



**The Assessments of Climate Change Impacts and Mapping of Vulnerability to Food Insecurity under Climate Change to Strengthen Household Food Security with Livelihoods' Adaptation Approaches (AMICAF)**

**Provincial Agricultural Market (PAM) Model**

**FINAL TECHNICAL REPORT**

**I. Background**

The Assessments of Climate Change Impacts and Mapping of Vulnerability to Food Insecurity under Climate Change to Strengthen Household Food Security with Livelihoods' Adaptation Approaches (AMICAF) is a project supported by the Food and Agriculture Organization (FAO) that aims to assist developing countries in climate change assessment and adaptation to improve food security. The AMICAF Project started in October 2011 with a budget of US\$ 2.5 million and is implemented in the Philippines and Peru.

The AMICAF Project has four (4) components called “Steps”:

1. Step 1: Impacts of Climate Change on Agriculture
2. Step 2: Food Insecurity Vulnerability Analysis at the Household Level
3. Step 3: Livelihood Adaptation to Climate Change
4. Step 4: Institutional Analysis and Awareness Raising

Step 1 of AMICAF covers the assessment of the impacts of climate change on the agriculture sector and consists of modelling activities. The objective of this Step is to produce relevant information on the impacts of climate change to agriculture as inputs for the subsequent Steps 2 to 4. The Agriculture, Natural Resources and Environment Staff (ANRES) of the National Economic and Development Authority (NEDA) is a partner agency under Step 1, together with the Philippine Atmospheric Geophysical Astronomical Service Administration (PAGASA), Philippine Rice Research Institute (PhilRice) and the University of the Philippines National Institute for Geological Studies (UP-NIGS).

The objective of Step 2 is to map and characterize the current and future vulnerability to food insecurity at the household level as a result of climate change, while Step 3 aims to enhance community capacities to adapt to climate change by identifying and field testing good adaptation practices in Camarines Sur and Surigao del Norte. The final component or Step 4 deals with enhancing the awareness on the impacts and vulnerability to climate change and improve institutional mechanism to conduct/use climate change assessments.

**II. Project Objectives**

The objective of the NEDA component under the AMICAF Project is to determine the effects of climate change on the agriculture sector in the Philippines. Specifically, it aims to:

1. Develop the Provincial Agricultural Market (PAM) Model through a capacity building approach in partnership with FAO; and

2. Conduct a projection of future rice production at the provincial level and farmgate prices in the Philippines in 2011-2030, under different climate change scenarios.

### III. Methodology

#### A. Development of the Provincial Agricultural Market (PAM) Model

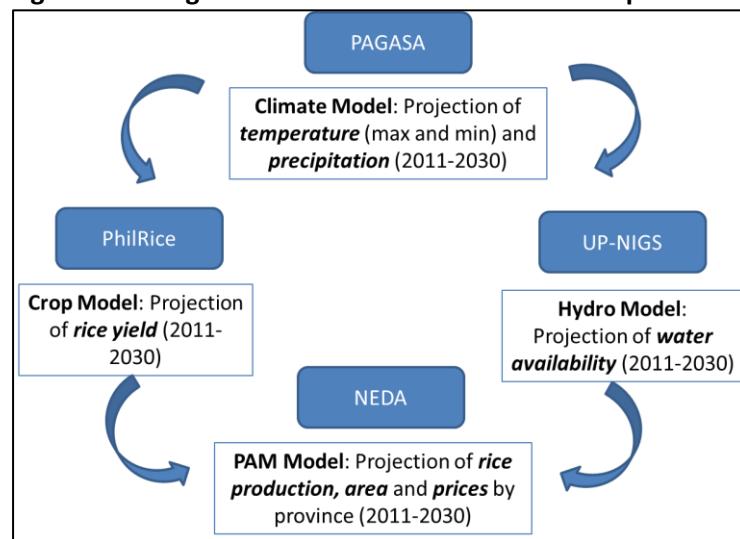
Under the project, a partial equilibrium<sup>1</sup> econometric model was developed in partnership with the FAO<sup>2</sup> called the “Provincial Agricultural Market” model or PAM. The following are the major features of PAM model:

1. *Uses Microsoft Excel as platform* – The MS Excel is a common software and less complicated to operate compared to other statistical software (e.g. EViews, Stata, GAMS).
2. *Commodity coverage* – The focus commodity is irrigated rice and rainfed rice.
3. *Spatial coverage* – The model is disaggregated by province.
4. *Timeframe of projection* – From year 2011 to year 2030.
5. *Major variables in projection* – Irrigated rice production, rainfed rice production, irrigated rice area harvested, rainfed rice area harvested and farmgate prices.

#### B. Linkage of the PAM Model with other Step 1 Models

The PAM model is not a stand-alone model. It is linked with the models of the other partner agencies under Step 1 of the AMICAF Project (**Figure 1**). This partnership between different agencies and linkage between various models enables a multi-disciplinary approach in assessing the different impacts of Climate Change.

**Figure 1. Linkage of the PAM Model with other Step 1 Models**



Source: NEDA-ANRES

<sup>1</sup> A partial equilibrium model focuses on one or more sectors of the economy and assumes that changes in other sectors are negligible.

<sup>2</sup> The PAM was developed by Dr. Tatsuji Koizumi of the FAO.

First, the PAGASA conducted a downscaling of the projected minimum temperature, maximum temperature and precipitation of three (3) Global Circulation Models (GCM) namely: (i) Bergen Climate Model (BCM) from Norway, (ii) Centre National de Recherches Meteorologiques (CNRM3) from France, and (iii) Max-Planck-Institute for Meteorology (MPEH5) from Germany. Two (2) climate change scenarios were used for each GCM: (i) A1B Scenario and (ii) A2 Scenario.

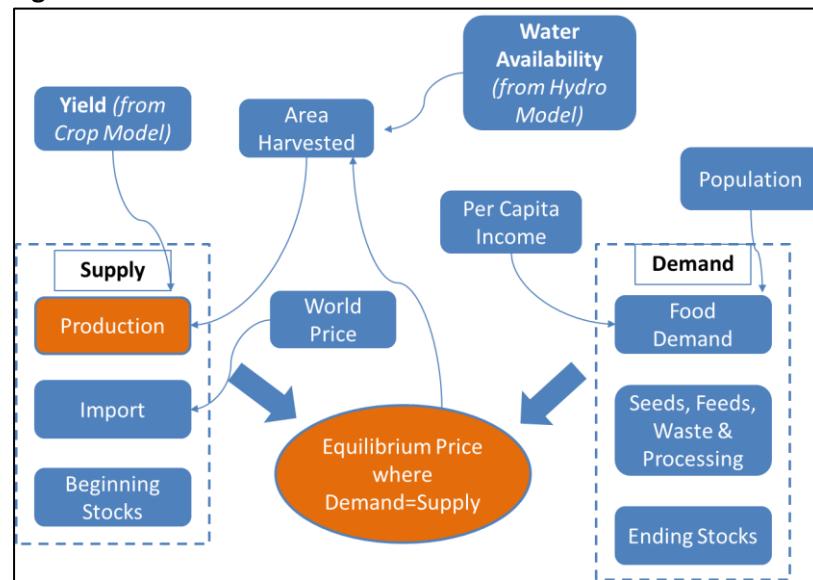
The A1B Scenario is a medium-range emission scenario characterized by a balance in the use of both fossil and non-fossil fuels with a projected increase in temperature of 2.8 degree Celsius (range of 1.7 degree Celsius to 4.4 degree Celsius), while the A2 Scenario is a high-range emission scenario focused on regionally-oriented economic development in the future with continuous increase in population and a projected increase in temperature of 3.4 degree Celsius (range of 2.0 degree Celsius to 5.4 degree Celsius)<sup>3</sup>. The emission scenarios are based on the Special Report on Emissions Scenarios (SRES) by the Intergovernmental Panel on Climate Change (IPCC) published in 2000. These projections of climate variables by PAGASA were then used by the PhilRice to conduct a projection of future irrigated and rainfed rice yield, and by the UP-NIGS to conduct a projection of future water discharge (or availability) in major river basins in the Philippines from 2011 to 2030.

The projections of PhilRice on rice yield and UP-NIGS on water discharge are integral inputs to the PAM Model under the NEDA component. The projected rice yields and water discharges are used in the computation of total rice production and area harvested to come up with projected farmgate prices in 2011-2030.

### C. Framework of the PAM Model

The PAM model computes an equilibrium price (farmgate) that balances the supply and demand of rice in the market (**Figure 2**). The supply of rice is composed of domestic production, import and beginning stocks. The demand for rice, on the other hand, is composed of food demand, demand for seeds, feeds, waste and processing as well as ending stocks.

**Figure 2. Framework of the PAM Model**



Source: NEDA-ANRES

<sup>3</sup> IPCC, 2007: Summary for Policymakers. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change

An increase in the supply of rice relative to demand, will lead to a decrease in prices, while an increase in the demand of rice relative to supply, will lead to an increase in prices<sup>4</sup>.

The most important component of rice supply is domestic production. It is computed as the product between the yield projections from the Crop Model of PhilRice and area harvested. The area harvested in the PAM model is affected by water availability from the projection of UP-NIGS. On the other hand, the bulk of rice demand comes from food demand which in turn is affected by per capita income and population growth.

#### D. Major Equations of the PAM Model

1. **Equation for Irrigated Rice Production.** Irrigated rice production is computed, by province, as the product between irrigated yield and area harvested. It is converted to milled terms by using the standard conversion factor of 0.654.

$$\text{Irrigated Production} = \text{Irrigated Yield} * \text{Area Harvested} \quad (1.1)$$

2. **Equation for Irrigated Area Harvested.** Irrigated area harvested is computed as a function of farmgate price. The magnitude of the change depends on the value of the elasticity of irrigated area harvested with respect to rice price. The elasticity is a positive number and it varies in each province which was estimated by using Ordinary Least Squares (OLS) Regression.

*Irrigated Area Harvested*

$$= \text{Area Harvested}_{t-1} * \left( \frac{\text{farmgate price}_t}{\text{farmgate price}_{t-1}} \right)^{\text{rice price elasticity}} \quad (1.2)$$

3. **Equation for Rainfed Rice Production.** Rainfed rice production is computed, by province, as the product between rainfed yield and area harvested. It is converted to milled terms by using the standard conversion factor of 0.654.

$$\text{Rainfed Production} = \text{Rainfed Yield} * \text{Area Harvested} \quad (1.3)$$

4. **Equation for Rainfed Area Harvested.** Rainfed area harvested is computed as a function of farmgate price and white corn price. The magnitude of the change depends on the value of the elasticity of rainfed area harvested with respect to rice price and white corn price. The elasticities vary in each province and were estimated using Ordinary Least Squares (OLS) Regression.

*Rainfed Area Harvested*

$$= \text{Area Harvested}_{t-1} * \left( \left( \frac{\text{farmgate price}_t}{\text{farmgate price}_{t-1}} \right)^{\text{rice price elasticity}} * \left( \frac{\text{white corn price}_t}{\text{white corn price}_{t-1}} \right)^{\text{corn price elasticity}} \right) \quad (1.4)$$

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<sup>4</sup>with the assumption of ceteris paribus or all else equal.

