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GTAP Annual Conference on Global Economic Analysis
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# Agriculture-sector policies and poverty in the Philippines: A computable general-equilibrium (CGE) analysis[1]

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**Abstract**

The Philippines has undertaken substantial trade-policy reforms since the 1980s. However, the poverty impact is not very clear and has been the subject of intense debate, most crucial of which is the likely poverty effects of liberalizing the highly protected agricultural sector. A CGE micro-simulation model is employed to estimate and explain these impacts. Tariff reduction induces consumers to substitute cheaper imported agricultural products for domestic goods, thereby resulting in a contraction in agricultural output. In contrast, the prevalence of cheap, imported inputs reduces the domestic cost of production, benefiting the outward-oriented and import-dependent industrial sector as their output and export increases. The national poverty headcount decreases marginally as lower consumer prices outweigh the income reduction experienced by the majority of households. However, both the poverty gap and severity of poverty worsens, implying that the poorest of the poor become even poorer

Keywords: agriculture, international trade, poverty, computable general equilibrium, micro-simulation, Philippines

JEL: D58, E27, F13, I32, O13, O15, O24, O53, Q10

[1] This work was carried out with the aid of a grant from the International Development Research Centre (IDRC)-funded Poverty and Economic Policy (PEP) Research Network (http://www.pep-net.org).

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**Abbreviations and acronyms**

| | |
|---|---|
| ACEF | Agricultural Competitiveness Enhancement Fund |
| AFMA | Agricultural and Fisheries Modernization Plan |
| ARMM | Autonomous Region for Muslim Mindanao |
| BOP | Balance of payments |
| CD | Cobb Douglas |
| CES | Constant elasticity of substitution |
| CET | Constant elasticity of transformation |
| CGE | Computable general equilibrium |
| DA | Department of Agriculture |
| EO | Executive Order |
| EPR | Effective protection rate |
| ER | Exchange rate |
| FGT | Foster, Greer, Thorbecke |
| FIES | Family Income and Expenditure Survey |
| GDP | Gross domestic product |
| GTAP | Global Trade Analysis Project |
| GVA | Gross value added |
| ILP | Import liberalization program |
| MAV | Minimum access volume |
| MS | Micro-simulation |
| NFA | National Food Authority |
| NCR | National Capital Region |
| QRs | Quantitative restrictions |
| RA | Republic Act |
| R&D | Research and development |
| RCA | Revealed comparative advantage |
| SAM | Social accounting matrix |
| SAFDZ | Strategic Agricultural and Fisheries Development Zones |
| TFP | Total factor productivity |
| TRP | Trade reform program |
| WTO | World Trade Organization |

# Summary

This paper assesses the economy-wide poverty impacts of trade liberalization in the Philippines. By employing a 35-sector CGE micro-simulation model calibrated to Philippine data with 24,797 households, the macroeconomic, sectoral, factor-income, and poverty effects of tariff reduction are analyzed.

The simulation results indicate that overall output increases slightly. Agricultural output contracts while the sectoral outputs of industry and services expand. The national poverty-headcount ratio decreases marginally. However, both the poverty gap and severity of poverty worsens. Poverty indices in most urban areas, particularly for the National Capital Region, decrease significantly. In contrast, rural households suffer due to declining returns from agricultural land and labor.

In conclusion, tariff reduction appears to have slightly reduced the poor while increasing the degree of poverty of those who are poor. The simulation results indicate that trade openness has a pro-urban and anti-rural bias. The critical challenge for the country is to capitalize on the gains and to minimize the losses by implementing complementary policies centered on three considerations: (i) increasing value-added utilization and encouraging forward and backward linkages in manufacturing; (ii) fostering competitiveness in agriculture; (iii) instigating programs aimed at correcting inter- and intra-regional imbalances through skills upgrading.

# 1 Introduction

The Philippines has undertaken substantial trade policy reforms since the 1980s to enhance domestic-producer efficiency and encourage exports. As a result, the country's trade-policy environment has significantly changed. The inherent bias towards manufacturing and against agriculture, which prevailed since the 1960s, waned by the 1990s. Instead, the current system of protection favors agriculture as quantitative restrictions (QRs) were replaced by high nominal tariff rates especially when the country became a part of the World Trade Organization (WTO).

Stylized trade theory suggests that trade liberalization brings about resource reallocation and productivity enhancements. In turn, this stimulates economic activity and results in welfare improvements in the long run. Two decades have passed since the onset of trade reforms in the Philippines and it seems that the rapid pace of tariff reduction imposed upon manufacturing has delivered some of the promised benefits (Austria 2002). Although the sector achieved modest expansion, limited labor absorption capacity, and declining gross-domestic-product (GDP) share, a correlation analysis by Aldaba (2005) revealed that least-protected subsectors performed well.

On the other hand, the relative protection afforded agriculture failed to induce competitiveness and productivity growth as the sector became inward-looking and inefficient. Because of this, calls to undertake rapid liberalization through tariff reduction in agriculture have emerged. Recently, this has received considerable attention and has been the subject of very intense debate. Will this be favorable or harmful to the poor especially rural households whose income mainly depends on agriculture? How will this affect farm workers who are among the very poor? What alternative or complementary policies may be implemented in order to ensure a more equitable distribution of the gains from freer trade? What are the channels through which these changes are most likely to affect the poor?

Further agricultural liberalization may bring about economy-wide and poverty impacts arising from resource-reallocation effects that may lead to changes in prices, factor income, and poverty. Surely, there will be gainers and losers in the process. The

critical challenge for the Philippines at this point is to capitalize on the gains and minimize the losses.

To shed light on these concerns, this study utilized a 35-sector computable general-equilibrium (CGE) model calibrated to Philippine data with 24,797 households. Two counterfactual policy experiments were carried out to analyze the economic and poverty effects of tariff reduction in general and on the agricultural sector in particular. The first involves simulating the actual tariff reduction between 1994 and 2000[3] to understand the probable economy-wide and poverty effects that occurred in the Philippines since the second phase of the trade reform program. The second simulates full tariff elimination in line with the WTO commitments.

# 2 Survey of literature

Analyzing the link between trade and poverty has become an important research agenda in recent years (Winters 2001; Winters, Mcculloch, and Mckay 2004; Hertel and Reimer 2004). In particular, the need to identify the transmission channels to assess how international trade may affect household poverty characteristics has been emphasized.

Notably, two methodologies—bottom-up and top-down—have been employed to analyze the poverty impacts of trade liberalization. The former focuses on detailed household survey data while the latter utilizes an economy-wide CGE model with representative household assumptions based on a coherent social-accounting-matrix (SAM) framework. In spite of the methodological difference, both approaches stress the importance of factor income on poverty. This is because households, especially rural households, have specialized earning patterns that are more sensitive to changes in unskilled wages and returns to self-employment (Hertel and Reimer 2004). A study by Coxhead and Warr (1995) on agricultural productivity in the Philippines confirms that income effects dominate consumption effects as the former accounts for two-thirds of poverty-alleviation impacts.

[3] This period was chosen because the policy reversals that occurred towards the end of the millennium resulted in current tariff rates not being significantly different from the levels in 2000.

Recently, the use of CGE models to facilitate the analysis of poverty and income distributions arising from macroeconomic shocks has become widespread. A popular but restrictive approach is to assume a log-normal distribution of income within each category where the variance is estimated from the base-year data (De Janvry, Sadoulet, and Fargeix 1991). Decaluwé et al. (2000) argue that a beta distribution is preferable to other distributions because it can be skewed to the left or right and thus may better represent the types of intra-category income distributions commonly observed. Regardless of the distribution chosen, it must be assumed that all but the first moment is fixed and unaffected by the shock being analyzed. This assumption is hard to defend given the heterogeneity of income sources and consumption patterns of households even within disaggregated categories. Indeed it is often found that intra-category income variance amounts to more than half of total income variance.

An alternative approach is to model each household individually as in Cockburn (2001) where a CGE model for Nepal was constructed with as many households based on the household survey data. This was the same approach Cororaton and Cockburn (2003) utilized to analyze the poverty effects of tariff reduction in the Philippines. Their model with 12 producing sectors was integrated with 24,797 households from the 1994 Family Income and Expenditure Survey (FIES).

This paper follows Cororaton and Cockburn (2003) by employing a detailed 35-sector CGE model integrated with 24,797 households. The rationale behind this approach stems from modeling each household individually and that counterfactual analysis using CGE models facilitates an analytical identification of the impacts of trade on poverty.

# 3 Background

## 3.1 Philippine trade reform

The first phase of the TRP (TRP-1) started in the early 1980s with three major components: (a) the 1981–1985 tariff reduction, (b) the import-liberalization program (ILP), and (c) the complementary realignment of the indirect taxes. The maximum tariff rates were reduced from 100 to 50 percent. Between 1983 and 1985, sales taxes on imports and locally produced goods were equalized. The markup applied on the value of imports (for sales-tax valuation) was also reduced and eventually eliminated.

The implementation of the ILP, designed to gradually remove non-tariff import restrictions, was suspended in the mid-1980s because of a BOP crisis but it resumed in 1986. Some initially deregulated items were re-regulated during the period. Overall, the TRP-1 resulted in a reduction of the number of regulated items from 1,802 in 1985 to 609 in 1988. Moreover, export taxes on all products except logs were also abolished.

In 1991, the government launched TRP-2 with the implementation of Executive Order (EO) 470. This was an extension of the previous program to realign tariff rates over a five-year period. The realignment involved the narrowing of tariff rates through a series of reductions of the number of commodity lines with high tariffs and an increase in the commodity lines with low tariffs. In particular, the program was aimed at the clustering of tariff rates within the 10–30-percent range by 1995. This resulted in a near-equalization of protection for agriculture and manufacturing by the start of the 1990s, reinforced by the introduction of protection to "sensitive" agricultural products. Despite the programmed narrowing of the tariff rates, about 10 percent of the total number of commodity lines were still subjected to a 0–5-percent tariff or a 50-percent tariff by the end of the program in 1995.

In 1992, a program of converting QRs into tariff equivalents was initiated. In the first stage, the QRs of 153 commodities were converted into tariff-equivalent rates. In a number of cases, tariff rates were raised over 100 percent especially during the initial years of the conversion. However, a built-in program for reducing tariff rates over a five-year period was also put into effect. The QRs on 286 commodities were further removed in the succeeding stage, with only 164 commodities being subjected to it by 1992. In 1994, the country became part of the WTO, committing to gradually remove QRs on sensitive agricultural product imports by switching towards tariff measures (with the exception of rice).

In 1995, the government started implementing TRP-3 aimed at adopting a uniform 5-percent tariff rate by 2005. Tariff rates were successively reduced on the following: capital equipment and machinery (1 January 1994); textiles, garments, and chemical inputs (30 September 1994); 4,142 manufacturing goods (22 July 1995); and non-sensitive components of the agricultural sector (1 January 1996). Through these

programs, the number of tariff tiers and the maximum tariff rates were reduced. In particular, the overall program was aimed at establishing a four-tier tariff schedule: 3 percent for raw materials and capital equipment that are not available locally, 10 percent for raw materials and capital equipment that are available from local sources, 20 percent for intermediate goods, and 30 percent for finished goods.

In 1996, the government implemented EO 313. This created a tariff-quota system among sensitive agricultural products. The minimum-access-volume (MAV) provision was instituted in which a relatively low tariff rate is imposed up to a minimum level (in-quota tariff rate) while a higher tariff rate is levied beyond it (out-quota tariff rate). EO 313 was supplemented by Republic Act (RA) 8178, specifying that tariff proceeds from the MAV must accrue to the Agricultural Competitiveness Enhancement Fund (ACEF) to help finance projects that promote agriculture-sector competitiveness.

By 1998, it became evident that the planned uniform tariff rate will not materialize as TRP-4 was undertaken to recalibrate the tariff-rate schedules implemented under previous rounds of TRPs. This resulted from a tariff-review process that evaluated the pace of tariff reduction in line with the competitiveness of the local industry. Initially, EO 465 was implemented on 22 January 1998 to adjust the tariff-rate schedules of 22 industries that were identified as globally competitive. Subsequently, EO 486 was passed on 10 July 1998 to amend the tariff schedule of residual items as well as reduce the number of tariff lines subject to quota from 170 under TRP-3 to 144 under TRP-4. Moreover, in line with TRP-4, EO 334, which took effect on 1 January 2001, provided for an amended tariff schedule on all product lines (except sensitive agricultural products) within the period 2001–2004.

Overall, the various rounds of TRPs were beset by policy reversals due to economic and political reasons, particularly lobbying by interest groups. These include[4]:

- 1983—Postponement of the ILP due to the BOP crisis

[4] The discussion here is taken from Aldaba (2005).

- 1990—EO 413, legislated to simplify the tariff structure within a one-year period, was not implemented[5].
- 1991—QRs were re-introduced for 93 items as a result of the Magna Carta for Small Farmers
- 1999—EO 63 was enacted to increase the tariff rates on textiles, garments, petrochemicals, pulp and paper, and pocket lighters
- 2000—Tariff reduction freeze (based on TRP-3) until 2001
- 2002—EO 84 was passed to extend existing tariff rates from January 2002 to January 2004 on various agricultural products
- 2003—EO 164 was legislated to maintain the tariff rates that prevailed in 2002 for 2003, covering a broad number of products
- 2003—EO 261 and EO 264 were decreed to adjust the tariff-rate schedules based on TRP-4; resulted in tariff increases on selected agricultural and manufactured products; increased tariffs for locally produced products while decreased tariffs for non-locally produced products.

## 3.2 Trade-policy environment (1981–2004)

The 1990s witnessed a reversal of protection towards agriculture coupled with accelerating manufacturing-sector liberalization. Nonetheless, trends show that: (a) the bias against exports and towards imports has not been addressed; (b) though tariff rates are low, the tariff structure is still distorted; (c) the reversal of protection towards agriculture, particularly on sensitive products, constrained growth and efficiency in the sector; and (d) the tariff structure has been influenced by policy reversals due to pressures from lobby groups.

The frequency distribution of tariff rates for the period 1980–2004 is now within the 0–50-percent range (Austria 2002). The applied nominal tariff rates for manufacturing are already lower than the bound tariff rates[6] that the country committed to the WTO. However, this is not the case for agriculture where binding rates remain at 100 percent

[5] Instead, EO 470 was enacted a year later with tariff realignment spread over a five-year period

[6] The bound tariff rate is the tariff level that a WTO-member country commits not to exceed.

(Austria 2002). In particular, applied tariff rates on sensitive agricultural products still remain within bound-tariff levels.

An analysis of tariff peak and coefficient of variation by Aldaba (2005) reveals that the current tariff structure is heavily distorted[7]. The tariff legislations enacted between 1998 and 2005 (including policy reversals) increased not only the tariff lines but more importantly the percentage of tariff peaks and coefficient of variation. From 1988 to 2005, overall tariff peaks increased from 2.24 to 2.71 percent while overall coefficient of variation increased from 0.44 to 1.07 percent. Similarly, this period reinforced the pro-agriculture bias as the sector's EPR stood at 15.09 percent compared to 5.13 for manufacturing, and the overall EPR of 6.33 percent (Aldaba 2005).

The heavy protection afforded agriculture hampered its efficiency as Philippine farm-gate prices have become higher than most Asian countries (Habito and Briones 2005). In part, this can be explained by a 10.16-percent EPR afforded to importable agricultural goods against 4.93 percent to exportables (Aldaba 2005).

Generally, the current tariff structure remains biased towards importables. Thus, exportable goods remain penalized. For instance, food processing, which registered the highest EPR of 15.36 percent, shows a bias towards importables, with 15.01 percent compared to 0.35 percent for exportables (Aldaba 2005).

