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Promoting Agricultural Productivity:
The Case Of The National Azolla Action Program

By

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PROMOTING AGRICULTURAL PRODUCTIVITY: THE CASE OF THE NATIONAL AZOLLA ACTION PROGRAM

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The National Azolla Action Program is a government program began in 1982 for the purpose of promoting the use of Azolla as an organic nitrogen fertilizer in the Philippines. It was to be a 5-year program jointly run by the University of the Philippines at Los Baños (UPLB) and the then Ministry of Agriculture (MA). UPLB was to take the lead in this arrangement: the program coordinator was appointed from the UPLB staff and the budget was given to the university to administer. How the program has fared in the pursuit of its objectives, seen from the social marketing as well as from the organizational communication point of view, is the subject of this case study.

Program Background

The National Azolla Action Program (NAAP) manifests one effect on Philippine agriculture of the swings in the price and supply of oil in the world market starting in the early 1970's. Nitrogen fertilizer is a critical element in rice farming. To increase yields, farmers have come to depend on chemical nitrogen fertilizers, which are mostly oil-based, imported, and paid for in foreign currency. The energy crisis and the steeply rising cost of chemical fertilizers meant the draining of dollar reserves for the government.
It also presaged lower production among rice farmers because of increased costs. The situation was threatening both the food supply of the country and the income of the largest sector of the population.

Clearly, feasible alternatives to chemical fertilizers had to be developed in a hurry. The most promising looked to be organic fertilizers coming from plant sources. Since 1975, International Rice Research Institute (IRRI) scientists, in collaboration with MA field technicians, had been experimenting with one of them -- Azolla. By 1982, agricultural planners felt that while research on Azolla needed to continue, enough was known about it to warrant a nationwide effort to promote its use as lowland rice fertilizer. A verbal report to President Marcos by IRRI director-general Nyle Brady about the virtues of Azolla was the open sesame to a ₱5 million fund for its popularization. So was the ground broken for NAAP.

A word about the Azolla technology. Azolla is a tiny fern found floating on ponds, ditches, rivers and other water surfaces. Embedded in its leaf cavities is a blue-green alga that can fix from the atmosphere more than enough nitrogen for its own needs and that of its Azolla host. When conditions are right, Azolla doubles in bulk in three to five days, quickly forming a mat on the water surface. Its fast growth rate and high nitrogen content make it a rich and cheap green manure for rice and vegetables as well as a protein feed supplement for livestock. A hectare of riceland fertilized with nothing but Azolla easily yields 4.5 tons of palay per hectare. (The national average is 3 tons per hectare in irrigated paddies.)
To grow well, the plant must have enough water and phosphorus, among others. It is extremely sensitive to heat and salinity. Since most of the Azolla species are not native to the Philippines, their strains have to be screened in potential sites to see how well they thrive. Then they have to be studied for the best ways of growing them in different ecosystems and of utilizing them as fertilizer and feed on the farm.

In 1982, the Azolla technology was virtually unknown to MA technicians, much less to farmers. Even now, many still regard it as a weed that blocks irrigation flow and that smothers young rice seedlings in times of flooding. Farmers need to know how to culture or where to get the starter pieces or inoculum (ferns do not produce seeds), how to grow the plants to best advantage, how to keep them healthy but not get swamped by them, how and when to mix them with the soil, and how to keep some of them alive for the next cropping. When not managed correctly, Azolla may not increase rice yields appreciably and does add to a farmer's work load. It is tedious business, for instance, to haul the fresh biomass from where it was cultured to where it is to fertilize rice plants. Its other uses, while equally bright, are barely past the experimental stage.

Program Planning

As conceptualized by UPLB and MA administrators, NAAP was to speed up the use of Azolla as an organic fertilizer in order to reduce by half the inorganic nitrogen requirements of irrigated lowland rice production in the Philippines in five years. By year 5, the target was
to have it used in one million hectares of riceland in the 12 regions of
the country. This was expected to save at least $2.2 million in foreign
exchange a year for every 100,000 hectares of lowland rice, or $22
million for one million hectares by 1987.

Identified as strategies to achieve the program objective were the
following:

1. Setting up of a national inoculum center at UPLB with regional
subcenters in MA stations and in agricultural universities and colleges
to serve as sources of pure inoculum for regional propagation centers.

