POLICY IMPLICATIONS OF THE EFFECTIVENESS OF PHILIPPINE HYBRID RICE PROGRAM

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ABSTRACT

In an attempt to increase rice production and to attain rice self-sufficiency in the Philippines, hybrid rice technology has been acknowledged and is now becoming a trend in the rice industry. Under the Department of Agriculture's Gintong Ani Program, hybrid varieties have been demonstrated on large-scale farmers' field trials at eleven provinces targeted for hybrid rice cultivation. The current state of the technology has been reached through collaborative efforts by members of the national rice R&D network spearheaded by PhilRice, the International Rice Research Institute (IRRI), and members of the private rice seed industry. Two hybrids, Magat and Mestizo, have been released in the country, hybrid rice seed production and cultivation technologies have been developed and packaged in the form of manuals, video tapes and other information dissemination materials, a critical mass of researchers, extension workers, and other key players in the rice seed industry and the national government have been educated on the various aspects of the technology during training courses held at IRRI and PhilRice, and the economic viability of hybrid rice cultivation and seed production have been studied and demonstrated. However, there is much to be done for hybrid rice technology to gain a solid foothold in Philippine rice agriculture. Challenges must be addressed to ensure that the increased yield levels attained in technology demonstration trials will be realized on farmers' rice fields leading to increased farm productivity and farmer-incomes. The development and use of hybrid rice technology in the Philippines provides a good example on how an international agricultural research centre and a national agricultural research system could jointly develop and benefit from a technology usable by the farmers for increasing rice yields.

***Keywords**: hybrid rice, production, inbred varieties, hybrid technology*

Philippines' population is projected to blow up by 32 million over the next 25 years with an average of 2.3 per annum (PHILRICE 2002). Consequently, with the projected increase in population, the demand for rice will also increase by 40 percent by the year 2030. During the first two decades of the green revolution, rice production increased at a respectable date resulting to the Philippines' transition from being a major rice importer to self-sufficiency in rice production. However, the increased yield has started slowing down with the decline in public sector investment for the expansion and maintenance of irrigation infrastructure and full adoption of modern rice varieties unfavorable ecosystems since early 1980s. (PHILRICE 2002)

For Filipinos, rice is an imperative. It is not just food or a source of income—it is their culture and tradition. Planting and harvesting rice is not just an economic activity.

It is also a symbolism of their resistance to hunger and the culture of have-nots in the rural area. Thus, achieving rice security is intricately related to the nation's struggle in eliminating extreme hunger and poverty which is one of the United Nation's first Millennium Development Goal. In Development Goal. In fact, rice security is tantamount to food security in the Philippines. As the staple food of the Filipinos, rice accounts for 46% and 35% of their caloric intake and protein consumption (FAO 2008).

Rice comprised 16% of the total expenditures of the poorest 30% of the population of people's major spending (World Bank, 2007). An increase in the prices of rice would also mean an increase in the Filipinos' cost of living which would result to more people experiencing poverty. Planted in about 30% of the total agricultural area harvested, rice is the most extensively grown crop in the country (Dawe 2003). Rice farming is the source of over half of the household income for almost two million families. Furthermore, millions of landless farm workers, and thousands of merchants indirectly depend on rice for a living. The production of rice in the Philippines grew from 5 million tons (1970) to more than 16 million tons (2008) with only a 44% increase in the area harvested. Helpful to this development are the usage of Green Revolution's seed-fertilizer technology and access to irrigation facilities.

Rice imports were used to fill the gap between demand and supply and to stabilize the domestic price of rice except for a few years in the late 1970s and early 1980s. The Philippines, however, has relied on rice imports. Since the 1990s, its quest for the rice self-sufficiency has persisted.