# 4 Agriculture

## 4.1 Agricultural Sector Performance

The sector's growth performance is generally weak because of the low productivity growth. Growth decreased from an annual average of 6.7 percent in the 1970s to 1.1 percent in the first half of the 1980s (Table 2). Although the second half of the 1980s saw some recovery, agriculture again lost steam in the 1990s to register an annual growth rate of 2 percent 2000. If compared to the population growth rate of almost three percent, the sector's dismal growth performance implies that it has been inept in sustaining the food requirements of the entire population.

[7] The tariff peak is the proportion of products with tariffs exceeding the three times the mean tariff; the coefficient of variation is the ratio of the standard deviation to the mean.

Agriculture was the most promising sector in the 1970s, growing rapidly mainly due to the "Green Revolution". It was a net exporter, contributing two-thirds of total exports and representing only 20 percent of total imports. Thus, it provided the foreign exchange needed to support the import-dependent manufacturing sector (Intal and Power 1990). However, the inherent policy bias against the sector, together with the collapse in world commodity prices, halted this growth momentum. Between the two causes, David (2003) concludes that the sector's poor performance was largely due to the former, arising from inadequate policies and a weak institutional framework.

The policy bias towards import substitution and against agriculture and exports until the late 1970s led to market distortions that promoted rent-seeking activities and distorted economic incentives against investments in agriculture. These biases include[8]: (a) the imposition of agricultural export taxes to generate government revenue; (b) the policy of maintaining an overvalued exchange rate that resulted in negative protection rates in agriculture thereby reducing rates of return to investments; and (c) the government intervention in agriculture that created government marketing agencies which siphoned off the gains from trade, leading to rent-seeking activities.

As a result, agriculture stagnated and exposed itself to low productivity growth thereby eroding its comparative advantage. This became apparent in the 1990s as the country witnessed a change in agricultural trade patterns. Exports stagnated and imports increased dramatically to the point that the Philippines became a net importer of agricultural goods. David (2003) attributes this evolution to the country's fading comparative advantage and low productivity levels in agriculture. Essentially, this can be traced to primary agricultural goods where exports have gone from 1400 percent of imports in 1970 to 50 percent in 1998.

## 4.2 Productivity and comparative advantage

The combined impact of stagnation and low productivity growth took its toll on agriculture. The crop subsector stagnated while modest growth was realized in rice[9],

[8] See Intal and Power (1990); David (2003); Cororaton, Cockburn, and Corong (2005).

[9] Rice and *palay* (roughly the equivalent in Tagalog) is used interchangeably in the text.

banana, poultry, livestock, and fishery (Table 3). If not for growth in poultry and livestock operations in recent years, agriculture's performance would have been extremely disappointing. David (2003) confirms that this improvement came from economies of scale and technology adoption in both sectors, thus lifting the entire sector's growth performance.

*Land Productivity.* Long-term trends reveal declining lowland and upland productivity in the Philippines (Coxhead and Jayasuriya 2003). Nonetheless, measures of land productivity suggest that the country has been an average performer when compared with other countries (Habito and Briones 2005). Since the last decade, yield rates in rice, corn, and non-traditional exports such as mango, banana, and pineapple increased (Table 4). David (2003) attributes this to: (a) the adoption of modern varieties, increased fertilizer use, and expansion of irrigation facilities in rice and corn; (b) access to international knowledge (e.g., Dole and Del Monte) spreading to small firms in banana and pineapple; and (c) chemical spraying to increase mango yields.

*Labor productivity.* Labor productivity mildly recovered in the 1990s after a series of sharp declines in the mid 1980s. Generally, the slight improvement was due to the modest exit of employment out of agriculture (Habito and Briones 2005). In particular, this improvement originated from productivity enhancements in poultry and livestock as the crop subsector stagnated (David 2003).

*Total factor productivity.* Productivity changes at the margin provide a better approximation of efficiency. Mundlak et al. (2004) estimated that total factor productivity (TFP) in agriculture fell substantially from 36 percent of total output to 9 percent for the periods 1961—1980 and 1980—1998, respectively, owing to a large decline in factor growth. This trend is in sharp contrast to that experienced by Thailand and Indonesia where substantial TFP improvements occured in the same periods.

*Comparative advantage.* Trends in revealed comparative advantage (RCA) in agriculture and agricultural exports (Table 4) confirms that the Philippines lost its competitiveness as the country's share of agricultural exports to the world market fell substantially (David 2003). This is not surprising as recent trends show that Philippine farm-gate prices are higher than most Asian countries (Habito and Briones 2005).

## 4.3 Government policy

Agriculture however is not to be solely blamed for its mediocre performance. The combined impact of internal and external factors, as well as the occurrence of the El Niño phenomenon and other weather related disturbances, affected the sector. Nevertheless, David (2003) concludes that the poor performance was largely due to inadequate policies and a weak institutional framework governing agriculture—both now and in the past.

### 4.3.1 Price-intervention policies

*Export taxes on agriculture.* Agricultural export taxes were abolished in the 1980s. Prior to this, taxes ranging from 4 to 10 percent were introduced following the 1970 devaluation to stabilize the BOP position. Initially intended to be temporary, the tax was eventually retained because of its revenue-generating potential. In fact, the government imposed an additional export-tax premium in 1974 to take advantage of the boom in world commodity prices. However, this aggravated the bias against agriculture as it generated a disincentive which resulted in a resource reallocation to other sectors of the economy, particularly towards the import-substituting consumer goods (Intal and Power 1990).

*Overvalued exchange rate.* The 1960s witnessed a period of an overvalued exchange rate to protect the import-competing manufacturing sector and to help address the perennial BOP problem. This occurred despite the removal of exchange-rate controls in 1960, and the *de facto* devaluations of 1962 and 1970. The overvaluation of the peso varied significantly, from 14 percent from 1962 to 1966, to as high as 32 percent from 1975 to 1979 (Intal and Power 1990). This resulted in negative protection rates for rice, sugar and coconut range from –13 percent to –33 percent. More importantly, this significantly reduced the returns to agricultural production (Intal and Power 1990).

It was not until after the Asian financial crisis struck in 1997 that the exchange rate was able to correct itself. For instance, the real exchange rate appreciated sharply between 1992 and 1996 due to the influx of portfolio investments and the failure of the government to incorporate appropriate macroeconomic policies when the country underwent financial liberalization in the 1990s.

*Government intervention.* The persistence of government pricing and marketing interventions in agriculture, purportedly aimed at protecting the domestic economy from instability in world commodity prices, led to the establishment of government marketing agencies that had monopoly power for imports and monopsony power for exports. In reality however, they siphoned off the gains from trade by diverting proceeds from agricultural producers and creating rent-seeking activities (Bautista and Tecson 2003). In particular, heavy restrictions on the trading of food grains (rice, corn, and wheat), coconut, and sugar reduced domestic prices. For instance, the government controlled the allocation among producers of exports and domestic sugar sales, with domestic sales further forced to sell at below-world prices. The establishment of a *de facto* government-funded coconut "parastatal" with substantial monopsony power took advantage of the favorable international market at the expense of domestic coconut producers. Similarly, the National Food Authority (NFA), a government food-grain marketing agency, reduced the returns to domestic producers by controlling the domestic price of food grains. All of these exacerbated the anti-agriculture bias.

Until recently, the NFA operated as a monopoly over international trade in rice and corn. Roumasset (2000) exposed that the presence of NFA in rice trade created a 64-percent wedge between domestic and border prices. Overall, the total cost of rice policy, excluding financial subsidies to NFA, reached 49 billion pesos (more than $100 million) in 1999.

### 4.3.2 Public investments

Public expenditure in agriculture varied since the 1970s. It increased sharply between 1973 and 1983, declined in the late 1980s, then peaked in 1993. A comparison over time reveals that real expenditures during the late 1990s were well above those in the 1970s. However, David (2003) points out that less than half went to "productivity enhancing, public good-type expenditures" as the majority was redistributive in nature, generally financing private goods and services.

Moreover, investments in irrigation, public programs and research and development (R&D) were not only under-funded but have also been plagued by design, implementation, and organizational problems (David 2003). Irrigation investments

stagnated since the 1980s while R&D spending declined since the 1990s. R&D expenditures only accounted for 0.4 percent of GVA in agriculture compared with a 1-percent average in other developing countries (David 2003). Hence, the agriculture-research-intensity ratio remained low (Habito and Briones 2005).

Table 6 summarizes the Department of Agriculture's (DA) 1994 action plan to provide safety nets in line with the commitments made under the WTO. The plan, projected to be implemented from 1995 to 1998, was initiated to foster agriculture competitiveness in the world market. However, it was severely hampered by funding and implementation problems. To begin with, the DA encountered budgetary constraints due to fiscal reasons. Out of the total appropriation of 61 billion pesos from 1995 to 1998, the DA only received 48.2 billion, of which 40.4 billion was utilized (Habito and Briones 2005).

## 4.4 Agriculture trade policies

The anti-agriculture bias started to wane in the 1990s when the country substantially reduced manufacturing protection rates while at the same time replaced QRs in agriculture with their tariff equivalents. The conversion of QRs into tariff equivalent was further promoted when country joined the WTO. However, this gave the government an opportunity to resort to dirty tariffication in agriculture by imposing high bound-tariff rates which are greater than the average nominal protection rates implied by QRs (David 2003). A case in point is the imposition of the MAV on sensitive agriculture products which simply replaced QRs with a tariff-quota system.

Figure 1 shows the stylized structure of the MAV which utilizes a stepwise tariff-quota system. The MAV mechanism allows the government to impose a relatively low tariff rate $T_I$ (in-quota tariff rate), whenever sensitive agriculture imports do not exceed the set minimum quantity level $Q_I$. However, a much higher tariff rate $T_O$ (out-quota tariff rate) will be imposed for every import beyond $Q_I$, say until, $Q_O$ or $Q_O'$. Since the MAV is not fixed, David (2003) argues that: (a) it can be altered to respond to changes in domestic prices whenever a domestic production shortfall occurs; and (b) since most MAV volumes were set below import demand level, it can create large quota rents as the actual volume is seldom auctioned.

Overall, the policy towards agriculture protection and the imposition of high bound-tariff rates resulted in agriculture EPRs exceeding that of industry for the first time in 1995. This however did not help induce agriculture-sector profitability as producers hid behind the protection walls built by the government. Exports remained low and imports and farm-gate prices remained high so that agriculture remained inward looking and inefficient.

# 5 The model

*Basic structure.* The model was calibrated to the 1994 SAM of the Philippine economy. It has 35 production sectors composed of 13 agriculture, fishing and forestry, 19 industry, and 3 services, which include government services. Factors of production are classified as capital, land, and labor. In turn, labor is further classified by skill (skilled and unskilled) and by industry (agriculture and production).

The model's production structure, assuming constant returns to scale, is presented in Figure 2. Gross output is produced through a linear aggregation of intermediate inputs and value added. Intermediate input is determined using a fixed Leontief coefficient, whereas value added is a Cobb-Douglas (CD) function of labor and capital. Sectoral capital is fixed. Land and unskilled agriculture labor is agriculture specific, whereas production labor is perfectly mobile across all sectors. All non-agriculture sectors, with the exception of government (which only utilizes skilled production labor) employ skilled and unskilled production labor.

Figure 3 illustrates the basic price relationships in the model. Output price, *px*, affects export price, *pe*, and local prices, *pl*. Indirect taxes are added to the local price to determine domestic prices, *pd*, which together with import price, *pm*, determines the composite price, *pq*. The composite price is the price paid by the consumers. Import price, *pm*, is in domestic currency, which is affected by the world price of imports, exchange rate, *er*, tariff rate, *tm*, and indirect tax rate, *itx*. All prices adjust to clear the factor and product markets. An Armington-CES (constant elasticity substitution) function allocates the demand between local and imported goods while a constant-elasticity-of-transformation (CET) function determines the allocation of domestic production between

export supply and local sales. The demand side assumes cost minimization while the supply side assumes profit maximization. Hence, both their first-order conditions generate the necessary import and domestic demand functions as well as the necessary supply and input demand functions.

The model integrates the entire 1994 Family Income and Expenditure Survey (FIES) with 24,797 households. Consumer demand is derived from CD utility functions.

*Poverty*. Poverty is measured through Foster-Greer-Thorbecke (FGT) $P_\alpha$ class of additively decomposable measures (Foster, Greer and Thorbecke 1984). In general, the FGT poverty measure is[10]

$$P_\alpha = \frac{1}{n}\sum_{i=1}^{q}\left(\frac{z - y_i}{z}\right)^\alpha,$$

where $\alpha$ is the poverty aversion parameter, $n$ is the population size, $q$ is the number of people below the poverty line, $y_i$ is income, and $z$ is the poverty threshold.[11]

Poverty indices are calculated before and after the policy shock using the actual distribution of income in the FIES. The FGT poverty measure depends on the values that the parameter $\alpha$ takes. At $\alpha = 0$, the poverty headcount is calculated by accounting for the proportion of the population that falls below the poverty threshold. At $\alpha = 1$, the poverty gap is measured indicating how far on the average the poor are from the poverty threshold. Finally, at $\alpha = 2$, the poverty-severity index is revealed. The severity index is more sensitive to the distribution among the poor as more weight is given to the poorest below the poverty threshold. This is because the poverty-severity index corresponds to the squared average distance of income of the poor from the poverty line, giving more weight to the poorest of the poor in the population.

[10] See Ravallion (1992) for a detailed discussion.

[11] The poverty threshold is equal to the food plus the non-food threshold, where threshold is defined as the cost of basic food and non-food requirements.

Essentially, the changes in the FGT indices (after a policy shock) are influenced by (i) the changes in household income and (ii) the changes in consumer prices, which affect the nominal value of the poverty line.

*Model closure*. Nominal government consumption is equal to exogenous real government consumption multiplied by its (endogenous) price. Fixing real government spending neutralizes any possible welfare/poverty effects of variations in government spending. Total government income is held fixed. Any reduction in government income from a tariff reduction is compensated endogenously by the introduction of an additional uniform sales tax. Thus, the government's budget balance (public savings) is endogenously determined. The only variations are due to changes in the nominal price of government consumption.

Total nominal investment is equal to exogenous total real investment multiplied by its price. Total real investment is held fixed in order to abstract from intertemporal welfare/poverty effects. The price of total real investment is endogenous. The current-account balance (foreign savings) is held fixed and the nominal exchange rate is the model's numéraire. The foreign-trade sector is effectively cleared by changes in the real exchange rate, which is the ratio of the nominal exchange rate multiplied by the world export prices and divided by the domestic price index. The propensities to save of the various household groups in the model adjust proportionately to accommodate the fixed total real investment assumption. This is undertaken through a factor in the household saving function that adjusts endogenously.

## 5.1 Structure at the base

*Economic structure*. Table 7 presents the economic structure based on the 1994 SAM. The sectoral CES and CET elasticities in the model are derived as one-half of the Armington elasticities for the Philippines in GTAP (Hertel et al. 2004). In general, the pattern of trade points out the dominance of the industrial sector. Indeed, it accounts for roughly 60 percent outperforming the services and agricultural sectors with 34-and 6-percent shares, respectively. Nonetheless, total agricultural exports contributed about 15 percent when agricultural-related food processing is accounted. The principal industrial

exports are semiconductor, and textile and garments followed by all processed food exports with a combined 9-percent share. Furthermore, semiconductor, coconut processing, banana, textile and garments, and mining are the most export intensive sectors.

Similarly, 99 percent of total imports accrue to the industrial sector with the remainder going to the agricultural sector. This enormous share stems from the low valued added, import-intensive-assembly-type operation nature of the manufacturing sector—particularly in the semiconductor, and textile and garment subsectors. The motor–vehicles sector[12] has the highest import share followed by semiconductors. The highly import-intensive sectors are mining (72.03 percent, mainly due to crude-oil imports), semiconductors, machinery, and fertilizer[13].