2. Setting up of propagation centers in all the regions to serve
as sources of Azolla seedpieces for distribution to targeted municipalities
and barangays.

3. Preparation of an area operations plan classifying lowland
rice-growing areas in the country according to suitability to and
requirements for Azolla seeding.

4. Preparation and production of information/extension/communication
materials for extension workers and farmers on the culture,
propagation, multiplication and utilization of Azolla. These would include
posters, leaflets, pamphlets, audio tapes for radio broadcasts and video
tapes for telecasts.

5. Conduct of regional training for technicians and seminars and
other extension services for farmers on the culture, propagation,
multiplication and utilization of Azolla.
In brief, the stated thrust of the program was to quickly make two things available: (1) a steady, high-quality, locally suitable supply of Azolla inoculum and (2) the proper information to help farmers grow and use the Azolla fertilizer correctly.

MA and UPLB were to collaborate on both tasks, with each one taking the lead where it was deemed better equipped to. UPLB was to run the national inoculum center and subcenters which were to be responsible for collecting and selecting suitable strains of Azolla for different environments. In addition, it was to prepare and produce the various communication materials. MA was to operate the regional centers which would propagate, test, maintain and distribute seed materials of Azolla strains suited to each region. It would also prepare the area operations plan marking the places where Azolla could be expected to grow well. UPLB would train MA trainors, who would in turn train MA field technicians, who would then teach the farmers.

Since this case study deals mainly with the second task -- spreading information on the Azolla technology -- we shall focus from hereon on NAAP planning for training and communication materials production, but with much more emphasis on the latter. Two teams were created at UPLB for the extension task. One, called the training-extension team, combined the job of training trainors with that of multiplying the pure Azolla inoculum and distributing it to the MA regional propagation centers. The other was named the communication and extension support team. The three other UPLB teams formed were those on biology and culture, utilization, and economics.
From the beginning, the communication and extension support team took as its terms of reference the view of communication as a support component to a development program. Based on the general and specific NAAP objectives (Appendix A) which it took upon itself to state concretely for the program, the communication team, using critical path analysis, drew up these corresponding communication objectives for the 5-year period:

General communication objective --

To encourage rice farmers to use Azolla as fertilizer on one million hectares of riceland in 1982-87.

Specific communication objectives --

1. To inform rice farmers and their families about the usefulness of Azolla to them.

2. To teach farmers and extension workers the correct culture, propagation and utilization of Azolla.

3. To continuously update crop subject matter specialists and agricultural teachers on the latest research information on Azolla.

4. To inform MA, UPLB and other administrators as well as NAAP researchers on what is being done in the Azolla program.

5. To inform media practitioners and the general public about Azolla and its uses and what is being done in the NAAP.

6. To integrate Azolla information in agricultural high school and university courses.
7. To monitor perceptions and problems on the culture, propagation and utilization of Azolla as seen by all the participants in the Azolla program.

8. To establish regular communication linkages among the participants in the Azolla program.

Keeping in mind the various groups of users of Azolla information, the team translated these objectives into the following broad communication strategies for NAAP:

1. Regional training of agricultural trainors and technicians on the value, culture, propagation and utilization of Azolla.

2. Farmer seminars on the value, culture, propagation and utilization of Azolla and the availability of supportive services.

3. Integration of Azolla information in Masagana 99 activities and communication materials.

4. Production and distribution of multi-media teaching aids to be used by trainors in the regional training courses and by extension workers in the farmer seminars.

5. Production and distribution of multi-media communication materials for direct use of farmers, extension workers, trainors, teachers, administrators, media practitioners and the general public.

6. Institution of feedback, monitoring and other communication linkages among the participants in the Azolla program.

7. Establishment of an Azolla information bank.

Using these general communication strategies as referent and guided by developments in the program, the team prepared a yearly plan of activities separate from those of training and extension. Samples
of the activity plans are shown in appendix B. These plans were the basis of the budget programmed for the communication team each year.

Program Implementation

The materials output of the communication team to date is listed in appendix C. It groups roughly into three categories: teaching and informational materials for trainors, field technicians and farmers; promotional and informational materials for the general public; and program support materials like photographs for the scientists, kit stickers, sign boards for the demonstration plots and annual reports.