5. **Equation for per capita consumption.** The per capita consumption (PCC) for rice is computed as a function of per capita Gross Domestic Product (GDP), rice retail price and white corn retail price (substitute commodity). The income elasticity used is 0.23, rice price elasticity is -0.24 and white corn price elasticity is 0.15. The PCC is computed at the national level.

$$PCC = PCC_{t-1} * \left( \left( \frac{pc GDP_t}{pc GDP_{t-1}} \right)^{(0.23)income\ elasticity} \right. \\ \left. * \left( \frac{rice\ retail\ price_t}{rice\ retail\ price_{t-1}} \right)^{(-0.24)rice\ price\ elasticity} \right. \\ \left. * \left( \frac{white\ corn\ retail\ price_t}{white\ corn\ retail\ price_{t-1}} \right)^{(0.15)corn\ price\ elasticity} \right) \quad (1.5)$$

6. **Equation for food consumption.** The total food consumption or demand is computed as a product between PCC and population. The total food consumption is computed at the national level.

$$Food\ Consumption = PCC * Population \quad (1.6)$$

7. **Equation for imports.** The level of imports is computed as a function of the wholesale price of rice and the world price of rice. The world price of rice is an exogenous variable taken from the Rice Economy Climate Change (RECC) Model<sup>5</sup>. The RECC Model is an international model covering rice markets in 15 countries and generates world price projections under Climate Change. The domestic rice price elasticity used is -0.10 and the world price elasticity is -0.44. This means that increases in the wholesale and world prices for rice will lead to a decline in the level of imports. The level of imports is computed at the national level.

$$Imports = Imports_{t-1} * \left( \left( \frac{wholesale\ price_t}{wholesale\ price_{t-1}} \right)^{(-0.10)rice\ price\ elasticity} \right. \\ \left. * \left( \frac{world\ price_t}{world\ price_{t-1}} \right)^{(-0.44)world\ price\ elasticity} \right) \quad (1.7)$$

8. **Equation for ending stocks.** The ending stock of rice is a function of rice consumption. The magnitude of change depends on the value of the elasticity of ending stocks with respect to rice food consumption. The elasticity used is -0.05 which means that an increase in rice food consumption will lead to a decrease in ending stocks for rice.

$$Ending\ Stocks = Ending\ Stocks_{t-1} * \left( \left( \frac{rice\ food\ consumption_t}{rice\ food\ consumption_{t-1}} \right)^{(-0.05)rice\ consumption\ elasticity} \right) \quad (1.8)$$

9. **Equation for wholesale price.** The wholesale price of rice is computed as a function of farmgate price. The magnitude of change depends on the value of the elasticity of

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<sup>5</sup> The RECC was developed by Dr.Tatsuji Koizumi of the FAO

wholesale price with respect to farmgate price. The elasticity used is 0.92 and was estimated using OLS Regression.

$$\text{Wholesale Price} = \text{Wholesale Price}_{t-1} * \left( \left( \frac{\text{Farmgate Price}_t}{\text{Farmgate Price}_{t-1}} \right)^{(0.92)\text{rice price elasticity}} \right) \quad (1.9)$$

10. **Equation for retail price.** The retail price of rice is computed as a function of farmgate price. The magnitude of change depends on the value of the elasticity of retail price with respect to farmgate price. The elasticity used is 0.99 and was estimated using OLS Regression.

$$\text{Retail Price} = \text{Retail Price}_{t-1} * \left( \left( \frac{\text{Farmgate Price}_t}{\text{Farmgate Price}_{t-1}} \right)^{(0.99)\text{rice price elasticity}} \right) \quad (1.10)$$

11. **Equation for farmgate price.** The farmgate price is computed as the price level that balances the supply and demand of rice in the market. This equilibrium farmgate price is computed in the PAM using the Gauss-Seidel Algorithm by balancing the following equation:

$$\begin{aligned} \text{Production} + \text{Imports} + \text{Beg. Stocks} \\ = \text{Food Consumption} + \text{Seeds, etc.} + \text{End Stocks} \end{aligned} \quad (1.11)$$

#### E. Data Used

1. **Gross Domestic Product (GDP)** – NEDA (2014: 6.5%, 2015: 7.0%, 2016: 7.5%) and ADB (2017-2030: 5.6%) projections<sup>6</sup>.
2. **Population** – PSA-NSCB (2011-2020: 1.8%) and ADB (2021-2030: 1.4%) projections<sup>7</sup>.
3. **World price of rice** – Projection of the *Rice Economy Climate Change (RECC) Model*. The RECC Model is an international partial equilibrium model covering rice markets in 15 countries and generates world price projections under Climate Change.
4. **White corn prices**–Historical farmgate price from PSA-BAS. The projection in 2011-2030 was computed by using exponential smoothing method (additive) with the root mean square error (RMSE) as criteria.
5. **Per capita consumption** – 2008-2009 Survey on Food Demand (SFD) by PSA-BAS
6. **Irrigated and rainfed rice yield** – Projection from the PhilRice Crop Model
7. **Water availability** – Projection from the UP-NIGS Hydrology Model
8. **Baseline data** – Baseline data on rice production, area harvested, prices, imports, stocks and utilization for seeds, feeds & waste, and processing from PSA-BAS.

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<sup>6</sup> Asian Development Bank, 2011. Long-Term Projection of Asian GDP and Trade.

<sup>7</sup> Ibid

## IV. Results and Discussion

### A. Summary of PhilRice Yield Projections

1. The projection of PhilRice shows that both irrigated and rainfed yield may decrease in the future under the A2 scenario, but the trend is mixed under the A1B scenario. **Table 1** below provides a summary of the rice yield projections by PhilRice under different scenarios<sup>8</sup>. This matrix was constructed based on the raw data from the PhilRice Crop Model which was validated by FAO Rome and sent to NEDA.

**Table 1. Summary of PhilRice Yields Projection by Scenario, 2011-2030**  
(in MT per hectare)

Global Circulation Model	Yield							
	Projection (2011-2030)							
	Irrigated				Rainfed			
	A1B	Level	% growth	A2	Level	% growth	A1B	A2
BCM2	3.70	-0.17	3.74	-0.14	2.69	0.11	2.78	-0.37
CNCM3	3.68	0.12	3.72	-0.15	2.71	-0.05	2.74	-0.26
MPEH5	3.68	-0.09	3.68	-0.13	2.69	0.01	2.66	-0.23
<b>Average</b>	<b>3.69</b>	<b>-0.05</b>	<b>3.71</b>	<b>-0.14</b>	<b>2.70</b>	<b>0.02</b>	<b>2.72</b>	<b>-0.29</b>

Source: Summarized by NEDA-ANRES from raw data of the PhilRice Crop Model as validated by FAO

2. Overall, both irrigated and rainfed yield are projected to decrease in the future in all GCMs under the A2 scenario. However, the projection under the A1B scenario shows mixed results wherein irrigated yield is projected to increase in only one (1) GCM (CNCM3 at 0.12%), while rainfed yield is projected to increase in 2 out of 3 GCMs (BCM2 at 0.11% and MPEH5 at 0.01%). On the average, irrigated yield is higher under A2 scenario at 3.71 MT per hectare compared to A1B scenario at 3.69 MT per hectare. The trend is similar with rainfed yield which is higher under the A2 scenario. The trends in the rice yield projection of PhilRice were used in this study to interpret the projections of the PAM model on rice production and farmgate prices in 2011-2030 since rice yield is a major factor in the computation of rice production which in turn affects farmgate prices.

### B. Irrigated and Rainfed Rice Production

1. The projection from the PAM model shows that irrigated and rainfed rice production will increase in the future. Irrigated rice production is projected<sup>9</sup> to increase from 11.954 MMT in 2005-2010 to a range of 13.4 MMT to 13.6 MMT in 2011-2030 (**Table 2**) across all GCMs. The same is true for rainfed rice production which is projected to increase from 3.882 MMT in 2005-2010 to a range of 4.5 MMT to 4.6 MMT in 2011-2030 across all GCMs.

The major factors contributing to the increase in rice production are: (i) positive growth in irrigated yield at 0.12% in CNCM3 A1B and growth in rainfed yield at 0.11% and 0.01% in BCM2 A1B and MPEH5 A1B, respectively; and (ii) an increase in both irrigated area

<sup>8</sup> The assumptions and interpretation/explanation of the rice yield projections of PhilRice can be found in their final report under the AMICAF project.

<sup>9</sup> Rice production and farmgate prices projection under PAM Model excludes Zamboanga City, Camiguin, Davao City, Dinagat, Sulu, and Tawi-tawi due to the lack of yield projection from PhilRice.

(range of 1.35% to 1.68% in all GCMs) and rainfed area (range of 1.39% to 1.80% in all GCMs) due to the positive impact of increasing farmgate prices (range of 3.4% to 4.3% in all GCMs) in 2011-2030 (**Annex B** and **Annex C**).

**Table 2. PAM Model Projection on Irrigated and Rainfed Production, 2011-2030**  
(in MT)

Global Circulation Models	Base (2008-2010 for Production, Area & Price)	PAM Model Projection (2011-2030)			
		A1B Scenario		A2 Scenario	
		2026-2030	2011-2030	2026-2030	2011-2030
<b>BCM2</b>					
Production	<b>16,284,761</b>	<b>20,051,810</b>	<b>18,219,269</b>	<b>20,149,405</b>	<b>18,271,459</b>
Irrigated	12,210,624	14,906,859	<b>13,617,553</b>	15,007,748	<b>13,649,014</b>
Rainfed	4,074,137	5,144,951	<b>4,601,715</b>	5,141,657	<b>4,622,445</b>
<b>CNCM3</b>					
Production	<b>16,284,761</b>	<b>20,092,749</b>	<b>18,193,216</b>	<b>20,256,070</b>	<b>18,261,476</b>
Irrigated	12,210,624	14,832,483	<b>13,496,529</b>	15,116,391	<b>13,592,048</b>
Rainfed	4,074,137	5,260,266	<b>4,696,687</b>	5,139,678	<b>4,669,428</b>
<b>MPEH5</b>					
Production	<b>16,284,761</b>	<b>20,171,416</b>	<b>18,278,796</b>	<b>20,147,284</b>	<b>18,214,459</b>
Irrigated	12,210,624	14,900,558	<b>13,630,273</b>	15,043,049	<b>13,671,796</b>
Rainfed	4,074,137	5,270,858	<b>4,648,524</b>	5,104,236	<b>4,542,663</b>

Source: NEDA-ANRES estimate

2. **By scenario, total rice production is higher under A2 Scenario in 2 out of 3 global circulation models.** The BCM2 and CNCM3 have a higher projected total rice production under A2 scenario, compared to MPEH5. As shown in **Table 2**, total rice production under BCM2 in 2011-2030 is 18.271 MMT under A2, compared to only 18.219 MMT under A1B. The CNCM3 shows a similar trend with total rice production of 18.261 MMT under A2, compared to only 18.193 MMT under A1B.

Both total rice production of BCM2 and CNCM3 is higher under A2 due to the higher projected yield from the PhilRice Crop Model. Total rice production in MPEH5 is lower under A2 scenario due to the decline in the projected growth of irrigated yield at -0.13% and rainfed yield at -0.23% in 2011-2030 (**Table 1**) from the PhilRice Crop Model under Climate Change.