In terms of value added, the agricultural sector generally has highest ratio compared to industry although its contribution to the overall value added is relatively small. Agriculture contributes about 20 percent of domestic value added (GDP) whereas industry and services contributes 31.5 and 48.5 percent, respectively. Labor intensity is uniformly higher in agriculture with the exception of fishing and other livestock.

*Household income and poverty profile*. Figure 4 presents the evolution of the poverty-headcount index and the Gini coefficient from 1985 to 2000. The poverty-headcount index dropped continuously from 49.2 percent in 1985 to 36.9 percent in 1997 but then worsened to 39.5 percent in 2000 as a result of the 1998 El Niño phenomenon and the Asian financial crisis. On the hand, income inequality steadily increased over this period as the Gini coefficient worsened from 0.42 in 1985 to 0.51 in 2000.

Income generated from labor is the major source for the entire population with 45.5 percent followed by 35.7 percent from capital. Income earned by laborers in the

[12] All vehicles are assembled using completely-knocked-down (CKD) parts.

[13] The Philippines does not produce all items in the semiconductor sector but instead imports these items. For example, it does not have the facilities to produce wafers (motherboards) and monitors which are major parts of computers. Domestic production focuses on hard disks, disk drives, processors, and some chips. Thus, while there is substantial domestic production and exports in the semiconductor sector, there are also substantial imports.

industrial sector and returns to capital in the services sector have the highest share within the labor and capital income block (Table 8).

In 1994, about 41 percent of the population of 67 million was below the poverty threshold (Table 9). National Capital Region (NCR), where majority of the industries are located, has the lowest poverty level while rural areas have the highest. Essentially, three important facts can be inferred from Table 9. First, poverty is influenced by spatial factors. Rural households, which represent roughly half of the population, are substantially poorer than urban households[14]. In the same vein, households residing in NCR or Metro Manila are less prone to poverty compared to other urban dwellers. Second, the degree of poverty depends on human capital. Household heads with at least a high school diploma (skilled workers), regardless of gender, are less susceptible to poverty, since they have better opportunities and options for employment. Third, household head affects poverty. Male-headed households are relatively worse off and much more vulnerable to poverty than their female counterparts.

A detailed comparison of poverty by region indicates that regions close to NCR (such as Central Luzon and Southern Tagalog) have low poverty levels. Moreover, Central Visayas and Southern Mindanao, which are centers of trade in Visayas and Mindanao, respectively, also show lower poverty indices. While, intra-regional analysis confirms that poverty has a rural bias with about half of the rural population living below poverty line. Across regions, the Autonomous Region for Muslim Mindanao (ARMM) has the highest inter- and intra-region poverty levels with total region, urban, and rural poverty headcount of 65.5, 57.4, 68 percent, respectively.

[14] Balisacan (2003) argues that this arises from the "systematic differences in levels of human capital between low and high income groups within a geographic area which translate to considerable difference in earning opportunities…thus disparity in income and human achievement is the major problem not disparity between regions".

# 6 Policy Experiments

Two policy experiments were undertaken in the study:

SIM_1 Actual tariff reduction that occurred between 1994 and 2000 (67 percent decrease in overall weighted nominal average tariff rates). This period was chosen because the policy reversals (tariff recalibration) that started during the end of the millennium resulted in the current nominal tariff rates not being significantly different from their levels in 2000.

SIM_2 Full tariff elimination

Both experiments entailed the use of a compensatory indirect tax applied uniformly to all consumer goods[15] (i.e. the loss in government revenue due to the tariff reduction was compensated endogenously (*ntaxr*) by an increase in the indirect tax). This was applied through

$$Pd_i = Pl_i \times [1 + itxr_i \times (1 + ntaxr)]$$
$$Pm_i = Pwm_i \times er \times (1 + tm_i) \times [1 + itxr_i \times (1 + ntaxr)],$$

where $Pd_i$ is the domestic price with tax, $Pl_i$ is the local price without tax, $itxr_i$ is the indirect tax rate, *ntaxr* is the endogenously determined increase in indirect tax rate, $Pm_i$ is the price of imports, $Pwm_i$ is the world price of imports, *er* is the exchange rate, and $tm_i$ is the tariff rate.

# 7 Simulation results

## 7.1 SIM_1

*Macro effects*. The tariff reduction (SIM_1) leads to an 8-percent decline in the local price of imported products (Table 10). As a result, consumer prices decrease by 2 percent, prompting a 0.5-percent increase in consumption. The tariff reduction effectively reduces the price of imported intermediate inputs, resulting in a 3.7-percent fall in the domestic cost of production. This brings about a real-exchange rate depreciation (by 4.6 percent), making Philippine-made products relatively cheaper in the international market. With this, producers reallocate towards the international market as allocation for domestic sales decreases by 2 percent while total export increases by 10.3 percent.

[15] Goods which are initially tax-exempt are not burdened by this tax.

However, overall imports increase by 11.5 percent due to a larger reduction in import prices. Effectively, import crowds out locally produced goods as consumers substitute cheaper imports for domestic goods. In spite of this, output increases minimally by 0.09 percent.

*Sectoral trade, output, and consumption.* The tariff reduction brings about varying impacts among the three major sectors. Nonetheless, it seems that the tariff reduction results in a reallocation from the inward-oriented agricultural sector towards the service sector and the outward oriented industrial sector (Table 11a). In general, the price reduction in industry is deeper relative to agriculture as intermediate goods became cheaper. An exception is the substantial decline in the price of imported agricultural products and the price of agricultural output because of the heavy protection afforded agriculture in 1994. Hence, import prices fall more for agricultural goods than for industrial goods as initial import-weighted average tariffs rates are higher for the former.

*Agriculture.* The substantial decline in local import prices induces consumers to substitute cheaper imported agricultural products for their local counterparts. In particular, irrigated rice and fruit imports increases by 92 and 39 percent[16], respectively. Agricultural imports rise by 21 percent, resulting in a 0.24-percent dip in agricultural output. Nonetheless, banana benefits from the tariff reduction as the sector's output and export expands by 7 and 12 percent, respectively. Similarly, the group "other agricultural crops" registers the highest increase in exports. On the whole, the 21-percent increase in agriculture imports surpasses the 7-percent increase in exports.

*Industry.* The tariff reduction generally favors the import-dependent-outward-oriented industrial sector as the cost of intermediate inputs falls, thereby resulting in an 11.5-percent surge in import demand. Notably, all food-related processing sectors generate a hefty increase in import demand[17] arising from cheaper intermediate inputs. This is not surprising as the removal of high tariff walls frees these sectors from the agricultural protection burden. Industrial producers reallocate towards the international

[16] The share of *palay* imports at the base is almost zero.

[17] These are meat processing; canning and preserving of fruits and vegetables; fish canning and processing; coconut processing; rice and corn milling; sugar milling and refining; beverages, sugar, confectionary, and related products; and other food manufacturing.

market as cheaper intermediate inputs drives domestic cost of production down. With this, total industrial export increases by 14.6 percent. Semiconductor, textile and garments, motor vehicles, fertilizer, and coconut processing emerge as the biggest gainers, realizing a substantial increase in both output and export volumes. Total industrial output expands marginally by 0.1 percent.

*Service*. The service sector appears to benefit the most from the tariff reduction. The decline in composite prices for both agricultural and industrial products brings about increased activity in wholesale and trading as well as "other services". Because of this, the entire sector's output increases by 0.22 percent, leading to a 0.22 percent increase in value-added demand (Table 12a).

*Factor remuneration.* Factor income decreases as return to capital and overall wage declines by 2.3 and 2.6 percent, respectively (Table 12a). Resources reallocate from the contracting agriculture towards the expanding industrial and service sector. Displaced agricultural laborers were, to some extent, absorbed by industry and mostly by the services sector as latter's labor utilization increases (0.74 percent). All these interactions leads to a decline in both the demand for and price of value added. However, the reduction in the price of value added in agriculture is much higher than that of industry because of the output contraction in the former. Nevertheless, value-added reallocations towards banana in agriculture and semiconductor, and textile and garments in industry occur as both subsectors expand. On the other hand, both the value-added price and demand increases for the service sector, effectively pulling resources toward itself.

*Household income.* Factor income of all households decline (Table 13). This is due to the reduction in the price of value added which consequently results in a lower return to capital and wages. Agriculture-dependent households experience the highest reduction in factor income as the sector's contraction leads to a reduction in skilled and unskilled agricultural wages (2.8 percent), return to capital (2.7 percent), and return to land (3.6 percent).

As expected, rural households who are largely dependent on agriculture suffer because of this. Having specialized earning patterns, they are much more sensitive to changes in unskilled wages and returns to self-employment. Moreover, their limited skill

hampers them from moving towards the expanding industrial and services sectors. As such, they find it difficult to enjoy the income gains from freer trade. Indeed, a comparison of income sources (agriculture vs. non-agriculture) reveals that agricultural income declines by 2.3 percent compared to a 0.9-percent improvement in non-agricultural income.

On the other hand, household income from unskilled production labor and returns to capital in services increase. The latter is due to the output-expansion and resource-reallocation effects accruing to the services sector whereas the former results from the increased demand for labor in industry as a result of industrial expansion. In fact, closer examination of labor demand (Table 12a) indicates that unskilled production laborers previously working in agriculture moved towards expanding subsectors such as semiconductor, textile and garments, motor vehicles, fertilizer, and coconut processing.

It should be noted however that the absorption capacity of the manufacturing sector to accommodate workers displaced in agriculture has been minimal due to the manufacturing sector's inherent production structure, concentrating on import-dependent-assembly-type operation with minimal value-added content. In fact, the average growth of unskilled and skilled production-labor utilization in manufacturing was a mere 1.2- and 0.6-percent increase, respectively, compared to a 2.6- and 3.2-percent decline in agriculture (skilled and unskilled) labor utilization.

*Poverty.* Table 14 presents the changes in the FGT poverty indices. Recall that poverty in the Philippines is likely influenced by spatial factors, human capital (or educational attainment), and household head. National-poverty headcount decreases by 0.41 percent, which is roughly equivalent to 112,601 households being lifted out of poverty. However, both the national poverty gap and severity increases marginally implying that the poor become poorer. This is also observable in the rural areas though in stark contrast to urban areas where all poverty indices fall.

*Spatial consideration.* Rural households are worse off compared to their urban counterparts. In particular, rural households experience the lowest poverty-headcount reduction and the highest increase in poverty gap and severity. Poverty indices fall for almost all urban households with those residing in NCR clearly reaping the highest poverty reduction as most industries are located within the area.

*Human capital.* Highly-educated household heads benefit the most from tariff reduction because of their ability to move towards sectors offering higher returns. Indeed, all poverty indices for highly-educated household heads decline with the exception of highly-educated, male-headed households in NCR. This is due to the fall in highly-educated male income as a result of a contraction in subsectors utilizing it.

*Household head.* It seems that female-headed households respond well to trade liberalization compared to their male-headed counterparts as the reduction in poverty headcount among female-headed household is higher (1.68 for female against 0.21 for male). As noted previously, female-headed households are better off because of the expansion in semiconductors, textile and garments, and wholesale and retail trade subsectors which mainly employ highly-educated/skilled female workers.

*Regional analysis.* A detailed regional poverty analysis shows that the decline in poverty headcount is highest for NCR followed by Central Visayas and Central Luzon (Table 15). Among urban areas, Central Luzon and Northern Mindanao are the biggest gainers, even exceeding that of NCR (Table 16). In contrast, Cagayan suffers the highest increase in urban poverty headcount (1.14 percent) primarily because of the limited economic activity in the region. Central Visayas, Ilocos, and Central Luzon attain the largest reduction in poverty headcount among rural areas (Table 17). ARMM experiences the highest increase in poverty headcount at 0.87 percent. On the other hand, intra-regional poverty comparisons reveal that Cagayan Valley is the most vulnerable region as its urban and rural poverty headcount increases by 1.14 and 0.82 percent, respectively.

Overall, gainers edge out the losers with 67 percent of all regions attaining a declining poverty headcount. Changes in intra-regional poverty headcount move in the same trend as ten out of 15 urban areas (67 percent) and seven out of 14 rural areas achieve declining poverty headcount.

## 7.2 SIM_2[18]

*Macro effects.* The macro effects (Table 10) for SIM_2 is similar to SIM_1[19]. The local price of imported goods decreases by 12 percent, leading to a 19-percent rise in imports, a 4-percent reduction in consumer prices, and a 0.73-percent increase in consumption. With this, the domestic cost of production goes down by 6.3 percent, bringing about a real-exchange-rate depreciation (by 7.7 percent). This makes exports competitive in the international market so that allocation for domestic sales decreases by 3.63 percent while export increases by 17 percent.

The substantial reduction in local import prices generates high import volumes, effectively crowding out locally produced products. This induces consumers to substitute cheaper imports for domestic products particularly in agriculture. Hence, agricultural output contracts by 0.52 percent which is double the result of SIM_1 (Table 11a and 11b, respectively).

*Household income.* The factor income of households declines as the price of value added falls (since the return to capital and wage decreases). Agriculture-dependent households experience the highest reduction in factor income as the sector's contraction leads to a reduction in skilled and unskilled agriculture wages (5.3 percent), return to capital (5 percent), and return to land (6.5 percent). As expected, rural households suffer the most as income from agriculture declines by 4 percent compared to a marginal 1.8-percent improvement in non-agriculture income. Once again, this emphasizes their sensitivity to changes in unskilled wages and returns to self-employment.

The manufacturing sector's capacity to accommodate workers displaced in agriculture is once again minimal, suggesting that only a limited amount of agricultural laborers were able to take advantage of the expanding industrial sector.

*Poverty.* The reduction in the national poverty headcount is lower in SIM_2 as only 63,169 people are lifted out of poverty (Table 14). In addition, the increase in the poverty gap and severity (0.76 and 1.24) is also higher under this scenario. This is traceable to the deeper contraction in agriculture thereby resulting in a larger reduction in

[18] This section only focuses on the significant results gleaned from SIM_2 since the analytical results have already been extensively discussed in SIM_1.

[19] Essentially, SIM_2 magnifies the impact of SIM_1 because of full tariff elimination.

factor income. Nevertheless, poverty headcount decreases because the reduction in consumer prices outweighs the income reduction for a majority of households.

Households residing in the rural areas experience an increase in poverty headcount as labor and capital income from agriculture substantially fall. In contrast to the first simulation, the poverty gap and severity for all urban households except NCR increases. This is because households residing in NCR enjoy proximity to major industries. At the same time, these households can readily take advantage of the services-sector expansion.

Among regions, Central Luzon gains the most with the highest poverty-headcount reduction owing to its closeness to NCR. Cagayan Valley is the foremost loser as inter- and intra-region poverty headcount increases the most. Once again, this is because of limited economic activity in the region.

It appears that gainers marginally edge the losers under the full-tariff-elimination scenario (SIM_2). Only 53 percent (8 out of 15) of all regions attain a reduction in poverty headcount while intra-reginal results shows the same trend as that of the first simulation with ten out of 15 urban areas (67 percent) and seven out of 14 rural areas achieving declining poverty headcount.

# 8 Conclusion

The discussion on the agricultural sector confirms that the sector is still hampered by inadequate policies and a weak institutional framework as pointed out by David (2003). Productivity and public investments remain low. The complementary policies detailed in the agriculture-sector plan for 1995–1998 to foster competitiveness in agriculture gained little ground.

The two policy experiments conducted in this paper generate similar outcome. The tariff reduction leads to a decline in local import prices, inducing consumers to substitute cheaper imported agricultural products for their domestic counterparts. Similarly, the tariff reduction brings about cheaper intermediate inputs as it drives the domestic cost of production down, benefiting the outward-oriented-import-dependent industrial sector as output and exports increases. Agricultural output contracts while industry and services output expand. Nonetheless, certain subsectors such as banana in

agriculture, semiconductor, as well as textile and garments in industry expand arising from a substantial output and export growth. Both industry and service sectors appear to benefit from the resource reallocation as a result of tariff reduction.

