Implementing a Price Support for Myanmar’s Rice Sector

Prepared for: Myanmar Development Research Institute

Prepared By: Russell Owen
Master of Public Policy Candidate
The Sanford School of Public Policy
Duke University
Faculty Advisor: Professor Robert Conrad

Disclaimer: This student paper was prepared in 2014 in partial completion of the requirements for the Master’s Project, a major assignment for the Master of Public Policy Program at the Sanford School of Public Policy at Duke University. The research, analysis, and policy alternatives and recommendations contained in this paper are the work of the student who authored the document, and do not represent the official or unofficial views of the Sanford School of Public Policy or of Duke University. Without the specific permission of its author, this paper may not be used or cited for any purpose other than to inform the client organization about the subject matter. The author relied in many instances on data provided by the client and related organization and makes no independent representations as to the accuracy of the data.
# Table of Contents

Executive Summary .................................................................................................................. 1

Introduction .......................................................................................................................... 4
  The Rice Industry in Myanmar ......................................................................................... 4
  A Brief History of Rice Policies in Myanmar ................................................................. 5
  Recent Developments in Myanmar’s Rice Industry ....................................................... 5
  The Farmer Rights Protection Act .................................................................................. 6
  Analytical Model and Analysis ....................................................................................... 7

A Review of Price Support Implementation ........................................................................ 8
  General Objectives of Price Support Programs ............................................................. 8
  Setting the Price ............................................................................................................... 10
  Price Control Enforcement Mechanisms ....................................................................... 12
  Overarching Issues in Price Support Programs ............................................................. 16

Country Case Studies ........................................................................................................... 20
  Thailand ......................................................................................................................... 20
  Indonesia ....................................................................................................................... 22
  Pakistan .......................................................................................................................... 25
  Papua New Guinea ......................................................................................................... 26

Data and Methods ................................................................................................................ 29

Results and Analysis ............................................................................................................ 34
  Initial Results ................................................................................................................... 34
  Sensitivity Analysis ......................................................................................................... 35
  Controlling Prices at the Border: Sensitivity to Middlemen .......................................... 38

Recommendations ............................................................................................................... 41

Appendix I: Farmer Rights Protection Act ......................................................................... 43
Appendix II: Parameters Table ............................................................................................ 46
Appendix III: Alternative Cost Estimates for Myanmar Rice Farmers ............................ 47
References ............................................................................................................................ 48
Tables and Figures

Figure 1: Yield by Data Source ........................................................................................................... 4
Table 1: Objectives, Approaches and Tradeoffs of Price-Control Programs .................................. 8
Table 2: General Price-Setting Strategies .......................................................................................... 10
Table 3: Price Control Enforcement Mechanisms ............................................................................ 12
Table 4: Overarching Issues in Price Support Programs ................................................................. 16
Table 5: Price Support Implementation in Thailand .......................................................................... 20
Table 6: Price Support Implementation in Indonesia ........................................................................ 22
Table 7: Effectiveness of Floor Price and Procurement Price of Rice in Indonesia: 1997-2003 ... 23
Table 8: Price Support Implementation in Pakistan .......................................................................... 25
Table 9: Price Support Implementation in Papua New Guinea ......................................................... 27
Table 10: Summary of Data Sources .................................................................................................. 30
Table 11: Representative Farmer Cash Flow – per-hectare (Summer Paddy) .............................. 31
Table 12: Price Margins along the Rice Supply Chain ................................................................ ... 33
Table 13: Initial Results of Incremental Analyses of Price Support Programs .............................. 34
Table 14: Government Cost per-hectare ............................................................................................ 34
Figure 2: Price Support Program’s Sensitivity to Yield ................................................................. 35
Figure 3: Sensitivity of Government Cost to Yield Estimates ........................................................ 36
Figure 4: Price Support Program’s Sensitivity to Exchange Rates ................................................ 37
Figure 5: Sensitivity of Government Implementation Costs to Exchange Rates .......................... 37
Table 15: Simulation of Varying Levels of Middlemen Market Influence ..................................... 39
Figure 6: Middlemen Market Power, and Farmer Surplus at Various Border Protection Rates ...... 39
Table 16: Parameters ......................................................................................................................... 46
Table 17: Production Cost and Returns for Monsoon and Summer Crop, 2011/2012 .................. 47
Table 18: Farmer Cost Structures for Summer Paddy – Bo Bo Nge ............................................... 47
List of Acronyms

CSO – Central Statistical Office

FAO – Food and Agriculture Organization

FOB – Free on Board: the export price of rice.

GoM – Government of Myanmar

Ha – Hectare

IRRI – International Rice Research Institute

MDRI – Myanmar Development Research Institute

MSU – Michigan State University

MT – Metric Ton

NPV – Net Present Value

NCF – Net Cash Flow

USDA – United States Department of Agriculture
Executive Summary

This paper will evaluate the costs and benefits of implementing a price support program for Myanmar’s rice sector. I begin with a review of the literature relevant to price support programs for staple crops. From the review, I will present a general framework for evaluating price support programs. This framework will then be applied to select countries in Southeast Asia to provide context for how these experiences might be applied in Myanmar. Next comes a quantitative analysis of a prospective price support program in Myanmar, complete with rough forecasts of government expenditures under each program. The paper concludes by recommending implementation strategies to minimize the costs and maximize the benefits from a price support program.

Context: The Rice Industry in Myanmar

Agriculture contributes to roughly 45% of Myanmar’s GDP and employs 66% of the labor force. Rice is cultivated on 18.9 million hectares and constitutes 33% of the total crop area sown (Wong 2013). The major production areas are the Ayeyarwady Delta, Bago in lower Myanmar, and Sagaing.

Rice and the rice industry are critical to the livelihoods of the people of Myanmar. Roughly 66% of the labor force is employed in agriculture, and a large percentage of these farmers cultivate rice (CSO 2011). There are two main categories of rural farmers: farmers and landless agricultural laborers. In 2009, it was estimated that 30-50% of rural laborers were landless.¹ Landless agricultural laborers are paid in monthly wages, and are net buyers of rice (Fujita 2009). Close to 75% of farm household income comes from rice cultivation activities, especially in the main rice-producing regions (Wong 2013).

In recent years, the Kyat’s exchange rate has strengthened relative to the dollar. This stronger exchange rate, coupled with rising costs of production, have led to steep drops in the value of rice farmers’ harvests – leading to lower farm productivity and farmer incomes. The Parliament of Myanmar has proposed a price support program as part of its 2013 Farmer Rights Protection Act in order to combat the rising costs of production and decreasing rice prices.

A Literature Review of Price Support Implementation Issues

Price support programs have two main purposes: (1) to increase the average price of rice; and (2) to decrease price variation via “price bands.” In theory, increasing the average price of rice allows the government greater control over farm-gate prices. In practice, trying to set a specific farm-gate price requires costly implementation and enforcement measures. Using a price-band strategy allows the price to fluctuate within a specified range of prices. Price bands require less frequent government intervention, and are typically less expensive to implement than trying to set a specific price.

Most price support programs set official government prices at the farm-gate. However, knowing which gate-price to set is complicated. Setting prices according to farmer production costs can be subjective. For rice in particular, production costs can vary by season, by grower, by region, and by type of rice grown. When prices are tied to production costs, the government is vulnerable to rent-seeking behavior by groups trying to influence the price-setting mechanism. Conversely, setting prices as a function of border prices

¹ Landlessness has been increasing in recent years (Fujita 2009; Dapice 2009).
allows for objective prices that better reflect scarcity values. Such market-based support prices can minimize market distortions and are a lower burden on government resources. The tradeoff is that basing government-support prices on market prices prevents the government from having strict control over prices at the farm-gate – at times, middlemen can capture the benefits of higher prices.

Controlling prices at the border via trade taxes or restrictions can be relatively easier to monitor, compared to enforcement at the farm-gate. Using trade taxes is also more straightforward to implement, and allows the government to avoid physically handling the commodity. However, in the ASEAN context, trade taxes may require some political negotiations. Also, controlling prices at the border does not necessarily guarantee a higher farm-gate price if the middlemen are able to capture most of the benefits. Devaluing the exchange rate is a similar way to raise the prices of all imports and exports – potentially to the benefit of rice farmers.

Marketing boards and public procurement of rice would lower price uncertainty and allow the government to set both producer and consumer prices of rice. However, the costs of procuring and storing commodities is often expensive for the government and can crowd-out private sector players.

Country Case Studies

Thailand’s Paddy Pledging Scheme procures rice at prices 30-40% above market rates. The scheme has been credited with increasing production of rice. However, it has proven to be a major strain on government budgets. Rice storage facilities are filled to unsustainably high levels, and the government has been forced to sell much of its rice at a loss.

In the late 1960’s/early 1970’s the Government of Indonesia formed a food logistics agency (BULOG). BULOG had three main objectives: (1) heavy investment in rural infrastructure; (2) R&D and dissemination of improved agricultural technology, including high-yielding seeds, fertilizers, pesticides, and farmer extension; and (3) implementation and enforcement of price support to both consumers and farmers (Arifin 2004). The program has increased farmer production, however there is evidence that farmers have not always benefitted from the price support program. For instance, in 2003 over 50% of farmers sold their crops at a price below the government benchmark.

In 1973, the Government of Pakistan formed the Pakistan Agricultural Storage and Services Corporation (PASSCO). PASSCO had four main functions: (1) price support for paddy and other crops; (2) price stabilization; (3) construction of storage facilities and marketing infrastructure; and (4) promotion of post-harvest processing facilities (Rashid et al 2005). Farmers under this program did not always benefit from the price support system. Often, middlemen were able to buy rice from farmers below the official price, then sell it later at a profit. Procurement was recently transferred to the private sector in select districts.

In 1977, the Government of Papua New Guinea stopped basing its cocoa support prices on costs of production – the rationale being that cost of production is a dubious criterion since costs depend on many factors and can vary widely across growers. The government also realized that setting the price too high or two low would make its price support program too expensive to administer. Therefore, the government decided to base the target price on the long-run world price, by setting the official price 10-20% higher than a 10-year moving average of past world prices. The government widely disseminated price data to farmers to prevent middlemen from exploiting all of the gains of higher prices. The strategy has been relatively successful thus far.
Data, Methods, and Analysis

Using data from the USDA, FAO, CSO, and MSU, I constructed a basic per-hectare cash flow for a typical rice farmer in Myanmar – this cash flow is otherwise known as the “base case.” Starting from the base case, I then simulated the effects of four price support programs on the farmer cash-flow: (1) fixed prices at the farm-gate; (2) price-bands at the farm-gate; (3) fixed-prices at the border; and (4) price-bands at the border. When evaluating border-price controls, I simulated two extreme scenarios of middlemen market power to show how the benefits to farmers can vary under border-price support programs. The analysis yielded the following results:

- Fixed price programs, in theory, produce greater benefits for farmers than price-band programs.
- In my model, a fixed-price program cost 4.4 trillion Kyat more than a price-band.
- Fixed-price program implementation costs were, on average, 44% of the GoM’s annual budget. Price-bands cost roughly 30% of the budget.

Data quality, especially on rice yields, can strongly affect estimated program benefits. Using FAO data on yield produced program benefits over 200% higher than those using USDA data. The sensitivity of estimates to data source underscores the difficulty of setting prices according to production costs, since inaccurate data on production costs and output could lead to dangerously incorrect estimations of program benefits and costs. Also, when supporting prices at the border, there is a risk that middlemen will absorb the benefits of a price-support program at the expense of farmers.

Recommendations

- Focus on market-based price support mechanisms to avoid physically handling the commodity.
- Consider the costs: price bands are generally cheaper to implement, and create less macroeconomic distortions.
- Set prices as a function of world market prices: there is not enough data on farmer production costs to make proper estimates of farmer cost structures.
- Limit the power of middlemen to capture the programs’ benefits as much as possible.
Introduction

The Rice Industry in Myanmar

Agriculture contributes about 45% of Myanmar’s GDP and employs 66% of the labor force. Rice is cultivated on 18.9 million hectares and constitutes 33% of the total crop area sown (Wong 2013). The major production areas are the lowlands of Myanmar, specifically the Ayeyarwady Delta, Bago in lower Myanmar, and Sagaing in upper Myanmar.

In the 1930’s, Myanmar was a major producer and exporter of rice, but production and exports have stagnated since World War II (Fujita 2009). Most recently, in 2012, Myanmar exported around 700,000 tons of rice (CSO 2012; USDA). This is likely an underestimate, as it only covers exports from ports in Yangon. Exports moving through other border crossings are typically not counted in official estimates. When trade through other border crossings is included, export estimates increase to 1.3 million tons (Wong 2013). The government has a target of exporting 3 million tons per year.