#### C. Irrigated and Rainfed Area Harvested

1. **Similar to rice production, both irrigated and rainfed area harvested are projected to increase in the future due to the positive growth in farmgate prices.** Irrigated area harvested is projected to increase from 2.938 million hectares in 2005-2010 to a range of 3.529 million hectares to 3.559 million hectares in 2011-2030 across all GCMs and scenarios (**Table 3**). The same is true for rainfed area harvested which is projected to increase from 1.369 million hectares in 2005-2010 to a range of 1.594 million hectares to 1.611 million hectares across all GCMs and scenarios in 2011-2030.

The major factor that contributed to the increase in irrigated and rainfed area harvested is the positive growth in farmgate price ranging from 3.4 % to 4.3%, on the average, in 2011-2030 across all GCMs and scenarios (**Annex B** and **Annex C**). In the PAM model, area harvested is a function of farmgate price which means that higher farmgate prices give rice farmers an incentive to expand their areas devoted to rice.

**Table 3. PAM Model Projection on Irrigated and Rainfed Area, 2011-2030**  
 (in hectares)

Global Circulation Models	Base (2008-2010 for Production, Area & Price)	PAM Model Projection (2011-2030)			
		A1B Scenario		A2 Scenario	
		2026-2030	2011-2030	2026-2030	2011-2030
<b>BCM2</b>					
Area Harvested	<b>4,448,816</b>	<b>5,768,996</b>	<b>5,156,552</b>	<b>5,715,073</b>	<b>5,129,550</b>
Irrigated	3,032,242	3,960,883	<b>3,550,223</b>	3,926,582	<b>3,533,010</b>
Rainfed	1,416,574	1,808,113	<b>1,606,330</b>	1,788,491	<b>1,596,540</b>
<b>CNCM3</b>					
Area Harvested	<b>4,448,816</b>	<b>5,746,690</b>	<b>5,170,739</b>	<b>5,657,813</b>	<b>5,133,420</b>
Irrigated	3,032,242	3,946,627	<b>3,559,210</b>	3,890,133	<b>3,535,490</b>
Rainfed	1,416,574	1,800,064	<b>1,611,529</b>	1,767,680	<b>1,597,930</b>
<b>MPEH5</b>					
Area Harvested	<b>4,448,816</b>	<b>5,703,045</b>	<b>5,124,348</b>	<b>5,716,571</b>	<b>5,157,553</b>
Irrigated	3,032,242	3,918,924	<b>3,529,695</b>	3,927,567	<b>3,550,881</b>
Rainfed	1,416,574	1,784,121	<b>1,594,653</b>	1,789,004	<b>1,606,672</b>

Source: NEDA-ANRES estimate

2. **By scenario, area harvested is higher under A1B in 2 out of 3 global circulation models.** The BCM2 and CNCM3 have a higher projected irrigated and rainfed area harvested under A1B scenario, compared to MPEH5. As shown in **Table 3**, total area harvested in BCM2 in 2011-2030 is 5.156 million hectares under A1B, compared to only 5.129 million hectares under A2. The CNCM3 shows a similar trend with total area harvested of 5.170 million hectares under A1B, compared to only 5.133 million hectares under A2.

Both total area harvested of BCM2 and CNCM3 in 2011-2030 is higher under A1B scenario due to the higher projected farmgate prices in the said scenario at Php 23.34 per kilo and Php 23.48 per kilo, respectively (**Annex A**). On the other hand, total area harvested in MPEH5 is lower under A1B scenario due to lower projected farmgate price at Php 22.98 per kilo, compared to Php 23.32 per kilo under A2 scenario (**Annex A**) in the same period.

#### D. **Farmgate Price**

1. **Farmgate prices are projected to be higher in the future.** The farmgate price of rice is projected to increase from Php 14.87 per kilo in 2010 to a range of Php 22.98 per kilo to Php 23.48 per kilo on the average in 2011-2030 across all GCMs and scenarios (**Table 4**). This is because the level of total rice demand (ranging from 13.969 MMT to 14.029 MMT) is higher than domestic production (ranging from 11.898 MMT to 11.954 MMT), on the average, in 2011-2030 across all GCMs and scenarios (**Annex B** and **Annex C**). As discussed in Section III Item C on the framework of the PAM Model, if demand is higher than supply, farmgate prices need to increase to induce higher domestic rice production.

The domestic production of rice cannot keep up with demand since the projected yields under Climate Change from the PhilRice Crop Model is lower in some provinces. Irrigated yield is projected to decline in BCM2 (-0.17%) and MPEH5 (-0.09), while rainfed yield is projected to decline in CNCM3 (-0.05) under the A1B scenario (**Table 1**). On the other hand, both irrigated and rainfed yield are projected to decline in all GCMs under the A2 scenario.

**Table 4. PAM Model Projection of Farmgate Prices, 2011-2030**

(in Php per Kilo)

Global Circulation Models	Base (2010 for price)	PAM Model Projection (2011-2030)			
		A1B Scenario		A2 Scenario	
		2026-2030	2011-2030	2026-2030	2011-2030
BCM2					
Farmgate Price	14.870	30.199	23.342	29.573	23.062
CNCM3					
Farmgate Price	14.870	29.927	23.484	28.927	23.068
MPEH5					
Farmgate Price	14.870	29.430	22.980	29.594	23.317

Source: NEDA-ANRES estimate

2. **Farmgate prices are lower under A2 scenario in 2 out of 3 GCMs.** The BCM2 and CNCM3 have a lower projected farmgate prices under A2 scenario, compared to MPEH5. As shown in **Table 4**, farmgate price in BCM2 in 2011-2030 is Php 23.062 per kilo under A2 scenario, which is lower compared to Php 23.342 per kilo under A1B scenario. The CNCM3 shows a similar trend with a lower farmgate price of Php 23.068 per kilo under A2 scenario, compared to Php 23.484 per kilo under A1B scenario in the same period.

Both farmgate price of BCM2 and CNCM3 is lower under A2 scenario due to the higher projected rice yield (**Table 1**) and higher projected rice production(**Table 2**) in 2 out of 3 GCMs in the said scenario in 2011-2030. The higher domestic rice production has lowered the demand-supply gap under A2 scenario thereby contributing to lower farmgate prices.

#### E. Summary of Result of Provincial Irrigated and Rainfed Rice Production

1. **A total of 59 provinces (or 78.7%) to 62 provinces (or 82.7%) out of 75 provinces in all the GCM's are projected to have increases in irrigated rice production.** The total number of provinces by GCM and scenario are presented in Table 5. The projected % growth of each province was computed by comparing the 2011-2030 average vs. the 2008-2010 baseline.

**Table 5. No of Provinces with Increases in Irrigated Palay Production (2011-2030)**

(in number)

Global Circulation Model	A1B Scenario	A2 Scenario
BCM2	61	62
CNCM3	59	59
MPEH 5	61	58

Source: NEDA-ANRES estimate

In all the GCM's and climate scenarios, the following are the top provinces:

- Basilan (78)
- Abra (55)
- Pangasinan (3)
- Sultan Kudarat (11)
- Bohol (33)

- f. Cebu (69)
- g. Bulacan (15)

The figure in the parenthesis beside the name of the provinces represents its ranking in actual rice production in 2008-2010. This is to determine the importance of each province as a rice producer in the country. Among the above provinces, only Pangasinan belongs to the top 10 biggest rice producer in 2008-2010. The projected increase in rice production in Pangasinan is mainly due to increases in area harvested. The detailed projection by GCM and climate scenario can be found in Annex H.1, H.3, H.5.

2. **A total of 13 provinces (or 17.3%) to 17 provinces (or 22.7%) out of 75 provinces in all the GCM's are projected to have decreases in irrigated rice production.** The total number of provinces by GCM and scenario are presented in Table 6. The projected % growth of each province was computed by comparing the 2011-2030 average vs. the 2008-2010 baseline.

**Table 6. No of Provinces with Decreases in Irrigated Palay Production (2011-2030) (in number)**

Global Circulation Model	A1B Scenario	A2 Scenario
BCM2	14	13
CNCM3	16	16
MPEH 5	14	17

Source: NEDA-ANRES estimate

In all the GCM's and climate scenarios, the following are the top provinces:

- a. Kalinga (23)
- b. Guimaras (72)
- c. Marinduque (74)
- d. Lanao del Sur (49)
- e. Antique (21)
- f. Maguindanao (22)
- g. Davao del Sur (28)
- h. Laguna (27)

The figure in the parenthesis beside the name of the provinces represents its ranking in actual rice production in 2008-2010. This is to determine the importance of each province as a rice producer in the country. Majority of the above provinces rank 21 to 28 in terms of actual rice production in 2008-2010. The decrease in irrigated rice production in Antique is mainly due to the contraction in area harvested by -1.3%, while it is mainly due to decreases in yield for Kalinga (-18.7%), Antique (-5.3%), Maguindanao (-10.1%), Davao del Sur (-6.7%) and Laguna (-4.8%). The detailed projection by GCM and climate scenario can be found in Annex H.1, H.3, H.5.

3. **A total of 42 provinces (or 56.0%) to 47 provinces (or 62.7%) out of 75 provinces in all the GCM's are projected to have Increases in rainfed rice production.** The total number of provinces by GCM and scenario are presented in Table 7. The projected % growth of

each province was computed by comparing the 2011-2030 average vs. the 2008-2010 baseline.

**Table 7. Provinces with Increases in Rainfed Palay Production (2011-2030)**  
(in number of provinces)

Global Circulation Model	A1B Scenario	A2 Scenario
BCM2	43	42
CNCM3	44	44
MPEH 5	45	47

Source: NEDA-ANRES estimate

In all the GCM's and climate scenarios, the following are the top provinces:

- a. Eastern Samar (33)
- b. Samar (14)
- c. Benguet (70)

The figure in the parenthesis beside the name of the provinces represents it's ranking in actual rice production in 2008-2010. This is to determine the importance of each province as a rice producer in the country. Only Samar is ranked higher at 14<sup>th</sup> place based on the actual rice production in 2008-2010. The increase in rainfed rice production in these three (3) provinces is mainly due to the expansion in area harvested ranging from 26% to 35%. The detailed projection by GCM and climate scenario can be found in Annex H.2, H.4, H.6.

4. **A total of 28 provinces (or 37.3%) to 33 provinces (or 44.0%) out of 75 provinces in all the GCM's are projected to have decreases in rainfed rice production.** The total number of provinces by GCM and scenario are presented in Table 8. The projected % growth of each province was computed by comparing the 2011-2030 average vs. the 2008-2010 baseline.

**Table 8. Provinces with Decreases in Rainfed Palay Production (2011-2030)**  
(in number of provinces)

Global Circulation Model	A1B Scenario	A2 Scenario
BCM2	32	33
CNCM3	31	31
MPEH 5	30	28

Source: NEDA-ANRES estimate

In all the GCM's and climate scenarios, the following are the top provinces:

- a. Quirino (63)
- b. Rizal (69)
- c. Laguna (72)
- d. Sorsogon (40)

The figure in the parenthesis beside the name of the provinces represents it's ranking in actual rice production in 2008-2010. This is to determine the importance of each

province as a rice producer in the country. All of the four (4) provinces above are not major rice producers. The decreased in rainfed rice production for Quirino and Rizal is due to the reduction in both area harvested and yield. For Laguna and Sorsogon, it is due to the decrease in yield. The detailed projection by GCM and climate scenario can be found in Annex H.2, H.4, H.6.