However, the manufacturing sector's labor absorption capacity to accommodate displaced agricultural laborers is minimal. This is because of the inherent manufacturing production structure in the country which focuses on import-dependent-assembly-type operations with minimal value-added content. Certainly, this may generate poverty ramifications as some rural, low-educated households may in fact be left behind during the trade reform process. Indeed they will not only bear the burden of lower factor returns due to an agricultural contraction but will also be constrained by their inability to move towards expanding sectors. Coupled with limited human capital (skills), this exposes them to greater vulnerability as they will continue to cling on the contracting agricultural sector sans the opportunity to move.

The national poverty headcount decreases marginally as the reduction in consumer prices outweighed the income reduction for a majority of households. However, both the poverty gap and severity worsen marginally implying that the poor become poorer. In contrast, poverty indices in most urban areas, particularly NCR, decrease significantly owing from their proximity to major industries while regions close to NCR (like Southern Tagalog and Central Luzon) attain a higher poverty-headcount reduction. On aggregate, it appears that poverty-stricken rural areas suffer the most due to the declining factor returns and agricultural contraction. Though close examination reveals that seven of the 14 rural areas actually experience a reduction in poverty headcount due to a larger reduction in consumer prices.

In conclusion, the tariff reduction appears to have marginally reduced the number of poor in the Philippines while increasing the degree of poverty among those who remain poor. The simulation results indicate that trade openness has a pro-urban and anti-rural bias. The challenge for the country and its policymakers is to capitalize on the gains and to minimize the losses. This can be achieved by focusing on three important policy considerations. First, policy directions towards increasing value-added utilization and encouraging forward and backward linkages in the manufacturing sector must be explored. This will not only allow the country to take advantage of the surplus

agricultural labor but will also create new opportunities for displaced agricultural laborers. Second, the government must faithfully implement the complementary policies laid out in the agriculture-sector-modernization plan to foster competitiveness in agriculture. Third, government must create programs aimed at correcting inter- and intra-regional imbalances through skills upgrading and by encouraging the relocation of manufacturing establishments towards regions other than NCR, Central Visayas, and Southern Mindanao.

All these should be undertaken in conjunction with programs designed towards the improvement of human capital especially those in the rural areas as the simulation results confirms that skill and education prove to be the best ally against poverty.

# References


Aldaba, R. (2005) "Policy reversals, lobby groups, and economic distortions", Philippine Institute for Development Studies (PIDS) Discussion Paper Series No. 2005-04. Makati City, Philippines.

Austria M. (2002) "The Philippines in the global trading environment: Looking back and the road ahead", PIDS Discussion Paper Series No. 2002-15. Makati City, Philippines.

Bautista, R., and G. Tecson (2003) "International dimensions" in *The Philippine Economy: Development, Policies and Challenges*, A. Balisacan and H. Hill, eds., pp. 136–171. Quezon City: Ateneo de Manila Press.

Bautista, R., J. Power, and Associates (1979) "Industrial promotion policies in the Philippines" PIDS. Makati City, Philippines.

Cockburn, J. (2001) "Trade liberalization and poverty in Nepal: A computable general-equilibrium micro-simulation analysis", Centre de Recherche en Economie et Finance Appliquees Discussion Paper 01-18. Universite Laval, Canada. October.

Cororaton C. and J. Cockburn (2003) "Trade reform and poverty in the Philippines: A computable general-equilibrium microsimulation analysis", Poverty and Economic Policy (PEP) Research Network, http://www.pep-net.org.

Cororaton C., J. Cockburn, and E. Corong (2005) "Doha scenarios, trade reform, and poverty in the Philippines: A computable general-equilibrium analysis", Chapter 13 in *Poverty and the WTO: Impacts of the Doha Development Aenda*, T. Hertel and L.A. Winters, eds. Palgrave Macmillan and The World Bank, Washington D.C.

Coxhead, I. and P. Warr (1995) "Does technical progress in agriculture alleviate poverty? A Philippine case study", *Australian Journal of Agricultural Economics* **39**(1):25–54.

Coxhead I. and S. Jayasuriya (2003) "Environment and natural resources" in *The Philippine Economy: Development, Policies and Challenges*, A. Balisacan and H. Hill, eds., pp. 381-417. Quezon City: Ateneo de Manila Press.

Clarete, R., and P. Warr (1992) "The theoretical structure of the APEX model of the Philippine Economy", Australian Centre for Industrial Agricultural Research. Manila, Philippines.

De Janvry, A., E. Sadoulet, and A. Fargeix (1991) "Politically feasible and equitable adjustment: Some alternatives for Ecuador" *World Development* **19**(11):1577–1594.

David, C. (1983) "Economic policies and agricultural incentives", *Philippine Economic Journal* 11:154–182.

David, C. (1997) "Agricultural policy and the WTO agreement: The Philippine case", PIDS Discussion Paper No. 1997-13. Makati City, Philippines.

David, C. (2000) "Changing patterns of agricultural protection and trade", Paper presented at the First Agricultural Policy Forum on Philippine Agriculture and the Next WTO Negotiations. Makati City, January 5.

David, C. (2003) "Agriculture" in *The Philippine Economy: Development, Policies and Challenges*, A. Balisacan and H. Hill, eds., pp. 175–218. Quezon City: Ateneo de Manila Press.

Decaluwé, B., A. Patry, L. Savard, and E. Thorbecke (2000) "Poverty analysis within a general-equilibrium framework", University of Laval Department of Economics Working Paper No. 9909. Québec, Canada.

Foster, J., J. Greer, and E. Thorbecke (1984) "A class of decomposable poverty measures", *Econometrica* **52**(3):761–766.

Habito, C. (1999) "Farms, food and foreign trade: The World Trade Organization and Philippine agriculture", Accelerating Growth, Investment and Liberalization with Equity (AGILE). Manila Philippines.

Habito, C. (2002) "Impact of international market forces, trade policies, and sectoral liberalization policies on the Philippines hogs and poultry sector" in *Livestock Industrialization, Trade and Social-Health-Environment Impacts in Developing Countries*, Department for International Development.

Habito, C. and R. Briones (2005) "Philippine agriculture over the years: Performance, policies and pitfalls", Paper presented at the conference on *Policies to Strengthen Productivity in the Philippines*. Makati City, June 27.

Hertel, T., D. Hummels, M. Ivanic, and R. Keeney (2004) "How confident can we be in CGE-based assessments of free-trade agreements?" GTAP Working Paper 26. Center for Global Trade Analysis, Purdue University, W. Lafayette, IN, USA.

Hertel T. and J. Reimer (2004) "Predicting the poverty impacts of trade reform: A survey of literature", manuscript.

Intal, P., and J. Power (1990) "Trade, exchange rate, and agricultural pricing policy in the Philippines", Comparative Studies on Political Economy of Agricultural Pricing Policy." World Bank, Washington, DC, USA.

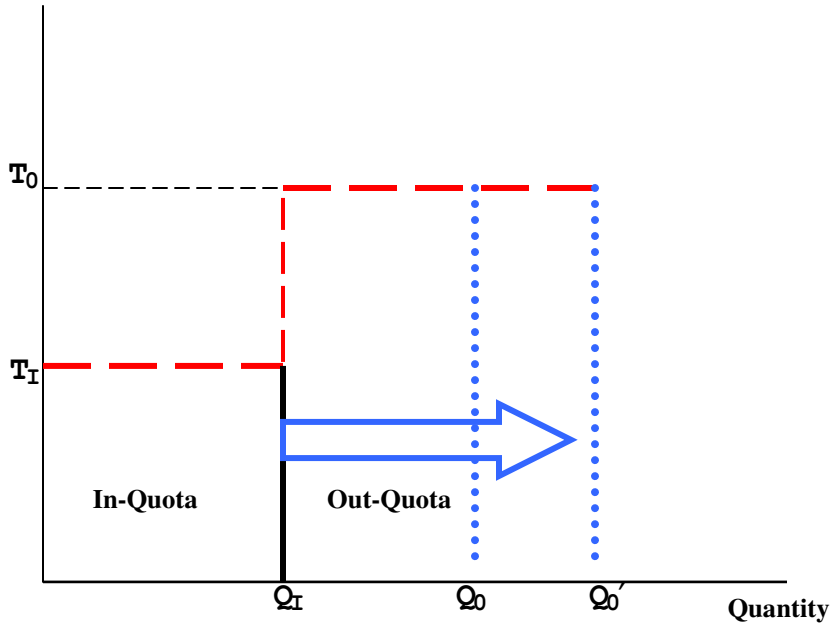
Power, J. H., and G. P. Sicat (1971) *The Philippines Industrialization and Trade Policies*. London: Oxford University Press.

Tan, E. (1979) "The structure of protection and resource flows in the Philippines" in *Industrial Promotion Policies in the Philippines*, R. Bautista, J. Power, and Associates, eds., pp. 126–171. Makati City: PIDS.

Winters, L.A. (2001) "Trade policies for poverty alleviation: What developing countries might do", Paper prepared for a session sponsored by the Centre for Economic Policy Research, at the Royal Economic Society Annual Conference, University of Durham, April 9-11.

Winters, L.A., N. McCulloch, and A. Mckay (2004) "Trade liberalization and poverty: The evidence so far", *Journal of Economic Literature* **XLII**(March):72–115.

**Figure 1. Stylized structure of minimum access volume (MAV) in sensitive agricultural products**




where $T_I$ is the in-quota tariff rate, $T_O$ is the out-quota tariff rate, $Q_I$ is the within-quota import (in quantity), $Q_O$ and $Q_O'$ are out-quota imports (in quantity)

**Figure 2. Production structure**

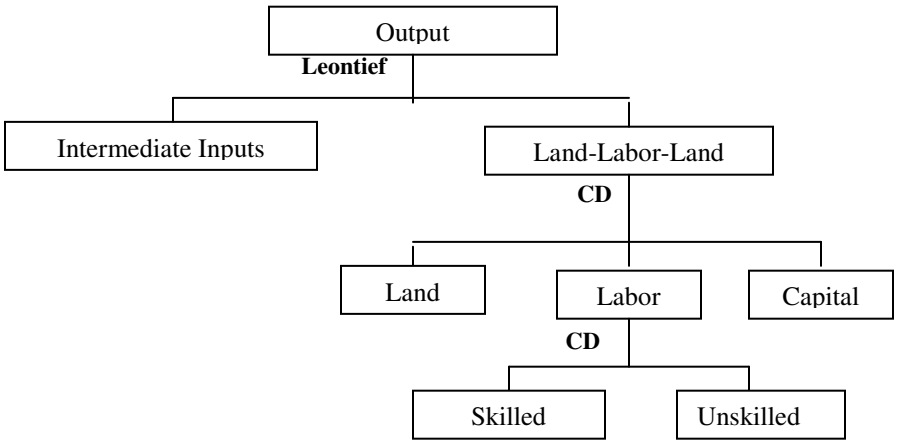


**Figure 3. Basic price relationships in the model**

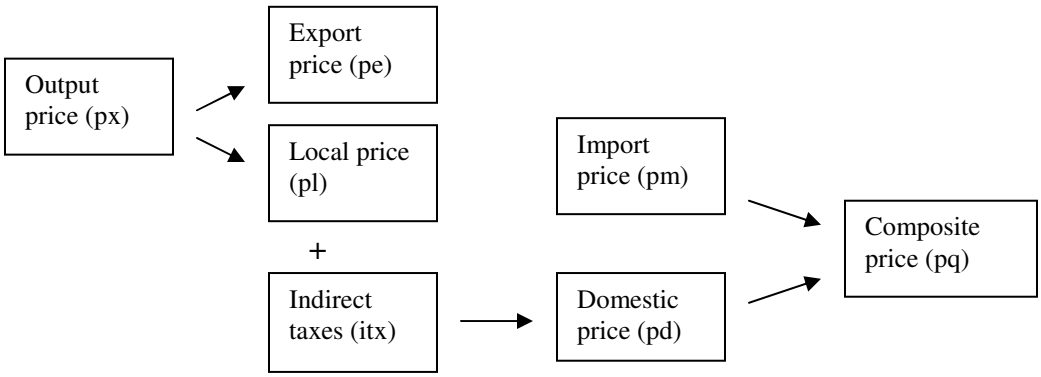
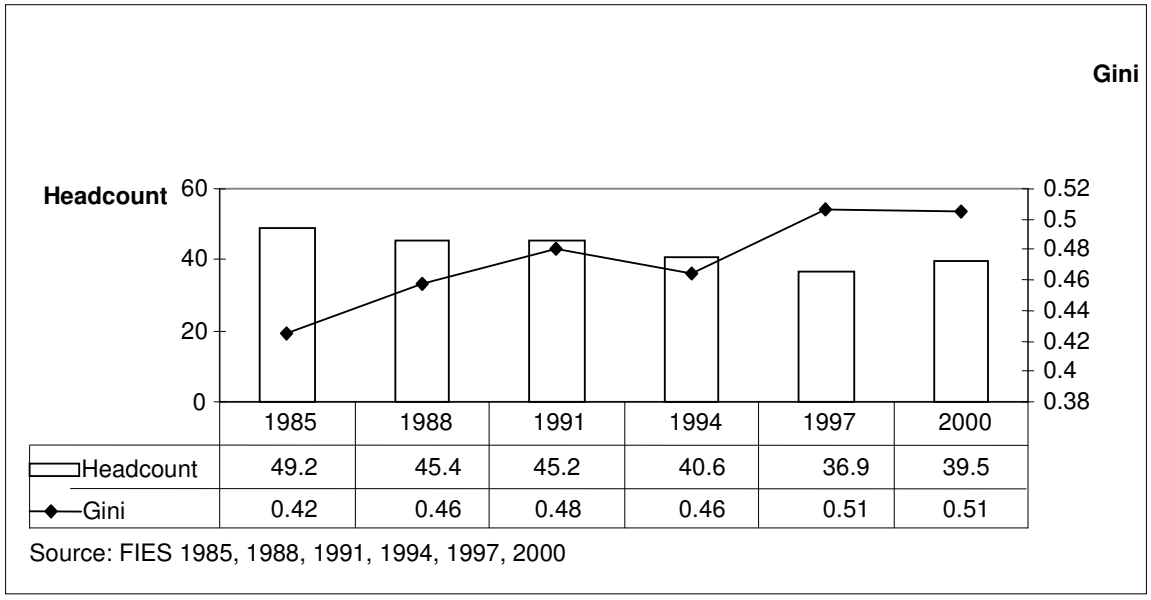



**Figure 4. Income distribution and poverty: The Philippines (1985–2000)**




| | 1985 | 1988 | 1991 | 1994 | 1997 | 2000 |
|---|---|---|---|---|---|---|
| Headcount | 49.2 | 45.4 | 45.2 | 40.6 | 36.9 | 39.5 |
| Gini | 0.42 | 0.46 | 0.48 | 0.46 | 0.51 | 0.51 |