In the first year or so of NAAP, the chief concern was to organize the inoculum center and subcenters, the regional propagation centers, and indeed the entire administrative machinery of the program including the management teams and committees. A major job of the communication team at that time was to assist in the organizational spadework by packaging the Azolla trial-demonstration kits, for instance, and making the billboards to identify the trial-demonstration sites.

Until a continuous supply of Azolla inoculum could be assured and the procedure for utilizing it locally tested, the communication team did not think a media campaign to publicize the technology to the users was justified, following conventional extension policy not to drum up a demand until it could be met adequately and safely. Interestingly enough, a divergent opinion among some of the UPLB staff was that if the users knew about the technology early, they themselves could pressure the inoculum producers to come up with the product on demand.
In any case, the technical coordinating committee (made up mainly of the UPLB program and team leaders plus some MA representatives) agreed to hold the campaign for the moment.

After the third trial cropping by August 1983, the program management was sure that it had a viable technology and the inoculum centers were turning out enough starter materials. But because of that initial position taken by the communication team and other later developments which hobbled a full-scale campaign, some of the NAAP staff never quite got over the feeling that the team was dragging its feet.

Besides doing promotional and administrative support work during the first year, the communication team cooperated with the training-extension team (1) by preparing training lessons with the accompanying visual and audio-visual aids and (2) by producing publications meant for trainees. The lessons and publications were used for training regional program managers and leaders, regional area operations plans officers, regional propagation center officers, regional trainors and technicians.

Making the radio plugs to promote public awareness of the program underlined an ambiguity in the division of labor between MA and UPLB that had worried the communication team from the start. Since UPLB was responsible for technology research and development and had in its premises a core of communication specialists who could pick up new Azolla findings from their researcher colleagues and convert them into appropriate media materials, the program planners had given to
UPLB the job of preparing and producing the communication materials for NAAP. The concept was valid enough, except that UPLB did not have the resources for mass production and distribution of the materials. Knowing this, the team early suggested to the NAAP management that UPLB do the prototypes and that MA, with its more ample manpower and facilities, do the mass production and distribution.

Even so, the matter of the radio plugs still showed flaws in the UPLB-MA arrangement. One plug chosen out of eight pretested at UPLB and turned over to MA for local revision, translation into the dialects, and channeling to the regular MA outlets seemed to have been held up unduly in the process and was finally lost to UPLB monitoring. Beside's showing up defects in the information relay system, the case of the radio plugs also reflected the inadequate communication across corresponding units of the two partner agencies.

In fact, the poor communication apparently existed not only across the two agencies but within each agency as well, if the experience of the communication team was indicative. The team felt cut off from a good deal of information, particularly about subcenter operations and technology evaluation in the field, that it felt it needed to know for its own planning. A suggestion of the team was accepted that monthly meetings be held and quarterly reports submitted so that everyone could keep abreast of NAAP activities. But reports were too pro forma and meetings crammed with other business to be of full value as communication mechanisms.
It did not help that the team was usually left out of field travel plans unless photographs were to be shot or slides were to be projected. The team was free to make its own travel plans, true enough, but for monitoring purposes, tagging along with the subcenter staff would have been more productive.

From the beginning, assessing farmer knowledge and perceptions of the Azolla technology and farmer problems with it was part of the team agenda. It could not be started until 1985-86 for personnel reasons: qualified research assistants were difficult to come by; UPLB and government policies discouraged hiring of new personnel or pegged their salaries at uncompetitive rates; the three-person communication team in 1982-84 was actually only part-time with NAAP and had its hands full with materials production. As a result of travel and personnel problems, the communication team's contact with the technician and farmers users of Azolla information in 1982-84 was not as close as it would have wished.

By the second year of the program, the team had begun producing the first "how-to" materials for farmers. A quarterly in-house newsletter was started to link the multi-agency NAAP staff together. It became more of a research publication, however, by the beginning of the third year, about the same time that the original members of the team went on leave or resigned from the university, requiring a completely new communication team altogether.
Not long afterwards, a new minister of agriculture took over, leading to a shakeup of the NAAP structure. When the smoke cleared, the program had been split into two: a research arm to remain at UPLB and retaining the name of NAAP, and an extension arm at MA to be called the Unified Azolla Program. NAAP still continued to make communication materials -- the quarterly Azolla Notes, sent also to MA personnel, and occasional trainor publications and audio-visual aids. Extension-type materials, however, were left to MA to do. By way of a postscript to this account, NAAP received the University of the Philippines Presidential Award for Extension/Community Service in 1986.