## V. Limitation and Future Study

1. **The yield, as an exogenous variable taken from the PhilRice crop model, does not take into account the impact of rice prices and other factors such as inputs.** The impact of these other variables to yield maybe higher than the impact of climate variables (e.g. maximum temperature, minimum temperature and precipitation). We suggest that for future study, the yield equations in the PAM Model can be modified to become endogenous to the model and to reflect it as a function of prices, inputs, climate variables and other factors.
2. **The computation of imports level is dissociated from changes in supply and demand within the PAM Model.** The import equation is only affected by the rice wholesale price and world price in the PAM Model. An option to improve the model is to formulate the import equation to reflect changes or dynamics in the levels of projected supply and demand.
3. **The projected water availability from the Hydrology Model was applied in only 2 out of the original 14 provinces.** As per recommendation of FAO Rome, the projected water availability from the UP-NIGS Hydrology Model was only applied in Nueva Ecija and Agusan del Sur due to technical issues.
4. **The corn market module in the PAM Model was not utilized.** This is due to the lack of corn yield projection from the PhilRice Crop Model due to technical issues. Hence, this study treated the farmgate price of white corn as exogenous. The farmgate price of white corn was projected in 2011-2030 using the exponential smoothing method<sup>10</sup>.

## VI. Conclusion and Recommendation

1. **Irrigated and rainfed rice production will increase in the future.** The positive growth in irrigated yield in 1 out of 3 GCMs and positive growth in rainfed yield in 2 out of 3 GCMs under the A1B Scenario in 2011-2030 will lead to increase rice production. The increase in both irrigated and rainfed area harvested in the same period, due to the increasing trend in farmgate prices, also contributed to the increase in rice production.
2. **Similar to rice production, irrigated and rainfed area harvested is also projected to increase in the future.** As mentioned previously, this is due to the increasing trend in the growth of farmgate prices in 2011-2030. Higher farmgate prices will provide rice farmers the incentive to expand their farm area devoted to rice.
3. **However, farmgate prices are still projected to be higher in the future, since the level of rice demand is higher than supply, due to the impact of Climate Change in some**

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<sup>10</sup> The criteria was based on the lowest root mean square error (RMSE) using EViews 7.2 software.

**provinces.** The domestic production of rice cannot keep up with demand due to the projected lower yields in some provinces under Climate Change from the PhilRice Crop Model.

4. **In terms of increases in rice production, there are more provinces who will experience growth in their irrigated rice production compared to rainfed rice production.** About 78.7% to 82.7% of the total number of provinces in the analysis are projected to have increases in their irrigated rice production, compared to about 56.0% to 62.7% for rainfed rice production. The increase in production is mainly due to higher growth in area harvested compared to yield in both ecosystems.
5. **On the other hand, there are more provinces who will experience a decline in their rainfed production.** About 37.3% to 44.0% of the total number of provinces in the analysis will experience a decline in their rainfed production compared to about 17.3% to 22.7% in irrigated rice. The decline in their rainfed production is mainly due to lower projected rainfed yields. However, majority of these provinces are not major rice producers.
6. **There is a need to focus effort on improving productivity given the negative impact of Climate Change on yield in some provinces.** To lower the gap between rice demand and supply in the future, there is a need to improve the rice productivity of those provinces affected by Climate Change. This can be done through increase investments in RDE to develop improve rice varieties and promotion of climate-resilient rice farming systems.
7. **Management of rice demand by promoting rice substitutes and reducing wastage can contribute in stabilizing rice prices.** Promotion of rice substitutes such as white corn, cassava and camote and reducing rice wastage can temper increases in rice demand by reducing the gap between demand and supply and contribute in future lower rice prices.
8. **Lastly, several limitations of the PAM model should be considered in the interpretation of results under this study.** This includes the following: (i) rice yield is exogenous from the model and is not affected by other relevant factors such as rice prices and other inputs, (ii) computation of imports does not consider the dynamics between supply and demand, and (iii) due to technical issues, majority of the projected water availability and the projection of the corn module under the PAM model were not utilized as originally envisioned.

## Annex A. PAM Model Projections on Rice Production, Area Harvested and Farmgate Price, 2011-2030

Global Circulation Models	Base (2008-2010 for Production, Area & Price)	PAM Model Projection (2011-2030)									
		A1B Scenario					A2 Scenario				
		2011-2015	2016-2020	2021-2025	2026-2030	2011-2030	2011-2015	2016-2020	2021-2025	2026-2030	2011-2030
<b>BCM2</b>											
Production	<b>16,284,761</b>	<b>16,340,409</b>	<b>17,710,475</b>	<b>18,774,381</b>	<b>20,051,810</b>	<b>18,219,269</b>	<b>16,415,214</b>	<b>17,723,432</b>	<b>18,797,783</b>	<b>20,149,405</b>	<b>18,271,459</b>
Irrigated	12,210,624	12,239,967	13,310,799	14,012,587	14,906,859	13,617,553	12,339,515	13,271,240	13,977,551	15,007,748	13,649,014
Rainfed	4,074,137	4,100,441	4,399,676	4,761,794	5,144,951	4,601,715	4,075,699	4,452,192	4,820,232	5,141,657	4,622,445
Area Harvested	<b>4,448,816</b>	<b>4,540,102</b>	<b>4,948,746</b>	<b>5,368,366</b>	<b>5,768,996</b>	<b>5,156,552</b>	<b>4,504,694</b>	<b>4,942,725</b>	<b>5,355,709</b>	<b>5,715,073</b>	<b>5,129,550</b>
Irrigated	3,032,242	3,136,132	3,411,315	3,692,561	3,960,883	3,550,223	3,113,507	3,407,470	3,684,482	3,926,582	3,533,010
Rainfed	1,416,574	1,403,969	1,537,431	1,675,805	1,808,113	1,606,330	1,391,187	1,535,255	1,671,227	1,788,491	1,596,540
Farmgate Price	<b>14.543</b>	<b>16.853</b>	<b>20.877</b>	<b>25.438</b>	<b>30.199</b>	<b>23.342</b>	<b>16.552</b>	<b>20.825</b>	<b>25.297</b>	<b>29.573</b>	<b>23.062</b>
<b>CNCM3</b>											
Production	<b>16,284,761</b>	<b>16,315,899</b>	<b>17,721,337</b>	<b>18,642,879</b>	<b>20,092,749</b>	<b>18,193,216</b>	<b>16,371,675</b>	<b>17,588,396</b>	<b>18,829,762</b>	<b>20,256,070</b>	<b>18,261,476</b>
Irrigated	12,210,624	12,159,989	13,104,325	13,889,319	14,832,483	13,496,529	12,230,783	13,052,744	13,968,273	15,116,391	13,592,048
Rainfed	4,074,137	4,155,910	4,617,012	4,753,559	5,260,266	4,696,687	4,140,892	4,535,652	4,861,490	5,139,678	4,669,428
Area Harvested	<b>4,448,816</b>	<b>4,551,737</b>	<b>4,943,171</b>	<b>5,441,357</b>	<b>5,746,690</b>	<b>5,170,739</b>	<b>4,524,697</b>	<b>5,012,594</b>	<b>5,338,577</b>	<b>5,657,813</b>	<b>5,133,420</b>
Irrigated	3,032,242	3,143,516	3,407,733	3,738,962	3,946,627	3,559,210	3,126,277	3,451,962	3,673,588	3,890,133	3,535,490
Rainfed	1,416,574	1,408,220	1,535,438	1,702,395	1,800,064	1,611,529	1,398,420	1,560,632	1,664,988	1,767,680	1,597,930
Farmgate Price	14.543	16.944	20.817	26.247	29.927	<b>23.484</b>	16.715	21.519	25.111	28.927	<b>23.068</b>
<b>MPEH5</b>											
Production	<b>16,284,761</b>	<b>16,367,265</b>	<b>17,697,619</b>	<b>18,878,885</b>	<b>20,171,416</b>	<b>18,278,796</b>	<b>16,308,476</b>	<b>17,553,461</b>	<b>18,848,614</b>	<b>20,147,284</b>	<b>18,214,459</b>
Irrigated	12,210,624	12,331,554	13,226,953	14,062,027	14,900,558	13,630,273	12,266,633	13,175,441	14,202,062	15,043,049	13,671,796
Rainfed	4,074,137	4,035,712	4,470,666	4,816,859	5,270,858	4,648,524	4,041,843	4,378,019	4,646,552	5,104,236	4,542,663
Area Harvested	<b>4,448,816</b>	<b>4,527,106</b>	<b>4,954,835</b>	<b>5,312,404</b>	<b>5,703,045</b>	<b>5,124,348</b>	<b>4,556,059</b>	<b>5,029,480</b>	<b>5,328,104</b>	<b>5,716,571</b>	<b>5,157,553</b>
Irrigated	3,032,242	3,127,842	3,415,168	3,656,845	3,918,924	3,529,695	3,146,317	3,462,747	3,666,895	3,927,567	3,550,881
Rainfed	1,416,574	1,399,264	1,539,668	1,655,560	1,784,121	<b>1,594,653</b>	1,409,742	1,566,733	1,661,208	1,789,004	<b>1,606,672</b>
Farmgate Price	14.543	16.740	20.927	24.821	29.430	<b>22.980</b>	17.003	21.676	24.994	29.594	<b>23.317</b>