Source: FIES 1985, 1988, 1991, 1994, 1997, 2000

## Table 1. Trade Policies in the Philippines

| Year | Policy | Description |
|---|---|---|
| **1949** | *BOP Crisis* | o Import and foreign exchange controls<br>o Identified essential imports<br>o Imposed of import quotas<br>o Allocation of scarce foreign exchange. |
| **1957** | *1957 Tariff Code* | Reinforced the:<br>o Import substitution policy<br>o Incentives to domestic producers of final consumer goods.<br>o High tariff rates imposed on non-essential consumer goods<br>o Low rates were applied to essential producer inputs |
| **1973** | *Revised Tariff Code* | o In spite of this, large disparity in Tariff rates still persisted |
| **1980** | *Trade Reform Program (TRP) - 1* | o Tariff reduction between 1981-85<br>  o Reduced tariff rates from 100 to 50 percent<br>o Import liberalization program (ILP)<br>  o Eliminated mark-up value applied on imports<br>o Realignment of indirect taxes<br>  o Equal sales taxes on imports and locally produced goods |
| **1983** | *Suspension of TRP-1* | o Balance of Payments (BOP) Crisis |
| **1986** | *Resumption of TRP-1* | o Resumption of ILP<br>o Reduction in regulated items from 1802 in 1985 to 609 by 1988<br>o Abolished export taxes except logs |
| **1990** | *Executive Order (EO) 413* | o Simplify tariff structure within a one year period—not implemented |
| **1991** | *TRP-2*<br>*EO 470* | o Realignment of tariff rates within a five year period<br>  o Narrowing tariff rates (Reduction in commodity lines with high tariff; Increase in commodity lines with low tariff)<br>  o Clustering of tariff rates within 10 to 30 percent by 1995 |
| | *Magna Carta for Small Farmers* | o QRs were re-introduced for 93 items |
| **1992** | *EO 8* | o Converted Quantitative Restrictions (QRs) to tariff equivalents<br>  o Tarrification of 153 agricultural commodities and realignment of 48 commodities |
| **1994 to 1996** | *Ratification of GATT-WTO* | o Committed to gradually remove QRs on "sensitive" agricultural products |
| | *TRP-3*<br>*EO 264* | o Reduced tariff rates on: capital equipment and machinery (January 1, 1994); textiles, garments, and chemical inputs (September 30, 1994); 4,142 manufacturing goods (July 22, 1995) and "non-sensitive" components of the agricultural sector (January 1, 1996).<br>o Four-tier tariff schedule: three percent for raw materials and capital equipment that are not available locally; ten percent for raw materials and capital equipment that are available from local sources; 20 percent for intermediate goods; and 30 percent for finished goods |

| | | | |
|---|---|---|---|
| **1994 to 1996** | *EO 288* | ○ | Modified nomenclature (Classification) and import duties on non-sensitive agriculture products |
| | *EO 313* | ○ | Modified nomenclature (Classification) and increased import duties on sensitive agricultural products |
| | *Republic Act (RA) 8178* | ○ | Minimum Access Volume on "sensitive" agricultural products |
| **1988** | *TRP-4*<br>*EO 465* | ○ | Implemented to adjust the tariff rate schedules of twenty-two industries that were identified as globally competitive |
| | *EO 486* | ○ | Amended the tariff schedule of residual items, and reduced the number of tariff lines subject to quota from 170 under TRP III to 144 under TRP IV. |
| **1999** | *EO 63* | ○ | Increased tariff rates on textiles, garments, petrochemicals, pulp and paper, and pocket lighters. |
| | | ○ | Tariff Reduction Freeze (based on TRP III) until 2001 |
| **2001** | *EO 334* | ○ | Amended tariff schedule on all product lines (except sensitive agricultural products) within the years 2001 to 2004. |
| | *EO 11* | ○ | Corrected EO 334 |
| **2002** | *EO 84* | ○ | Extended existing tariff rates from 2002 to 2004 |
| | *EO 91* | ○ | Modified tariff rates on imported materials, intermediate inputs, machinery and parts |
| **2003** | *EO 164* | ○ | Maintained 2002 tariff rates for 2003, covering a broad number of products |
| | *EO 261 and EO264* | ○ | Adjusted tariff rate schedules based on TRP IV.<br>○ Resulted in tariff increases on selected agricultural and manufactured products. (Increased tariffs for locally produced products, while decreased tariffs for non-locally produced products). |

Sources: Aldaba (2005); Intal and Power (1990); Cororaton et al (2005);
Tariff Commission (www.tariffcommission.gov.ph)

**Table 2. Growth rates of gross value added (agriculture, fishery and forestry)**

| | 1970-75 | 1975-80 | 1980-85 | 1985-90 | 1990-95 | 1995-2000 |
|---|---|---|---|---|---|---|
| **Agriculture** | 6.7 | 6.7 | 1.1 | 3.1 | 2.0 | 2.3 |
| Crops | | | | | | |
| Palay (Rice) | 3.8 | 5.2 | 3.6 | 3.6 | 2.0 | 4.3 |
| Corn | 7.1 | 5.0 | 3.7 | 5.4 | -0.5 | 0.5 |
| Sugarcane | 7.7 | 0.1 | -3.5 | -5.8 | 1.6 | 0.5 |
| Coconut | 11.1 | 11.1 | 0.0 | -8.7 | 0.9 | -0.05 |
| Banana | 12.5 | 20.2 | 0.8 | -4.8 | -0.5 | 6.0 |
| Other Crops | 8.7 | 6.8 | 0.5 | 5.5 | 1.7 | 0.9 |
| Livestock | 0.02 | -1.5 | 1.3 | 6.1 | 3.3 | 4.7 |
| Poultry | 7.4 | 13.5 | 3.0 | 8.0 | 6.4 | 5.1 |
| Agricultural Services | - | 6.7 | 2.8 | 8.7 | 1.0 | -0.5 |
| **Fishery** | 4.3 | 4.2 | 5.1 | 1.0 | 2.6 | 1.3 |
| **Forestry** | -6.8 | -2.6 | -11.4 | -6.0 | -23.3 | -9.2 |
| **Agriculture, Fishery and Forestry** | **3.1** | **4.5** | **0.4** | **2.0** | **1.3** | **1.9** |

**Source**: National Statistical and Coordination Board

**Table 3. Contribution of agriculture to GDP (in percent)**

| | 1980 | 1985 | 1990 | 1995 | 2000 | 2003 |
|---|---|---|---|---|---|---|
| **Agriculture, Fishery, and Forestry** | **23.50** | **24.58** | **22.30** | **21.55** | **19.78** | **19.88** |
| **a. Agriculture** | **16.98** | **18.27** | **17.02** | **17.03** | **15.83** | **15.65** |
| *Crops* | *13.29* | *14.11* | *11.91* | *11.63* | *10.34* | *10.07* |
| Palay (Rice) | 3.18 | 3.93 | 3.45 | 3.51 | 3.41 | 3.34 |
| Corn | 1.29 | 1.66 | 1.52 | 1.23 | 1.10 | 1.02 |
| Coconut including copra | 1.96 | 1.98 | 0.98 | 0.92 | 0.74 | 0.72 |
| Sugarcane | 0.85 | 0.66 | 0.51 | 0.49 | 0.48 | 0.53 |
| Banana | 0.65 | 0.62 | 0.37 | 0.35 | 0.46 | 0.45 |
| Other crops | 5.36 | 5.27 | 5.08 | 5.12 | 4.15 | 4.01 |
| Livestock | 1.60 | 1.92 | 2.34 | 2.47 | 2.54 | 2.53 |
| Poultry | 1.13 | 1.18 | 1.69 | 2.00 | 2.12 | 2.22 |
| Agricultural activities and services | 0.96 | 1.06 | 1.07 | 0.93 | 0.82 | 0.83 |
| **b. Fishery** | **3.53** | **4.73** | **4.27** | **4.29** | **3.81** | **4.15** |
| **c. Forestry** | **3.00** | **1.57** | **1.02** | **0.22** | **0.14** | **0.08** |
| **Industry** | **40.52** | **35.07** | **35.46** | **35.38** | **35.46** | **33.46** |
| **Services** | **35.98** | **40.35** | **42.24** | **43.07** | **44.76** | **46.66** |
| **Gross Domestic Product** | **100** | **100** | **100** | **100** | **100** | **100** |

**Source**: Philippine Statistical Yearbook (2004)

**Table 4. Agricultural production (percentage distribution)**

| | 1993 | | | 1997 | | | 2002/p | | |
|---|---|---|---|---|---|---|---|---|---|
| | Area | Quantity | Value | Area | Quantity | Value | Area | Quantity | Value |
| **A. Cereals** | **51.4** | **21.7** | **40.9** | **51.7** | **22.8** | **41.6** | **50.1** | **24.2** | **47.2** |
| Palay (Rice) | 26.2 | 14.4 | 28.6 | 30.3 | 16.5 | 31.6 | 31.5 | 18.2 | 37.9 |
| Corn | 25.2 | 7.3 | 12.3 | 21.5 | 6.3 | 10.0 | 18.6 | 5.9 | 9.3 |
| **B. Major Crops** | **38.4** | **64.9** | **41.9** | **39.0** | **68.6** | **44.9** | **45.9** | **71.7** | **45.5** |
| Coconut | 24.6 | 17.3 | 13.2 | 24.7 | 20.1 | 12.0 | 31.8 | 18.8 | 11.6 |
| Sugarcane | 3.1 | 34.9 | 5.5 | 3.0 | 32.6 | 5.5 | 2.9 | 37.4 | 7.0 |
| Banana | 2.6 | 4.8 | 6.0 | 2.7 | 6.5 | 7.0 | 3.1 | 7.2 | 9.4 |
| Pineapple | 0.3 | 2.0 | 3.1 | 0.3 | 2.4 | 4.0 | 0.4 | 2.2 | 3.3 |
| Mango | 0.5 | 0.6 | 3.6 | 1.0 | 1.4 | 5.6 | 1.1 | 1.3 | 4.8 |
| Other major crops | 7.3 | 5.4 | 10.6 | 7.3 | 5.6 | 10.8 | 6.6 | 4.7 | 9.3 |
| **Other Crops** | **10.1** | **13.4** | **17.2** | **9.3** | **8.6** | **13.5** | **3.9** | **4.1** | **7.2** |
| **Total** | **100** | **65,616** | **175,630** | **12,694** | **100** | **278,170** | **100** | **100** | **100** |

Source: Philippine Statistical Yearbook
/p: preliminary

**Table 5. Trends in revealed comparative advantage in agriculture and selected major agricultural exports (1960–1998)**

| Year | Agriculture | Coconut | Sugar | Banana | Pineapple | |
|---|---|---|---|---|---|---|
| | | | | | Canned | Fresh |
| **1960** | 3.0 | | | | | |
| **1965** | 2.7 | 131.8` | 15.3 | | | |
| **1970** | 2.6 | 145 | 21.4 | | | |
| **1975** | 3.8 | 211.2 | 22.0 | 29.3 | | |
| **1980** | 2.9 | 224.1 | 12.1 | 30.4 | 82.2 | 48.9 |
| **1985** | 2.4 | 212.3 | 7.6 | 31.2 | 91.6 | 59.7 |
| **1990** | 1.6 | 212.4 | 3.8 | 23.4 | 70.2 | 54.6 |
| **1995** | 1.1 | 153.5 | 2.0 | 14.1 | 41.5 | 23.6 |
| **1998** | 0.8 | 105.3 | 1.4 | 8.8 | 33.2 | 11.5 |

Source: David (2003)

**Table 6. Department of Agriculture Action Plan 1995–1998**

| Type | Action Plan / Funding | Purpose | Results |
|---|---|---|---|
| ***Irrigation*** | • Required – 27 Billion<br>• Allocated – 50%<br>• Utilized – 85% of Allocation | • Construction of rice irrigation<br>• Pump projects for diversified cropping | • Rehabilitation of existing facilities covering 1.34 million hectares<br>○ about 3 times the target |
| Bureau of Soil and Water Management (BSWM) | • Required – 772 Million<br>• Received and Utilized – 2.1 Billion | • Small water impounding project | • Funding Fully Utilized |
| ***Farm to Market Roads*** | • Required – 8 Billion<br>• Allocated – 1.5 Billion<br>• Utilized – 380 Million (26%) | • 8000 kilometers of farm to market road (within a three year period) | • 381 kilometers |
| National Irrigation Administration (NIA) | • Received and Utilized – 570 Million | • Road construction in existing National Irrigation System (NIS) | • 2,706 kilometers repaired<br>• (96%) |
| ***Post Harvest Facilities*** | • Required – 72 Million<br>• Allocated – 489 Million - Fully utilized | • Grains drying facilities for farmers' cooperatives | • Mechanical dryers and multi-purpose pavements<br>• Not allocated but constructed 200 outdoor storage, 12 in store dryers, and 1000 moisture meters |
| ***Grains Centers*** | • Required – 64 Million | • 799 farm level grain centers (FLGCs) | • 104 installed |
| National Food Authority | | • 260 grains centers | • 21 farm level and 32 municipal |
| ***Agriculture Competitiveness Enhancement Fund(ACEF)*** | • Funding from Tariff revenue of MAV on agriculture | • Fund projects aimed at improving competitiveness in the world market | • Revenues for 1995-97 did not accrue to the fund due to absence of clear procedures.<br>• No fund released until 1999 |
| ***Agriculture and Fisheries Modernization Act (AFMA)***<br>• *Strategic agricultural and Fisheries Development Zones (SAFDZs)*<br>• *Agriculture and Fisheries Modernization Plan (AFMP)* | • Proposed Funding – 20 Billion | • Programs to help the sector face globalization challenges<br>• Shall serve as centers for agriculture and fisheries development<br>• Medium and Long-term plan | • Limited funding due to fiscal problems<br>• Beleaguered by politics<br>• Beset by incapacity to draft plans at local levels |

Source: Compiled from Habito and Briones (2005)