**Program Analysis**

Whether they were aware of it or not, the members of the NAAP staff were trying to operationalize three information delivery concepts all at once: (1) extension education, where training is a critical component and which most agricultural administrators are already comfortable with; (2) development support communication (not quite the same as development communication), which tries to provide a development program with all its communication requirements; (3) and social marketing, which speaks in terms of a product to be sold aggressively to consumers at a price that they can afford. While the three concepts may diverge on some points, they have many overlaps. One that is basic to all of them is the principle that a good information delivery plan is contingent on prior client, user or consumer research.
Both the NAAP economics and communication teams spoke early of the need to understand user perceptions of and problems with the Azolla technology. Because of personnel, travel and social environmental constraints, social research has not been adequately done at NAAP. The emphasis has been on the biological and physical aspects of the technology, an all-too-familiar syndrome in agricultural universities which social researchers complain about but do not do enough to overcome.

Even when subsequent developments in the program required that the package of technology be evaluated on the ground, the team formed did not include a social scientist. The results showed, in several instances, soils scientists re-inventing or wrestling with essentially social concepts in technology utilization.

Social research is perhaps even more imperative for NAAP whose raison d'etre was non-user slanted: how the country could save on foreign exchange without letting down on national rice production. Strong countervailing reasons are needed to make palatable to small farmers -- who make up the bulk of rice producers -- a completely unfamiliar technology whose social cost in terms of additional learning, time and physical labor may not be compensable in increased yield.

A lot of these judgments are of course said in hindsight, a social science failing that understandably annoys natural scientists when they come up against it, but the circumstances in which they are made nevertheless add to the accumulating evidence in the Philippines that social research cannot be postponed or omitted in technology transfer
programs. A significant straw in the wind is the finding in one NAAP locality that adoptor farmers switched back to inorganic fertilizer when its price went down recently.

In joint MA-UPLB programs, UPLB generally takes care of the more basic research while MA does the field testing and extension. The NAAP directive was unusual in that while MA was indeed mandated to conduct technician training, farmer seminars and demonstration trials, UPLB was assigned the preparation and production of communication materials. Since UPLB lacks the resources for sustained nationwide materials production and distribution -- a deficiency that present university personnel, printing and equipment policies are powerless to remedy -- the communication team took on only the responsibility for making the materials prototypes. This decision may have been conveyed incorrectly or not at all to its MA counterpart or may have been received in a different light. At any rate, the uphill task of seeing each NAAP communication material through to its production and distribution was not made easier by agency misunderstandings.

The same organizational irritants also surfaced when NAAP was created. They may well have played a large role too in the spin-off of the Unified Azolla Program. By the very nature of their functions, MA and UPLB cannot but work together to complement each other's strengths and nullify each other's weaknesses. Perhaps the rivalry issue needs to be swept out from under the rug where it is usually consigned and faced more constructively.
Finally, if they are to be effective, NAAP and other communicators must begin to resolve their identity crisis in earnest. They must show, and their colleagues learn, that communication is a profession that is more than just technical service to the rest of the NAAP staff or mindless media publicity; that even, in fact, as publicity or service, it still entails planning anchored on systematically gathered information.

The extension and communication component of NAAP is integrated enough in the program so that apart from the pretests of communication materials and measures of increase in knowledge after training, evaluating the success of the information delivery strategies would be meaningless. As early as 1984, it was apparent that while the program was doing well, the goal of using Azolla on one million hectares of riceland was not going to be reached. If awareness of the technology by potential and actual users is taken as a success indicator, a Laguna study shows 70% awareness of Azolla, although adoption is only a little over 30%. Laguna, however, is not to be taken as representative of the provinces where Azolla has been adopted.

The field of innovation diffusion is past the stage where non-adoption is equated with failure of the communication program. The present state of Azolla utilization is more likely a comment on the nature of the technology itself. In social terms, it has turned out to be more complex than the NAAP planners had figured. It needs to
he communicated not as one simple message of "use Azolla," but as various sets of very concrete messages just as soon as NAAP researchers and communicators have sat down together and agreed on what those messages are.