## Annex B.1 Major Indicators under A1B Scenario (BCM2)

Item	2011	2015	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Average (2011-2030)
<b>Yield Projections</b>														
Irrigated	<b>3.764</b>	<b>3.717</b>	<b>3.694</b>	<b>3.662</b>	<b>3.654</b>	<b>3.624</b>	<b>3.621</b>	<b>3.653</b>	<b>3.652</b>	<b>3.617</b>	<b>3.706</b>	<b>3.702</b>	<b>3.639</b>	<b>3.701</b>
% growth		-0.27	-1.57	-0.85	-0.24	-0.80	-0.11	0.90	-0.02	-0.98	2.47	-0.12	-1.70	-0.17
Rainfed	<b>2.722</b>	<b>2.746</b>	<b>2.705</b>	<b>2.599</b>	<b>2.625</b>	<b>2.649</b>	<b>2.668</b>	<b>2.619</b>	<b>2.629</b>	<b>2.627</b>	<b>2.639</b>	<b>2.688</b>	<b>2.773</b>	<b>2.693</b>
% growth		-1.03	-0.23	-3.94	1.03	0.89	0.73	-1.83	0.37	-0.08	0.46	1.85	3.19	0.11
<b>Total Area</b>	<b>4,444,217</b>	<b>4,735,299</b>	<b>5,148,501</b>	<b>5,202,228</b>	<b>5,269,574</b>	<b>5,349,281</b>	<b>5,463,758</b>	<b>5,556,988</b>	<b>5,614,583</b>	<b>5,716,930</b>	<b>5,774,973</b>	<b>5,827,838</b>	<b>5,910,657</b>	<b>5,156,552</b>
Irrigated Area	3,068,197	3,272,438	3,550,649	3,580,437	3,624,066	3,674,145	3,759,171	3,824,985	3,856,493	3,922,052	3,957,926	4,004,332	4,063,612	<b>3,550,223</b>
% growth		2.24	2.24	0.84	1.22	1.38	2.31	1.75	0.82	1.70	0.91	1.17	1.48	1.49
Rainfed Area	1,376,020	1,462,861	1,597,852	1,621,792	1,645,508	1,675,136	1,704,588	1,732,003	1,758,090	1,794,878	1,817,048	1,823,505	1,847,046	<b>1,606,330</b>
% growth		2.17	2.20	1.50	1.46	1.80	1.76	1.61	1.51	2.09	1.24	0.36	1.29	1.57
<b>Total Demand</b>	<b>12,446</b>	<b>13,242</b>	<b>14,013</b>	<b>14,087</b>	<b>14,206</b>	<b>14,296</b>	<b>14,487</b>	<b>14,645</b>	<b>14,724</b>	<b>14,811</b>	<b>14,941</b>	<b>15,228</b>	<b>15,415</b>	<b>13,987</b>
% growth		1.37	1.05	0.53	0.84	0.63	1.33	1.09	0.54	0.60	0.88	1.92	1.23	1.13
<b>Total Supply</b>														
Production (milled)	<b>10,292</b>	<b>11,084</b>	<b>11,916</b>	<b>11,998</b>	<b>12,118</b>	<b>12,211</b>	<b>12,432</b>	<b>12,633</b>	<b>12,745</b>	<b>12,880</b>	<b>13,055</b>	<b>13,319</b>	<b>13,570</b>	<b>11,915</b>
% growth		1.67	1.32	0.69	1.00	0.76	1.81	1.62	0.89	1.05	1.36	2.03	1.88	1.47
<b>Imports</b>	<b>2,152</b>	<b>2,156</b>	<b>2,095</b>	<b>2,089</b>	<b>2,087</b>	<b>2,085</b>	<b>2,053</b>	<b>2,010</b>	<b>1,978</b>	<b>1,931</b>	<b>1,885</b>	<b>1,905</b>	<b>1,843</b>	<b>2,070</b>
% growth		-0.12	-0.38	-0.30	-0.08	-0.09	-1.55	-2.07	-1.62	-2.36	-2.36	1.07	-3.28	-0.78
<b>Ending Stocks</b>	<b>3,422</b>	<b>3,412</b>	<b>3,404</b>	<b>3,403</b>	<b>3,402</b>	<b>3,401</b>	<b>3,399</b>	<b>3,397</b>	<b>3,397</b>	<b>3,396</b>	<b>3,395</b>	<b>3,392</b>	<b>3,390</b>	<b>3,404</b>
% growth		-0.06	-0.05	-0.02	-0.03	-0.02	-0.06	-0.05	-0.02	-0.02	-0.04	-0.10	-0.06	-0.05
<b>Per Capita Consumption</b>	<b>0.117</b>	<b>0.116</b>	<b>0.112</b>	<b>0.111</b>	<b>0.110</b>	<b>0.109</b>	<b>0.109</b>	<b>0.109</b>	<b>0.107</b>	<b>0.106</b>	<b>0.106</b>	<b>0.106</b>	<b>0.106</b>	<b>0.112</b>
% growth		-0.45	-0.64	-1.06	-0.72	-0.95	-0.17	-0.45	-1.08	-1.01	-0.70	0.48	-0.30	-0.53
<b>Farmgate Price</b>	<b>15.90</b>	<b>18.77</b>	<b>23.06</b>	<b>23.54</b>	<b>24.26</b>	<b>25.10</b>	<b>26.56</b>	<b>27.72</b>	<b>28.28</b>	<b>29.47</b>	<b>30.13</b>	<b>31.00</b>	<b>32.12</b>	<b>23.34</b>
% growth		5.83	5.70	2.11	3.06	3.46	5.81	4.36	2.03	4.20	2.24	2.87	3.62	3.80

## Annex B.2 Major Indicators under A1B Scenario (CNCM3)

CNCM3 A1B														
Item	2011	2015	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Average (2011-2030)
<b>Yield Projections</b>														
Irrigated	<b>3.610</b>	<b>3.795</b>	<b>3.687</b>	<b>3.691</b>	<b>3.620</b>	<b>3.610</b>	<b>3.628</b>	<b>3.622</b>	<b>3.609</b>	<b>3.579</b>	<b>3.730</b>	<b>3.728</b>	<b>3.685</b>	<b>3.678</b>
% growth		1.01	0.89	0.11	-1.92	-0.27	0.49	-0.16	-0.36	-0.85	4.21	-0.05	-1.14	0.12
Rainfed	<b>2.743</b>	<b>2.838</b>	<b>2.794</b>	<b>2.783</b>	<b>2.657</b>	<b>2.553</b>	<b>2.504</b>	<b>2.580</b>	<b>2.485</b>	<b>2.497</b>	<b>2.690</b>	<b>2.677</b>	<b>2.688</b>	<b>2.710</b>
% growth		3.87	-2.19	-0.40	-4.50	-3.93	-1.92	3.05	-3.71	0.50	7.73	-0.48	0.40	-0.05
<b>Total Area</b>														
Irrigated Area	3,118,928	3,233,324	3,522,535	3,556,512	3,666,768	3,777,526	3,842,411	3,851,594	3,910,275	3,971,683	3,902,493	3,930,711	4,017,972	<b>3,559,210</b>
% growth		1.16	1.79	0.96	3.10	3.02	1.72	0.24	1.52	1.57	-1.74	0.72	2.22	1.35
Rainfed Area	1,404,950	1,440,844	1,581,970	1,608,168	1,669,940	1,734,675	1,752,080	1,747,111	1,788,904	1,823,419	1,785,170	1,781,660	1,821,165	<b>1,611,529</b>
% growth		0.81	1.64	1.66	3.84	3.88	1.00	-0.28	2.39	1.93	-2.10	-0.20	2.22	1.39
<b>Total Demand</b>	<b>12,333</b>	<b>13,330</b>	<b>14,072</b>	<b>14,138</b>	<b>14,119</b>	<b>14,090</b>	<b>14,323</b>	<b>14,592</b>	<b>14,619</b>	<b>14,716</b>	<b>15,050</b>	<b>15,374</b>	<b>15,504</b>	<b>13,969</b>
% growth		1.96	1.29	0.46	-0.13	-0.20	1.65	1.88	0.18	0.67	2.27	2.15	0.85	1.22
<b>Total Supply</b>														
Production (milled)	<b>10,189</b>	<b>11,164</b>	<b>11,972</b>	<b>12,045</b>	<b>12,038</b>	<b>12,019</b>	<b>12,277</b>	<b>12,582</b>	<b>12,647</b>	<b>12,790</b>	<b>13,154</b>	<b>13,456</b>	<b>13,655</b>	<b>11,898</b>
% growth		2.32	1.58	0.62	-0.06	-0.16	2.15	2.48	0.52	1.13	2.85	2.30	1.48	1.56
<b>Imports</b>	<b>2,144</b>	<b>2,162</b>	<b>2,099</b>	<b>2,092</b>	<b>2,081</b>	<b>2,072</b>	<b>2,043</b>	<b>2,007</b>	<b>1,971</b>	<b>1,925</b>	<b>1,891</b>	<b>1,913</b>	<b>1,848</b>	<b>2,069</b>
% growth		0.13	-0.28	-0.32	-0.51	-0.45	-1.41	-1.73	-1.78	-2.33	-1.78	1.17	-3.43	-0.74
<b>Ending Stocks</b>	<b>3,424</b>	<b>3,411</b>	<b>3,403</b>	<b>3,402</b>	<b>3,403</b>	<b>3,404</b>	<b>3,401</b>	<b>3,398</b>	<b>3,398</b>	<b>3,397</b>	<b>3,393</b>	<b>3,390</b>	<b>3,389</b>	<b>3,405</b>
% growth		-0.10	-0.06	-0.01	0.02	0.03	-0.08	-0.09	0.01	-0.02	-0.12	-0.11	-0.03	-0.05
<b>Per Capita Consumption</b>	<b>0.116</b>	<b>0.117</b>	<b>0.113</b>	<b>0.112</b>	<b>0.110</b>	<b>0.107</b>	<b>0.108</b>	<b>0.108</b>	<b>0.107</b>	<b>0.106</b>	<b>0.106</b>	<b>0.107</b>	<b>0.106</b>	<b>0.111</b>
% growth		0.21	-0.38	-1.14	-1.81	-1.89	0.18	0.44	-1.48	-0.94	0.87	0.74	-0.73	-0.44
<b>Farmgate Price</b>	<b>16.59</b>	<b>18.20</b>	<b>22.60</b>	<b>23.15</b>	<b>24.98</b>	<b>26.88</b>	<b>28.03</b>	<b>28.19</b>	<b>29.25</b>	<b>30.39</b>	<b>29.11</b>	<b>29.63</b>	<b>31.25</b>	<b>23.48</b>
% growth		2.99	4.56	2.43	7.89	7.62	4.27	0.59	3.76	3.87	-4.19	1.77	5.48	3.44

### Annex B.3 Major Indicators under A1B Scenario (MPEH)

MPEH A1B	2011	2015	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Average (2011-2030)
<b>Yield Projections</b>														
Irrigated	<b>3.764</b>	<b>3.698</b>	<b>3.688</b>	<b>3.682</b>	<b>3.652</b>	<b>3.597</b>	<b>3.698</b>	<b>3.721</b>	<b>3.660</b>	<b>3.590</b>	<b>3.629</b>	<b>3.627</b>	<b>3.696</b>	<b>3.680</b>
% growth		-0.46	0.64	-0.15	-0.81	-1.52	2.81	0.63	-1.66	-1.90	1.09	-0.05	1.88	-0.09
Rainfed	<b>2.745</b>	<b>2.648</b>	<b>2.726</b>	<b>2.664</b>	<b>2.723</b>	<b>2.663</b>	<b>2.709</b>	<b>2.694</b>	<b>2.624</b>	<b>2.625</b>	<b>2.673</b>	<b>2.689</b>	<b>2.740</b>	<b>2.689</b>
% growth		0.06	1.66	-2.26	2.21	-2.23	1.73	-0.53	-2.63	0.07	1.83	0.60	1.87	0.01
<b>Total Area</b>														
Irrigated Area	3,044,924	3,266,611	3,520,779	3,571,660	3,615,738	3,673,930	3,679,855	3,743,040	3,803,003	3,878,968	3,897,307	3,987,250	4,028,091	<b>3,529,695</b>
% growth		2.09	1.79	1.45	1.23	1.61	0.16	1.72	1.60	2.00	0.47	2.31	1.02	1.49
Rainfed Area	1,362,792	1,459,577	1,580,980	1,616,791	1,640,752	1,675,013	1,659,591	1,685,651	1,727,556	1,770,179	1,782,195	1,813,778	1,826,897	<b>1,594,653</b>
% growth		1.98	1.63	2.27	1.48	2.09	-0.92	1.57	2.49	2.47	0.68	1.77	0.72	1.56
<b>Total Demand</b>	<b>12,499</b>	<b>13,255</b>	<b>14,076</b>	<b>14,106</b>	<b>14,223</b>	<b>14,297</b>	<b>14,650</b>	<b>14,811</b>	<b>14,831</b>	<b>14,896</b>	<b>15,060</b>	<b>15,261</b>	<b>15,484</b>	<b>14,029</b>
% growth		1.45	1.29	0.21	0.83	0.52	2.47	1.10	0.13	0.44	1.10	1.34	1.46	1.14
<b>Total Supply</b>														
Production (milled)	<b>10,341</b>	<b>11,096</b>	<b>11,975</b>	<b>12,016</b>	<b>12,134</b>	<b>12,211</b>	<b>12,583</b>	<b>12,790</b>	<b>12,847</b>	<b>12,960</b>	<b>13,167</b>	<b>13,352</b>	<b>13,635</b>	<b>11,954</b>
% growth		1.75	1.58	0.34	0.98	0.63	3.04	1.64	0.45	0.88	1.60	1.41	2.12	1.47
<b>Imports</b>	<b>2,156</b>	<b>2,157</b>	<b>2,099</b>	<b>2,090</b>	<b>2,088</b>	<b>2,085</b>	<b>2,063</b>	<b>2,020</b>	<b>1,984</b>	<b>1,936</b>	<b>1,892</b>	<b>1,907</b>	<b>1,847</b>	<b>2,073</b>
% growth		-0.09	-0.28	-0.43	-0.09	-0.14	-1.07	-2.06	-1.80	-2.43	-2.27	0.81	-3.18	-0.78
<b>Ending Stocks</b>	<b>3,421</b>	<b>3,412</b>	<b>3,403</b>	<b>3,403</b>	<b>3,402</b>	<b>3,401</b>	<b>3,397</b>	<b>3,395</b>	<b>3,395</b>	<b>3,395</b>	<b>3,393</b>	<b>3,391</b>	<b>3,389</b>	<b>3,404</b>
% growth		-0.07	-0.06	0.00	-0.03	-0.02	-0.13	-0.05	0.01	-0.01	-0.05	-0.06	-0.07	-0.05
<b>Per Capita Consumption</b>	<b>0.118</b>	<b>0.116</b>	<b>0.113</b>	<b>0.111</b>	<b>0.110</b>	<b>0.109</b>	<b>0.110</b>	<b>0.110</b>	<b>0.108</b>	<b>0.107</b>	<b>0.107</b>	<b>0.106</b>	<b>0.106</b>	<b>0.112</b>
% growth		-0.36	-0.38	-1.42	-0.73	-1.09	1.10	-0.43	-1.53	-1.19	-0.44	-0.18	-0.04	-0.53
<b>Farmgate Price</b>	<b>15.59</b>	<b>18.68</b>	<b>22.58</b>	<b>23.40</b>	<b>24.12</b>	<b>25.10</b>	<b>25.20</b>	<b>26.28</b>	<b>27.33</b>	<b>28.69</b>	<b>29.02</b>	<b>30.68</b>	<b>31.44</b>	<b>22.98</b>
% growth		5.44	4.55	3.65	3.10	4.04	0.40	4.29	3.99	4.96	1.16	5.71	2.50	3.79