There are two main sources for agricultural production data in Myanmar – the FAO and the USDA. Yield data vary greatly between the two sources, as is illustrated in Figure 1 below. The graph is a striking illustration of the uncertainty underlying agricultural statistics in Myanmar. Note that FAO production data are consistently higher than USDA statistics. For instance, in 2011, the USDA estimated paddy yields of 2.5 MT/hectare, while the FAO estimated yields at roughly 4 MT/hectare. Many analysts recommend using USDA data to the extent possible (Dapice 2009; Fujita 2004).

Figure 1: Yield by Data Source

Rice and the rice industry are critical to the livelihoods of the people of Myanmar. Roughly 66% of the labor force is employed in agriculture, and a large percentage of these farmers cultivate rice (CSO 2011). There are two main categories of rural farmers: farmers and landless agricultural laborers. In 2009, it was
estimated that 30-50% of rural laborers were landless. Landless agricultural laborers are paid in monthly wages, and are net buyers of rice (Fujita 2009). Close to 75% of farm household income comes from rice cultivation activities, especially in the main rice-producing regions (Wong 2013).

Rice is a major component of household expenditures. Over 70% of household expenditures are spent on food (IHLCS 2010). Estimates vary by region, but it is estimated that rice contributes to 16% to 20% of household expenditures. The national average is 17%, and it is 27% for the lowest income groups (Fujita 2009; Wong 2013). Therefore, not only is rice a large employer in Myanmar, but the price of rice is inextricably linked to the livelihoods of farmers and the rural landless in Myanmar. This underscores the importance of the rice industry to the GoM, and sheds light on the complexity of rice policies in Myanmar.

A Brief History of Rice Policies in Myanmar

The Government of Myanmar (GoM) has a legacy of command and control policies, in general, and for the rice industry in particular. There have historically been three main methods of control: procurement systems, planned cropping systems, and state ownership of farmland. Rice procurement provides an historical example of the GoM attempting to regulate the price and production of rice.

The rice procurement program began after World War II during the “Burmese new way forward.” Under this program, the government would buy rice from farmers at far below the market price—sometimes at 50% to 60% of the market price. The government would sell some of this rice in the domestic market at a discounted price, and export a portion of the rice at the higher world market price—using the profits from the exported rice to finance other projects and programs. The program served two purposes: (1) it kept the price of rice low for domestic consumers; and (2) proceeds from the exported rice were a major source of foreign exchange and government revenue. The program was temporarily dismantled in 1987 due to fiscal deficits—purchasing the rice was not financially sustainable—however it was swiftly readopted due to protests over surging rice prices in 1988. The procurement program was officially abandoned in 2003.

Recent Developments in Myanmar’s Rice Industry

The Kyat has appreciated greatly since 2006. In 2006 the black market exchange rate was 1300 Kyat/USD while the official rate was roughly 6 Kyat/USD. By 2011 the black market rate had dropped to 700-800 Kyat. The exchange rate was officially liberalized in 2012 and has currently been hovering around 900 Kyat/USD.

When a currency appreciates there are two main effects in an economy resulting from the decrease in the price of all tradable goods and services: (1) imports are cheaper, and (2) export prices (in terms of the local currency) decrease. Since rice is a tradable commodity, the appreciation of the Kyat has made it harder for Myanmar rice farmers to compete with cheaper imported rice, while depressing export revenues as measured in Kyat. Rising inflation in Myanmar has also led to an increase in the costs of key

---

2 Landlessness has been increasing in recent years (Fujita 2009; Dapice 2009).
3 One third of rural households report having to borrow at some point during the year in order to buy food (IHLCS 2010).
4 Until 2012, there were two exchange rates in Myanmar. The government’s official exchange rate was around 6 Kyat/USD. Traders needed a special permit to buy/sell dollars at this rate. As a result, a black market for foreign exchange was formed. In this paper, exchange rates in years prior to 2012 refer to the black market rate.
inputs for rice farmers (Dapice 2011). These two forces combined have removed many farmers’ incentives for investing in their rice production, resulting in negative impacts not only on the livelihoods of the farmers, but on the productivity of the rice industry as a whole. David Dapice, of Tufts University, puts it best:

A major explanation for the lack of increase in rice output, and the general lack of dynamism of Myanmar’s agricultural sector, has been the steep fall in the real value of paddy and other crops. At the existing Kyat/dollar exchange rate, it barely pays to apply inputs. There is little chance that poverty in rural Myanmar can decline significantly, when income earned from cultivating the country’s major crop is so minimal and output growth is so sluggish (Dapice 2011).

As Dapice describes, the appreciation of the Kyat has depressed the gate price of rice for farmers in Myanmar. Comparable rice prices in world markets have been rising at the same time that prices in Myanmar have been falling. This suggests that the exchange rate has played a role in depressing the output and incomes of farmers (Dapice 2012). Dapice estimates that if the Kyat were to move to 700 Kyat to the dollar, output could fall as much as 10-15% (Dapice 2011).^5

To add to these problems, poor infrastructure is hurting rice farmers’ profits. Inefficiencies in the ports and transport infrastructure are both exporters and smallholder farmers (Wong 2013; Dapice 2010).^6 Seed distribution systems are weak, leading to non-uniformity in rice seeds across farmers and regions. Field studies have suggested that improving uniformity in seeds may increase yields by 5-20%, as well as possibly increasing grain quality and market acceptability (Denning 2013). There is also a serious lack of post-harvest storage facilities in villages. Farmers are not able to store paddy at harvest to sell later when prices rise. Even in villages where storage is possible, lenders refuse to provide credit using the stored harvest as collateral, and typically require farmers to begin repaying their loans right away—forcing them to sell at harvest anyway (Kloepinger-Todd 2013).

The Farmer Rights Protection Act

To address the mounting problems in Myanmar’s agricultural economy, the GoM has proposed a “Farmers’ Rights Protection Act.” The act has three main objectives: (1) to provide adequate loans and grants for farmers; (2) to support R&D, farmer extension, and infrastructure investments; and (3) to set a fair price in the marketplace for farmers. As per the proposed act, all of these objectives will be carried out by a Farmer Rights Protection Body formed by the GoM. The third objective – setting a fair price in the marketplace for farmers – is the focus of this paper.

---

^5 There is a debate on which direction the exchange rate will move in coming years. A recent assessment by the IMF was more optimistic. They point to a significant depreciation of the Kyat in the past year, and say that the chances of a real appreciation of the Kyat in this coming year is low (IMF 2013). However, the IMF also cautions that projected increases in natural resource revenues and aid inflows will exert some upward pressure on future exchange rates. In short, it is difficult to know what the exchange rate will do in coming years.

^6 Costs of using ports in Myanmar are high compared to its neighbors. These higher costs act as an export tax (Dapice 2010, page 23). Lowering port costs could lead to higher gate prices for farmers, but also higher prices for consumers (Dapice 2010).

^7 For the full text of the act, see Appendix 1.
Analytical Model and Analysis

This paper will evaluate the costs and benefits of implementing a price support program for Myanmar’s rice sector. It will also recommend implementation strategies to minimize the costs and maximize the benefits from a price support program. I begin with a review of the literature relevant to price support programs for staple crops. From the review, I will present a general framework for evaluating price support programs. This framework will then be applied to select countries in Southeast Asia to give a context for how these experiences might be applied in Myanmar.

For a quantitative analysis of a price-support program, I develop a basic cash flow for a rice farmer. I present simulations to examine a policy’s potential impacts on farmers’ income. The analysis will show how sensitive farmers’ income is to various parameters such as yield and exchange rate fluctuations, and will offer estimates on farmers’ income relative to the market power of middlemen. The analysis will also offer basic forecasts on the cost of the price support program to the GoM. The paper will then conclude with recommendations on how to implement a price support program in Myanmar.
A Review of Price Support Implementation

This section contains a review of academic literature on price support programs, and the relative costs and benefits of key methods and implementation tools. The section begins with a discussion of the two main objectives of price support programs. The objectives are followed by a discussion of two strategies for determining which price to set. Next comes an analysis of the specific implementation tools that governments can use to support food prices. The review concludes with a discussion of the broader consequences and underlying issues to consider when implementing price support programs.

General Objectives of Price Support Programs

There are two main objectives with price-control programs: (1) stabilizing prices by decreasing price variation; and (2) increasing average prices via price controls. There are many ways to achieve these objectives, such as implementing a price band, or setting specific prices. Table 1 below summarizes the general policy instruments for price controls. A more detailed discussion then follows.

Table 1: Objectives, Approaches and Tradeoffs of Price-Control Programs

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Approaches</th>
<th>Benefits</th>
<th>Challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decrease Price Variation</td>
<td>Price Band: The government allows the price to fluctuate within a specified range of prices.</td>
<td>Flexible. Avoids errors of precision in trying to set a specific price. Reduces grain storage burdens and costs. Prevents extreme price values.</td>
<td>Uncertainty is reduced but not eliminated. It may be difficult to predict where exactly the price will end up.</td>
</tr>
<tr>
<td>Increase Average Prices</td>
<td>The government sets a specific price, usually higher or lower than the free market price.</td>
<td>Farmers know exactly what the price will be. Higher farm productivity and investment.</td>
<td>Enforcement requires frequent intervention, leading to higher implementation costs. Price-setting can be subjective (pegged to production costs? world prices?). Setting price too high or too low can lead to excess or deficits of production.</td>
</tr>
</tbody>
</table>
Increasing Average Prices

The government may set a specific price for the commodity – either as a function of observed market prices, such as border prices or farm-gate prices, or as a function of farmer production costs. Raising prices has many advantages. For example, higher price certainty for farmers can lead to higher farm productivity and investment in inputs (Rakotoarisoa 2011). However, if the government chooses to set a specific price, it would require more frequent government intervention, oversight and monitoring to enforce – leading to higher implementation costs. Also, setting prices too high or too low can lead to excess or deficits in production. For example, Thailand’s high rice prices have put an excessive burden on grain storage facilities (USDA 2012).

Decreasing Price Variation: “Price Bands”

To reduce variation in prices, governments may set a “price band.” With a price band, the government allows the price to fluctuate within a specified range of prices. When the commodity’s price becomes too high or too low the government intervenes to raise or lower the price. For example, Indonesia has enforced minimum prices by buying surplus rice that has not been absorbed by the market. If the price becomes too high, the government then sells cheap rice to targeted consumers.

Stabilizing prices around a price band is less costly to governments relative to setting a specific, fixed price. Price bands provide more flexibility, and avoid errors of precision that occur when trying to stabilize around a specific price. The wider the margin between the upper and lower price limits, the less frequently the government will be required to intervene. The less frequently the government is required to intervene, the lower the costs of implementation. Price bands also cut down on grain storage costs relative to enforcing a specific price, as allowing the price to fluctuate can help avoid excessive grain storage (Cummings 2006; Knudsen and Nash 1990).

There are tradeoffs when determining the size of the price band. Narrower bands are more costly to implement, but have the benefit of lowering price uncertainty for local farmers. Wider price bands are cheaper and logistically easier to manage, but leave farmers more vulnerable to price swings. At a minimum, any price band offers farmers the certainty that the price will fall within a specified range. In short, when setting a price band’s margin, governments should consider their logistical capacity to enforce prices, the costs of enforcement, and effective price margins to ensure farmer profitability.

---

8 The costs and benefits of each strategy are discussed below.
9 There are numerous interventions the government could use, such as releasing reserved stocks of the commodity into the market to lower the price, or imposing additional taxes to raise the price. Specific intervention tools are discussed below.
Setting the Price

There are two main strategies for setting government prices: (1) pegging prices to production costs; and (2) setting prices as a function of world market prices. Table 2 below summarizes the benefits and costs of each price-setting strategy. A more detailed discussion follows the table.