Arguing for and against attaining rice self-sufficiency has been a constant topic in debates among academicians, scientists, economists, and politicians. Some say that the Philippines' lack of comparative advantage in producing rice can be attributed to its geography (Dawe 2006). On the other hand, others say that public investments required to achieve rice self- sufficiency are too expensive given the competing use of scarce public resources. Alternatively, some believe that self-sufficiency is justified by the thin world rice market. World supply is vulnerable to changes in the consumption and production dynamics of major producing countries since it is mostly consumed in countries where it is produced. Thus, it would be more practical to obtain rice from domestic production to avoid serious fluctuations in the world supply of rice and its price. The surge in 2008 in the price of grains illustrates the political importance of self-sufficiency in rice. The Philippine government enacted an open-tender policy to avoid a rice shortage while some countries exporting rice banned their rice exports from domestic production to avoid serious fluctuations in the world supply of rice and its price. The surge in 2008 in the price of grains illustrates the political importance of self-sufficiency in rice. The Philippine government enacted an open-tender policy to avoid a rice shortage while some countries exporting rice banned their rice exports.

A more serious issue to deal with than the issue of rice self-sufficiency is the expanding domestic production which is essential in ensuring the availability of supply for the ever-increasing population. Improving rice productivity may mean reducing poverty in the rural areas. This can increase the income of small farmers and landless farm workers, specifically, those who depend on rice production for a living. Moreover, productivity improvement can make local producers go head-to-head with international producers which are necessary if the country is to liberalize its rice trade. Unfortunately, there are several factors that threaten the future of Philippine rice production: urbanization, industrial land-use, and competing agricultural uses. These factors have decreased the physical area devoted to rice production from 3.4 million hectares in 1991 to 2.8 million hectares in 2001. Additionally, the declining quality of land and water resources worsens the shrinking quantity of physical resources as a result of years of mono-cropping practices indica-inbred rice cultivars has deteriorated from 9 to 10 metric tons per hectare (Peng, et al. 1999; Tiongco and Dawe 2002). The average actual farm produce are only about half of the experiment station yields (Sebastian, Bordey and Alpuerto 2006). Some studies also show a decrease in rice total factor productivity (TFP) in the late 1980s (Umetsu, Lekprichakul and Chakravorty 2003) and through the 1990s (Estudillo and Otsuka 2006). Fortunately, rice research and development (R&D) holds the promise of mitigating, if not countering, the impacts of these challenges. Even though the Philippines is already benefiting from technological innovations, efforts are continuously made to apply science in rice production.

The purpose of the study and the knowledge brought about it shall be significant to the people to provide a feedback mechanism for the policymakers in order to attack existing problems and to make hybrid rice accessible to all the Filipino farmers. The respondents and participants who will take this research endeavor will share their experiences for better understanding and will give comprehensive insights for this specific phenomenon.

Secondly, for the farmers, workers and tenants to envision rice program to help increase rice yields and farmer's income. Therefore, it is a must that necessary actions are taken to improve rice that will lead to the improvement of rice farmers' productivity and income and eventually ensuring national food security.

Thirdly, in doing so, the implementation of a more effective and efficient list of measures by the government may be aspired to be beneficial to the nation as a whole. This may ensure a constant high level of rice production and may eventually foster the well-being of our countrymen, specifically the small farmers, who are highly dependent on the industry. In the same manner, it may also provide the immediate needs of our populace for food requirements and national survival.

Research Questions

This paper is concerned with the politics involved in the hybrid rice program in the Philippines and how can it help in the agricultural challenges of the country. Specifically, the paper sought answers to the following questions:

1. What are the past and current problems of rice production in the Philippines?

2. What are the government thrusts and strategies done to address these problems? To what extent did they work? What are the challenges

3. What is the background and history of the hybrid rice program? How did it permeate the agricultural environment of the Philippines? Are there other policies and innovations similar to this is other parts of Asia?

4. What are the political dynamics between implementers, stakeholders, and other relevant sectors (private investors, etc.) when it comes to the hybrid rice program? How did they change the landscape of agriculture, especially food sufficiency, in the Philippines?