## Annex C.1 Major Indicators under A2 Scenario (BCM2)

Item	2011	2015	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Average (2011-2030)
<b>Yield Projections</b>														
Irrigated	<b>3.830</b>	<b>3.754</b>	<b>3.731</b>	<b>3.689</b>	<b>3.710</b>	<b>3.647</b>	<b>3.719</b>	<b>3.680</b>	<b>3.748</b>	<b>3.732</b>	<b>3.721</b>	<b>3.734</b>	<b>3.727</b>	<b>3.737</b>
% growth	-0.61	1.44	-1.13	0.57	-1.69	1.97	-1.05	1.85	-0.43	-0.29	0.34	-0.17	-0.14	
Rainfed	<b>2.895</b>	<b>2.810</b>	<b>2.766</b>	<b>2.693</b>	<b>2.764</b>	<b>2.724</b>	<b>2.812</b>	<b>2.779</b>	<b>2.759</b>	<b>2.711</b>	<b>2.734</b>	<b>2.765</b>	<b>2.687</b>	<b>2.776</b>
% growth	1.06	-1.32	-2.66	2.65	-1.46	3.25	-1.18	-0.74	-1.71	0.83	1.14	-2.82	-0.37	
<b>Total Area</b>	<b>4,278,796</b>	<b>4,703,308</b>	<b>5,138,026</b>	<b>5,215,230</b>	<b>5,245,686</b>	<b>5,368,469</b>	<b>5,415,057</b>	<b>5,534,104</b>	<b>5,533,383</b>	<b>5,648,765</b>	<b>5,714,944</b>	<b>5,770,474</b>	<b>5,907,796</b>	<b>5,129,550</b>
Irrigated Area	2,962,580	3,251,975	3,543,957	3,588,717	3,608,860	3,686,335	3,728,116	3,810,381	3,804,802	3,878,725	3,919,822	3,967,774	4,061,787	<b>3,533,010</b>
% growth	1.65	1.27	1.26	0.56	2.15	1.13	2.21	-0.15	1.94	1.06	1.22	2.37	1.68	
Rainfed Area	1,316,215	1,451,334	1,594,069	1,626,512	1,636,826	1,682,134	1,686,940	1,723,723	1,728,581	1,770,040	1,795,123	1,802,700	1,846,009	<b>1,596,540</b>
% growth	1.43	0.98	2.04	0.63	2.77	0.29	2.18	0.28	2.40	1.42	0.42	2.40	1.80	
<b>Total Demand</b>	<b>12,694</b>	<b>13,288</b>	<b>14,027</b>	<b>14,070</b>	<b>14,238</b>	<b>14,271</b>	<b>14,550</b>	<b>14,674</b>	<b>14,827</b>	<b>14,896</b>	<b>15,015</b>	<b>15,300</b>	<b>15,419</b>	<b>14,024</b>
% growth	1.69	1.57	0.31	1.19	0.24	1.95	0.85	1.04	0.47	0.80	1.89	0.78	1.03	
<b>Total Supply</b>														
Production (milled)	<b>10,518</b>	<b>11,126</b>	<b>11,929</b>	<b>11,982</b>	<b>12,147</b>	<b>12,188</b>	<b>12,490</b>	<b>12,661</b>	<b>12,842</b>	<b>12,960</b>	<b>13,125</b>	<b>13,387</b>	<b>13,575</b>	<b>11,950</b>
% growth	2.03	1.88	0.45	1.37	0.34	2.48	1.37	1.43	0.92	1.27	2.00	1.40	1.35	
<b>Imports</b>	<b>2,170</b>	<b>2,159</b>	<b>2,096</b>	<b>2,087</b>	<b>2,089</b>	<b>2,083</b>	<b>2,057</b>	<b>2,012</b>	<b>1,984</b>	<b>1,936</b>	<b>1,889</b>	<b>1,909</b>	<b>1,843</b>	<b>2,073</b>
% growth	0.01	-0.16	-0.39	0.07	-0.26	-1.29	-2.17	-1.41	-2.42	-2.40	1.06	-3.47	-0.82	
<b>Ending Stocks</b>	<b>3,418</b>	<b>3,412</b>	<b>3,403</b>	<b>3,403</b>	<b>3,401</b>	<b>3,401</b>	<b>3,398</b>	<b>3,397</b>	<b>3,395</b>	<b>3,395</b>	<b>3,394</b>	<b>3,391</b>	<b>3,390</b>	<b>3,404</b>
% growth	-0.08	-0.08	0.00	-0.05	0.00	-0.10	-0.03	-0.05	-0.01	-0.03	-0.09	-0.03	-0.04	
<b>Per Capita Consumption</b>	<b>0.120</b>	<b>0.116</b>	<b>0.112</b>	<b>0.111</b>	<b>0.111</b>	<b>0.109</b>	<b>0.110</b>	<b>0.109</b>	<b>0.108</b>	<b>0.107</b>	<b>0.106</b>	<b>0.107</b>	<b>0.106</b>	<b>0.112</b>
% growth	-0.09	-0.06	-1.31	-0.33	-1.40	0.52	-0.71	-0.51	-1.16	-0.79	0.45	-0.81	-0.65	
<b>Farmgate Price</b>	<b>14.52</b>	<b>18.47</b>	<b>22.95</b>	<b>23.68</b>	<b>24.01</b>	<b>25.31</b>	<b>26.02</b>	<b>27.46</b>	<b>27.36</b>	<b>28.68</b>	<b>29.43</b>	<b>30.31</b>	<b>32.08</b>	<b>23.06</b>
% growth		4.28	3.20	3.18	1.40	5.41	2.82	5.52	-0.36	4.83	2.61	3.00	5.84	4.29

## Annex C.2 Major Indicators under A2 Scenario (CNCM3)

CNCM3 A2																				Average (2011-2030)
Item	2011	2015	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030							
<b>Yield Projections</b>																				
Irrigated	<b>3.811</b>	<b>3.757</b>	<b>3.678</b>	<b>3.659</b>	<b>3.680</b>	<b>3.743</b>	<b>3.732</b>	<b>3.692</b>	<b>3.833</b>	<b>3.769</b>	<b>3.742</b>	<b>3.743</b>	<b>3.691</b>	<b>3.721</b>						
% growth		0.07	0.95	-0.51	0.60	1.71	-0.31	-1.07	3.82	-1.66	-0.72	0.04	-1.38	-0.15						
Rainfed	<b>2.823</b>	<b>2.790</b>	<b>2.741</b>	<b>2.732</b>	<b>2.681</b>	<b>2.733</b>	<b>2.708</b>	<b>2.612</b>	<b>2.769</b>	<b>2.745</b>	<b>2.762</b>	<b>2.669</b>	<b>2.674</b>	<b>2.736</b>						
% growth		-1.09	3.33	-0.35	-1.85	1.95	-0.93	-3.56	6.04	-0.89	0.62	-3.37	0.21	-0.26						
<b>Total Area</b>																				
Irrigated Area	3,001,477	3,246,285	3,575,362	3,607,614	3,617,339	3,616,760	3,714,040	3,812,188	3,737,644	3,800,561	3,869,412	3,982,155	4,060,893	<b>3,535,490</b>						
% growth		2.13	0.79	0.90	0.27	-0.02	2.69	2.64	-1.96	1.68	1.81	2.91	1.98	1.61						
Rainfed Area	1,338,173	1,448,132	1,611,839	1,637,297	1,641,666	1,642,279	1,678,953	1,724,747	1,690,400	1,725,415	1,766,204	1,810,878	1,845,502	<b>1,597,930</b>						
% growth		2.03	0.37	1.58	0.27	0.04	2.23	2.73	-1.99	2.07	2.36	2.53	1.91	1.72						
<b>Total Demand</b>	<b>12,601</b>	<b>13,301</b>	<b>13,961</b>	<b>14,031</b>	<b>14,220</b>	<b>14,416</b>	<b>14,579</b>	<b>14,671</b>	<b>14,965</b>	<b>15,054</b>	<b>15,116</b>	<b>15,271</b>	<b>15,421</b>	<b>14,017</b>						
% growth		1.43	1.83	0.50	1.35	1.37	1.13	0.63	2.01	0.59	0.41	1.03	0.98	1.07						
<b>Total Supply</b>																				
Production (milled)	<b>10,433</b>	<b>11,138</b>	<b>11,867</b>	<b>11,945</b>	<b>12,130</b>	<b>12,321</b>	<b>12,519</b>	<b>12,658</b>	<b>12,970</b>	<b>13,109</b>	<b>13,221</b>	<b>13,362</b>	<b>13,576</b>	<b>11,943</b>						
% growth		1.74	2.17	0.66	1.55	1.57	1.61	1.11	2.46	1.07	0.85	1.07	1.60	1.40						
<b>Imports</b>	<b>2,164</b>	<b>2,160</b>	<b>2,091</b>	<b>2,085</b>	<b>2,088</b>	<b>2,093</b>	<b>2,058</b>	<b>2,012</b>	<b>1,992</b>	<b>1,945</b>	<b>1,895</b>	<b>1,908</b>	<b>1,843</b>	<b>2,072</b>						
% growth		-0.10	-0.05	-0.31	0.13	0.23	-1.63	-2.26	-1.00	-2.36	-2.56	0.68	-3.38	-0.81						
<b>Ending Stocks</b>	<b>3,420</b>	<b>3,411</b>	<b>3,404</b>	<b>3,404</b>	<b>3,402</b>	<b>3,399</b>	<b>3,398</b>	<b>3,397</b>	<b>3,394</b>	<b>3,393</b>	<b>3,393</b>	<b>3,391</b>	<b>3,390</b>	<b>3,404</b>						
% growth		-0.07	-0.09	-0.01	-0.06	-0.07	-0.05	-0.02	-0.10	-0.02	-0.01	-0.04	-0.04	-0.05						
<b>Per Capita Consumption</b>	<b>0.119</b>	<b>0.116</b>	<b>0.112</b>	<b>0.111</b>	<b>0.110</b>	<b>0.110</b>	<b>0.110</b>	<b>0.109</b>	<b>0.109</b>	<b>0.108</b>	<b>0.107</b>	<b>0.106</b>	<b>0.106</b>	<b>0.112</b>						
% growth		-0.38	0.22	-1.10	-0.15	-0.13	-0.39	-0.96	0.58	-1.01	-1.22	-0.52	-0.59	-0.60						
<b>Farmgate Price</b>	<b>15.02</b>	<b>18.39</b>	<b>23.46</b>	<b>23.99</b>	<b>24.15</b>	<b>24.14</b>	<b>25.78</b>	<b>27.49</b>	<b>26.19</b>	<b>27.29</b>	<b>28.51</b>	<b>30.58</b>	<b>32.07</b>	<b>23.07</b>						
% growth		5.54	1.98	2.26	0.67	-0.04	6.80	6.63	-4.74	4.19	4.50	7.25	4.86	4.13						