Table 2: General Price-Setting Strategies

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Benefits</th>
<th>Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peg price to production costs</td>
<td>Guarantees farmers get a profitable price.</td>
<td>There is no one &quot;true&quot; production cost: production costs can vary by region, by season, by type of rice grown, and by farm (commercial versus subsistence).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lack of rigorous data of production costs in Myanmar can lead to inaccurate predictions and improper prices.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vulnerable to rent-seeking behavior.</td>
</tr>
<tr>
<td>Peg price to world market prices</td>
<td>Border prices are objective, and more closely resemble scarcity values.</td>
<td>Benefits from price increases may be captured by middlemen.</td>
</tr>
<tr>
<td></td>
<td>Minimizes market distortions.</td>
<td>Government cannot set specific prices.</td>
</tr>
<tr>
<td></td>
<td>Lower burden on government resources.</td>
<td>Government has less control over prices at the farm-gate.</td>
</tr>
<tr>
<td></td>
<td>Reduced chances of inaccurate cost and price estimates.</td>
<td></td>
</tr>
</tbody>
</table>

Setting Prices as a Function of Production Costs

When determining the official price, the government may consider setting rice prices as a function of farmer production costs. The advantage to this strategy is that, if well measured and implemented, it ensures that the farmers get a profitable farm-gate price. However, there are numerous implementation challenges with this strategy. Pegging prices to production costs can be difficult and arbitrary, as cost of production depends on numerous factors and can vary widely across growers. With rice in particular, production costs can vary by season, region, farm size, and type of rice grown. If the government wishes to set prices according to production costs, they will need a clear, transparent process for calculating the prices (Knudsen and Nash 1990). It is critical to be transparent about whose production costs are being considered in supported price, be they commercial farms, or small farmers. It is also important to consider if each region will get its own prices, since production costs vary by region. Setting prices as a function of production costs can be subjective and open to rent-seeking behavior, as various interest groups try to influence government estimates of production costs. Furthermore, given the lack of rigorous data on farmer production costs in Myanmar, it would be especially difficult to estimate accurate production costs for price-setting purposes.
Setting Prices as a Function of World Market Prices

Prices may also be set as a function of world market prices. For example, the government may ensure that domestic prices are 20% higher than long-run world market prices. The government of Indonesia did this after 2004 by using import restrictions to ensure higher domestic prices (Dawe 2010). There are numerous advantages to such a strategy. International borders prices are objective, and more closely resemble opportunity cost in a small open economy. Pegging local prices to long-run world market prices also reduces the chances of inaccurate cost and price estimates that may occur when attempting to peg prices to production costs. However, basing prices off of long-run world prices offers the government less control over prices at the farm gate. Though domestic prices may be, on average, higher than world prices, there would be no guarantee that the higher prices would make it to the farm-gate. Middlemen and other traders may capture the benefits of higher prices. Therefore, any program that bases official prices off of government prices needs to have safeguards that allow the benefits to accrue to farmers.

---

10 Import restrictions are one of many potential strategies. Other strategies, such as trade taxes, currency devaluation, and public procurement are discussed below.
Price Control Enforcement Mechanisms

Once the government has set an appropriate price, there are numerous ways to enforce the official price. Table 3 below summarizes some of the main enforcement mechanisms used by governments in price control programs. The table is followed by a more detailed discussion of each mechanism.

**Table 3: Price Control Enforcement Mechanisms**

<table>
<thead>
<tr>
<th>Mechanism</th>
<th>Uses</th>
<th>Benefits</th>
<th>Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trade taxes/restrictions</td>
<td>• Decreasing price variation</td>
<td>(Relatively) easy to monitor, as compared to collecting taxes at farm gate.</td>
<td>Using an import/export tax gives government less control over prices at the farm gate.</td>
</tr>
<tr>
<td></td>
<td>• Increasing average prices</td>
<td>Logistically easier to implement.</td>
<td>There may remain a large gap between border prices and gate prices, and benefits may accrue only to middlemen.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Can increase government revenues.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>There is no need for the government to physically handle the commodity.</td>
<td></td>
</tr>
<tr>
<td>Devalue the exchange rate</td>
<td>• Increasing average prices</td>
<td>If border (export) prices fall, devaluation of the currency can partially offset the decrease in world prices (in Kyat).</td>
<td>Imports become more expensive (in Kyat). Real income of consumers of imports falls accordingly.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Real income losses from decreased world prices of exportables are spread around the economy (between importers and exporters) rather than falling solely on exporters.</td>
<td>May be logistically challenging to manage, if there are not government institutions in place to manage the exchange rate.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Government does not have to physically handle the commodity.</td>
<td>Can help to stabilize the price, and make it more predictable, but cannot be used to set a specific price.</td>
</tr>
<tr>
<td>Marketing boards: procurement, public storage.</td>
<td>• Decreasing Price Variation</td>
<td>Lower price uncertainty.</td>
<td>High cost, logistically challenging.</td>
</tr>
</tbody>
</table>
Trade Taxes and Restrictions

Trade taxes and restrictions can be used to enforce government prices. Depending on how they are implemented, they may decrease price variation or increase average prices. Knudsen and Nash (1990) summarize various approaches to using tariffs and quantitative restrictions to regulate domestic prices:

Trade taxes or quantitative restrictions [can be] used to regulate domestic prices. The main distinguishing characteristic of this type of scheme is that the government need never handle the commodity to control its price. In Chile, for example, a variable import tariff is used to maintain a price band. When international prices are low, the import tariff is high, thus maintaining a minimum price to producers; when international prices rise, the tariff becomes progressively smaller, finally becoming zero at prices above a "maximum" price. Thus consumers are offered some protection from "high" prices, although internal prices are never lower than international prices. One variation of the variable tariff is the buffer (or stabilization) fund. When the world price of a commodity is high, a tariff is levied and the proceeds are put in a fund to be paid out as a subsidy when the world price is low. This kind of fund is used in Papua New Guinea (coffee, cocoa, copra, and palm oil), Côte d'Ivoire (coffee, cocoa, cotton), and South Korea (wheat).

How the government uses trade restrictions to manage the domestic price depends on the government’s relative trading position, and whether or not the government desires higher or lower domestic prices. Net exporters behave differently than net importers. An export tax on a commodity would lower the domestic price relative to world prices – lowering the price for local consumers, and potentially acting as a source of government revenue. Conversely, import tariffs or quantitative import restrictions would raise domestic prices above border prices.

In low-income countries, often the capacity to collect direct taxes is low. Since it is generally easier to collect taxes at the border, trade taxes may be a viable price-enforcement mechanism for a country like Myanmar (David and Huang 1996). However, Timmer (2011) warns that trade restriction programs need to use transparent mechanisms that are visible to both domestic and international traders – such as openly published schedules of variable import duties.

As always, the costs of such programs should be considered. Countries who keep local prices well above border prices tend to produce surpluses that must be stored or exported at a loss (Timmer 1989). Alternatively, keeping domestic prices lower than world prices can lead to lower productivity, forcing the country to import the commodity, at a cost to the local budget, in order to keep domestic prices low. In either scenario, public resources are required to ensure an effective program.

In Myanmar’s case, trade taxes and restrictions could be an effective and valuable price regulation tool. Given the level of rural infrastructure, institutional capacity in government ministries, and general lack of data on rural markets, controlling prices at the border would be relatively easier to administer in Myanmar. However, negotiating trade taxes may prove difficult in the context of ASEAN. Also, even if a trade tax were successfully approved, controlling prices via tariffs gives the government less control over farm gate prices. There is a risk that the benefits of higher domestic prices may accrue solely to market middlemen, and never reach the farmer. Even in the presence of a tariff, there may remain a large gap between farm-gate prices and border prices.
Devaluation of the Exchange Rate

Devaluing the exchange rate is one way to increase average domestic prices, while minimizing administrative costs. In general, price regulation schemes are costly and offer no certainty that domestic prices will actually be more stable than international prices. Currency devaluation may be especially relevant in Myanmar, since the appreciating Kyat has been hurting farmer profitability and productivity. Knudsen and Nash (1990) offer an excellent summary of the effects of the real exchange rate on real national income:

One such mechanism occurs through changes in the real exchange rate in response to fluctuations in the international prices of a country's exportables. When these world prices fall and export revenues decline, pressure is put on the exchange rate to depreciate, tending to partially offset the decrease in world prices. Thus, the price received by producers tends not to fall as dramatically as the international price. Of course, the devaluation of the exchange rate means that imports become more expensive and the real income of consumers of imports falls accordingly. Thus, the depreciation of the real exchange rate cannot really ameliorate the fall in the economy's real income implied by a fall in the international price of its exportables. But it does spread this loss around the economy, rather than concentrating its effects on the export sector. To the extent that the objective is to make more stable and predictable the price and/or income of this sector, exchange rate movements can thus contribute to these goals (Knudsen and Nash 1990).

Dapice (2011) argues that devaluing the currency and providing a stable exchange rate would be a “quick and easy means of helping agricultural producers in Myanmar.” It would effectively increase the domestic price (in Kyat) relative to the dollar, without any need for the government to physically handle the commodity. One issue to consider is if Myanmar has the institutional capacity to manage the exchange rate. If there are not adequate government institutions in place to manage the exchange rate, it may prove difficult and ineffective to attempt a currency devaluation.

In short, devaluing the exchange rate would lead to increases in domestic prices – in Kyat. However, currency devaluation on its own would do nothing to reduce price variance. Prices would be higher on average, however they would be just as volatile as they would be in the absence of a devaluation.

Marketing Boards: Government Procurement and Public Storage

Marketing boards are used across Asia to enforce official government prices. A marketing board buys and sells the physical commodity and is usually the sole buyer in the domestic market. Typically, public procurement programs buy rice from the farmers at a specified price, store the grains, and then export or sell rice to consumers at a different price. The advantage to this method is that, if properly implemented, it allows the government some control over both farm gate prices and the prices consumers pay for rice. This could allow the government to balance the conflicting interests of consumers and producers.

If effectively implemented, a marketing board could be used to either set specific prices, or to reduce price variation via price bands. For example, Indonesia’s marketing board (BULOG) used public procurement and selling to enforce a price band around rice. Pakistan’s PASSCO, however, used its public procurement powers to enforce specific government prices.
Marketing boards can be costly and difficult to manage. With few exceptions, most attempts to regulate prices using governmental or parastatal marketing agencies have been extremely costly – both in terms of government budget and economic efficiency. Marketing agencies are a natural focus for rent-seeking groups. They also require large, sometimes inefficient bureaucracies that are hard to dismantle once established (Knudsen and Nash 1990; Timmer 2011). Indeed, Myanmar had a type of marketing board for decades following World War II under the rice procurement program. It was officially disbanded in 2003, after it proved financially insolvent (Fujita 2009). Given this history, it would not be to Myanmar’s advantage to resurrect a marketing board.
Overarching Issues in Price Support Programs

All programs have consequences and effects beyond the initial objectives of increasing prices or decreasing price variation. Table 4 below summarizes additional issues to consider when implementing a price support program. The discussion to follow elaborates on the general tradeoffs and design factors that governments should consider when developing a price support program.

Table 4: Overarching Issues in Price Support Programs

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumers and Producers: Who Wins? Who Loses?</td>
<td>Consumers and producers have conflicting interests on prices. High prices benefit producers but hurt consumers, and vice-versa. Government price-supports need to consider the needs of both groups.</td>
</tr>
<tr>
<td>Spatial/Seasonal Considerations</td>
<td>Should prices be allowed to vary by region, season, and type of rice grown? Regions with higher transport and production costs may need higher prices.</td>
</tr>
<tr>
<td>Maintaining Private Sector Growth and Innovation</td>
<td>Pricing policies have the potential to either stifle or encourage private sector growth.</td>
</tr>
<tr>
<td>Long-Term Issues</td>
<td>What is the exit strategy? It is important to consider how the government’s role may change as the country develops.</td>
</tr>
<tr>
<td>Evaluating Success and Failure</td>
<td>What, specifically, are the goals of the program? How will progress on these goals be tracked and measured?</td>
</tr>
</tbody>
</table>

Consumers and Producers: Who Wins? Who Loses?

When setting the price of rice, the government must be careful to balance the conflicting interests of consumers and producers. Setting the price too low is good for consumers, but acts as a tax on producers. Setting the price too high, however, will benefit farmers at the expense of consumers. Since most agricultural laborers are landless and net consumers of rice, it is possible that setting prices higher for producers could have a negative effect on most rural laborers. Conversely, keeping the price low would only perpetuate the stagnating productivity levels being seen in Myanmar’s rice industry.

In Myanmar, 30 to 50% of rural agricultural laborers are landless, paid in cash wages, and are net buyers of rice (Fujita 2009). Since a rice price support program would likely lead to higher rice prices, such a program could harm this especially vulnerable class of farmers. Therefore, the government should closely consider the distributional impacts of a price support program, as it may not be beneficial for the most vulnerable rural citizens.
Spatial and Seasonal Considerations

Because farmers in different regions and seasons face varying farm gate prices, any price support program should allow the domestic price to fluctuate throughout the year. Typically, rice prices fluctuate between the harvest and lean seasons. These fluctuations are important because higher lean-season prices can compensate farmers for the costs of grain storage. Allowing the government prices to fluctuate alongside these natural price variations will not only compensate farmers for grain-storage, but it will also reduce the logistical and financial burdens on government price-stabilization efforts.