5. What would be the long term effect of the hybrid rice program when it comes to food sufficiency? What will be its benefits to the Filipinos?

Theoretical Framework

The researcher used in order to analyze the conditions that gave rise Hybrid Rice Commercialization Program as well its effects on the grassroots, which are the farmers and local technicians that ultimately use hybrid rice. The data gathered during the interviews served as feedback mechanism to the entire program, its strengths, challenges and suggested improvements that will serve as the new inputs in the whole system.

Below is the diagram showing the entire process of the theory used in the paper.

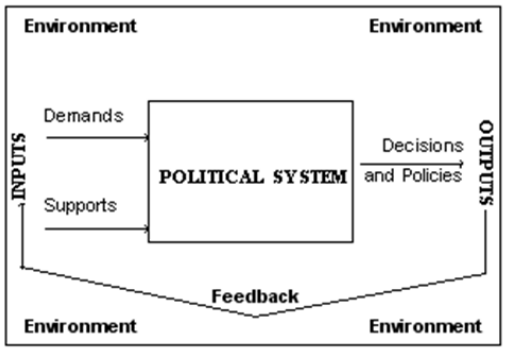

Figure 1. David Easton's Systems theory

Literature Review

Researchers continue to analyze and better understand problems and issues in rural development in general, and the situation of small farmers. It is essential to assess the characteristics of agricultural production strategies among small farmers to have greater understanding to determine their access to credit. Empirical research has shown borrowing restrictions that prevent small farmers in developing countries from adopting high return-innovations such as irrigations and modern technique varieties (Blackman, 2001). This allows small farmers to identify their needs and ideas as to the relative role of credit in the context of production agricultural and livelihood strategies.

Hybrid rice technology was first introduced under the Gintong Ani Program (GAP) of former President Fidel Ramos. This was renamed as the Agrikulturang Makamasa (Agriculture for the Masses) For Rice when Joseph Estrada succeeded Ramos as president. However, there was no substantial difference between the two programs: both aimed to "to utilize available hybrid rice technology (with a view) to improving productivity and competitiveness in rice production and ultimately, to attaining rice self-sufficiency" (Casiwan et al, 2003). The preliminary implementation of the hybrid rice technology programs consisted of technology demonstrations and adaptation ability trials in five areas in the country. The Department of Agriculture started training seed producers in 1999 and organized them into a network of producers of hybrid seeds. Former President Arroyo's project entitled One Million-Jobs Programs aimed to generate employment and whereby alleviate rural poverty.

Pandey (1999) argues that fine-tuning of policy and institutional innovations are important in further increasing rice yields and farmers' incomes. In the more intensive irrigated areas, where chemical fertilizer use was already high, a change in the paradigm from that of encouraging higher input use to achieving increased input-use efficiency was suggested.

The Department of Agrarian Reform (DAR) recently conducted a Capacity Enhancement Training for members of Agrarian Reform Beneficiaries Organizations (ARBOS) in Batangas to strengthen and to capacitate agrarian reform beneficiaries (ARBs) toward operating sustainable development.

Provincial Agrarian Reform Program Officer II James Arsenio O. Ponce and Mr. Franklin Jose Ilustrado, Municipal Head in Agrarian said the farmers 155 farmers of which 81 percent of ARBs were provided information on how to increase their level

of awareness and understanding on the roles as members of cooperative and their right to avail hybrid rice and other supporting services

San Juan, Batangas started to integrate the hybrid rice assistance program since 2015 but on the process, the farmers clamoring against the results of variety. These were all the challenges of the said program. The farmers experienced a lot of losses. There was resistance of cultural characteristics of palay, once it's good in harvesting and quality it commands high price meaning high input. All of these disadvantages, the DAR of San Juan, Batangas continue to push through and diffuse the said rice hybridization for high productivity and for food stability. The management integrated strategies for rice cultivation such as post-harvest facility grain, dryer targeting, geo -tagging, land extension and rice crop manager.