### Annex C.3 Major Indicators under A2 Scenario (MPEH)

MPEH A2																				Average (2011-2030)
Item	2011	2015	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030							
<b>Yield Projections</b>																				
Irrigated	<b>3.773</b>	<b>3.663</b>	<b>3.606</b>	<b>3.650</b>	<b>3.706</b>	<b>3.698</b>	<b>3.697</b>	<b>3.675</b>	<b>3.626</b>	<b>3.684</b>	<b>3.737</b>	<b>3.696</b>	<b>3.674</b>						<b>3.683</b>	
% growth		-1.69	-1.29	1.23	1.52	-0.20	-0.04	-0.58	-1.35	1.60	1.45	-1.10	-0.61						-0.13	
Rainfed	<b>2.816</b>	<b>2.663</b>	<b>2.528</b>	<b>2.570</b>	<b>2.548</b>	<b>2.607</b>	<b>2.660</b>	<b>2.627</b>	<b>2.626</b>	<b>2.687</b>	<b>2.733</b>	<b>2.730</b>	<b>2.686</b>						<b>2.660</b>	
% growth		-1.15	-3.42	1.67	-0.86	2.31	2.02	-1.23	-0.04	2.31	1.69	-0.10	-1.60						-0.23	
<b>Total Area</b>																				
Irrigated Area	3,022,541	3,299,275	3,594,423	3,588,992	3,611,600	3,644,574	3,707,273	3,782,038	3,847,470	3,857,973	3,871,424	3,980,225	4,080,743						<b>3,550,881</b>	
% growth		2.49	2.14	-0.15	0.63	0.91	1.72	2.02	1.73	0.27	0.35	2.81	2.53						1.60	
Rainfed Area	1,350,097	1,478,009	1,622,645	1,626,669	1,638,390	1,658,187	1,675,117	1,707,678	1,752,932	1,758,169	1,767,356	1,809,780	1,856,780						<b>1,606,672</b>	
% growth		2.48	2.07	0.25	0.72	1.21	1.02	1.94	2.65	0.30	0.52	2.40	2.60						1.70	
<b>Total Demand</b>	<b>12,551</b>	<b>13,183</b>	<b>13,922</b>	<b>14,070</b>	<b>14,232</b>	<b>14,357</b>	<b>14,593</b>	<b>14,731</b>	<b>14,741</b>	<b>14,938</b>	<b>15,112</b>	<b>15,275</b>	<b>15,382</b>						<b>13,984</b>	
% growth		1.24	1.11	1.06	1.16	0.88	1.64	0.95	0.07	1.33	1.17	1.08	0.70						1.08	
<b>Total Supply</b>																				
Production (milled)	<b>10,388</b>	<b>11,029</b>	<b>11,831</b>	<b>11,980</b>	<b>12,142</b>	<b>12,267</b>	<b>12,531</b>	<b>12,715</b>	<b>12,763</b>	<b>12,997</b>	<b>13,215</b>	<b>13,366</b>	<b>13,540</b>						<b>11,912</b>	
% growth		1.53	1.39	1.26	1.35	1.03	2.15	1.47	0.38	1.84	1.68	1.14	1.31						1.41	
<b>Imports</b>	<b>2,160</b>	<b>2,152</b>	<b>2,089</b>	<b>2,087</b>	<b>2,088</b>	<b>2,089</b>	<b>2,059</b>	<b>2,015</b>	<b>1,979</b>	<b>1,938</b>	<b>1,895</b>	<b>1,908</b>	<b>1,841</b>						<b>2,070</b>	
% growth		-0.18	-0.36	-0.07	0.05	0.02	-1.42	-2.13	-1.82	-2.05	-2.24	0.70	-3.50						-0.80	
<b>Ending Stocks</b>	<b>3,421</b>	<b>3,413</b>	<b>3,405</b>	<b>3,403</b>	<b>3,401</b>	<b>3,400</b>	<b>3,398</b>	<b>3,396</b>	<b>3,397</b>	<b>3,394</b>	<b>3,393</b>	<b>3,391</b>	<b>3,390</b>						<b>3,405</b>	
% growth		-0.06	-0.05	-0.05	-0.05	-0.04	-0.08	-0.04	0.01	-0.06	-0.05	-0.05	-0.03						-0.05	
<b>Per Capita Consumption</b>	<b>0.118</b>	<b>0.115</b>	<b>0.111</b>	<b>0.111</b>	<b>0.111</b>	<b>0.110</b>	<b>0.110</b>	<b>0.109</b>	<b>0.108</b>	<b>0.107</b>	<b>0.107</b>	<b>0.106</b>	<b>0.106</b>						<b>0.112</b>	
% growth		-0.59	-0.58	-0.47	-0.37	-0.68	0.17	-0.60	-1.60	-0.18	-0.37	-0.47	-0.90						-0.60	
<b>Farmgate Price</b>	<b>15.30</b>	<b>19.16</b>	<b>23.77</b>	<b>23.68</b>	<b>24.06</b>	<b>24.61</b>	<b>25.67</b>	<b>26.96</b>	<b>28.12</b>	<b>28.31</b>	<b>28.55</b>	<b>30.54</b>	<b>32.45</b>						<b>23.32</b>	
% growth		6.46	5.43	-0.38	1.57	2.28	4.31	5.04	4.30	0.67	0.85	6.99	6.23						4.07	

#### Annex D. Palay Production, Area Harvested and Yield, 1990-2013

Production of Palay, 1990-2013 (in MT)													
Item	1990	1995	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average
<b>Palay (total)</b>	<b>9,319,276</b>	<b>10,540,649</b>	<b>12,389,412</b>	<b>14,603,005</b>	<b>15,326,706</b>	<b>16,240,194</b>	<b>16,815,548</b>	<b>16,266,417</b>	<b>15,772,319</b>	<b>16,684,062</b>	<b>18,032,422</b>	<b>18,439,406</b>	<b>13,180,002</b>
Irrigated Palay	6,604,826	7,598,555	9,412,676	11,233,793	11,594,933	12,269,390	12,556,150	12,083,264	11,992,459	12,358,931	13,396,480	13,823,145	9,827,056
Rainfed Palay	2,714,450	2,942,094	2,976,736	3,369,212	3,731,773	3,970,804	4,259,398	4,183,153	3,779,860	4,325,131	4,635,942	4,616,261	3,352,946
<b>% Growth (total)</b>	<b>0.02</b>	<b>5.11</b>	<b>0.73</b>	<b>4.96</b>	<b>5.96</b>	<b>3.54</b>	<b>-3.27</b>	<b>-3.04</b>	<b>5.78</b>	<b>8.08</b>	<b>2.26</b>	<b>3.48</b>	
Irrigated Palay		1.16	5.55	2.67	3.21	5.82	2.34	-3.77	-0.75	3.06	8.40	3.18	3.63
Rainfed Palay		-2.80	3.76	-5.22	10.76	6.41	7.27	-1.79	-9.64	14.43	7.19	-0.42	3.33

Area Harvested of Palay, 1990-2013 (in hectares)													
Item	1990	1995	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average
<b>Palay (total)</b>	<b>3,318,720</b>	<b>3,758,691</b>	<b>4,038,085</b>	<b>4,070,421</b>	<b>4,159,930</b>	<b>4,272,889</b>	<b>4,459,977</b>	<b>4,532,310</b>	<b>4,354,161</b>	<b>4,536,642</b>	<b>4,689,960</b>	<b>4,746,082</b>	<b>3,987,620</b>
Irrigated Palay	2,009,930	2,334,373	2,703,354	2,791,721	2,827,886	2,917,012	3,032,638	3,055,763	3,008,325	3,072,637	3,163,182	3,236,336	2,633,418
Rainfed Palay	1,308,790	1,424,318	1,334,731	1,278,700	1,332,044	1,355,877	1,427,339	1,476,547	1,345,836	1,464,005	1,526,778	1,509,746	1,354,202
<b>% Growth (total)</b>	<b>2.93</b>	<b>0.96</b>	<b>-1.36</b>	<b>2.20</b>	<b>2.72</b>	<b>4.38</b>	<b>1.62</b>	<b>-3.93</b>	<b>4.19</b>	<b>3.38</b>	<b>1.20</b>	<b>1.83</b>	
Irrigated Palay		5.18	1.45	-0.02	1.30	3.15	3.96	0.76	-1.55	2.14	2.95	2.31	2.26
Rainfed Palay		-0.55	-0.04	-4.18	4.17	1.79	5.27	3.45	-8.85	8.78	4.29	-1.12	1.17

Yield of Palay, 1990-2013 (in metric ton per hectare)													
Item	1990	1995	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average
<b>Palay (total)</b>	<b>2.81</b>	<b>2.80</b>	<b>3.07</b>	<b>3.59</b>	<b>3.68</b>	<b>3.80</b>	<b>3.77</b>	<b>3.59</b>	<b>3.62</b>	<b>3.68</b>	<b>3.84</b>	<b>3.89</b>	<b>3.27</b>
Irrigated Palay	3.29	3.26	3.48	4.02	4.10	4.21	4.14	3.95	3.99	4.02	4.24	4.27	3.68
Rainfed Palay	2.07	2.07	2.23	2.63	2.80	2.93	2.98	2.83	2.81	2.95	3.04	3.06	2.46
<b>% Growth (total)</b>	<b>-2.83</b>	<b>4.12</b>	<b>2.12</b>	<b>2.70</b>	<b>3.16</b>	<b>-0.80</b>	<b>-4.81</b>	<b>0.93</b>	<b>1.53</b>	<b>4.55</b>	<b>1.05</b>	<b>1.48</b>	
Irrigated Palay		-3.82	4.04	2.69	1.89	2.58	-1.56	-4.49	0.81	0.90	5.29	0.85	1.21
Rainfed Palay		-2.27	3.80	-1.09	6.33	4.53	1.90	-5.06	-0.86	5.19	2.78	0.70	1.79