Timmer (1989) models the effects on government budgets when government prices attempt to intervene in seasonal and regional price fluctuations. He shows that government attempts to squeeze the price margin to less than the full costs of grain storage, including the profit and risk premium, can be expensive. He shows that “costs to the government budget rise with the square of the ‘squeeze’ on the full price margin - that is, the proportion of the full seasonal price rise that the government attempts to prevent by implementing a narrow band between permitted low and high prices.”

Cummings (2006) suggests that allowing floor and ceiling prices to vary by region and season may encourage private-sector development in storage, transport, and trading. He argues that allowing regional variation in prices to cover the transportation and management costs of moving grains can encourage private operations to arbitrage the market – subsequently encouraging them to develop more sophisticated transportation networks. Also, allowing domestic prices to vary by season may encourage private holding of grains, since it would compensate farmers and private storage facilities for the costs of storing grain over time. In the case of Myanmar, such domestic price variations would need to complement larger structural programs to increase local capacity for grain transportation and storage.

Maintaining Private Sector Growth and Innovation

Any government intervention runs the risk of crowding out private sector players. Short-term pricing policies should take care not to squeeze private processors, storers, and marketers out of the market. Not only is this important for long-term economic growth, but it is also critical to keep the costs of implementing the program reasonably low. The more private sector players that are squeezed out of the market, the more of a role the government will have to play in managing the price – raising the overall program implementation costs.

Government-induced price distortions may also influence market dynamics. Keeping prices high could stifle crop diversification and growth. If the price of rice, for instance, is kept artificially high, it could provide incentives for farmers to continue to grow rice in place of higher-value commodities. In this sense, price controls can delay agricultural transformation and development. Also, if there is a strong direct public presence in the market, it may discourage private players from purchasing, distributing, selling, or storing the controlled commodities (Cummings 2006). Myers (2006) warns that price support schemes can remove the private incentives to innovate credit and insurance markets and to invest in storage facilities. He further warns that price support programs “to achieve short-term goals can lead to long-term costs [to the economy as a whole] in terms of under-development of improved market-based mechanisms for managing risks and smoothing consumption.”

11 The costs in this generic ‘floor and ceiling’ price model do not include the overhead costs of maintaining an effective food logistics agency, nor the probability that storage costs for the public agency are likely to be substantially higher than those in the private sector (Timmer 1989).
Any program that increases the price needs to anticipate how excess production will be handled. The government should consider the roles of both private and public reserve stocks, and the potential for exporting surplus production. Gilbert and Morgan (2010) argue that private stockholding should take precedence over public stockholdings. They argue that increased public stockholdings can displace private stocks, and therefore stifle private sector development in this important area of agriculture. However, governments should also consider the capacity of private sector players to store adequate amounts of reserve stocks. Any public stockholding program should also include capacity-development activities for private sector players.

Finally, government interventions into the level and stability of food prices, if properly designed, can actually stimulate private sector growth and innovation. Rakotoarisoa (2011) argues that technology adoption and innovation generally increase with expected profits – as expected prices increase for farmers, farmers are more willing to adopt new technology or increase production. Fulginiti and Perrin (1992) show evidence of this effect. However, Timmer (1989) warns that it is exceedingly difficult to know exactly which measures to take to generate positive expectations in the market. He argues that “positive expectations are fragile; they take a long time to build and can be destroyed overnight with one foolish intervention.” Therefore, though there is potential to stimulate private sector growth through price-control strategies, the government must proceed carefully and thoroughly research the best ways to instill confidence and optimism in farmers and other agriculture-based businesses.

**Long-Term Issues**

Government interventions can be valuable, but it is necessary to know when and how one must withdraw. Ignoring the exit-strategy can lead to high, sometimes unsustainable, costs. Indeed, once public institutions or public organizations are created, they are very difficult to reform or shut down. Cummings (2006) notes that numerous Asian grain price stabilization programs are unsustainably expensive, while the benefits of such programs are decreasing due to the changing context of food systems. Therefore, it is important to consider how the government’s role may change as the country develops. In the coming decades, stronger economic growth may make a price support system less important to the economy. Maintaining a robust private sector, as explained above, is one way to anticipate and adapt to long-term macroeconomic developments. If there is a robust private sector, transitions away from price support programs will be more easily accomplished (Timmer 1989).

One way to ensure a robust private sector is to complement price support interventions with other interventions to improve structural performance in food markets – such as increased R&D, farmer extension, and infrastructure development. Specific policies and programs will be discussed below, in the country case studies section.

**Evaluating Success and Failure**

Ongoing monitoring and evaluation of any public program is necessary to achieve effective results. First, the government must decide what, specifically, the goals of the program are. It should be clear if the goal is to simply increase productivity, improve farmer welfare, or to encourage the modernization of agriculture. Each goal necessitates a distinct performance metric.

---

12 To avoid this, the government may choose to sell excess production at a loss. However, this may prove financially unsustainable and could destabilize domestic rice markets if done improperly.

13 Specific policies and programs will be discussed below, in the country case studies section.
Timmer (2011) suggests creating a regional component to these goals. Typically, at the local level, the goal is to increase agricultural productivity on smallholder farms. At the national level, the main goals are typically higher political support for the administration and a more stable investment climate for economic growth.

The government needs to create a monitoring and evaluation system to track and measure progress on achieving these goals, combined with regular evaluations and cost-benefit analyses to evaluate if or how well the program is working.
Country Case Studies

Thailand

Thailand’s Paddy Pledging Scheme formally began in 2011 as an effort to support farmer incomes and boost agricultural productivity. There was also a pledging scheme from 2004 - 2009. Both pledging programs involved state procurement of paddy from farmers – typically at levels 30-40% higher than market prices (Mohanty 2012). Under the current pledging scheme, the government is charged with physically handling the stocks, though there are also private storage facilities. Table 5 below offers a summary of price-support implementation in Thailand, its impacts on the Thai economy, and the key lessons for Myanmar to take away. The discussion to follow elaborates on the lessons in the table.

Table 5: Price Support Implementation in Thailand

<table>
<thead>
<tr>
<th>Implementation</th>
<th>Impacts</th>
<th>Lessons for Myanmar</th>
</tr>
</thead>
</table>
| Public Procurement via Marketing Board | • Higher yields and rice productivity.  
• Expanded rice planting and acreage dedicated to rice.  
• Benefits accruing mainly to wealthy farmers.  
• Inadequate storage, leading to rotting rice.  
• Shortages of government implementation funds.  
• Exports becoming less competitive. | • Price support programs may increase yields and productivity.  
• Benefits of price supports may accrue mainly to middlemen/wealthy farmers.  
• Ensure there are adequate credit lines for program financing.  
• Ensure adequate public and private storage capacity.  
• Consider the possible negative effects of price supports on Myanmar rice export growth. |

Farmer-Level Impacts

The Paddy Pledging Scheme led to increased agricultural production in initial years. In 2012, the higher government prices enticed farmers to increase their rice plantings and expand the number of acres planted. Yields increased as a result (USDA 2012). However, there is evidence that farmers switched away from planting other crops in favor of rice due to the attractive intervention prices (USDA 2012).

There is also evidence that the benefits from higher prices mainly accrue to wealthier rice farmers. The poorest farmers, often in need of quick cash, are sometimes forced to sell their crop before the formal harvest season. Since the government only procures rice at the time of harvest, the poorer farmers are forced to sell to middlemen, who then store the crop and re-sell it to the government at the higher, pledged price.\(^\text{14}\)

\(^\text{14}\) This information was gathered from a private correspondent who wished to remain anonymous.
Fiscal and Financial Impacts

The increased production has put a strain on storage facilities. In 2012, the government was forced to release around 6-7 million tons below market prices to relieve the strain on storage facilities – selling below the procurement price and therefore incurring a loss (USDA 2012; Tan 2012). In 2013, there were close to 18 million tons of rice held in stockpiles – some of it produced as far back as 2008 – with thousands of tons rotting and burnt in the silos (Bangkok Post 2013). As one of the leading exporters of rice, Thailand is in a delicate position. It cannot simply export the surplus production, since this would further depress world prices. Many market observers question the feasibility of Thailand simply offloading surplus production into the market, since it may face resistance from major trading partners (Tan 2012).

As of 2012, the Thai government still had an outstanding debt of around $2.1 billion from the 2004 – 2009 pledging program (USDA 2012). In 2012, the Bank for Agriculture and Agricultural Cooperatives (BAAC) estimated that the Thai government would need a credit line of $4 billion to implement the current pledging program (USDA 2012). In 2013, the BAAC faced a shortage of funds to buy paddy from farmers (Bangkok Post 2013). Moody’s Investors Services recently speculated that losses from the pledging program will hamper Thailand’s goal of achieving a balanced budget by 2017, to the detriment of its bond ratings (Suwannakij 2013). The government in 2013 decided to reduce the support price to farmers in order to rein in spending (Suwannakij 2013).

The pledging price also contributes to inflation. In 2012, the Bank of Thailand estimated that a 50 percent increase in paddy prices would lead to a 0.4 percent increase in the inflation rate.

Impacts on Trade

In recent years, Thai rice has lost its competitive edge as a result of the pledging programs. In 2012, rice from India and Vietnam was over $100/MT cheaper than Thai rice due to the government support prices in Thailand, allowing traders from India and Vietnam to take market share from Thai rice producers (USDA 2012; Mohanty 2012). In 2013, the government approved a 20 percent reduction in the support price in order to both rein in government spending, and to make exports more competitive so that excess stocks could be traded in world markets (Suwannakij 2013).

Lessons for Myanmar

Though the rice industry in Thailand is at a different level of development than in Myanmar, the Thai experience – like in other countries – suggests that higher guaranteed prices do indeed entice farmers to invest more in inputs and acreage, leading to higher yields. However, this comes at the expense of crop diversification – with possible long-term impacts on biodiversity and the macroeconomy.

Some speculate that were a similar system instituted in Myanmar, many of the benefits would accrue to middlemen in the same way it happens in Thailand, since many smaller growers are vulnerable relative to middlemen.15 Any system in Myanmar would need to consider the needs of the poorest farmers who may be forced to sell their crops before the harvest.

15 This information was gathered from a private correspondent who wished to remain anonymous.
Rice procurement and storage have been extremely expensive in Thailand. The government lacks the adequate credit lines and storage capacity to handle excess production. If Myanmar is considering public procurement, storage, or any form of physically handling the commodity, the GoM needs to ensure that adequate credit lines exist for program financing, and that private and public storage capacity is sufficient. The government may also investigate the feasibility of exporting excess production in the ASEAN context.

The government of Myanmar needs to consider the impacts that higher prices could have on export volumes. The price-setting mechanism must be able to accommodate adequate export growth, and not hinder exports as has happened recently in Thailand. According to Wong (2013), Myanmar’s 2013 exports totaled 1.3 million tons. Given the government’s target of exporting 3 million tons per year, the potential impacts of price support on exports need considerable attention.

Indonesia

Table 6 below offers a summary of price-support implementation in Indonesia, its impacts on the economy, and the key lessons for Myanmar to take away.

Table 6: Price Support Implementation in Indonesia

<table>
<thead>
<tr>
<th>Implementation</th>
<th>Impacts</th>
<th>Lessons for Myanmar</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Procurement via a food logistics agency (BULOG).</td>
<td>• Increases in rice production and yields.</td>
<td>• Poor-quality rice harvests can demand a lower price than the official floor price.</td>
</tr>
<tr>
<td>• Investments in infrastructure, R&amp;D, and improved agricultural technologies.</td>
<td>• The minimum government price was not always enforceable, especially during years where rice quality was low.</td>
<td>The GoM needs adequate safeguards to enforce prices when there is evidence of a poor harvest.</td>
</tr>
<tr>
<td></td>
<td>• Financial inefficiencies in BULOG, and difficulties enforcing and implementing government prices.</td>
<td>The higher the domestic floor price is set above world prices, the more challenging it is to enforce a government price.</td>
</tr>
<tr>
<td></td>
<td>• Lack of credit in the early 2000’s left BULOG relatively powerless in maintaining procurement functions.</td>
<td>The GoM needs steady access to credit to ensure effective price-management during drought years.</td>
</tr>
<tr>
<td></td>
<td>• Increased rent-seeking and cronyism around BULOG.</td>
<td>• Controlling prices at the border may be a viable option for Myanmar, however, the GoM must ensure price transparency and minimal smuggling.</td>
</tr>
<tr>
<td></td>
<td>• Import restrictions increased domestic prices.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Higher instances of rice smuggling following import restrictions.</td>
<td></td>
</tr>
</tbody>
</table>

In the late 1960’s/early 1970’s under President Soeharto, the Government of Indonesia (GoI) began an aggressive program to improve the rice industry in Indonesia. The program had three main components: (1) heavy investment in rural infrastructure; (2) R&D and dissemination of improved agricultural technology, including high-yielding seeds, fertilizers, pesticides, and farmer extension; and (3) implementation and enforcement of price support to both consumers and farmers (Arifin 2004). The GoI
formed a food logistics agency (BULOG) to implement the pricing program. BULOG’s mandate included domestic government procurement, stocks, distribution of food to households during lean seasons, and government reserves for emergencies (Dawe 2010).