## Table 7. Elasticities and parameters

| SECTORS | Foreign Trade | | | | | | Production | | |
|---|---|---|---|---|---|---|---|---|---|
| | Trade Elasticities*** | | Exports,% * | | Imports,% * | | | VA Share | Lab-Cap |
| | Armington | CET | Share | Intensities+ | Share | Intensities++ | $(VA/X)_i$ | $(VA_i / VA)$ | Ratio* * |
| Irrigated Palay (Rice) | 5.05 | 5.05 | - | - | 0.001 | 0.01 | 73.88 | 1.97 | 0.95 |
| Non_irrigated Palay (Rice) | 5.05 | 5.05 | - | - | - | 0.00 | 92.98 | 0.84 | 2.09 |
| Corn | 1.30 | 1.30 | 0.01 | 0.23 | 0.15 | 3.15 | 79.73 | 1.11 | 2.21 |
| Banana | 1.85 | 1.85 | 1.26 | 56.18 | - | 0.00 | 62.94 | 0.46 | 2.96 |
| Fruits | 1.85 | 1.85 | 0.77 | 12.38 | 0.22 | 3.60 | 75.86 | 1.54 | 1.66 |
| Coconut | 1.85 | 1.85 | 0.37 | 9.85 | - | - | 86.53 | 1.05 | 2.94 |
| Sugarcane | 2.70 | 2.70 | - | - | - | - | 71.87 | 0.57 | 1.18 |
| Other agricultural crops | 3.25 | 3.25 | 0.67 | 6.08 | 0.13 | 1.18 | 78.36 | 2.81 | 1.47 |
| Hog | 2.00 | 2.00 | - | - | 0.34 | 3.42 | 56.05 | 1.65 | 1.16 |
| Chicken_egg and other poultry products | 2.00 | 2.00 | 0.00 | 0.04 | 0.04 | 0.37 | 55.57 | 1.84 | 0.98 |
| Other livestock | 1.53 | 1.53 | 0.02 | 0.37 | 0.03 | 0.45 | 74.03 | 1.41 | 0.51 |
| Fishing | 1.25 | 1.25 | 3.36 | 20.83 | 0.03 | 0.21 | 71.74 | 3.75 | 0.56 |
| Other Agriculture | 3.38 | 3.38 | - | - | 0.15 | 3.40 | 77.00 | 0.99 | 2.29 |
| **AGRICULTURE** | | | **6.46** | **7.49** | **1.08** | **1.26** | | **19.98** | **1.12** |
| Mining | 6.34 | 6.34 | 2.45 | 43.07 | 8.87 | 72.03 | 54.96 | 1.01 | 0.87 |
| Meat Processing | 4.17 | 4.17 | 0.08 | 0.51 | 0.45 | 2.58 | 28.46 | 1.47 | 0.33 |
| Canning and preserving of fruits and vegetables | 2.00 | 2.00 | 1.41 | 28.76 | 0.13 | 3.49 | 36.90 | 0.59 | 0.84 |
| Fish canning and processing | 4.40 | 4.40 | 2.07 | 39.58 | 0.02 | 0.68 | 24.51 | 0.42 | 0.72 |
| Coconut processing | 2.00 | 2.00 | 3.03 | 62.01 | 0.33 | 14.32 | 22.33 | 0.35 | 0.87 |
| Rice and corn milling | 2.60 | 2.60 | 0.04 | 0.15 | 0.24 | 0.97 | 32.32 | 2.46 | 0.30 |
| Sugar milling and refining | 2.70 | 2.70 | 0.40 | 8.92 | 0.22 | 4.77 | 30.11 | 0.44 | 0.90 |
| Beverages_sugar_confectionery and related products | 1.42 | 1.42 | 0.22 | 3.83 | 0.22 | 3.60 | 45.72 | 0.84 | 0.54 |
| Other food manufacturing | 2.40 | 2.40 | 1.34 | 5.57 | 4.37 | 15.31 | 29.25 | 2.29 | 0.86 |
| Textile and garments | 3.79 | 3.79 | 10.75 | 47.42 | 6.90 | 35.27 | 36.32 | 2.67 | 0.71 |
| Wood_paper products | 3.16 | 3.16 | 3.55 | 27.46 | 5.02 | 33.49 | 34.76 | 1.46 | 0.64 |
| Fertilizer | 3.30 | 3.30 | 0.53 | 42.98 | 1.47 | 66.13 | 33.47 | 0.13 | 0.40 |
| Other chemicals | 3.30 | 3.30 | 1.77 | 11.81 | 10.79 | 43.42 | 40.74 | 1.98 | 0.37 |
| Petroleum_related products | 2.10 | 2.10 | 1.12 | 5.59 | 4.14 | 17.05 | 20.19 | 1.31 | 0.48 |
| Metal and related products | 3.63 | 3.63 | 5.86 | 43.96 | 8.65 | 52.14 | 23.73 | 1.03 | 0.44 |
| Semi_conductors and other electronic products | 4.40 | 4.40 | 13.33 | 70.61 | 12.52 | 67.98 | 24.85 | 1.52 | 0.58 |
| Motor vehicles and other machineries | 3.70 | 3.70 | 5.97 | 34.66 | 27.50 | 69.69 | 19.79 | 1.11 | 0.73 |
| Other manufacturing | 3.42 | 3.42 | 5.32 | 30.05 | 7.08 | 35.00 | 37.61 | 2.16 | 0.90 |
| Construction and utilities | 2.34 | 2.34 | 0.46 | 0.95 | - | - | 52.86 | 8.34 | 0.60 |
| **INDUSTRY** | | | **59.71** | **21.17** | **98.92** | **29.51** | | **31.57** | **0.59** |
| Wholesale trade | 1.90 | 1.90 | 14.31 | 20.88 | - | - | 64.06 | 14.23 | 0.51 |
| Other service | 1.90 | 1.90 | 19.51 | 14.63 | - | - | 61.44 | 26.56 | 0.37 |
| Government services | 1.90 | 1.90 | - | - | - | - | 69.02 | 7.66 | - |
| **SERVICES** | | | **33.83** | **14.32** | **-** | **-** | | **48.46** | **0.68** |
| **TOTAL** | | | **100** | **16.54** | **100** | **15.72** | | **100.00** | **0.72** |

* Based on the 1994 SAM
** Lab-Cap is labor-capital ratio
+ Export as a percentage of sectoral output
++ Import as a percentage of composite good
*** Based on GTAP (Hertel, 2004)

**Table 8. Sources of household income (at the base)**

| | | All | All_Fem | All_Fem_L | All_Fem_H | All_Male | All_Male_L | All_Male_H |
|---|---|---|---|---|---|---|---|---|
| **Labor** | Agriculture Skilled | 1.9 | 0.6 | 0.0 | 1.1 | 2.2 | 0.0 | 4.0 |
| | Agriculture Unskilled | 7.1 | 3.8 | 8.1 | 0.0 | 7.7 | 16.9 | 0.0 |
| | Industry Skilled | 22.8 | 17.2 | 0.0 | 31.9 | 23.8 | 0.0 | 43.5 |
| | Industry Unskilled | 13.7 | 15.0 | 32.4 | 0.0 | 13.4 | 29.7 | 0.0 |
| **Capital** | Agriculture | 8.3 | 4.7 | 7.8 | 1.9 | 9.0 | 15.0 | 4.0 |
| | Industry | 2.2 | 1.2 | 1.5 | 0.9 | 2.4 | 1.9 | 2.8 |
| | Services | 23.6 | 24.9 | 25.0 | 24.9 | 23.4 | 19.3 | 26.8 |
| | Land | 1.6 | 0.9 | 1.5 | 0.4 | 1.7 | 2.9 | 0.8 |
| **Other Income** | Dividends | 6.5 | 7.1 | 5.6 | 8.3 | 6.4 | 5.6 | 7.0 |
| | Others | 12.3 | 24.8 | 18.1 | 30.6 | 10.0 | 8.8 | 11.1 |
| | | **100** | **100** | **100** | **100** | **100** | **100** | **100** |

Where: tot_fem – Total Female; fem_l – Female with low education; fem_h – Female with high education;
tot_mal – Total Male; mal_l – Male with low education; mal _h – Male with high education;

**Table 9. Poverty indices (at the base)**

| **All Philippines** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Index** | **All** | **tot_fem** | **fem_l** | **Fem_h** | **tot_mal** | **mal_l** | **mal_h** |
| pov_hdcnt | 41.07 | 27.31 | 37.23 | 8.46 | 43.00 | 55.04 | 20.03 |
| pov_gap | 13.94 | 8.65 | 12.04 | 2.19 | 14.69 | 19.38 | 5.72 |
| pov_sev | 6.37 | 3.84 | 5.40 | 0.88 | 6.72 | 9.01 | 2.35 |
| **National Capital Region (NCR)** | | | | | | | |
| pov_hdcnt | 10.40 | 5.83 | 10.72 | 2.76 | 11.44 | 18.87 | 7.72 |
| pov_gap | 2.01 | 1.16 | 2.39 | 0.38 | 2.21 | 3.78 | 1.42 |
| pov_sev | 0.60 | 0.38 | 0.82 | 0.10 | 0.65 | 1.14 | 0.41 |
| **All Urban, except NCR** | | | | | | | |
| pov_hdcnt | 30.49 | 19.92 | 28.00 | 6.44 | 32.06 | 43.36 | 16.71 |
| pov_gap | 9.73 | 5.78 | 8.35 | 1.49 | 10.31 | 14.62 | 4.46 |
| pov_sev | 4.25 | 2.33 | 3.39 | 0.55 | 4.54 | 6.57 | 1.78 |
| **All Rural** | | | | | | | |
| pov_hdcnt | 57.09 | 44.85 | 49.98 | 21.87 | 58.47 | 64.73 | 34.60 |
| pov_gap | 20.25 | 15.03 | 16.92 | 6.58 | 20.83 | 23.43 | 10.95 |
| pov_sev | 9.47 | 6.97 | 7.89 | 2.81 | 9.75 | 11.07 | 4.72 |
| **Population and number of poor people at the base** | | | | | | | |
| population | 67,430,383 | | | | | | |
| poor | 27,693,877 | | | | | | |

where: tot_fem is total female
fem_l is female with low education
fem_h is female with high education
tot_mal is total male
mal_l is male with low education
mal_h is male with high education
pov_hdcnt is headcount index
pov_gap is poverty gap
pov_sev is poverty severity

**Table 10. Macro effects**

| | SIM_1 | SIM_2 |
|---|---|---|
| Change in overall nominal tariff rate, % | -67 | -100 |
| Change in Prices, %: | | |
| Import prices in local currency | -7.99 | -11.78 |
| Consumer prices | -2.24 | -3.89 |
| Local cost of production | -3.70 | -6.26 |
| Real exchange rate change, % | 4.63 | 7.68 |
| Change in import volume, % | 11.56 | 19.02 |
| Change in export volume, % | 10.38 | 17.03 |
| Change in domestic production for local sales, % | -2.15 | -3.62 |
| Change in consumption (composite) goods, % | 0.52 | 0.72 |
| Change in overall output, % | 0.09 | 0.12 |

## Table 11a. Effects on prices and volumes (SIM_1)

| SECTORS | Price Changes (%) | | | | | Volume Changes (%) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | $\delta pm_i$ | $\delta pd_i$ | $\delta pq_i$ | $\delta px_i$ | $\delta pl_i$ | $\delta m_i$ | $\delta e_i$ | $\delta d_i$ | $\delta q_i$ | $\delta x_i$ |
| Irrigated Palay (Rice) | -14.59 | -2.59 | -2.60 | -4.50 | -4.50 | 92.35 | - | -0.98 | -0.97 | -0.98 |
| Non_irrigated Palay (Rice) | - | -3.05 | -3.05 | -4.95 | -4.95 | - | - | -0.95 | -0.95 | -0.95 |
| Corn | -15.97 | -2.66 | -3.36 | -4.55 | -4.56 | 18.72 | 4.20 | -1.94 | -1.00 | -1.92 |
| Banana | - | -3.36 | -3.36 | -2.24 | -5.26 | - | 11.72 | 1.10 | 1.10 | 7.14 |
| Fruits | -18.70 | -2.23 | -3.39 | -3.62 | -4.15 | 39.41 | 7.19 | -0.89 | 1.32 | 0.13 |
| Coconut | - | -2.27 | -2.27 | -3.76 | -4.18 | - | 9.48 | 1.16 | 1.16 | 2.00 |
| Sugarcane | - | -3.73 | -3.73 | -5.61 | -5.61 | - | - | -4.00 | -4.00 | -4.00 |
| Other agricultural crops | -7.49 | -2.22 | -2.30 | -3.86 | -4.13 | 18.45 | 13.48 | -1.05 | -0.77 | -0.15 |
| Hog | -15.44 | -2.75 | -3.50 | -4.66 | -4.66 | 29.53 | - | -2.08 | -0.55 | -2.08 |
| Chicken_egg and other poultry products | -5.44 | -2.20 | -2.21 | -4.11 | -4.11 | 6.16 | 7.93 | -0.76 | -0.73 | -0.76 |
| Other livestock | -11.27 | -3.09 | -3.14 | -4.97 | -4.98 | 13.36 | 7.11 | -0.95 | -0.86 | -0.92 |
| Fishing | -4.38 | -1.19 | -1.20 | -2.46 | -3.12 | 4.34 | 4.19 | 0.14 | 0.15 | 1.00 |
| Other Agriculture | 2.00 | -1.72 | -1.60 | -3.64 | -3.64 | -11.53 | - | 0.29 | -0.12 | 0.29 |
| **AGRICULTURE** | **-12.03** | **-2.30** | **-2.52** | **-3.89** | **-4.22** | **21.16** | **7.30** | **-0.86** | **-0.45** | **-0.24** |
| Mining | -4.79 | -2.25 | -4.17 | -2.23 | -4.16 | 4.45 | 15.67 | -11.66 | 0.24 | 0.25 |
| Meat Processing | -22.90 | -3.17 | -4.43 | -5.04 | -5.07 | 150.90 | 20.43 | -3.06 | 2.39 | -2.93 |
| Canning and preserving of fruits and vegetables | -17.40 | -1.59 | -2.49 | -2.48 | -3.52 | 40.10 | 6.03 | -1.30 | 0.53 | 0.84 |
| Fish canning and processing | -19.73 | -0.18 | -0.50 | -1.26 | -2.13 | 154.43 | 7.22 | -2.48 | -1.09 | 1.38 |
| Coconut processing | -19.78 | -4.10 | -7.66 | -2.19 | -5.98 | 34.57 | 6.54 | -5.83 | 1.57 | 1.93 |
| Rice and corn milling | -20.75 | -1.39 | -1.76 | -3.32 | -3.32 | 74.87 | 8.18 | -0.92 | 0.05 | -0.91 |
| Sugar milling and refining | -26.89 | -2.94 | -5.66 | -4.38 | -4.84 | 103.16 | 8.08 | -5.48 | 2.06 | -4.24 |
| Beverages_sugar_confectionery and related products | -10.51 | -1.71 | -2.12 | -3.49 | -3.63 | 13.76 | 4.96 | -0.42 | 0.18 | -0.21 |
| Other food manufacturing | -11.25 | -2.29 | -4.09 | -3.96 | -4.20 | 22.17 | 7.52 | -3.01 | 1.42 | -2.41 |
| Textile and garments | -15.75 | -6.28 | -10.77 | -3.94 | -8.12 | 31.96 | 21.48 | -11.89 | 6.14 | 4.29 |
| Wood_paper products | -11.18 | -4.62 | -7.32 | -4.56 | -6.49 | 15.76 | 14.20 | -7.59 | 1.18 | -1.46 |
| Fertilizer | 1.67 | 0.84 | 1.39 | -0.64 | -1.13 | -1.07 | 5.52 | 1.63 | -0.16 | 3.31 |
| Other chemicals | -7.53 | -4.21 | -5.82 | -5.30 | -6.09 | 7.55 | 17.80 | -4.25 | 1.26 | -1.57 |
| Petroleum_related products | -1.28 | -1.25 | -1.26 | -3.00 | -3.19 | -0.26 | 6.69 | -0.32 | -0.31 | 0.07 |
| Metal and related products | -7.71 | -3.52 | -5.95 | -2.90 | -5.41 | 8.87 | 13.37 | -7.36 | 1.63 | 1.90 |
| Semi_conductors and other electronic products | -6.12 | -2.51 | -5.12 | -1.21 | -4.42 | 8.81 | 12.47 | -7.83 | 3.87 | 6.60 |
| Motor vehicles and other machineries | -5.30 | -3.41 | -4.79 | -3.34 | -5.30 | 3.63 | 17.78 | -3.71 | 1.56 | 3.88 |
| Other manufacturing | -17.49 | -7.18 | -12.12 | -5.98 | -9.00 | 28.29 | 18.44 | -14.19 | 3.45 | -4.05 |
| Construction and utilities | 0.00 | -2.13 | -2.13 | -4.01 | -4.05 | - | 8.85 | -1.18 | -1.18 | -1.09 |
| **INDUSTRY** | **-7.95** | **-2.90** | **-4.73** | **-3.70** | **-4.80** | **11.46** | **14.64** | **-3.92** | **1.28** | **0.10** |
| Wholesale trade | - | -0.17 | -0.17 | -1.67 | -2.12 | - | 3.31 | -0.82 | -0.82 | 0.05 |
| Other service | - | 0.02 | 0.02 | -1.65 | -1.94 | - | 3.52 | -0.25 | -0.25 | 0.31 |
| Government services | - | - | - | -2.25 | - | - | - | - | - | - |
| **SERVICES** | **-** | **-0.04** | **-0.04** | **-1.66** | **-2.00** | **-** | **3.43** | **-0.44** | **0.22** | **0.22** |

