NVSU-DA Partnership in Rice Seed Production and Promotion

Elbert A. Sana[1], Agustin B. Lunag[1], Liberty G. Torres[2], Peter A. Piggangay[1], and Gaspar D. Baysa[3]

[1] Department of Plant Science, Nueva Vizcaya State University, Bayombong 3700, Nueva Vizcaya
[2] Department of Veterinary Medicine, Nueva Vizcaya State University, Bayombong 3700, Nueva Vizcaya
[3] Department of Agricultural Technology, Nueva Vizcaya State University, Bayombong 3700, Nueva Vizcaya

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ABSTRACT

The project partnership with the Department of Agriculture mobilized NVSU in promoting technologies and commercial use of certified seeds of improved inbred rice varieties by farmers in Nueva Vizcaya. In the scheme NVSU engaged in seed production, channeled a portion of the harvest to seed recipients from selected municipalities, monitored rice production and extended technical assistance to farmers, and sold the rest of the seeds through the Nueva Vizcaya Seed Growers and Marketing Cooperative.

NVSU set aside a 4.0 hectare area and produced for two seasons a total of 674 bags of certified seeds of improved inbred rice varieties preferred by farmers. The project channeled 200 bags through the Municipal Agriculture Offices of Aritao, Bayombong, Solano, and Villaverde, Nueva Vizcaya. Under an agreement, beneficiaries pay with 60 kg good seeds they produce from the 40 kg certified seeds they received from the project. The endeavor effectively promoted use of certified seeds and provided opportunities for technical sharing of inputs during monitoring, strengthening of linkage with partners, and generating income for the university from sales of certified seeds. Recorded yield showed a range of 3.75-6.30 tons ha^{-1} and a net income range of Php35,000-86,000 per ha for Bayombong, while 4.19-7.5 tons ha^{-1} with a net income range of Php42,500-110,000 per ha for Aritao, suggesting a relatively good harvest and farm income for users of NVSU-produced certified seeds.

A microproject was also set-up as a strategic approach for promoting certified seed production through an entrepreneurship scheme involving a senior graduating agriculture student. The student entrepreneur successfully produced certified seeds from half a hectare with technology applications from seed preparation to post-harvest processing. The microproject yielded a total of 52 bags (40 kg per bag) sold for Php62,500.00 and generated a 93% return on cash expense (ROCE). The success of the student led to a degree Bachelor in Agricultural Technology.

INTRODUCTION

Rice is grown in the 15 towns of Nueva Vizcaya covering about 27,000 ha of irrigated lands and over 2,300 ha of rainfed lowland and upland areas (DA-RF02, 2013). In the irrigated ecosystem for the last two seasons of 2013, 48% (12,716.05 ha) of rice farmers planted certified seeds, 47% (12,385.75 ha), good seeds, and 5% (1,396.35 ha), hybrid seeds. The range and average yield levels per hectare in irrigated farms varied

primarily by the kind of seeds planted by farmers. Hybrid seeds recorded the highest yield with an average 6.10 tons ha^{-1} (5.68-6.51 tons ha^{-1}), certified seeds, with an average 4.86 tons ha^{-1} (4.76-4.96 tons ha^{-1}), and good seeds with average 4.25 tons ha^{-1} (4.02-4.52 tons ha^{-1}). In the same year, lowland and upland rainfed ecosystems recorded an average yield of 3.21 tons ha^{-1} with the lowest at 1.68 tons ha^{-1} and the highest at 4.31 tons ha^{-1} (DA-RF02, 2013).

In order to promote use of certified inbred rice seeds and enhance productivity of rice farmers in the country, the National Rice Program of the Department of Agriculture launched in 2013 a project partnership with state universities and colleges (SUCs).The National Program seeks to mobilize selected agri-based SUCs as effective DA partners in the production of high quality seeds for massive rice production and utilization demonstration by farmers for increasing rice yields in strategic areas.