Low Production

Tado (2000) says that the current mechanization level of rice production in the Philippines is unsatisfactory. Lowering production costs was necessary to compete with neighboring countries. Supportive government measures is the goal in modernizing agriculture and improving the quality of life for the rural population. Besides increasing yields and reducing post-harvest losses, innovations in rice production mechanization could act as a catalyst for rural areas. These developments must consider social and economic backgrounds, and nowadays, last but not least, environmental protection. Poor performance of seed production of public bred and social and economic backgrounds, and nowadays last but not least, environmental protection. Poor performance of seed production of public bred and requires space for growing samples and problem about high seed cost. The DAR should provide the requisites of the fund to make availability of breeder seed for foundation of certified seed production.

Low Industrialization

Even if new and more productive technologies are available, farmers might lack information about their existence and knowledge about proper implementation techniques. Extension services have been used as a means to diffuse new technology in developing countries since the Second World War. Extension services also include related services. When they began, extension services mostly included education about new technologies, as well as input and credit provision (Birkhaeuser et al., 1991)

Moreover, limited scope of rice farmers potted lives and their families have carried by a e number of rice farmers has been declining faster in proportion to the continuous cropping of rice, either singly or in combination, has brought world's population therefore, require a substantial improvement in productivity and efficiency of rice production systems that lead to food scarcity and poverty reduction as the overarching goals that describes the promotion of economic growth that will permanently lift as many people as possible over a poverty line. Farmers or other individuals obtained high yields and to have developed the world's highest rice yield variety. Higher rice yield per unit of land and per unit per time is needed to provide more rice to meet increasing food demand and one of the means of combating world food crises. (Castro, 2004).

Rural Poverty

Although the Philippines has relied increasingly on rice imports since the 1990s, its quest for the rice self-sufficiency has persisted. In constant debate, academicians, scientists, economists, and politicians argue for and against attaining rice self-sufficiency. Some say that the Philippines' lack of comparative advantage in producing rice can be attributed to its geography (Dawe 2006). Others say that public investments required to achieve rice self- sufficiency are too costly given the competing use of scarce public resources. On the other hand, there are those who believe that self-sufficiency is justified by the thin world rice market. Since rice is mostly consumed in countries where it is produced, world supply is vulnerable to changes in the consumption and production dynamics of major producing countries. Thus, it is more practical to source rice from domestic production to avoid severe fluctuations in the world supply of rice and its price.

Beyond the issue of rice self-sufficiency, expanding domestic production is essential in ensuring the availability of supply for the ever-increasing population. Improving rice productivity can contribute in reducing poverty in the rural areas because it can increase the income of small farmers and landless farm workers, specifically, who depend on rice production for a living. In addition, productivity improvement can make local producers cost-competitive with international producers, which is necessary if the country is to liberalize its rice trade. Unfortunately, several factors threaten the future of Philippine rice production. Urbanization, industrial land-use, and competing agricultural uses have decreased the physical area devoted to rice production. From 3.4 million hectares in 1991, the actual rice area declined to 2.8 million hectares in 2001.

Furthermore, the declining quality of land and water resources aggravates the diminishing quantity of physical resources as a result of years of mono-cropping practices (Cassman and Pingali 1995; Flinn and De Datta 1984). Evidence of declining productivity abounds. On the scientific front, the yield potential of Indica-inbred rice cultivars has stagnated at 9 to 10 metric tons per hectare (Peng, et al. 1999; Tiongco and Dawe, 2002). The average actual farm yields are only about half of the experiment station yields (Sebastian, Bordey and Alpuerto, 2006). Some studies also show a decline in rice total factor productivity (TFP) in the late 1980s (Umetsu, Lekprichakul and Chakravorty, 2003) and through the 1990s (Estudillo and Otsuka, 2006). Fortunately, rice research and development (R&D) holds the promise of mitigating, if not countering, the impacts of these challenges. While the Philippines is already benefiting from technological innovations, efforts are continuously made to apply science in rice production. Science that recapitulates the importance of biotechnology to ensure against global warming and environmental crisis like drought and locust that causes extensive damage to crops.