BULOG also implemented a price band on rice. Its floor price guaranteed a minimum gate price for rice farmers, while the ceiling price kept rice affordable for consumers. BULOG managed the price by strategically buying up rice production not absorbed by the market. Then, if rice prices increased too much – especially during lean seasons, droughts, or natural disasters – BULOG would sell cheap rice to targeted consumers (Rashid et al 2005).

**Farmer-Level Impacts**

Rice production grew by an average of 4.6% per year during the 1969 – 1990 period under BULOG, significantly outpacing population growth of 2.1 percent. Yields grew by 2.7 percent per year. This growth in land productivity has been attributed to heavy investment in rural infrastructure, agricultural technology, and price supports (Arifin 2004). In theory, BULOG’s floor price kept the farm-gate price well above production costs, while its ceiling price made rice affordable to low-income consumers, especially in urban areas.

**Table 7: Effectiveness of Floor Price and Procurement Price of Rice in Indonesia: 1997-2003**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Floor Price Policy (Rp/kg)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>525</td>
<td>1,000</td>
<td>1,400</td>
<td>1,400</td>
<td>1,500</td>
<td>1,500</td>
<td>1,725</td>
</tr>
<tr>
<td><strong>Farmers selling below floor price (%)</strong></td>
<td>0.8</td>
<td>3.8</td>
<td>8.3</td>
<td>48.3</td>
<td>17.1</td>
<td>9.6</td>
<td>50.3</td>
</tr>
<tr>
<td><strong>Number of observations</strong></td>
<td>6,297</td>
<td>6,811</td>
<td>6,683</td>
<td>5,455</td>
<td>4,914</td>
<td>4,851</td>
<td>6,367</td>
</tr>
<tr>
<td><strong>World Price ROB(USD/ton)</strong></td>
<td>281.0</td>
<td>276.0</td>
<td>216.2</td>
<td>173.6</td>
<td>152.7</td>
<td>171.8</td>
<td>180.0</td>
</tr>
</tbody>
</table>

Notes:
a) In 1998, floor price was revised four times: Rp 525/kg (January), Rp 600/kg (April), Rp 1,000/kg (June) and Rp 1,400/kg (December).
b) The percentage is simply the number of observed farmers receiving farm-gate price below the referenced price announced by the Government.
Sources: Calculated from *Tim Monitoring Harga Gabah* BPS, the newest: February 2004

There is evidence, however, that farmers did not always benefit from the program. Table 7 above shows the percentage of farmers selling below the floor price from 1997 – 2003 (Arifin 2004). Note that in some years, most farmers received the floor price. However, in some years a large percentage of farmers was forced to sell below the government reference price. For example, in 2003, 50 percent of farmers’ gate prices fell below the official government reference price, likely due to low rice quality. Since most farmers are price-takers, they did not always exercise their options in choosing which marketing agents to trade with. Therefore, middlemen often benefited from buying rice below the government reference price, and selling it later at a profit (Arifin 2004).

**Logistical, Fiscal, and Financial Challenges**
BULOG has often been accused of financial inefficiency. From 1993 – 1998, BULOG’s cost-inefficiencies were estimated at USD $2.0 billion dollars (Cummings 2006). BULOG’s costs rose especially during drought and flooding years (1997 – 1999), where logistical challenges are typically greatest (Arifin 2004). The size of the price band in 1998 was the highest in the history of Indonesian rice. This is evidence that the GoI had trouble enforcing and implementing official prices, since wider price bands are easier to implement than narrower bands.

In the early 2000’s BULOG was given limited access to state budgets, and no longer enjoyed direct liquidity credit from the central bank. These financial strains prevented BULOG from maintaining its rice procurement functions. It effectively lost much of its power to defend a floor price at the farm-gate – especially since the floor price was set well above the prevailing import-parity price (Arifin 2004).

Arifin (2004) provides an excellent description of the rent-seeking and cronyism that developed around BULOG in Indonesia:

The influence of special interests became obvious in the 1990s. This was reflected through a practice of interlocking mechanisms between government / political elites and private sectors; non-transparent government decisions in rice-import process; and closed appointing of rice importers. Big conglomerates such as the Salim Group and former President Soeharto’s cronies dominated rice importers and importing activities. These companies generated economic rents and excessive profits from trading fees as much as US$ 10-15 per ton, in addition to benefitting from the price differences between world market and the fixed contract price set by the government. A large amount of rice import meant large economic rents. Under these non-transparent schemes of collaboration with government officials, the favored companies controlled the distribution system.

Impacts on Trade

After a surge in rice imports in 2003 – 2004 kept domestic prices weak, the government introduced a new import policy whereby imports were severely limited and can only be executed by BULOG following the issuance of import licenses by the Ministry of Trade (Dawe 2010). This policy led to increases in domestic prices, and lower instances of farm-gate prices falling below the government reference prices (Dawe 2010). There is evidence, however, that this has resulted in higher levels of rice smuggling. Field observations have confirmed that under-invoicing of rice imports reached as high as 50 percent of actual imports in 2004 (Arifin 2004).

Lessons for Myanmar

Public procurement and distribution gave Indonesia a certain degree of control over both farm-gate prices and prices for consumers. However, the minimum price was not always enforceable, especially during years where rice quality was lower. Despite government efforts, a poor-quality rice harvest can demand a lower price than the official floor price. The GoM needs safeguards to ensure appropriate farm-gate prices when there is evidence of a poor harvest.

---

16 In other words, the margin between the farm-gate price and the consumer price.
Like any parastatal food logistics agency, BULOG suffered from high cost-inefficiencies — especially during years of drought, flooding, or other natural disasters. Inefficiencies were compounded as a result of ambitious price-setting policies. The higher the floor price is set above the prevailing import-parity price, the larger the costs of implementation and enforcement. Also, when BULOG’s access to state budgets and credit was hampered in the early 2000’s, it lost its effectiveness to manage prices. The GoM needs contingency plans and steady access to credit to ensure effective price-management during drought years.

Import restrictions did lead to higher domestic prices in Indonesia, and greater enforcement of official government prices. Controlling prices at the border may be a viable option for the GoM, since it does not involve physically handling the commodity. However, the GoM would need to take measures to ensure price transparency and minimal smuggling.

Pakistan

In 1973, the Government of Pakistan (GoP) formed the Pakistan Agricultural Storage and Services Corporation (PASSCO). PASSCO had four main functions: (1) price support for paddy and other crops; (2) price stabilization; (3) construction of storage facilities and marketing infrastructure; and (4) promotion of post-harvest processing facilities (Rashid et al 2005). PASSCO would typically set a minimum support price for farmers, and procure large quantities of rice to stabilize prices.

Table 8 below offers a summary of price-support implementation in Pakistan, its impacts on the economy, and the key lessons for Myanmar to take away.

Table 8: Price Support Implementation in Pakistan

<table>
<thead>
<tr>
<th>Implementation</th>
<th>Impacts</th>
<th>Lessons for Myanmar</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Procurement via a food logistics agency (PASSCO).</td>
<td>• Middlemen often captured most of the benefits from the program.</td>
<td>• Failure to consult with stakeholders prior to price-setting can create unrest.</td>
</tr>
<tr>
<td>• Investments in marketing infrastructure and post-harvest technologies.</td>
<td>• Delayed public procurement in 2009 led to middlemen arbitraging the market by buying from farmers below the official price, then re-selling the crops at the official price.</td>
<td>• Farmers in remote regions need empowerment to sell their harvest at the official price – either via increased market information or adequate government oversight.</td>
</tr>
<tr>
<td></td>
<td>• In 2009, rice growers expressed discontent when the Pakistani government set prices too low without consulting them.</td>
<td></td>
</tr>
</tbody>
</table>

Farmer-Level Impacts

At times, farmers were not benefitting from the minimum support prices. For example, in 2009, the government set the support price at Rs 1,250 per 40 kg. In the Southern Punjab region, government procurement was delayed, forcing farmers to sell to middlemen at prices as low as Rs 700. The middlemen
would then sell the rice in Upper Punjab, where procurement was already under way, at the official price of Rs 1,250 (Financial Times 2009).

Also, later in 2009 the Rupee depreciated, prompting the government to lower the support price by 30 percent. Many growers accused the government of reducing the support price without consulting with key stakeholders and growers, to the detriment of farmer profits (Goraya 2009).

Lessons for Myanmar

PASSCO’s experience offers an important warning for similar programs in Myanmar. Failure to consult with stakeholders prior to price-setting can create unrest. Also, farmers in more remote regions need to be empowered to sell their rice at the official government price – either through increased market information, or serious oversight on the part of government officials.

It is also important to note that the GoP abandoned PASSCO’s role in government procurement in 2011, leaving procurement and price-setting to private-market forces (Pakistan Observer 2011).

Papua New Guinea

In 1977, the Government of Papua New Guinea stopped basing its cocoa support prices on costs of production – the rationale being that cost of production is a dubious criterion since costs depend on many factors and can vary widely across growers. The government also realized that if it set the price too high or two low relative to the long-run world price, it would become too expensive to enforce and administer the program. Therefore, the government decided to base the target price on the long-run world price, as proxied by a 10-year moving average of past world prices and adjusted for inflation. Instead of trying to stabilize prices at this exact level, the program was set up to pay a subsidy or levy a tax equal to half the difference between the 10-year average in a given year and the world price in that year. So, the fluctuation in producer prices would be approximately half the difference between the change in world prices and the change in the moving average (Knudsen and Nash 1990).

Table 9 below offers a summary of price-support implementation in Papua New Guinea, its impacts on the economy, and the key lessons for Myanmar to take away.
Table 9: Price Support Implementation in Papua New Guinea

<table>
<thead>
<tr>
<th>Implementation</th>
<th>Impacts</th>
<th>Lessons for Myanmar</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Based the target price on the long-run world price.</td>
<td>• Reduced price instability by 46%</td>
<td>• Controlling prices at the border may be a viable option for Myanmar.</td>
</tr>
<tr>
<td>• Paid subsidies or levied taxes equal to half the difference between long-run world price and the world price in the given year.</td>
<td>• Avoided the costs and problems of programs that require a marketing board.</td>
<td>• Controlling border prices does not guarantee control over farm-gate prices, so disseminating price information to farmers could mitigate the impacts of middlemen capturing the program's benefits.</td>
</tr>
<tr>
<td></td>
<td>• Price information widely disseminated to growers by radio and other means to minimize exploitation by middlemen.</td>
<td>• The GoM should follow local market dynamics closely to verify if farmers are positively affected by border price controls.</td>
</tr>
<tr>
<td></td>
<td>• The tax-subsidy scheme is self-financing, and does not destabilize the government budget.</td>
<td></td>
</tr>
</tbody>
</table>

Logistical Impacts

Knudsen and Nash (1990) offer a great summary of the benefits of Papua New Guinea's price stabilization strategy:

This scheme has reduced instability of cocoa prices by an estimated 46%, and has had three important concomitant advantages, compared to stabilization programs tried in other countries. First, since the board regulates the price only by taxing or subsidizing the export price, it avoids the costs and problems of many programs that require a marketing board to become directly involved in the purchase and transport of the crop. In order to insure that bounties as well as levies are passed on to producers through the private traders who are the initial payees or payers, price information is widely disseminated to growers even in remote areas by radio and other means to improve their bargaining positions vis-a-vis the traders. Second, this kind of system avoids some of the undesirable macroeconomic side effects of other schemes. The tax-subsidy system is self-financing, so it does not destabilize the government's current budget. Furthermore, at least 60% of the fund is deposited with the Central Bank, which can then easily sterilize any undesirable fluctuations in foreign exchange to neutralize inflationary or deflationary effects. Finally, the program does not require any physical stockpiling of the commodity, thereby avoiding the kinds of costs associated with buffer stocks in other countries.