NVSU which has been producing registered and certified inbred rice seeds since 2008 through the NVSU Seed Foundation Project received funding to implement the project. This paper presents the accomplishments of the seed production partnership of NVSU and DA endeavored to benefit rice farmers of Nueva Vizcaya. The NVSU-DA seed production partnership has the following specific objectives:

1) To establish in NVSU a 4.0 hectare area for sustained production of certified seeds of improved inbred rice varieties;
2) To organize rice farmers in selected municipalities of Nueva Vizcaya in partnership with local government units for the promotion and use of NVSU certified seeds;
3) To produce certified seeds in NVSU, channel at least 160 bags to farmer beneficiaries under a memorandum of agreement, and sell the rest of the seeds to interested clients;
4) To monitor farm operations and extend technical assistance to rice farmer beneficiaries; and
5) To implement a student entrepreneurship project as a strategic means for promoting technology and use of certified rice seeds;

METHODOLOGY

The DA-NVSU seed production partnership project started during the wet season of September 2013. DA provided Php200,000.00 (Php50,000.00 per ha) for seed production under an agreement that NVSU will return the amount in the form of certified seeds to be distributed to farmers. The project engaged in four major activities: (1) certified seed production and student entrepreneurship, (2) coordination and linkage with local government units and farmer leaders, (3) seed distribution to farmer beneficiaries, and (4) monitoring of farm operations and technical assistance to farmer beneficiaries. Each of these major activities is described in this paper.

Certified Seed Production and Student Entrepreneurship

Upon release of funds, seed production was coordinated with DA-RFO2 where registered seeds of NSIC Rc152 and NSIC Rc214 were secured. Four bags (40 kg each) of registered seeds (two bags per variety) were sown and planted in the four hectare production area of NVSU Bayombong on October 2013 following recommended practices from seeding, crop maintenance, harvesting, to post-harvest operations (Figure 1). The municipal seed inspector regularly monitored seed production as required by the seed certification process.

After harvest on February 2014, seeds were dried below 14% moisture content and temporarily stored under ambient temperature. A month after harvest, samples were taken from the seed lots and submitted to the National Seed Quality Control Services (NSQCS) at San

Mateo, Isabela for testing. The same protocol was followed for the second batch of certified seeds produced. Registered seeds were bought from Nueva Ecija varieties NSIC Rc216, 218, 238, and 302.

For the second batch, a microproject involving a senior Bachelor in Agricultural Technology student was also set-up. This was allotted a half-hectare portion of the seed production area at NVSU and managed by the student entrepreneur under the supervision of the project coordinator. The scheme provided a hands-on exposure to the student which is a strategy in promoting production and use of certified seeds.

Coordination and Linkage with the Local Government Units

The project team in NVSU coordinated with the Provincial Agricultural Office (PAGRO), the Municipal Agriculture Offices (MAGRO) of Bayombong, Solano, Villaverde, and Aritao, and the farmer leaders of the province. For the first batch of certified seed distribution, a consultative meeting among partners and intended recipients was held at NVSU to discuss the concept, objectives, and benefits of the project.

Seed Distribution to Farmer Beneficiaries

Four municipalities namely, Bayombong,

Figure 1. (A) Rice plants a month after transplanting; (B) At heading during the visit of the National Rice Program Senior Technical Adviser, Dr. Santiago R. Obien; (C) Threshing after harvesting; and (D) Seed sampling by the Municipal Seed Inspector, Mr. Henry Bayag

Solano, Villaverde, and Aritao, with relatively good rice production record in terms of area, volume, and yield level were selected. A total of 160 farmer beneficiaries, 40 from each town, were identified in coordination with the MAGRO. A staff from the MAGRO was assigned to contact farmers and come up with the cluster of seed recipients. A schedule was set for seed distribution to each recipient in the barangay identified for each selected municipality. The project leader coordinated the activity and delivered NVSU-produced seeds. A short ceremony was held to discuss the purpose of the project, get the commitment of all parties, and sign the memorandum of agreement.

Monitoring and Technical Assistance

As part of NVSU's commitment to its clients, the project team monitored farm operations of farmer beneficiaries as well as extend technical assistance on rice production. Farm activities monitored were seedbed preparation, seeding and transplanting, and other management practices. During field visits, the project team discussed recommended technologies on rice production as options for farmers who are willing to follow.