Method

This study utilized a descriptive approach and highly interpretive because it will try to explain the phenomena on how Philippine Hybrid Rice Program serves as a tool in recognizing hybrid rice could possibly be a road to increase production, government focused on adopting it as the country's main rice program. Both decrees intensified the utilization and promotion of hybrid rice. It also analyses how the variety of rice grains developed by PHRP affected the farmers who adopted their use especially in terms of living conditions. The study involves in-vivo type of evaluation in which the effects of various biological entities are tested on whole.

Sampling Procedure

In pursuit of acquiring firsthand information regarding the topic of inquiry, it involves the use of interview method and at the same time, interview questions were utilized to gather the necessary information from the farmers and local technicians who can be interviewed given the limited time. Interview method was rendered to five (5) local farmers who are concentrated in Calubcub, Balagbag and Talahiban in San Juan, Batangas. Hybrid rice varieties are chosen out of non-probability specifically convenience sampling. Farmers from San Juan, Batangas will be chosen due to proximity of the place to the researcher's home place and at the same time, majority of the population in San Juan, Batangas are farmers.

Since the farmers are concentrated on the said place, more or less, their harvests and cultivating experiences do not vary significantly and considering that San Juan, Batangas on Southern Luzon, the terrain do not vary significantly.

Instrumentation

Since the study makes use of interview for gathering data, the interview guide is an open-ended form in to provide a wide range of responses, especially from the farmers, regarding their side of the inquiry since they are the ones who really actuate the results of the research conducted by PHRP. The content of the interview will mainly focus on the Philippine Hybrid Rice Programs, its role in agricultural development and how it can alleviate food security, poverty and environmental protection.

The questions are themed according to the following:

1. Situationer / Historical Development
2. Dynamics of the Program and the Stakeholders
3. Dynamics of the Political Actors towards the Effectiveness of the Program

Data Gathering Procedures

The researcher, gathered the necessary information from the local farmers through interview at the study site particularly, at San Juan, Batangas. The researcher set an interview at the convenient time and place of the researcher and the respondents.

Findings and Discussion

The findings drawn from the interviews of the farmers were coded and constructed in the following diagram:

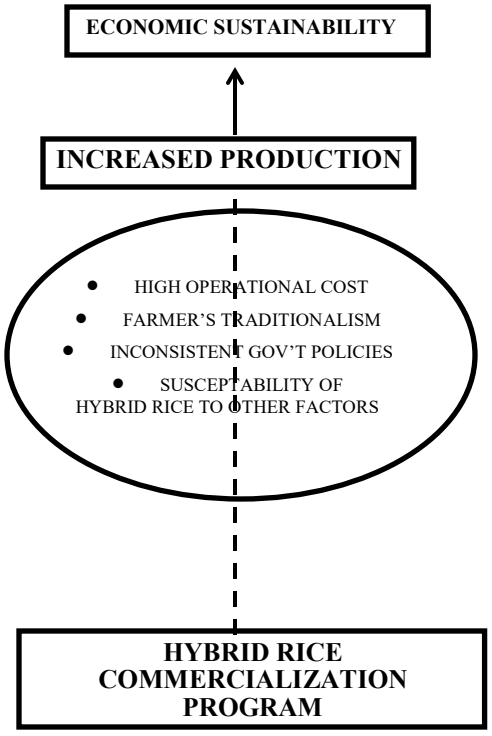

Figure 2. Thematization of raw data

Theme 1: The necessity that the farmer respondent admitted to himself that in developing agricultural hybrid rice, technology or with technical expertise such as agricultural biotechnology was significant. The kind of seeds brought by hybrid rice can outyield other varieties of rice and can raises yield potential for ample harvests.