Lessons for Myanmar

From a logistical standpoint, Papua New Guinea’s strategy was cost-effective since it did not require the government to physically handle the commodity. As is evidenced in the other country cases above, public procurement and storage of crops is a major strain on food logistical agencies’ budgets.

Controlling the price at the border may be a viable option for Myanmar, with one caveat: controlling domestic prices via border prices does not guarantee the same level of control over farm-gate prices.
Domestic prices will certainly follow world prices, but there is less control over how much of the benefits of higher prices accrue to the middlemen versus farmers. In Papua New Guinea, they try to ensure fair farm-gate prices by disseminating price information via radio and other means. If Myanmar chooses such an option, they should follow local market dynamics closely to verify if farmers are being positively affected by border price controls.
Data and Methods

Data

The model uses a linear production technology with fixed input and output coefficients. The key inputs are fertilizer, seed, labor, and land. The output is rice production, as measured in MT per hectare. The production function is summarized in equation (1) below:

$$\frac{rice}{ha} = \min\left(fertilizer\left(\frac{Kg}{ha}\right), seed\left(\frac{Kg}{ha}\right), labor\left(\frac{workers}{ha}\right)\right)$$

The input coefficients represent the number of units of an input used to produce a certain number of units of output. For instance, the input coefficient on fertilizer may be 40 Kg/ha, and the output coefficient on rice might be 3 MT/ha – meaning that 40 kg of fertilizer are used to produce 3 MT of rice per hectare. After the input requirements per unit of output are determined, you can then multiply those requirements by the price of the input to compute the cash flow.

The main data sources for input-output coefficients were the International Rice Research Institute (IRRI) database\(^{17}\); medium-scale studies conducted by Michigan State University, MDRI, and USAID; and private correspondences. Input coefficient estimates were calculated by dividing the total use of the input by the number of hectare cultivated. For example, the parameter for Kg Fertilizer/ha was estimated by dividing the total fertilizer consumption by the total number of hectares cultivated. Private correspondences within Myanmar confirmed that the parameters, though not rigorously measured, were more or less representative of input use in Myanmar rice production.

Farm-gate price data was imputed using values from the IRRI database. The past 10 years of price data were used as the model’s first 10 yearly average prices. Those same 10 prices, adjusted for inflation, were imputed into years 11 – 20, then 21 – 30. This allowed the price to vary with some degree of historical accuracy.

Table 10 below summarizes the data sources used to calculate each input coefficient’s values. For a full list of the input and output parameters used, and the corresponding values, see Table 18 in Appendix II.

\(^{17}\) http://ricestat.irri.org:8080/wrs
Methods

The model attempts to measure the cash flow, per hectare, to a rice farmer in Myanmar. Then, adjusting for inflation and price uncertainty, the cash flow is extended out 30 years. The model is broken into two sections: (1) cash-in, which represents the revenue per hectare for a rice farmer; and (2) cash-out, which represents the costs of rice farming – both operational costs and investment costs. Subtracting the costs from the revenue yields the net cash flow (NCF) for a given year. Discounting the NCF for each of the thirty years to a base year gives us the net present value (NPV), per hectare, of a farming operation in Myanmar over 30 years. Since the unit of observation is per-hectare, in order to generalize the results one can simply multiply the NPV per-hectare by the number of hectares farmed. For instance, for a five-hectare farm, one could multiply the per-hectare NPV by five to get the NPV to the farm.

Table 11 below summarizes the cash flow, per hectare, to a typical rice farmer in Myanmar. The first column of numbers is the cash flow to the farmer in the first year of the analysis. The “net cash flow” in line 15 is the net income the farmer receives in year zero. The second column of numbers gives the 30-year present value (PV) of each line item in the cash flow. Line 17 gives the per-hectare NPV over 30 years for a typical rice farmer in Myanmar. It represents the value of a hectare of paddy farmland in the absence of a government price support program that farmers would receive in the absence of a price support program – referred to formally in the analysis as the “base case.”

---

18 Note that the cash flow assumes a relationship between two key prices – the farm-gate price, and the FOB (border) price. Wong et al (2013) found that the farm-gate price of paddy was $182 USD/MT, while the FOB price was roughly $330 USD/MT. These figures yield a price margin of $148 USD/MT.
Table 11: Representative Farmer Cash Flow – per-hectare (Summer Paddy)

<table>
<thead>
<tr>
<th></th>
<th>Value Year Zero</th>
<th>PV (30 yrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 I. Cash - In</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Gross Revenue (Kyat/ha)</td>
<td>189,429.30</td>
<td>$4,595,926</td>
</tr>
<tr>
<td>3 TOTAL CASH INFLOWS</td>
<td>$189,429</td>
<td>$4,595,926</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 II. Cash - Out</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 A. Investments:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Land</td>
<td>$382,383</td>
<td>$34,762</td>
</tr>
<tr>
<td>8 B. Operations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 Seed</td>
<td>$29,797</td>
<td>$500,545</td>
</tr>
<tr>
<td>10 Fertilizer</td>
<td>$5,650</td>
<td>$70,210</td>
</tr>
<tr>
<td>11 C. Labor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 Hired Labor</td>
<td>$176,645</td>
<td>$2,669,373</td>
</tr>
<tr>
<td>13 Family Labor</td>
<td>$11,760</td>
<td>$177,711</td>
</tr>
<tr>
<td>14 TOTAL CASH OUTFLOWS</td>
<td>$606,234</td>
<td>$3,778,307</td>
</tr>
<tr>
<td>15 NET CASH FLOW</td>
<td>($416,805)</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17 NPV</td>
<td>$817,619</td>
<td></td>
</tr>
</tbody>
</table>

Table 11 is a per-hectare cash flow for paddy farmers in the base case. Using a 10% discount rate, the analysis finds an initial net revenue of -416,805 Kyat/hectare, and a positive NPV of 817,618 Kyat/ha over thirty years 30 years.19 The NPV of 817,618 represents the 30-year value of a hectare of paddy farmland for the typical Myanmar farmer.

Starting from the base case, I then simulated the effects of government price support programs on the farmer cash-flow. To begin, I constructed two cash flows under programs specifically targeting farm gate prices – one program with a fixed, supported gate-price, and another program with a price band around farm-gate prices. Next, I constructed cash flows with government programs controlling prices at the border – again, one with a fixed price and another with a price band around FOB prices. When supporting border-prices, there is a greater chance that the benefits of the price support will be siphoned off by market middlemen. When evaluating border-price controls, I simulated two extreme scenarios of middlemen market power to show how the benefits to farmers can vary under border-price support programs. The scenarios are discussed in more detail in the Analysis section below.

---

19 The assumptions in growth rates and other parameters are presented in Appendix II.
Description of Government Price-Support Programs

Below is a discussion of my assumptions and methods for simulating various government price-support programs.

**Fixed-Price Program**

To simulate a price-support program with fixed farm-gate prices, I initially assumed a government price 20% higher than the average world price for the past 10 years. Then, using the same input and output coefficients as the base case, I calculated the per-hectare cash flows for paddy farmers under the fixed price program. Subtracting the base-case cash flow from the fixed-price cash flow gives the “incremental cash flow” of the program. The incremental cash flow, and the subsequent incremental NPV, represents the added benefit to the farmer under the government program. Next, I tested the program’s sensitivity to various protection levels, yield, and exchange rate fluctuations.

**Price-Band Program**

To simulate the price band on the farm-gate price, I first set the margin to between 142,500 and 237,500 Kyat per MT. In other words, if the market price dropped below 142,500 Kyat/MT, the government would intervene to ensure a minimum price of 142,500 Kyat/MT. Conversely, if the price rose above 237,500 Kyat/MT, the government would intervene to ensure a maximum price of 237,500 MT/Kyat. In this the price ceiling could enable the government to accrue revenue by purchasing rice at the ceiling price and exporting it at the higher market price. The price margin – i.e. the difference between the maximum and minimum prices – remained constant, while the price levels were allowed to increase with inflation. Using this price margin, I calculated a per-hectare cash flow for paddy farmers under a price-band program. Subtracting the base-case cash flow from Table 11 from the price-band cash flow yielded another incremental cash flow, which represents the added benefits to the farmer under a price-band program. Another sensitivity analysis on yield and exchange rates was conducted.

**Price Controls at the Border**

Next, I simulated the impacts of controlling prices at the border under both an FOB price-band, and a fixed-price enforced via trade restrictions at the border. Data on the margin between the farm-gate price and the FOB price was taken from Wong (2013), and is presented in Table 12 below.

---

20 Therefore, in theory, you could set the floor and ceiling prices such that the revenue cost to the government could be zero over time. In practice, however, it would be difficult to forecast price fluctuations such that the program cost nothing.
Table 12: Price Margins along the Rice Supply Chain

<table>
<thead>
<tr>
<th>Market participants</th>
<th>USD per tonne (Emata 25% rice)</th>
<th>(%) Percent on farmer selling price of paddy</th>
<th>Margin (USD per tonne)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paddy: Ex mill price</td>
<td>182</td>
<td>63 (see above)</td>
<td></td>
</tr>
<tr>
<td>Rice: (conversion ratio, milling cost)</td>
<td>270</td>
<td>148</td>
<td></td>
</tr>
<tr>
<td>Rice millers (Selling price of rice)</td>
<td>291</td>
<td>160</td>
<td>21 (291-270)</td>
</tr>
<tr>
<td>Rice traders in Yangon REXC</td>
<td>302</td>
<td>166</td>
<td>11 (302-291)</td>
</tr>
<tr>
<td>Rice exporters (f.o.b. YGN) price</td>
<td>330</td>
<td>181</td>
<td>28 (330-302)</td>
</tr>
</tbody>
</table>

Note: USD =860 Kyats, cost of rice bag for rice millers (paddy price + milling) = 11629 Kyats per bag (USD 13.52 per bag) or USD 270 per tonne, rice selling price at rice mill is USD 291 per tonne.
REXC: Yangon Bayint Naung Rice Exchange Center, Yangon Bayint Naung Wholesale Market

Note that the farm-gate price is 182 USD/ton, while the FOB price is 330 USD/ton. When evaluating the price-support program, I ran two different simulations assuming two different price margins between the FOB price and the farm-gate price. First, I assumed the price margin to be constant at 148 USD/ton. Therefore, as the FOB price increased under a price-support program, the farm-gate price would increase by an equal amount, staying constantly 148 USD/ton below the FOB price. The second scenario assumed that the farm-gate price was always 55% of the FOB price. Again, I calculated cash flows under each scenario to illustrate how varying levels of market power for middlemen can affect the benefits accruing to farmers under border-price support programs. The border-price simulations are described in more detail in the analysis section below.

21 330 USD – 182 USD = 148 USD.
22 182 / 330 = 0.55
Results and Analysis

Initial Results

Table 13 below summarizes the results of the initial analysis of price support programs at the farm gate. Presented are the “base case” NPV – the NPV to the farmer in the absence of any price support program – as well as the new NPVs under a fixed price policy and a price band policy. The “fixed price” was assumed to be 20% greater than the going market price in a given year. The price band has an initial minimum of 147,500 Kyat/MT, and a maximum of 237,500 Kyat/MT. The margin of the price band remains constant over the 30-year cash flow, while the minimum and maximum prices increase with inflation. The incremental NPV under each program is simply the difference between the farmer’s NPV with the program, and the “base case” NPV. It represents the additional benefits (or costs) accruing to the farmer under the program.

Table 13: Initial Results of Incremental Analyses of Price Support Programs

<table>
<thead>
<tr>
<th></th>
<th>Fixed Price</th>
<th></th>
<th>Price Band (147,500 - 237,500)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NPV</td>
<td>Incremental NPV</td>
<td>NPV</td>
<td>Incremental NPV</td>
</tr>
<tr>
<td>Base Case</td>
<td>817,618.74</td>
<td>1,709,720.62</td>
<td>1,978,675.32</td>
<td>1,161,056.59</td>
</tr>
<tr>
<td>Fixed Price</td>
<td>2,527,339.36</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Price Band</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As Table 13 indicates, with this particular model the fixed price policy leads to greater benefits accruing to the farmer. However, these benefits would come at a greater cost to the government. Table 14 below summarizes the cost of implementing the price support program under a price-band and a fixed-price system.23

Table 14: Government Cost per-hectare

<table>
<thead>
<tr>
<th></th>
<th>Fixed Price</th>
<th></th>
<th>Price Band (147,500 - 237,500)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Per-Hectare Cost</td>
<td>National Cost</td>
<td>Avg % Budget</td>
<td>Per-Hectare Cost</td>
</tr>
<tr>
<td></td>
<td>1,709,721</td>
<td>13,838,000,010,387</td>
<td>44%</td>
<td>1,161,057</td>
</tr>
</tbody>
</table>

Note that the fixed-price system costs 4.4 trillion Kyat more than the price band. Price bands are generally cheaper to implement, because if the market price falls within the price band it is not necessary for the government to enforce an official price. In numerous years, the market price fell within the price band, making the implementation cost zero. Assuming a Myanmar government of budget of $4.3 billion USD, and adjusting for inflation over the 30-year model, the fixed-price system amounted to, on average, 44% of the total government budget while the price-band system worked out to an average of 30% of the government’s annual budget.