RESULTS AND DISCUSSION

NVSU-Produced Certified Seeds

For the 2014 season covering October 2013 to February 2014, seed production yielded a total of 323 bags (154 bags of NSIC Rc152 and 166 bags of NSIC Rc214), with an average of 4.21 tons ha^{-1} (Table 1). The minimum target of 5 tons ha^{-1} was not achieved due to limiting factors in the growing conditions. Low temperature prevailed from booting to heading and reduced the yield. A low temperature range of 13.94°C-31.17°C was recorded in the NVSU Field Monitoring System during the period. It is a common observation that below the critical temperature of 18°C for rice, pollen sterility increases and panicles are not fully exserted affecting grain filling and development. Low temperature stress manifested as unfilled grains and partial panicle exsertion.

NVSU project team packaged seeds into

Table 1. Yield and number of processed seeds produced for two seasons from the NVSU rice production area (4.0 hectares)

Harvest Date	Variety*	Area (ha)	Threshed Yield		Processed Seeds (40 kg per bag)
			No. of Bags (40kg per bag)	tons ha^{-1}	
February 5, 2014	NSIC Rc152	2.00	154	4.27	158
February 11, 2014	NSIC Rc214	2.00	166	4.15	165
Total		4.00	320		323
Mean Yield				**4.21**	
January 10, 2015	NSIC Rc238	2.80	296	5.29	303
January 12-13, 2015	NSIC Rc216	0.50	51	5.10	48
	NSIC Rc218	0.40	32	4.00	
	NSIC Rc302	0.40	49	6.13	
Total		4.00	428		351
Mean Yield				**5.10**	

**NSIC Rc 218 succumbed to blast while NSIC Rc302 showed mixtures. Seeds of both varieties were sold after drying*

20 and 40 kg bags to provide farmers with 0.5-1.0 ha rice production area. NSIC Rc152 had a total of 158 bags (40kg per bag) and NSIC Rc214, with a total of 165 bags. Seeds of both varieties passed certification standards (Figure 2) and were given blue tags on March 2014. NSIC Rc152 and NSIC Rc214 are preferred varieties of farmers in Nueva Vizcaya.

In the same season, the project sold 163 bags of certified seeds at Php1,200.00 per bag, earning a gross amount of Php195,600.00. A total of 160 bags at 40kg per bag were distributed to farmer recipients valued at Php177,600.00, bringing the total gross income of Php373,200.00 (Table 2). Deducting the DA investment of Php200,000.00, the NVSU seed production project earned a net income of Php173,000.00.

The second season planting started in September 2014 due to repair of the water system. The set-up involved four varieties: NSICRc 216, NSICRc 218, NSICRc 238, and NSICRc 302. In this production period (September 2014-January 2015), a total of 428 bags were harvested with a mean yield of 5.10 tons ha^{-1}. Of these, three seed lots with

Figure 2. NVSU-Produced Certified seeds under ambient temporary storage

Table 2. Income derived from the sale of certified seeds

Particulars	Amount (Php)
Gross Sales	
163 bags certified seeds @Php1,200.00 per bag	195,600.00
160 bags clean seeds to be returned by farmers for a total of 160 bags 40 kg certified seeds received x 60kg @Php18.50 per kg	177,600.00
Sub-total	373,200.00
Investment cost of seed production	
Php50,000.00 per ha for a total of 4.0 h	200,000.00
Net Income (total sales-investment)	**Php173,200.00**

a total of 351 bags of 40 kg each (303 bags NSIC Rc238 and 48 bags NSIC Rc216) were processed, stored under ambient condition and passed certificatio. From these seeds, 300 bags were sold through the cooperatives, 40 bags channeled through LGUs of Aritao and Bayombong, and the rest were disposed to walk-in clients. The project is expected to earn a gross income of Php500,000.00 and a net income of more than Php300,000.00 when all collections and payments have been completed.

Student Entrepreneurship

The student entrepreneur produced a total of 52 bags processed seeds (40 kg per bag) of NSIC Rc238 which passed certification as part of the three seed lots of the whole project. Table 3 presents the cost and return analysis of the microproject. Based on analysis, the microproject posted a 93% return on cash expense (ROCE) indicating good profitability. Added to the profit, the student was able to defend his manuscript as partial requirement and graduated will the degree Bachelor in Agricultural Technology.

Coordination and Linkage

The consultative meeting on January 29, 2014 held at NVSU assembled representatives from the PAGRO, MAGRO, municipal seed inspectors, farmer leaders, officials of NVSU, and the project team (Figure 3). The group agreed on a seed banking scheme where one bag of 40 kg certified seeds given to a farmer beneficiary will be replaced with 60 kg of good seeds after the cropping season. The group also appreciated the project's offer of distributing 40 bags of certified seeds to each of the four selected municipalities. Figure 4 presents the agreed seed banking scheme by the consultative group to be followed in distributing the seeds to the recipients. The linkage further strengthened the working partnership of NVSU, the LGUs and the farmers.