> *"Yung hybrid, kagaya ng mga Pioneer, lahat ng hybrid, marami ang inaani. Ako kaya ako nagtatanim kasi gusto kong mapatunayan sa mga farmers na yung makaluma ay modern na ngayon. Na mas pupwede silang dumami ng ani sa paggamit ng hybrid na bagay.*
>
> *Yun nga, dahil ang alam nila ay makaluma, kaya mas kokonti ang nagiging ani kapag ang ginagamit ay mga makaluma.*
>
> *Oo. Hindi naman lahat ay magaganda ang kalidad. May napipili na maganda, yun na lang ang aking tinatanim."*

Theme 2: The extension of the hybrid rice seeds subsidy program for a long-term goal is "to help farmers cope with increasing price of farm inputs like fertilizer and pesticides. According to the farmer respondent, IRRI supported capacity building and delivering research to the rice community at Balagbag, San Juan, Batangas. The said institute conducted seminar trainings to introduce the hybridization program. According to the respondent, on what he had learnt from the seminar hybrid rice lines have no assurance that there's a high level of drought resistance and tolerance.

Theme 3: The project demonstrated by the IRRI, the integrated approach in hybrid rice commercialization among Local Government Units (LGUs) at the provincial and municipal levels to decentralize the policy implementations of this program catered by the national government. To carry out decentralized functions of either national or local government resources through loan guarantees.

> *"Dito sa San Juan, Batangas kakaunti ang sakop ng hybrid rice. Dahil itong barangay na ito ay nasa 42 barangay lang siya. Hindi lahat ay nagtatanim. May lugar na walang palayan.*
>
> *Di sumusunod dahil ang iba ay kulang sa gastusin tapos ang gobyerno ay dapat may tulong sa mga magbubukid na kapag inani ay tsaka babayaran. Malaki ang puhunan kapag bibili ng tao. Kaya ang kalimitang sumusunod lang diyan ay yung katulad ko na malawak ang bukid na gusting umani ng maganda".*

Theme 4: The perspective of farmers regarding the intensification of the price of fertilizers and crop protection chemicals that pose a severe problem regarding that it will lead to a possible failure to reach standardized quality of grains.

> *"Sa panahon natin ngayon, ang pangangailangan natin ay kulang sa abono. Tsaka kailangan talaga ngayon ay yung binhi Diyan, sa bilihan ng abono. Mahal nga ang binhi eh. Itong tinanim ko ay ngayon ay galing sa Cebu, noong nagseminar ako."*
>
> *Maganda ang kalidad pero kumporme kasi may ilang hybrid na mahina ang quality. Iba iba kasi ng klase yan".*

Theme 5: A new hybrid rice variety gives hope for the hopeful farmers, more unfaltering yields per hectare with its robust feature. Hybrid was attributed as the factor that hybrid rice yield advantaged has overcome the conventional rice in terms of quality but entails good maintenance.

> *"Magaling ang hybrid rice . Maganda ang buhay ng palay. Di masyadong dinadamo. Di ganun katrabaho."*

Based on the interviews of the farmers regarding the Hybrid Rice Commercialization Program (HRCP), they all agreed that the program can elevate the normal level of rice production in their rice fields up to twice the normal volume. It definitely has high returns to the farmers, yet the downside is a high operational cost in planting, maintaining, and harvesting hybrid rice. In order to retain the high quality of rice vis-à-vis the traditional/inbred rice production techniques more modernized forms of plant care must be undertaken—fertilizers, irrigation, etc.—which can be quite problematic for small farmers. In the interviews, only those with vast lands can religiously comply with rice hybridization while small farmers still employ traditional methods in rice farming. Thus, high production entails high returns to the farmers although operational costs are a burden to small farmers.