Below is a discussion of the results’ sensitivity to yield and exchange rates, followed by a simulation of the uncertainty underlying any price-support program targeting border prices.

23 The cost was computed by multiplying the number of hectares farmed in Myanmar by the difference between the government-supported price and the going market rate.
Sensitivity Analysis

The following analysis illustrates the model’s sensitivity to yield and exchange rate fluctuations. Yield was chosen since data on yield vary widely in Myanmar, both between data sources and between regions. Exchange rate sensitivity is also important, since the appreciating exchange rate has been especially harmful to farmer income and productivity. Analyzing the model’s sensitivity to these two key parameters can highlight the uncertainty involved in estimating the benefits of any price support program.

Yield Sensitivity

Table 15 below summarizes the sensitivity of benefits to estimated rice yields under a fixed-price and price band price support policy. The “base case” column shows how the farmer’s NPV in the absence of a program varies by yield. The following two columns show the value-added to the farmer under two difference price support schemes – a fixed-price scheme and a price band, both assumed to be effectively enforced at the farm-gate. The final two columns present estimates of per-hectare costs to the GoM for enforcing the price support.

Figure 2: Price Support Program’s Sensitivity to Yield

In Figure 2 above, yields increase in 10% increments. It is important to illustrate the model’s sensitivity to yields, since Myanmar rice yield estimates vary greatly in the literature. The FAO estimated 2013 yields to be about 4 MT/ha, while the USDA estimated yields of 2.55 MT/ha. In this case, the table shows that for the base case scenario, FAO data yields an NPV estimate over three times greater than an NPV using USDA yield statistics. In terms of program benefits and costs, for both fixed-price and price programs at the farm-gate, FAO yield data leads to added NPVs and government costs close to 1.5 times higher than USDA yield statistics would produce. Figure 3 below illustrates the sensitivity of government implementation costs to yield estimates.

\[ \frac{3,123,757}{985,442} = 3.17 \]
The model’s sensitivity to yield estimates highlights an important issue for any price support program in Myanmar. Since Myanmar’s agricultural production data is sparse and inconsistent between data sources, rigorous data on input application rates and farmer cost structures are largely absent. The lack of data highlights the difficulty of trying to base the government price on cost-of-production statistics. Not only is the data limited, but improper estimates of farmer cost structures could lead to highly inaccurate predictions of farmer benefits – potentially leading to large discrepancies in intended benefits for farmers and actual program results on the ground – and government costs. Indeed, under a fixed-price program, relying on FAO data instead of USDA data would produce program cost estimates over 1.5 times higher – a difference of nearly 7 trillion Kyat on a national scale.

**Exchange Rate Sensitivity**

The appreciating Kyat has been especially harmful to Myanmar’s rice industry (Dapice 2011). Increases in the exchange rate correspond to a depreciation in the domestic currency – in other words, as the exchange rate increases, it requires more Kyat to buy USD. Therefore, increases in the exchange rate effectively increase the price of rice in Kyat. Since the Kyat’s exchange rate has been volatile in recent years, any price support program needs to account for uncertainty in the exchange rate. Figure 4 below illustrates the sensitivity of program benefits and costs to exchange rate estimations.
Figure 4 shows that the added benefits to the farmer under both fixed-price and price-band programs also increase as the Kyat depreciates. Figure 5 below illustrates that as domestic prices – in Kyat – have increased due to currency depreciation so do the costs of program implementation for the government.

Note program costs and benefits would not be affected by changing exchange rates if the government is not a function of the world price. If the official price were fixed according to production costs or some other method, any gains from a Kyat devaluation would not lead to increases in farmer benefits.
Controlling Prices at the Border: Sensitivity to Middlemen

As discussed above in the country case studies, middlemen can sometimes capture the majority of the gains from price support programs, especially in regions where government prices are hard to enforce (Financial Times 2009; Knudsen and Nash 1990). In order to simulate the effects of middlemen on farmer incomes, I have constructed two extreme scenarios to illustrate how middlemen can capture the benefits of price support programs, particularly those enforced at the border.25

The simulations rely on the relationship between two key prices – the farm-gate price, and the FOB price.26 Wong et al (2013) found that the average 2012/2013 farm-gate price of paddy was $182 USD/MT, while the FOB price was roughly $330 USD/MT.27 These figures yield a price margin of $148 USD/MT.28 This was the assumed margin in both the base case and in scenario one.

In the analysis to follow, government price supports are applied to the FOB price to simulate how the benefits of border-price support programs can trickle down to the farmer. The simulations were run under two scenarios. In scenario one, the difference between the farm-gate price and the FOB price is constant at $148 USD/MT. Therefore, a $1 USD/MT increase in the FOB price leads to a proportional $1 USD/MT increase in the farm-gate price. In scenario two, the farm-gate price is always 55% of the FOB price.29 In scenario two, changes in the FOB price do not lead to proportional changes in the farm-gate price. These scenarios are extreme cases, and the true relationship between the FOB price and the farm-gate price would lie somewhere between. These same price margins hold for the base case as well.

In Table 17, simulations were run for each of the above scenarios using varying levels of protection on the world price of rice. For instance, a protection rate of 20% means that the official government FOB price was set to be 20% higher than the prevailing world market price. The tables illustrate how benefits accrue to different parties depending on the relative market power of middlemen. A benefit to the farmer is represented by the incremental NPV for the farmer in the presence of FOB price-support.30 Benefits to middlemen are measured as the incremental NPV of the FOB/farm-gate price margin and the quantity traded.

---

25 For the purposes of this analysis, the middlemen include any and all parties in the value chain between the farmer himself, and exporters. These can include millers, distributors, wholesalers, and the exporters themselves.
26 The farm-gate price is the price that farmers receive for unprocessed, unmilled paddy. The FOB price is the export price, and represents the price that rice exporters received for milled rice.
27 See Appendix II for the full data tables of price margins along the rice supply chain.
28 The price margin is simply the difference between the FOB price and the farm-gate price.
29 Note that Wong (2013) found a farm-gate price of $182/MT, which is 55% of the estimated $330/MT FOB price.
30 The incremental NPV is simply the difference between the farmer’s NPV with the program, and the farmer’s NPV in the absence of government intervention.
Table 15: Simulation of Varying Levels of Middlemen Market Influence

<table>
<thead>
<tr>
<th>Protection Rate</th>
<th>Benefits to Farmer - Scenario 1</th>
<th>Benefits Captured by Middlemen</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>905,119</td>
<td>-</td>
</tr>
<tr>
<td>15%</td>
<td>1,357,678</td>
<td>-</td>
</tr>
<tr>
<td>20%</td>
<td>1,810,237</td>
<td>-</td>
</tr>
<tr>
<td>25%</td>
<td>2,262,797</td>
<td>-</td>
</tr>
<tr>
<td>30%</td>
<td>2,715,356</td>
<td>-</td>
</tr>
<tr>
<td>35%</td>
<td>3,167,915</td>
<td>-</td>
</tr>
<tr>
<td>40%</td>
<td>3,620,475</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Protection Rate</th>
<th>Incremental NPV to Farmer</th>
<th>Value for Middlemen</th>
<th>Portion of Benefits to Middlemen</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>895,128</td>
<td>9,991</td>
<td>1%</td>
</tr>
<tr>
<td>15%</td>
<td>1,144,721</td>
<td>212,957</td>
<td>16%</td>
</tr>
<tr>
<td>20%</td>
<td>1,394,314</td>
<td>415,923</td>
<td>23%</td>
</tr>
<tr>
<td>25%</td>
<td>1,643,908</td>
<td>618,889</td>
<td>27%</td>
</tr>
<tr>
<td>30%</td>
<td>1,893,501</td>
<td>821,855</td>
<td>30%</td>
</tr>
<tr>
<td>35%</td>
<td>2,143,094</td>
<td>1,024,821</td>
<td>32%</td>
</tr>
<tr>
<td>40%</td>
<td>2,392,688</td>
<td>1,227,787</td>
<td>34%</td>
</tr>
</tbody>
</table>

Scenario one represents an extreme case where farmers enjoy all of the benefits of a government-supported FOB price. Note that as the protection rate increases, middlemen capture no additional benefits. In scenario two, however, middlemen capture a portion of the program’s benefits. Note that as the protection rate increases, the proportion of the program benefits taken by middlemen increases. For instance, at a 10% protection rate, middlemen capture only 1% of the program’s benefits. However, at a 40% protection rate, middlemen capture nearly 34% of the program’s benefits. The relationship is depicted graphically in Figure 6 below. Note that the farmer’s benefits are categorically higher under scenario one, and increase at a greater rate. In scenario two, though farmers do continue to realize benefits from the program, the payoffs are not as high as middlemen are able to capture a portion of the program’s benefits.

Figure 6: Middlemen Market Power, and Farmer Surplus at Various Border Protection Rates

The two scenarios depict an important lesson for policymakers in Myanmar. If the GoM decides to implement its price-control policy at the border via trade taxes or restrictions, the benefits may not fully
accrue to the farmers. Before moving forward with any price program, the GoM would need to commission research to find more robust estimates of the relative power of middlemen in Myanmar. Unfortunately, at this time, there is not enough data to accurately estimate the relative power of middlemen. Before any policies are crafted, it is critical that the GoM fully understand the relationships between middlemen and farmers in order to accurately predict the benefits of the program.
Recommendations

Focus on Market-Based Interventions: Avoid Physically Handling the Commodity

In every country case study that involved public procurement from a marketing board, procurement and storage of rice have proven to be unsustainably high drains on government budgets. Myanmar’s own past experience with public procurement – the paddy pledging scheme – was discontinued in 2003 when it became financially unsustainable (Fujita 2009). Therefore, any intervention should focus on market-based strategies that minimize the government’s role in physically procuring, handling, and storing rice.

Set Prices as a Function of World Prices: Avoid Pegging Prices to Production Costs

As suggested by many academics, and shown by Papua New Guinea’s experience, setting prices according to production costs can be subjective, challenging, and open to manipulation (Knudsen and Nash 1990). Farmer production costs vary by region, by season, and by type of rice grown. The analysis of the farmer cash flows illustrated the sensitivity of farmers’ benefits to different estimations of input coefficients and production costs. Basing national prices on inaccurate cost estimates could lead to under- or over-shooting the intended benefits of the program. Given the lack of rigorous data on farmer production functions, input coefficients, and cost structures, trying to accurately set prices according to production costs would likely lead to misguided and inappropriate interventions.

Controlling Prices at the Border

Enforcing and implementing government prices at the farm-gate may be beyond the reach of the GoM. Controlling prices at the border via trade taxes could be a viable alternative. The tradeoff here, of course, is that it would give the GoM less control over prices at the farm-gate. The discussion on middlemen below offers some potential strategies to ensure the benefits of higher domestic actually reach the farmers.

Exchange Rate Devaluation

If trade taxes prove infeasible, a devaluation of the exchange rate may also raise farm-gate prices. This strategy would not, however, allow the GoM to specifically target rice and could have wider effects on the economy. Also, a careful assessment of the GoM’s capacity to manage a fixed exchange rate is necessary.

Limit the Power of Middlemen

The simulation in the analysis section illustrates how, under certain conditions, middlemen could capture all of the benefits of higher prices. I offered extreme examples, and the true position of middlemen in Myanmar falls somewhere in between. Any effort to control prices at the border, or via market mechanisms, needs to limit the power of middlemen to capture too many of the benefits of higher prices. Papua New Guinea accomplished this by disseminating price information to farmers – by letting farmers know the going price of rice in their village or surrounding villages, farmers can exercise more choice in
who to sell their harvest to (Knudsen and Nash 1990). A mobile-phone based Market Information System (MIS) may be an effective way to empower farmers to get a fair price.