**Where**

mi : imports

ei : exports

di : domestic sales

qi : composite commodity

xi : total output

pmi : import (local) prices

pdi : domestic prices

pxi : output prices

pli : local prices

pqi : composite commodity prices

$\delta$ : change

## Table 11b. Effects on prices and volumes (SIM_2)

| | Price Changes (%) | | | | | Volume Changes (%) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **SECTORS** | **$\delta pm_i$** | **$\delta pd_i$** | **$\delta pq_i$** | **$\delta px_i$** | **$\delta pl_i$** | **$\delta m_i$** | **$\delta e_i$** | **$\delta d_i$** | **$\delta q_i$** | **$\delta x_i$** |
| Irrigated Palay (Rice) | -31.03 | -4.99 | -5.00 | -8.16 | -8.16 | 395.01 | - | -1.81 | -1.75 | -1.81 |
| Non_irrigated Palay (Rice) | - | -5.82 | -5.82 | -8.97 | -8.97 | - | - | -1.60 | -1.60 | -1.60 |
| Corn | -33.88 | -5.26 | -6.98 | -8.41 | -8.43 | 53.15 | 7.59 | -4.05 | -1.73 | -4.02 |
| Banana | - | -6.29 | -6.29 | -3.92 | -9.42 | - | 22.70 | 2.18 | 2.18 | 13.96 |
| Fruits | -39.56 | -4.72 | -7.80 | -6.85 | -7.90 | 126.27 | 13.50 | -2.53 | 3.59 | -0.47 |
| Coconut | - | -4.28 | -4.28 | -6.69 | -7.48 | - | 18.78 | 2.87 | 2.87 | 4.49 |
| Sugarcane | - | -6.93 | -6.93 | -10.03 | -10.03 | - | - | -7.22 | -7.22 | -7.22 |
| Other agricultural crops | -16.26 | -4.25 | -4.47 | -6.94 | -7.45 | 51.65 | 26.21 | -1.83 | -1.10 | -0.06 |
| Hog | -32.80 | -5.45 | -7.40 | -8.61 | -8.61 | 88.87 | - | -4.59 | -0.53 | -4.59 |
| Chicken_egg and other poultry products | -12.00 | -4.11 | -4.15 | -7.31 | -7.31 | 16.96 | 14.66 | -1.49 | -1.42 | -1.49 |
| Other livestock | -24.12 | -5.25 | -5.39 | -8.38 | -8.42 | 38.57 | 12.89 | -1.31 | -1.09 | -1.26 |
| Fishing | -9.80 | -2.42 | -2.44 | -4.46 | -5.68 | 10.50 | 7.75 | 0.15 | 0.18 | 1.77 |
| Other Agriculture | 3.45 | -3.45 | -3.24 | -6.68 | -6.68 | -20.71 | - | 0.17 | -0.57 | 0.17 |
| **AGRICULTURE** | **-25.71** | **-4.44** | **-5.01** | **-7.03** | **-7.63** | **66.15** | **13.92** | **-1.72** | **-0.61** | **-0.52** |
| Mining | -6.84 | -3.02 | -5.94 | -3.25 | -6.26 | 6.58 | 24.44 | -17.42 | 0.27 | 0.94 |
| Meat Processing | -34.29 | -6.29 | -8.63 | -9.36 | -9.42 | 314.55 | 42.38 | -5.78 | 4.69 | -5.52 |
| Canning and preserving of fruits and vegetables | -25.95 | -3.53 | -4.91 | -4.71 | -6.75 | 66.68 | 12.92 | -1.80 | 1.08 | 2.54 |
| Fish canning and processing | -29.48 | -0.60 | -1.24 | -2.29 | -3.92 | 330.87 | 13.50 | -4.83 | -2.09 | 2.51 |
| Coconut processing | -29.56 | -6.95 | -12.48 | -3.57 | -10.05 | 58.79 | 12.47 | -9.01 | 2.87 | 4.57 |
| Rice and corn milling | -31.03 | -2.92 | -3.55 | -6.15 | -6.16 | 139.13 | 15.96 | -1.70 | -0.02 | -1.67 |
| Sugar milling and refining | -40.35 | -5.53 | -10.43 | -7.81 | -8.68 | 211.32 | 14.98 | -10.03 | 3.88 | -7.70 |
| Beverages_sugar_confectionery and related products | -15.51 | -3.08 | -3.67 | -6.06 | -6.31 | 20.49 | 8.78 | -0.84 | 0.04 | -0.46 |
| Other food manufacturing | -16.63 | -3.83 | -6.52 | -6.62 | -7.04 | 33.87 | 13.25 | -4.96 | 1.74 | -3.91 |
| Textile and garments | -23.46 | -9.54 | -16.54 | -5.81 | -12.56 | 52.67 | 34.83 | -18.96 | 9.96 | 7.44 |
| Wood_paper products | -16.53 | -6.89 | -10.99 | -6.90 | -9.99 | 24.69 | 23.10 | -11.72 | 1.79 | -1.78 |
| Fertilizer | 2.96 | 1.69 | 2.52 | -0.96 | -1.71 | -1.66 | 8.41 | 2.43 | -0.29 | 5.02 |
| Other chemicals | -10.99 | -6.16 | -8.54 | -8.02 | -9.29 | 11.20 | 28.86 | -6.60 | 1.68 | -2.22 |
| Petroleum_related products | -1.52 | -1.50 | -1.50 | -4.51 | -4.79 | -0.62 | 10.13 | -0.66 | -0.65 | -0.04 |
| Metal and related products | -11.27 | -4.95 | -8.67 | -4.24 | -8.12 | 13.81 | 20.57 | -11.35 | 2.52 | 3.02 |
| Semi_conductors and other electronic products | -8.86 | -3.44 | -7.41 | -1.76 | -6.66 | 13.28 | 19.00 | -12.14 | 5.68 | 10.07 |
| Motor vehicles and other machineries | -7.62 | -4.75 | -6.85 | -4.90 | -7.93 | 5.29 | 27.66 | -5.96 | 2.11 | 6.01 |
| Other manufacturing | -26.09 | -11.04 | -18.69 | -8.99 | -14.01 | 46.49 | 30.28 | -22.22 | 5.75 | -5.58 |
| Construction and utilities | 0.00 | -3.16 | -3.16 | -6.33 | -6.40 | - | 14.52 | -1.88 | -1.88 | -1.72 |
| **INDUSTRY** | **-11.63** | **-4.57** | **-7.28** | **-5.91** | **-7.76** | **18.51** | **23.51** | **-6.31** | **1.94** | **0.23** |
| Wholesale trade | - | -0.39 | -0.39 | -2.92 | -3.72 | - | 5.86 | -1.50 | -1.50 | 0.06 |
| Other service | - | -0.24 | -0.24 | -3.03 | -3.57 | - | 6.41 | -0.69 | -0.69 | 0.36 |
| Government services | - | - | - | -3.76 | - | - | - | - | - | - |
| **SERVICES** | **-** | **-0.29** | **-0.29** | **-2.99** | **-3.62** | **-** | **6.17** | **-0.95** | **0.27** | **0.26** |

**Where**

mi : imports

ei : exports

di : domestic sales

qi : composite commodity

xi : total output

pmi : import (local) prices

pdi : domestic prices

pxi : output prices

pli : local prices

pqi : composite commodity prices

□ : change

## Table 12a. Effects on the factor market (SIM_1)

| SECTORS | Value Added Changes (%) $\delta va_i$ | $\delta pva_i$ | $\delta r_i$, % | Change (%) in Labor Demand L* | L1** | L2** | L3** | L4** |
|---|---|---|---|---|---|---|---|---|
| Irrigated Palay (Rice) | -0.98 | -5.60 | -6.53 | -1.93 | -1.83 | -1.83 | -4.31 | -4.89 |
| Non_irrigated Palay (Rice) | -0.95 | -5.22 | -6.12 | -1.50 | -1.39 | -1.39 | -3.89 | -4.47 |
| Corn | -1.92 | -5.31 | -7.13 | -2.87 | -2.46 | -2.46 | -4.93 | -5.50 |
| Banana | 7.14 | -2.44 | 4.53 | 9.25 | 9.79 | 9.79 | 7.00 | 6.36 |
| Fruits | 0.13 | -4.32 | -4.20 | 0.13 | 0.62 | 0.62 | -1.93 | -2.52 |
| Coconut | 2.00 | -4.18 | -2.27 | 2.23 | 2.65 | 2.65 | 0.05 | -0.55 |
| Sugarcane | -4.00 | -7.53 | -11.23 | -6.94 | -6.77 | -6.77 | -9.13 | -9.68 |
| Other agricultural crops | -0.15 | -4.54 | -4.68 | -0.37 | 0.12 | 0.12 | -2.42 | -3.01 |
| Hog | -2.08 | -5.93 | -7.88 | -3.83 | -3.25 | -3.25 | -5.70 | -6.27 |
| Chicken_egg and other poultry products | -0.76 | -5.01 | -5.73 | -1.53 | -0.98 | -0.98 | -3.50 | -4.08 |
| Other livestock | -0.92 | -5.99 | -6.85 | -2.69 | -2.16 | -2.16 | -4.64 | -5.21 |
| Fishing | 1.00 | -2.46 | -1.49 | 2.81 | 3.47 | 3.47 | 0.85 | 0.24 |
| Other Agriculture | 0.29 | -4.17 | -3.89 | 0.42 | 0.95 | 0.95 | -1.61 | -2.20 |
| **AGRICULTURE** | **-0.20** | **-4.57** | **-4.65** | **-0.40** | | | | |
| Mining | 0.25 | -1.74 | -1.49 | 0.54 | - | - | 0.84 | 0.24 |
| Meat Processing | -2.93 | -10.42 | -13.05 | -11.27 | - | - | -10.99 | -11.52 |
| Canning and preserving of fruits and vegetables | 0.84 | -1.04 | -0.21 | 1.85 | - | - | 2.16 | 1.54 |
| Fish canning and processing | 1.38 | -0.20 | 1.18 | 3.34 | - | - | 3.58 | 2.96 |
| Coconut processing | 1.93 | 0.21 | 2.15 | 4.20 | - | - | 4.57 | 3.94 |
| Rice and corn milling | -0.91 | -4.96 | -5.82 | -3.90 | - | - | -3.59 | -4.17 |
| Sugar milling and refining | -4.24 | -6.65 | -10.61 | -8.77 | - | - | -8.49 | -9.04 |
| Beverages_sugar_confectionery and related products | -0.21 | -2.40 | -2.60 | -0.59 | - | - | -0.29 | -0.89 |
| Other food manufacturing | -2.41 | -4.76 | -7.05 | -5.14 | - | - | -4.85 | -5.42 |
| Textile and garments | 4.29 | 3.96 | 8.41 | 10.61 | - | - | 10.98 | 10.32 |
| Wood_paper products | -1.46 | -4.22 | -5.62 | -3.71 | - | - | -3.39 | -3.97 |
| Fertilizer | 3.31 | 6.22 | 9.74 | 11.98 | - | - | 12.34 | 11.66 |
| Other chemicals | -1.57 | -6.15 | -7.62 | -5.66 | - | - | -5.43 | -6.00 |
| Petroleum_related products | 0.07 | -1.92 | -1.85 | 0.23 | - | - | 0.47 | -0.13 |
| Metal and related products | 1.90 | 2.31 | 4.25 | 6.39 | - | - | 6.72 | 6.08 |
| Semi_conductors and other electronic products | 6.60 | 9.42 | 16.64 | 19.03 | - | - | 19.40 | 18.68 |
| Motor vehicles and other machineries | 3.88 | 3.26 | 7.27 | 9.46 | - | - | 9.81 | 9.15 |
| Other manufacturing | -4.05 | -6.42 | -10.21 | -8.37 | - | - | -8.08 | -8.63 |
| Construction and utilities | -1.09 | -3.83 | -4.87 | -2.87 | - | - | -2.62 | -3.20 |
| **INDUSTRY** | **-0.22** | **-2.55** | **-2.77** | **-0.43** | | | | |
| Wholesale trade | 0.05 | -2.09 | -2.04 | 0.15 | - | - | 0.29 | -0.32 |
| Other service | 0.31 | -1.09 | -0.79 | 1.14 | - | - | 1.56 | 0.95 |
| Government services | | -2.31 | | | - | - | - | - |
| **SERVICES** | **0.217** | **-1.44** | **-1.19** | **0.74** | | | | |
| **TOTAL** | **-0.02** | **-2.48** | **-2.27** | | | | | |
| **Change in average wage, % -->** | | | | **-2.63** | **-4.79** | **-4.79** | **-2.31** | **-1.72** |

where
vai : value added
pvai : value added prices
li: labor
*L aggregate labor
**L1, L2, L3, & L4: Labor type 1, 2, 3, & 4
ri: rate of return to capital
δi : change

## Table 12b. Effects on the factor market (SIM_2)

| | Value Added Changes (%) | | $\delta r_i$, % | Change (%) in Labor Demand | | | | |
|---|---|---|---|---|---|---|---|---|
| **SECTORS** | **$\delta va_i$** | **$\delta pva_i$** | | **L*** | **L1**** | **L2**** | **L3**** | **L4**** |
| Irrigated Palay (Rice) | -1.81 | -10.16 | -11.79 | -3.48 | -3.28 | -3.28 | -8.15 | -8.99 |
| Non_irrigated Palay (Rice) | -1.60 | -9.45 | -10.90 | -2.51 | -2.30 | -2.30 | -7.22 | -8.07 |
| Corn | -4.02 | -9.77 | -13.40 | -5.84 | -5.04 | -5.04 | -9.82 | -10.65 |
| Banana | 13.96 | -4.42 | 8.92 | 18.28 | 19.43 | 19.43 | 13.41 | 12.37 |
| Fruits | -0.47 | -8.27 | -8.70 | -0.86 | 0.11 | 0.11 | -4.93 | -5.81 |
| Coconut | 4.49 | -7.46 | -3.31 | 5.16 | 6.02 | 6.02 | 0.68 | -0.25 |
| Sugarcane | -7.22 | -13.51 | -19.75 | -12.34 | -12.01 | -12.01 | -16.44 | -17.21 |
| Other agricultural crops | -0.06 | -8.17 | -8.22 | -0.34 | 0.63 | 0.63 | -4.44 | -5.32 |
| Hog | -4.59 | -11.36 | -15.43 | -8.36 | -7.27 | -7.27 | -11.94 | -12.75 |
| Chicken_egg and other poultry products | -1.49 | -9.20 | -10.55 | -2.98 | -1.92 | -1.92 | -6.86 | -7.72 |
| Other livestock | -1.26 | -10.08 | -11.21 | -3.68 | -2.64 | -2.64 | -7.54 | -8.39 |
| Fishing | 1.77 | -4.68 | -3.00 | 5.03 | 6.36 | 6.36 | 1.01 | 0.08 |
| Other Agriculture | 0.17 | -7.78 | -7.62 | 0.24 | 1.29 | 1.29 | -3.81 | -4.70 |
| **AGRICULTURE** | **-0.43** | **-8.37** | **-8.51** | **-0.81** | | | | |
| Mining | 0.94 | -2.47 | -1.55 | 2.03 | - | - | 2.51 | 1.57 |
| Meat Processing | -5.52 | -18.68 | -23.17 | -20.38 | - | - | -20.00 | -20.73 |
| Canning and preserving of fruits and vegetables | 2.54 | -0.58 | 1.94 | 5.65 | - | - | 6.14 | 5.17 |
| Fish canning and processing | 2.51 | -0.23 | 2.27 | 6.11 | - | - | 6.49 | 5.52 |
| Coconut processing | 4.57 | 1.65 | 6.30 | 10.10 | - | - | 10.69 | 9.67 |
| Rice and corn milling | -1.67 | -8.83 | -10.35 | -7.11 | - | - | -6.66 | -7.51 |
| Sugar milling and refining | -7.70 | -11.79 | -18.58 | -15.60 | - | - | -15.22 | -16.00 |
| Beverages_sugar_confectionery and related products | -0.46 | -4.34 | -4.78 | -1.30 | - | - | -0.85 | -1.76 |
| Other food manufacturing | -3.91 | -7.89 | -11.49 | -8.26 | - | - | -7.83 | -8.68 |
| Textile and garments | 7.44 | 6.76 | 14.70 | 18.82 | - | - | 19.43 | 18.33 |
| Wood_paper products | -1.78 | -6.16 | -7.84 | -4.52 | - | - | -4.03 | -4.92 |
| Fertilizer | 5.02 | 8.93 | 14.40 | 18.53 | - | - | 19.12 | 18.03 |
| Other chemicals | -2.22 | -9.23 | -11.24 | -7.91 | - | - | -7.58 | -8.43 |
| Petroleum_related products | -0.04 | -3.68 | -3.72 | -0.12 | - | - | 0.25 | -0.67 |
| Metal and related products | 3.02 | 3.30 | 6.42 | 10.28 | - | - | 10.81 | 9.79 |
| Semi_conductors and other electronic products | 10.07 | 13.89 | 25.35 | 29.90 | - | - | 30.52 | 29.32 |
| Motor vehicles and other machineries | 6.01 | 4.59 | 10.88 | 14.90 | - | - | 15.45 | 14.39 |
| Other manufacturing | -5.58 | -9.47 | -14.52 | -11.42 | - | - | -10.99 | -11.81 |
| Construction and utilities | -1.72 | -6.34 | -7.95 | -4.53 | - | - | -4.15 | -5.03 |
| **INDUSTRY** | **-0.24** | **-4.27** | **-4.48** | **-0.25** | | | | |
| Wholesale trade | 0.06 | -3.66 | -3.60 | 0.18 | - | - | 0.38 | -0.54 |
| Other service | 0.36 | -2.38 | -2.03 | 1.36 | - | - | 2.01 | 1.08 |
| Government services | | -3.96 | | | - | - | - | - |
| **SERVICES** | **0.26** | **-2.83** | **-2.54** | **0.88** | | | | |
| **TOTAL** | **-0.06** | **-4.48** | **-4.12** | | | | | |
| **Change in average wage, % -->** | | | | **-4.66** | **-8.80** | **-8.80** | **-3.96** | **-3.07** |