There was a mention of government subsidies in the interviews in the form of dams, modern machineries for rice planting and harvesting, and accessibility to the market, yet these are inconsistent and normally in small scale. The only large-scale project of the national government is the dam in Tiaong, Quezon Province. The rest of the assistance in understanding and applying HRCP had been small scale and inconsistent. Evidence to this claim include the varied opinions of the four interviewees in defining the role of the national and local government in this endeavor—some said that irrigation is now present while some claim that fertilizers are hard to obtain from commercial centers. It is worthy to note that those who said that government projects are visible in the rice fields are those who own vast lands to farm and not the small farmers interviewed.

These challenges in the HRCP plus the uneven flow of government subsidies demoralize small farmers in participating in the said program. Even though seminars and trainings were given to starting farmers regarding the basics of hybrid rice planting, not everyone adapts it when they return to their respective lands. This may be behavioral, since these farmers are more accustomed in planting rice using the traditional way (inbred variety) and tend to disregard technological advancements in their field.

Some interviewed farmers are doubtful about the Program and are not willing to try because they see it more as a liability than a potential mechanism for technological development and profit maximization.

Finally, all of these factors suggest that the very foundation of rice hybridization the rice itself is also subject to other mostly destructive factors. Majority of the farmers shared that both the inbred and hybrid rice suffer the same fate when disasters strike. Farmers also mentioned that not all hybrid rice have the highest quality because of the differentiation in the breed of rice themselves. Finally, sensitivity of hybrid rice was also taken into consideration by the farmers, saying that these breeds of rice should receive the highest plant care exceeding the normal maintenance of the inbred/traditional breeds.

In summary, the four main reasons of the interviewees (high operational costs, inconsistent government subsidies, personal inhibition of the stakeholders, and the susceptibility of hybrid rice to a number of factors) inhibit them in fully participating in the agricultural development of the Hybrid Rice Commercialization Program. These may be seen as barriers to the benefits of increased production and economic viability that the Program is promoting.

The government needs to review its program priorities with regard to the rice research, development and extension. Hybrid rice is a technology that has yet to prove itself, only if the government shall give it necessary focus especially in the industrialization of farming in rural areas. Other problems such as the method of traditionalism of the farmers and the pronounced susceptibility of hybrid rice to natural factors should only be second to the problem of insufficient funding from the national government.

Conclusion

This paper attempted to describe the condition of HRCP in the Philippines. Since rice hybridization is not endemic to the Philippines and is an international concept, there will always be disparities between the theory and how it will be practiced by the grassroots. Hybrid rice poses a very significant yield in rice production that will soon cause economic development in the Philippines, owing it to development of the agricultural sector.

Since the Philippines is an agricultural country, with rice as its primary produce, rice hybridization will be a quantum leap from traditional rice paddies that only grow up to a certain extent. Hybrid rice extends that limit that makes our produce competitive to the world market as well as causing significant

change in our agricultural output. This is the benefit that hybrid rice can bring, only if it will be adapted by the farmers, both big and small.

The data have shown that these four factors served as 'hindrances' to the effectiveness of the implementation of hybrid rice program: high costs, government support, environmental susceptibility, and the farmers' own psychology of rice traditionalism. If these factors will be dealt with dexterity and swiftness, hybrid rice may do its job of agricultural innovation. However, if these problems persist over time, then hybrid rice will only serve as a benefit for big farmers with land and capital rather than being inclusive with the small farmers and tenants of land as well. Hybrid rice should be accessible to all farmers for its effects to materialize.

Yet no matter what the hindrances are, the technological innovation discussed in this paper will surely benefit a country like the Philippines. This is a manifestation of the increasing linkage of the Philippines to the global sphere of agricultural and technological development by coming up with a variety of rice that is technologically improved. The success of this program now depends on how well it will be applied in the Philippines, just as what out Asian neighbors did in their production of hybrid rice

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