**Research for Results**

The GoM should conduct further research before moving forward with the price support program. Taking the above recommendations as a starting point, the GoM should carefully estimate farmer production functions and the potential effects of the different implementing mechanisms. That way, the GoM could be sure to support the intended beneficiaries of the program – the smallholder rice farmers of Myanmar.

During the research and risk analysis, the government may consider comparing different programs either keeping the NPV to the farmer constant, or holding government expenditure constant. That way, the GoM could set a defined goal of farmer benefits and compare the costs of implementing various programs to achieve those benefits. Alternatively, the GoM could set a maximum budget for the program, and see which strategies yield the most benefits at the least cost. Such an approach would enable a comparison of different strategies while holding important variables fixed.
Appendix I: Farmer Rights Protection Act

Food Security Working Group-Land Core Group (Unofficial Translation)

Republic of the Union of Myanmar
2013 Farmer Rights Protection Law
2013, Pyidaungsu Hluttaw Law no.

Pyidaungsu Hluttaw enacts this law.
Pyidawunsu Hluttaw hereby enacts this law for safeguarding the rights of farmer
1. This law shall be called 2013 Farmer Rights Protection Law (Farmer Supporting Law)

Chapter 1
Name and Definitions of term

2. The following expressions contained in this law shall have the meaning given hereunder;
a) Farmer means a person who relies on land for livelihood, who has been working on the
land or who supervises the works on land as the main livelihood for particular period.
Under the law this expression also means the people who use land for livestock.
b) ’Central Body’ means the Farmer Rights Protection Central Body (Farmers Supporting
Central Body) formed under this law

c) ‘Agriculture’ means the following works, including ‘Contract Farming’ carried out by
individual or a group of people.
1. Farming
2. Plantation
3. Industrial Crop for raw material
4. Crops for Animal feed
5. Forest Gardening
6. Dam, irrigation and land improvement
7. Business which is sale, storage, leasing, and distribution of equipment related to the
above works

d) ‘Livestock’ means the following works, including ‘Contract Farming’, carried out by
individual or a group of people
1. Animal husbandry
2. Marine and fresh water aquaculture and breeding
3. Poultry
4. Beekeeping
5. Breeding Silkworms
6. Business which is sale, storage and distribution of necessary equipment related to
the above works

e) ‘Crops Price’ means the price which is decided based on the cost and market price, and
fixed by the central body to secure the benefit of the farmer within the particular
period.

f) ‘Product’ means the products produced by agricultural or livestock activities by the
Farmers.

Chapter (2)
Purposes
3. The purposes of this law are as follow:
   a) To support farmers with reasonable amount of loan and grant.
   b) To support research methodology, credit, machinery and input for transforming into Industrial agricultural system
   c) To set fair price in the marketplace for the farmers

Chapter (3)
Farmer Rights Protection Central Body (Farmer Supporting Central Body) forming and Responsibilities
4. The Union Government shall form ‘Farmer Rights Protection Central Body’ (Farmer Supporting Central Body) with at least (-) reasonable person
5. The responsibilities of the Central Body is as follow;
   a) To set reasonable price for the products and issue notification that price to public
   b) To organize program which will improve agricultural and livestock activities of Farmer
   c) To establish research program for agricultural and livestock activities
   d) If necessary, to form farmer rights protection working groups at the region and state level, and set up responsibilities for them
   e) To manage and provide loan and financial support for farmers
   f) To coordinate with Union Ministries, Government agencies and organizations, and non-government organizations in implementing Central Body’s duties
   g) To form necessary working groups, and set up rules and responsibilities to implement central body’s agenda
6. Members of Central Body who are not civil servants shall have the rights to receive honorarium and other allowance
7. Central Body has the rights to refer it’s duties to Government department or the organization appointed by the government department

Chapter (4)
Loan and Grant
8. The Central body has the responsibilities to;
   a) Set up rules and regulations for farmers to be able to receive loan for their agricultural and livestock activities with relevant technical assistance.
   b) Set the amount of loan, interest rate and repayment period which is issued according to section-a
9. Grant
   a) Set up rules and regulations for farmers to be able to receive necessary grant for their agricultural and poultry activities with relevant technical assistance
10. In case of devastation of crops and poultry farms, agricultural inputs, products by natural disaster, the central body shall have the responsibilities to provide necessary grant to farmers
11. To be able to provide grant to farmers, the central body shall have the responsibilities to ask budget allocation through union government to Pyitaungsu Hluttaw.
12. The central body shall coordinate with region and state government to be able to provide grant and loan to farmers
Chapter (5)
Miscellaneous

13. The relevant Union Ministry is responsible to;
   a) Cover the setting up cost for the other association under this law
   b) Support the respective working committees to be able to implement their works

14. To be able to enforce this law;
   a) The Union Government and the Central Body shall issue necessary bylaws
   b) The central body and the relevant Ministries shall issue degree, notification, directive and regulations

I hereby sign according to the Constitution of the Republic of the Union of Myanmar
# Appendix II: Parameters Table

Table 16: Parameters

<table>
<thead>
<tr>
<th>A. Input and Output Prices</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Exchange Rate Period 0 (Kyat/USD)</td>
<td>950</td>
</tr>
<tr>
<td>2 Export Price of Rice (USD/MT)</td>
<td>330</td>
</tr>
<tr>
<td>3 Gate Price of Paddy (USD/ton)</td>
<td>182</td>
</tr>
<tr>
<td>4 Wage Rate (Hired Labor per hectare)</td>
<td>176,645</td>
</tr>
<tr>
<td>5 Wage Rate (Family Labor per hectare)</td>
<td>11,760</td>
</tr>
<tr>
<td>6 Price of Seed (USD/Kg)</td>
<td>0.50</td>
</tr>
<tr>
<td>7 Price of Fertilizer - NPK (Kyat/kg)</td>
<td>500.00</td>
</tr>
<tr>
<td>8 Yield Period 0 (MT/ha)</td>
<td>2.55</td>
</tr>
<tr>
<td>9 Seed Application Rate (Kg/ha)</td>
<td>62.73</td>
</tr>
<tr>
<td>10 Fertilizer Application Period 0 - NPK (Kg/ha)</td>
<td>11.30</td>
</tr>
<tr>
<td>11 Land</td>
<td>382,383</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B. Rates of Growth in Real Relative Prices</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>16 World Price of Rice</td>
<td>2%</td>
</tr>
<tr>
<td>17 Gate Price of Rice</td>
<td>2%</td>
</tr>
<tr>
<td>18 Wage Rate</td>
<td>4%</td>
</tr>
<tr>
<td>19 Seed</td>
<td>5%</td>
</tr>
<tr>
<td>20 Chemical Fertilizer</td>
<td>2%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C. Interest Rates and Expected Inflation</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>23 Real Interest Rate</td>
<td>10%</td>
</tr>
<tr>
<td>24 Real Interest Rate on Loans</td>
<td>10%</td>
</tr>
<tr>
<td>25 Expected Inflation Rate</td>
<td>5%</td>
</tr>
<tr>
<td>26 Nominal Interest Rate</td>
<td>16%</td>
</tr>
<tr>
<td>27 Nominal Interest Rate on Loans</td>
<td>16%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>D. Other Important Parameters</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>30 Growth Rate Rice Yield</td>
<td>2.0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>E. Government Program Parameters</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>33 Net Protection Rate</td>
<td>20%</td>
</tr>
<tr>
<td>34 Lower Bound Price Band (WP - USD) YR 0</td>
<td>250</td>
</tr>
<tr>
<td>35 Upper Bound Price Band (WP - USD) YR 0</td>
<td>350</td>
</tr>
<tr>
<td>36 Lower Bound Price Band (GP - USD) YR 0</td>
<td>150</td>
</tr>
<tr>
<td>37 Upper Bound Price Band (GP - USD) YR 0</td>
<td>250</td>
</tr>
<tr>
<td>38 Lower Bound Price Band (GP - Kyat) YR 1</td>
<td>142,500</td>
</tr>
<tr>
<td>39 Upper Bound Price Band (GP - Kyat) YR 1</td>
<td>237,500</td>
</tr>
</tbody>
</table>
Appendix III: Alternative Cost Estimates for Myanmar Rice Farmers

Table 17: Production Cost and Returns for Monsoon and Summer Crop, 2011/2012

<table>
<thead>
<tr>
<th>Particular</th>
<th>Unit</th>
<th>Summer Paddy (Ks/acre)</th>
<th>Per-Hectare</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Hired labour</td>
<td>Ks per acre</td>
<td>84,800</td>
<td>209,545</td>
</tr>
<tr>
<td>2. Agro-input cost</td>
<td>Ks per acre</td>
<td>116,400</td>
<td>287,630</td>
</tr>
<tr>
<td><strong>Total cash cost</strong></td>
<td>Ks per acre</td>
<td>201,200</td>
<td>497,175</td>
</tr>
<tr>
<td>3. Farm family labour</td>
<td>Ks per acre</td>
<td>6,000</td>
<td>14,826</td>
</tr>
<tr>
<td><strong>4. Cost of production</strong></td>
<td>Ks per acre</td>
<td>207,200</td>
<td>512,002</td>
</tr>
<tr>
<td>5. Paddy yield per acre/ha</td>
<td>Basket per acre/ha</td>
<td>85</td>
<td>210</td>
</tr>
<tr>
<td>6. Paddy yield per acre</td>
<td>Tonne per acre</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>7. Break-even price of paddy (4)/(5)</td>
<td>Ks per basket</td>
<td>2,438</td>
<td>2,438</td>
</tr>
<tr>
<td>8. Marketing cost of paddy to be sold at rice mill</td>
<td>Ks per basket</td>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td><strong>9. Break-even cost of production and marketing</strong></td>
<td>Ks per basket</td>
<td>2,688</td>
<td>2,688</td>
</tr>
<tr>
<td>10. Net margin for farmers (8-9)</td>
<td>Ks per basket</td>
<td>862</td>
<td>862</td>
</tr>
<tr>
<td><strong>11. Net margin (returns)</strong></td>
<td>Ks per acre</td>
<td>73,270</td>
<td>181,054</td>
</tr>
</tbody>
</table>

In terms of costs and returns at the farm level, we utilized data from a comprehensive survey conducted by E-Trade Myanmar with the help of U Kyaw Myint. These are presented for the Monsoon and Summer crop of 2011/12 in Table 9.


Table 18: Farmer Cost Structures for Summer Paddy – Bo Bo Nge

| Summer Paddy: Planting by Seed-Spreading for 10 acres |
|-----------------------------------------------|-----------------|------------------|
| **Inputs**                                    | **Per 10 Acres** | **Per-Hectare**  |
| Item                                          | Value (Ks.)     |                  |
| Seeds                                         | 120,000         | 29,653           |
| Ploughing                                     | 270,000         | 66,718           |
| Hired Labor                                   | 90,000          | 22,239           |
| Fertilizer                                    | 400,000         | 98,842           |
| Pumping Water                                 | 90,000          | 22,239           |
| Harvest Labor                                 | 150,000         | 37,066           |
| Thrasing by machine                           | 100,000         | 24,711           |
| **Total expenses**                            | **1,220,000**   | **301,468**      |

| Outputs                                       | Small Farmers   |
| Item                                          | Value (Ks.)     |
| Unhusked Paddy                               | 2,700,000       | 667,184          |
| Yield (90 Baskets per Acre)                   | (90 Baskets per Acre) | (90 Baskets per Acre) | (90 Baskets per Acre) |
| Income                                       | 2,600,000       | 642,473          |
| **Annual Income**                             | **3,360,000**   | **830,273**      |

Source: Bo Bo Nge
References


Dawe, D. (2001). How far down the path to free trade? the importance of rice price stabilization in developing Asia. *Food Policy, 26*(2), 163-175. doi:10.1016/S0306-9192(00)00044-0


Face the facts in rice fiasco. (2013, May 30, 2013). Bankok Post,

Farmers worried: Basmati rice being procured below fixed price.(2009). Business Recorder,


IMF. Country report no. 13/250. 2013,


Kloeppinger-Todd, R., & Sandar, T. M. (2013). Rural finance in myanmar MSU-MDRI.


MSU-MDRI. (2013). Strategic choices for the future of agriculture in myanmar: A summary paper


Quan, D. (2013, September 4). Vietnam government intervention sought to support rice prices. Thanh Nien News,


Rotting rice came from old pledge scheme. (2013, September 18, 2013). *Bankok Post,*


Suwannakij, S. (2013, June 19). Rice exports from Thailand to advance as support prices cut. *Bloomberg,*


USDA. (2012). *Thailand: Grain and feed annual*

