic. Then, extensive evaluation by farmers is necessary before a scaling-out strategy is contemplated to avoid negative impacts.

### Managing multistakeholder participation

A multistakeholder partnership of high quality is essential to ensure success of the scaling-out process. We achieved this using a participatory style of leadership to stimulate creative problem solving and to promote high morale, satisfaction, local ownership, and commitment. Group decisions and supportive relationships based on mutual trust and respect were strongly emphasized in meetings and workshops. We also emphasized flexibility in our discussions, decision making, and relationships. Initially, the team establishes a "common stake" in the project, which helps various stakeholders establish their own stakes, roles, and commitments. We did this through developing a "common understanding of the various issues," a "consensus of the approaches," and a "common view of likely impacts and their measurements." The partnership was given the important task of branding the campaign to suit local language and culture. In addition, we made special efforts to share all data, analyses, results, publications, financing, credits, and awards.

To achieve large diffusion of the heuristics, strong commitment and support of local government authorities and agencies are essential. The goals of the project will need to satisfy the priorities of the local government as well as those of local implementing agencies. For instance, if the wages of extension agents in the area were dependent on the amount of farm chemicals they sold to farmers, this conflict would significantly compromise implementation plans. Thus, at the start of the project, a stakeholder analysis would be useful to understand stakeholder relationships to decide whether to proceed or make necessary adjustments before proceeding.

### Rapid adoption of *Ba Giam, Ba Tang* in An Giang Province

The commitment and support provided by the An Giang government is exemplary of the multiplier effects that our process was designed to achieve. In 2003, An Giang Province launched its own campaign, distributing 200,000 leaflets and 12,000 posters and erecting 31 billboards in the rural community (Fig. 4). Media materials were fashioned after the prototype materials developed at the "Message Design Workshop" but had an "An Giang identity" (Fig. 5). Between 2003 and 2008, the provincial government provided about \$1.5 million in support. This funded 1,031 training ses-



Fig. 4. Posters used in the “Ba Giam, Ba Tang” campaigns in Vietnam. On the left was the final version used in the Can Tho pilot project, while the one on the right was used in An Giang Province.

sions, 827 demonstration plots, numerous farmer contests, and promotional activities resulting in rapid adoption of *Ba Giam, Ba Tang* practices over 85% of the rice area in An Giang (Fig. 6). Details can be found at <http://devcompage.com/2009/02/28/rapid-adoption-of-three-reductions-in-an-giang-province-vietnam/>.

### Lessons learned

The *Ba Giam, Ba Tang* campaign in Vietnam has enjoyed huge success in reaching millions of farmers, leading to substantial changes in farmers’ attitudes, practices, and incomes (Huan et al 2008). *Ba Giam, Ba Tang* seems to have become part of the agricultural vocabulary being discussed at all levels, from policymakers to farmers to children. An independent impact analysis conducted by Huelgas et al (2008) showed that the Ministry of Agriculture and Rural Development (MARD) established a line item in its 2005 extension budget and that some provinces such as An Giang were continuing to allocate resources to *Ba Giam, Ba Tang*. In 2008, the An Giang provincial government extended this idea by adding two more “reductions,” reduce water use and postharvest losses, which is coined “*Five reductions and one must do*.” The *one must do* is to use certified seed. *Ba Giam, Ba Tang* was proclaimed a national priority by the minister of agriculture and rural development in 2006, which helped propel the

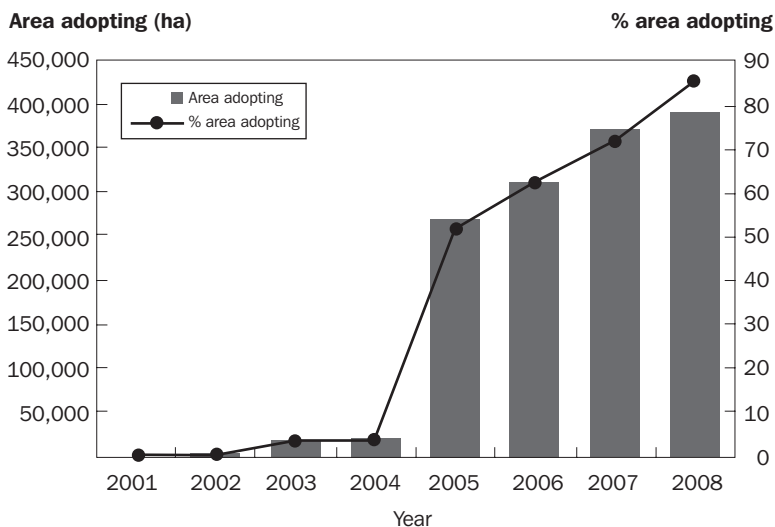


Fig. 5. Billboard used by An Giang Province to promote “Five reductions, one must do,” a further modification of the “*Ba Giam, Ba Tang*” campaign.

campaign further. The initial operating budget allocated to this initiative through the Irrigated Rice Research Consortium funded by the Swiss Agency for Development and Cooperation (SDC) was less than \$50,000, yet it leveraged more than \$1.8 million from various local sources. In 2008, this campaign gained the recognition of the Dubai International Award for Best Practices (DIABP) and is included in the world’s database of best practices (<http://beta.irri.org/news/bulletin/2009.03/>).

The key lessons we learned from the *Ba Giam, Ba Tang* project, its multiplier effects, its reach, and its impact on farmers are summarized as follows:

- The use of a systematic multistakeholder participatory planning and review process from project conception to implementation.
- The participatory leadership style of management of the multistakeholders focusing on quality partnerships, local ownership, mutual trust, and respect.



**Fig. 6.** Adoption rate of “Ba Giam, Ba Tang” in An Giang Province from 2002 to 2008. Data from An Giang Department of Agriculture, Long Xuyen, Vietnam.

- The integration of ecological, agricultural, and social sciences, particularly communication and decision sciences, in a trans-disciplinary manner.
- The application of social marketing techniques, such as branding, framing of messages, and motivating adopters.
- After the campaign has made progress, follow-up is needed in order to sustain the initial impacts to avoid or slow down discontinuance.
- The use of a comprehensive research framework throughout the project to monitor progress and track changes in farmers’ inputs, behavior, and attitudes, which in turn allows us to document impacts.

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## Notes

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