Seed Distribution

Table 3. Cost and return analysis of the microproject involving production of certified seeds of NSIC Rc238

Particulars	Amount (P)
Cash Sales from certified seeds (52 bags @Php1,200.00 per bag	62,400.00
Less: Direct Expenses:	
Registered seeds	1,200.00
Fertilizers	7,043.50
Pesticides	795.00
Less Indirect Expenses:	
Land Preparation	3,000.00
Pulling	750.00
Transplanting	2,500.00
Harvesting	3,500.00
Threshing	2,070.00
Fuel (Gasoline)	900.00
Sacks	520.00
Tractor rent	500.00
Seed cleaner rent	246.00
Mechanical dryer	1,081.00
Irrigation	1,530.00
Seed Certification	500.00
Loan interest	760.00
Non-cash expense (student labor)	5,400.00
Total Expenses	32,295.50
Net Income (Before NVSU Share)	30,104.50
Less NVSU Share (50% of Net Income)	15,052.00
Net Income	**15,052.00**
Return on Cash Expenses (ROCE)	**93%**

Table 4 presents the seed delivery schedule accomplished by the project participants. Seeds were brought to the municipal hall in coordination with the municipal mayor and the municipal agriculturist and distributed to farmer beneficiaries after a briefing about the project. In the case of Magapuy, Bayombong, recipients gathered at the barangay hall and

Table 4. Schedule of seed distribution to farmer recipients

Municipality	Place of Delivery	Date of Delivery	Number of Bags Delivered*
Bayombong	Magapuy Barangay Hall	April 11, 2014	40
Solano	Municipal Hall	May 6, 2014	40
Aritao	Municipal Hall	April 21, 2014	36
Villaverde	Municipal Hall	April 22, 2014	40

**Four bags of the reserved seeds for Aritao were sold*

Figure 3. (A) Participants during the consultation meeting with PAGRO and MAGRO focal persons and farmer leaders held at NVSU on January 29, 2014; (B) Visit of the same group in the seed production area of NVSU

participated in the program before receiving their share of certified seeds. In Aritao, the mayor sought a resolution of the Sanguniang Bayan before signing the MOA of the project.

Monitoring and Technical Assistance

In all the four towns selected, farmer recipients were located in one or adjacent barangays to group them into clusters for ease of monitoring and technical assistance. Selected farmers in Bayombong and Aritao started seeding and transplanting in May to June. Farmer beneficiaries in Solano and Bayombong mostly planted in August and September. In Bayombong, most farmers know the recommended technology for seedbed preparation and area requirement of 400 m^2 per 40 kg certified seeds. However, they deliberately chose to prepare three to four wide seedbeds of about 3 m by 15-20 m, thus, producing relatively small seedlings for transplanting (Figure 5). Farmer recipients when interviewed claimed that the practice is labor efficient during pulling and transplanting. The monitoring became a venue for discussion and technical inputs on the proper use of organic inputs to loosen soil for seedling pulling and recommended application rate and timing of fertilizer application.

Bayombong farmer recipients started paying back their 60kg seeds to NVSU since September, while Aritao farmer recipients, on October 2014. Table 5 shows those who have already paid, the rice variety received, and the yield obtained. Farmers who paid expressed their satisfaction from the use of