where
vai : value added
pvai : value added prices

li: labor
*L aggregate labor
**L1, L2, L3, & L4: Labor type 1, 2, 3, & 4

ri:rate of return to capital
δi: change

**Table 13. Sources of household income (percentage change)**

***SIM_1***

| | | All | All_Fem | All_Fem_L | All_Fem_H | All_Male | All_Male_L | All_Male_H |
|---|---|---|---|---|---|---|---|---|
| **Labor** | Agriculture Skilled | -2.8 | -3.3 | | -3.6 | -2.7 | | -3.0 |
| | Agriculture Unskilled | -2.8 | -3.4 | -3.1 | | -2.7 | -2.4 | |
| | Industry Skilled | -0.3 | -0.9 | | -1.1 | -0.2 | | -0.5 |
| | Industry Unskilled | 0.3 | -0.3 | 0.01 | | 0.4 | 0.8 | |
| **Capital** | Agriculture | -2.7 | -3.2 | -3.0 | -3.5 | -2.6 | -2.2 | -2.9 |
| | Industry | -0.8 | -1.4 | -1.1 | -1.5 | -0.7 | -0.3 | -0.9 |
| | Services | 0.8 | 0.3 | 0.5 | 0.0 | 0.9 | 1.3 | 0.6 |
| | Land | -3.6 | -4.1 | -3.8 | -4.3 | -3.5 | -3.1 | -3.8 |
| **Other Income** | Dividends | 2.1 | 1.5 | 1.8 | 1.2 | 2.2 | 2.5 | 1.9 |
| | Others | 2.1 | 1.5 | 1.8 | 1.2 | 2.2 | 2.5 | 1.9 |

***SIM _2***

| | | All | All_Fem | All_Fem_L | All_Fem_H | All_Male | All_Male_L | All_Male_H |
|---|---|---|---|---|---|---|---|---|
| **Labor** | Agriculture Skilled | -5.3 | -6.3 | | -6.7 | -5.1 | | -5.7 |
| | Agriculture Unskilled | -5.3 | -6.3 | -5.8 | | -5.1 | -4.5 | |
| | Industry Skilled | -0.3 | -1.3 | | -1.8 | -0.1 | | -0.7 |
| | Industry Unskilled | 0.6 | -0.4 | 0.2 | | 0.8 | 1.5 | |
| **Capital** | Agriculture | -5.0 | -6.0 | -5.5 | -6.4 | -4.8 | -4.2 | -5.4 |
| | Industry | -0.9 | -1.9 | -1.3 | -2.3 | -0.7 | 0.1 | -1.2 |
| | Services | 1.2 | 0.2 | 0.7 | -0.3 | 1.4 | 2.1 | 0.8 |
| | Land | -6.5 | -7.3 | -6.9 | -7.8 | -6.3 | -5.6 | -6.9 |
| **Other Income** | Dividends | 3.8 | 2.8 | 3.3 | 2.3 | 4.0 | 4.7 | 3.4 |
| | Others | 3.8 | 2.8 | 3.3 | 2.3 | 4.0 | 4.7 | 3.4 |

Where: tot_fem – Total Female; fem_l – Female with low education; fem_h – Female with high education;
tot_mal – Total Male; mal_l – Male with low education; mal _h – Male with high education;

## Table 14. Percentage change in poverty indices

| SIM_1 | | | | | | | |
|---|---|---|---|---|---|---|---|
| **All Philippines** | | | | | | | |
| **Poverty Index** | **All** | **tot_fem** | **fem_l** | **fem_h** | **tot_mal** | **mal_l** | **mal_h** |
| Headcount | -0.41 | -1.68 | -1.37 | -4.28 | -0.29 | -0.31 | -0.21 |
| Gap | 0.07 | -1.10 | -0.95 | -2.78 | 0.16 | 0.24 | -0.35 |
| Severity | 0.22 | -1.07 | -0.96 | -2.39 | 0.34 | 0.42 | -0.25 |
| **National Capital Region (NCR)** | | | | | | | |
| Headcount | -1.63 | -9.53 | -9.70 | -9.13 | -0.70 | -1.81 | 0.65 |
| Gap | -1.64 | -2.51 | -2.30 | -3.43 | -1.54 | -1.85 | -1.13 |
| Severity | -2.00 | -2.63 | -2.69 | -2.88 | -1.84 | -2.28 | -1.23 |
| **All Urban** | | | | | | | |
| Headcount | -0.81 | -2.17 | -2.39 | -0.56 | -0.68 | -0.70 | -0.63 |
| Gap | -0.25 | -1.71 | -1.51 | -3.64 | -0.13 | 0.00 | -0.67 |
| Severity | -0.05 | -1.72 | -1.59 | -3.64 | 0.09 | 0.21 | -0.56 |
| **All Rural** | | | | | | | |
| Headcount | -0.19 | -0.97 | -0.54 | -5.30 | -0.12 | -0.13 | -0.08 |
| Gap | 0.22 | -0.84 | -0.71 | -2.37 | 0.31 | 0.35 | -0.06 |
| Severity | 0.36 | -0.82 | -0.72 | -1.93 | 0.46 | 0.51 | -0.04 |
| | | | | | | | |
| **Poor** | **- 0.41** | | ***112,601 - People Lifted Out of Poverty*** | | | | |

| SIM_2 | | | | | | | |
|---|---|---|---|---|---|---|---|
| **All Philippines** | | | | | | | |
| **Poverty Index** | **All** | **tot_fem** | **fem_l** | **fem_h** | **tot_mal** | **mal_l** | **mal_h** |
| Headcount | -0.23 | -2.86 | -2.50 | -5.88 | 0.01 | 0.12 | -0.57 |
| Gap | 0.76 | -1.32 | -1.04 | -4.29 | 0.93 | 1.07 | 0.00 |
| Severity | 1.24 | -1.15 | -0.93 | -3.53 | 1.44 | 1.59 | 0.30 |
| **National Capital Region (NCR)** | | | | | | | |
| Headcount | -1.58 | -6.26 | -5.07 | -9.13 | -1.03 | -2.55 | 0.83 |
| Gap | -2.53 | -3.54 | -3.38 | -4.49 | -2.40 | -2.81 | -1.97 |
| Severity | -3.16 | -4.21 | -4.40 | -4.81 | -2.92 | -3.51 | -1.97 |
| **All Urban** | | | | | | | |
| Headcount | -0.68 | -3.08 | -2.72 | -5.70 | -0.46 | -0.09 | -1.74 |
| Gap | 0.15 | -2.46 | -2.10 | -5.72 | 0.38 | 0.61 | -0.65 |
| Severity | 0.68 | -2.32 | -2.00 | -5.82 | 0.90 | 1.16 | -0.34 |
| **All Rural** | | | | | | | |
| Headcount | 0.01 | -2.55 | -2.28 | -5.30 | 0.23 | 0.27 | -0.03 |
| Gap | 1.06 | -0.84 | -0.60 | -3.60 | 1.21 | 1.29 | 0.59 |
| Severity | 1.50 | -0.67 | -0.52 | -2.67 | 1.68 | 1.77 | 0.80 |
| | | | | | | | |
| **Poor** | **-0.23** | | ***63,169 - People Lifted Out of Poverty*** | | | | |

Where: tot_fem – Total Female; fem_l – Female with low education; fem_h – Female with high education; tot_mal – Total Male; mal_l – Male with low education; mal _h – Male with high education;

**Table 15. Percentage change in regional poverty indices**

| SIM_1 | | | |
|---|---|---|---|
| **Region*** | **Headcount** | **Gap** | **Severity** |
| All Philippines | -0.41 | 0.07 | 0.22 |
| National Capital Region (NCR) | -1.63 | -1.64 | -2 |
| Region 1 – Ilocos | -1 | -0.74 | -0.77 |
| Region 2 – Cagayan Valley | 0.88 | 0.81 | 1.07 |
| Region 3 – Central Luzon | -1.3 | -0.82 | -0.96 |
| Region 4 – Southern Tagalog | -0.74 | 0.02 | 0.34 |
| Region 5 – Bicol | -0.13 | 0.3 | 0.43 |
| Region 6 – Western Visayas | -0.28 | -0.24 | -0.18 |
| Region 7 – Central Visayas | -1.5 | 0.41 | 0.83 |
| Region 8 – Eastern Visayas | 0.47 | 0.47 | 0.64 |
| Region 9 – Western Mindanao | -0.16 | 0.38 | 0.49 |
| Region 10 – Northern Mindanao | -0.39 | 0.18 | 0.45 |
| Region 11 – Southern Mindanao | 0.22 | 0.22 | 0.4 |
| Region 12 – Central Mindanao | 0.06 | 0.56 | 0.89 |
| Cordillera Autonomous Region (CAR) | -0.12 | -0.06 | -0.1 |
| Autonomous Region in Muslim Mindanao (ARMM) | 0.4 | 0.93 | 0.91 |
| **SIM_2** | | | |
| **Region*** | **Headcount** | **Gap** | **Severity** |
| All Philippines | -0.23 | 0.76 | 1.24 |
| National Capital Region (NCR) | -1.58 | -2.53 | -3.16 |
| Region 1 – Ilocos | -1.31 | -0.9 | -0.83 |
| Region 2 – Cagayan Valley | 2.92 | 2.15 | 2.78 |
| Region 3 – Central Luzon | -2.11 | -0.82 | -1.04 |
| Region 4 – Southern Tagalog | -0.78 | 0.62 | 1.4 |
| Region 5 – Bicol | 0.14 | 1 | 1.38 |
| Region 6 – Western Visayas | 0.1 | 0.36 | 0.71 |
| Region 7 – Central Visayas | -1.03 | 1.26 | 2.2 |
| Region 8 – Eastern Visayas | 1.33 | 1.4 | 1.82 |
| Region 9 – Western Mindanao | -0.09 | 1.4 | 1.83 |
| Region 10 – Northern Mindanao | -0.06 | 0.89 | 1.58 |
| Region 11 – Southern Mindanao | 0.37 | 1.22 | 1.86 |
| Region 12 – Central Mindanao | 0.16 | 1.67 | 2.53 |
| Cordillera Autonomous Region (CAR) | -0.73 | 0.38 | 0.47 |
| Autonomous Region in Muslim Mindanao (ARMM) | 0.54 | 3.2 | 3.66 |

*Based from 1994 FIES Regional Classification

**Table 16. Ranking of urban poverty headcount reduction (percentage change)**

| | | | |
|---|---|---|---|
| | **SIM_1** | | |
| 1 | Central Luzon | Region 3 | -1.93 |
| 2 | Northern Mindanao | Region 10 | -1.91 |
| 3 | National Capital Region | NCR | -1.63 |
| 4 | Autonomous Region in Muslim Mindanao | ARMM | -1.42 |
| 5 | Cordillera Autonomous Region | CAR | -1.4 |
| 6 | Southern Tagalog | Region 4 | -1.3 |
| 7 | Central Visayas | Region 7 | -1.2 |
| 8 | Ilocos | Region 1 | -0.94 |
| 9 | Bicol | Region 5 | -0.81 |
| 10 | Western Visayas | Region 6 | -0.05 |
| 11 | Eastern Visayas | Region 8 | 0.16 |
| 12 | Central Mindanao | Region 12 | 0.21 |
| 13 | Western Mindanao | Region 9 | 0.45 |
| 14 | Southern Mindanao | Region 11 | 0.62 |
| 15 | Cagayan | Region 2 | 1.14 |
| | **SIM_2** | | |
| 1 | Central Luzon | Region 3 | -2.17 |
| 2 | Cordillera Autonomous Region | CAR | -1.92 |
| 3 | Northern Mindanao | Region 10 | -1.73 |
| 4 | Southern Tagalog | Region 4 | -1.72 |
| 5 | Ilocos | Region 1 | -1.64 |
| 6 | National Capital Region | NCR | -1.58 |
| 7 | Autonomous Region in Muslim Mindanao | ARMM | -0.71 |
| 8 | Central Visayas | Region 7 | -0.58 |
| 9 | Central Mindanao | Region 12 | -0.31 |
| 10 | Bicol | Region 5 | -0.14 |
| 11 | Western Mindanao | Region 9 | 0.54 |
| 12 | Eastern Visayas | Region 8 | 0.61 |
| 13 | Western Visayas | Region 6 | 1.01 |
| 14 | Cagayan | Region 2 | 1.14 |
| 15 | Southern Mindanao | Region 11 | 1.21 |

*Regional Classification is based from 1994 FIES

**Table 17. Ranking of rural poverty headcount reduction (percentage change)**

| | | | |
|---|---|---|---|
| | **SIM_1** | | |
| 1 | Central Visayas | Region 7 | -1.62 |
| 2 | Ilocos | Region 1 | -1.03 |
| 3 | Central Luzon | Region 3 | -0.84 |
| 4 | Southern Tagalog | Region 4 | -0.49 |
| 5 | Western Visayas | Region 6 | -0.37 |
| 6 | Western Mindanao | Region 9 | -0.29 |
| 7 | Central Mindanao | Region 12 | -0.005 |
| 8 | Southern Mindanao | Region 11 | 0.06 |
| 9 | Bicol | Region 5 | 0.07 |
| 10 | Cordillera Autonomous Region | CAR | 0.11 |
| 11 | Northern Mindanao | Region 10 | 0.35 |
| 12 | Eastern Visayas | Region 8 | 0.54 |
| 13 | Cagayan | Region 2 | 0.82 |
| 14 | Autonomous Region in Muslim Mindanao | ARMM | 0.87 |
| | **SIM_2** | | |
| 1 | Central Luzon | Region 3 | -2.06 |
| 2 | Central Visayas | Region 7 | -1.19 |
| 3 | Ilocos | Region 1 | -1.1 |
| 4 | Cordillera Autonomous Region | CAR | -0.51 |
| 5 | Southern Tagalog | Region 4 | -0.35 |
| 6 | Western Mindanao | Region 9 | -0.22 |
| 7 | Western Visayas | Region 6 | -0.21 |
| 8 | Southern Mindanao | Region 11 | 0.03 |
| 9 | Bicol | Region 5 | 0.22 |
| 10 | Central Mindanao | Region 12 | 0.37 |
| 11 | Northern Mindanao | Region 10 | 0.76 |
| 12 | Autonomous Region in Muslim Mindanao | ARMM | 0.87 |
| 13 | Eastern Visayas | Region 8 | 1.47 |
| 14 | Cagayan | Region 2 | 3.29 |

*Regional Classification is based from 1994 FIES