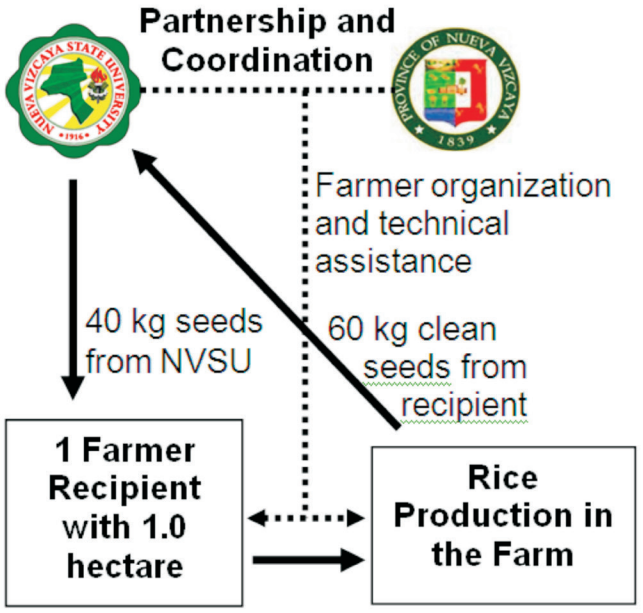

Figure 4. Approved seed banking scheme followed by partners and seed recipients

Figure 5. Farmer reipients and the project team during the monitoring at Magapuy, Bayombong: (A) long and wide but few seed beds; (B) Edgardo Nuesca in his 7,000 m2 rice farm during heading stage; and (C) gathering some information and feedback and collection of seed payment from three farmer beneficiaries

NVSU-produced seeds. While doing collection during monitoring, the project team also gathered information on fertilizer and pesticide use and the amount they spent for labor in various farm operations. These information are needed in the computation of their ROCE.In Bayombong, the highest yield was 6.30 tons ha^{-1} from the farm of Mr. Giovanni Dumagas who planted NSIC Rc214. In Aritao, a total of 10 farmer recipients have paid. The highest yield was 7.50 tons ha^{-1} from the farm of Mrs. Lourdes Reyes who planted NSIC Rc214.

CONCLUSION AND RECOMMENDATIONS

Conclusion

The seed production partnership provided opportunities for technology application in seed production, labor employment, and income generation for NVSU. The project also further strengthened NVSU's linkage with the Department of Agriculture, the local government units, and rice farmers in the province. The continuing monitoring work currently serves as a window for understanding farmers, their practices and choices, and their reasons for adoption or non-adoption of recommended technologies. Insights on these experiences may guide researchers in focusing future interventions in rice production.

Farmer recipients were fulfilled on the provision of high quality seeds of preferred rice varieties and technical assistance from NVSU. The certified seeds to be paid with seeds after the cropping season is also a privilege for them.

Table 5. Variety received, area planted, and yield of farmer beneficiaries

Farmer Beneficiary	Variety Received	Area Planted (m^2)	Actual Harvest (kg)	Yield per ha (tons)
A. Magapuy, Bayombong, Nueva Vizcaya				
1. Giovanni Dumagas	NSIC Rc214	10,080	6,350	6.30
2. Aldrin Fontanilla	NSIC Rc214	10,000	4,650	4.65
3. Rodel Cordero	NSIC Rc214	10,200	5,100	5.00
4. Melchor Cordero	NSIC Rc214	10,000	4,200	4.20
5. Victorina Ruiz	NSIC Rc214	6,000	2,450	4.83
6. Nestor Collado	NSIC Rc214	5,000	3,100	6.20
7. Melchor Cordero	NSIC Rc152	8,000	3,000	3.75
8. Joel Cordero	NSIC Rc152	4,000	1,950	4.88
9. Martin Berras	NSIC Rc152	6,000	2,500	4.17
10. Edgardo Nuesca	NSIC Rc214	7,000	3,150	4.50
11. Gerry Collado	NSIC Rc214	6,000	3,100	5.17
12. Lorenzo Mariano	NSIC Rc214	5,786	2,900	5.01
13. Emilio Olia	NSIC Rc214	4,000	2,200	5.50
B. Aritao, Nueva Vizcaya				
1. Ernesto Corpuz	NSIC Rc152	10,300	8,600	6.62
2. Josephine Doculan	NSIC Rc214	10,800	7,550	4.19
3. Ernesto Peralta	NSIC Rc152	8,000	5,250	6.56
4. Lourdes Reyes	NSIC Rc214	10,000	7,500	7.50

Recommendations

As agreed upon in the MOA, the farmer recipient returns 60 kg good seeds to NVSU for the 40 kg certified seeds he received from the project. A simple economic analysis based on expenses and yield levels attained should be done to record productivity of recipients in using NVSU certified seeds and in adopting some of the aspects of the package of technology for growing improved inbred rice varieties.

NVSU can use the income from the project and continue with production of certified seeds. When foundation seeds of preferred varieties become available, NVSU should continue to produce registered seeds for seed grower partners in the province.

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