## Annex E.1 Projected Irrigated Rice Production by Province, 2011-2030 (BCM2)

Province	Base (2008-2010)	Projected Irrigated Rice Projection (2011-2030)									
		A1B Scenario					A2 Scenario				
		2011-2015	2016-2020	2021-2025	2026-2030	2011-2030	2011-2015	2016-2020	2021-2025	2026-2030	2011-2030
..CAR											
....Abra	50,306	58,388	73,328	83,241	99,595	78,638	58,205	72,146	89,029	105,432	81,203
....Apayao	68,836	72,168	86,428	96,559	108,848	91,001	71,493	79,205	92,311	109,936	88,236
....Benguet	14,442	14,583	15,301	14,719	15,074	14,919	14,527	15,452	16,271	18,331	16,145
....Ifugao	60,781	60,472	67,387	71,542	78,415	69,454	60,598	63,500	69,168	77,642	67,727
....Kalinga	146,928	129,738	127,300	126,732	132,710	129,120	132,866	119,959	124,281	133,972	127,770
....Mountain Province	15,529	14,784	16,716	17,410	19,508	17,105	14,932	15,481	17,747	20,335	17,124
..ILOCOS REGION											
....Ilocos Norte	239,228	261,241	285,960	301,186	342,927	297,829	264,374	287,903	311,437	364,912	307,157
....Ilocos Sur	100,083	111,045	120,642	117,059	120,271	117,254	102,775	110,455	111,154	118,925	110,827
....La Union	87,413	86,257	91,366	90,039	94,925	90,646	80,019	87,963	88,578	99,234	88,948
....Pangasinan	623,604	749,237	861,896	960,201	1,066,109	909,361	702,344	869,360	949,993	1,085,243	901,735
..CAGAYAN VALLEY											
....Cagayan	550,631	540,674	558,157	586,031	557,267	560,532	565,281	556,979	557,418	542,393	555,518
....Isabela	952,336	971,307	1,110,752	1,198,643	1,263,432	1,136,033	1,033,168	1,093,735	1,157,393	1,257,910	1,135,552
....Nueva Vizcaya	211,669	198,034	213,384	217,186	228,104	214,177	202,030	212,004	222,937	238,739	218,927
....Quirino	67,917	65,036	74,344	80,029	86,706	76,529	64,721	71,589	79,604	91,917	76,958
..CENTRAL LUZON											
....Aurora	82,206	85,628	87,743	89,069	93,646	89,022	86,267	95,244	97,224	101,136	94,968
....Bataan	128,591	135,509	141,961	142,610	150,368	142,612	133,834	147,999	148,349	154,196	146,095
....Bulacan	246,039	259,003	314,621	341,052	382,259	324,234	260,177	316,664	346,802	382,472	326,529
....Nueva Ecija	1,251,712	1,267,353	1,281,519	1,250,345	1,229,648	1,257,216	1,308,094	1,342,169	1,292,858	1,299,365	1,310,622
....Pampanga	364,181	358,096	395,910	403,961	414,006	392,993	367,883	394,836	393,605	413,183	392,377
....Tarlac	500,562	514,809	583,719	612,588	619,401	582,629	519,053	591,802	596,435	634,981	585,568
....Zambales	80,300	88,792	96,192	101,330	104,917	97,807	87,788	95,771	97,511	103,705	96,194
..CALABARZON											
....Batangas	41,219	39,776	44,048	41,534	48,141	43,375	38,585	43,113	45,240	51,649	44,647
....Cavite	38,432	45,543	50,547	52,057	56,827	51,244	44,174	53,186	57,174	60,941	53,869
....Laguna	122,344	122,282	121,146	114,741	117,757	118,981	118,717	117,713	117,198	115,884	117,378
....Quezon	93,265	104,343	108,211	105,538	106,957	106,262	101,003	104,963	107,821	112,838	106,656
....Rizal	25,635	28,435	28,577	24,837	27,196	27,262	28,970	30,250	29,099	30,082	29,600
..MIMAROPA											
....Marinduque	10,193	8,945	9,117	9,155	9,400	9,154	8,987	9,222	9,391	9,547	9,287
....Occidental Mindoro	202,389	223,466	238,447	254,371	287,981	251,067	223,304	239,821	254,671	265,287	245,771
....Oriental Mindoro	235,924	249,389	246,259	246,516	243,951	246,529	251,340	241,581	240,653	246,292	244,967
....Palawan	108,747	120,006	124,316	133,619	142,050	129,998	121,125	124,665	126,176	132,646	126,153
....Romblon	18,470	18,277	17,864	18,018	18,260	18,105	18,267	18,138	18,407	18,567	18,345
..BICOL REGION											
....Albay	136,073	131,337	137,437	132,228	139,419	135,105	136,708	137,161	136,690	150,065	140,156
....Camarines Norte	48,932	48,754	48,231	47,460	51,325	48,942	51,374	49,605	54,049	56,569	52,899
....Camarines Sur	433,898	423,455	453,388	444,840	490,451	453,034	435,855	446,959	460,937	517,842	465,398
....Catanduanes	18,986	17,032	19,417	21,455	26,027	20,983	17,853	20,420	25,033	28,273	22,895
....Masbate	24,623	25,399	28,825	29,001	30,328	28,388	26,659	28,367	29,534	33,033	29,398
....Sorsogon	89,568	85,774	95,160	97,722	108,273	96,732	85,411	92,218	102,402	118,946	99,744
..WESTERN VISAYAS											
....Aklan	69,585	62,839	66,207	70,153	73,177	68,094	62,127	65,631	70,120	74,258	68,034
....Antique	152,673	130,687	135,017	145,062	160,950	142,929	128,875	138,276	149,702	158,203	143,764
....Capiz	119,812	111,263	122,513	134,476	147,182	128,858	111,120	122,055	135,526	144,521	128,305
....Guimaras	12,877	11,043	11,093	11,429	12,006	11,393	10,889	11,119	11,417	11,552	11,244
....Iloilo	489,973	398,261	441,382	505,507	559,796	476,237	390,074	436,273	498,292	541,065	466,426
....Negros Occidental	319,973	309,527	321,476	344,200	368,447	335,912	301,379	322,008	348,389	367,865	334,910
..CENTRAL VISAYAS											
....Bohol	105,295	134,369	138,351	146,498	157,985	144,301	130,242	131,476	142,798	146,889	137,852
....Cebu	15,028	15,588	18,061	21,821	25,467	20,234	15,339	17,738	21,493	23,960	19,633
....Negros Oriental	56,413	58,749	62,314	63,533	69,786	63,595	58,158	64,054	65,694	64,397	63,076
....Siquijor	2,628	2,784	2,665	2,697	2,982	2,782	2,770	2,633	2,611	2,674	2,672
..EASTERN VISAYAS											
....Biliran	68,013	67,129	77,861	78,511	80,491	75,998	71,802	83,205	84,393	85,831	81,308
....Eastern Samar	11,961	10,957	13,252	13,610	14,272	13,023	12,104	13,400	13,264	13,737	13,126
....Leyte	389,182	363,888	411,031	403,632	405,336	395,972	370,373	392,540	402,277	426,235	397,856
....Northern Samar	14,417	17,132	17,509	16,905	18,800	17,586	17,405	17,798	17,632	18,238	17,769
....Southern Leyte	89,299	86,462	95,858	99,847	102,455	96,155	88,470	101,942	109,903	112,325	103,160
....Samar (Western Samar)	16,360	15,619	17,473	17,147	17,826	17,016	16,526	17,412	17,062	18,452	17,363
..ZAMBOANGA PENINSULA											
....Zamboanga del Norte	49,240	48,251	54,048	55,452	62,786	55,135	46,057	49,590	57,457	62,397	53,875
....Zamboanga del Sur	233,782	225,328	254,581	268,462	286,951	258,830	237,369	241,644	261,529	290,792	257,833
....Zamboanga Sibugay	75,610	75,362	85,025	89,730	95,117	86,308	74,808	75,233	87,336	99,222	84,150

Province	Base (2008-2010)	Projected Irrigated Rice Projection (2011-2030)									
		A1B Scenario					A2 Scenario				
		2011-2015	2016-2020	2021-2025	2026-2030	2011-2030	2011-2015	2016-2020	2021-2025	2026-2030	2011-2030
..NORTHERN MINDANAO											
....Bukidnon	299,409	293,192	314,340	347,926	387,529	335,747	300,324	317,433	345,492	363,515	331,691
....Lanao del Norte	127,459	125,187	132,514	143,019	156,979	139,425	123,251	129,887	143,355	155,528	138,005
....Misamis Occidental	70,199	65,958	66,420	66,186	68,447	66,753	66,422	63,581	65,241	66,397	65,410
....Misamis Oriental	25,758	25,445	26,135	26,840	28,566	26,746	24,797	24,964	26,857	28,500	26,280
..DAVAO REGION							353,258	365,295	369,975	379,956	367,121
....Davao del Norte	112,272	107,037	107,740	110,268	112,748	109,448	100,760	112,080	113,241	116,758	110,710
....Davao del Sur	121,572	111,604	115,931	118,300	120,536	116,593	113,102	110,474	110,354	113,942	111,968
....Davao Oriental	51,489	48,947	50,905	54,671	55,229	52,438	50,720	51,312	51,819	53,075	51,732
....Compostela Valley	82,726	85,428	89,884	97,420	94,181	91,728	88,675	91,429	94,561	96,180	92,711
..SOCCSKSARGEN											
....North Cotabato	365,420	366,959	420,686	455,794	520,668	441,027	360,555	418,187	465,255	511,029	438,757
....Sarangani	32,748	33,396	35,578	36,959	37,047	35,745	32,321	34,229	36,349	38,311	35,303
....South Cotabato	259,596	250,216	278,400	333,589	361,329	305,883	244,850	271,210	310,122	351,487	294,417
....Sultan Kudarat	335,740	369,853	444,355	505,001	587,916	476,781	369,330	423,108	481,858	559,399	458,424
..CARAGA											
....Agusan del Norte	58,205	53,350	61,486	77,497	78,216	67,637	56,443	66,379	71,267	75,473	67,391
....Agusan del Sur	116,879	115,630	127,901	149,951	157,932	137,853	117,931	139,387	152,270	165,743	143,833
....Surigao del Norte	51,711	44,780	50,406	58,471	65,079	54,684	46,158	54,327	57,996	61,155	54,909
....Surigao del Sur	65,686	66,861	67,886	68,529	70,454	68,433	67,485	69,076	68,515	68,306	68,346
..ARMM											
....Basilan	2,580	3,556	3,791	4,003	5,077	4,107	3,666	4,152	4,432	4,751	4,250
....Lanao del Sur	65,001	58,562	62,200	60,655	59,663	60,270	59,524	61,088	66,327	69,264	64,051
....Maguindanao	148,171	134,398	132,910	134,214	164,977	141,625	128,555	127,307	140,765	143,899	135,131

## Annex E.2 Projected Irrigated Rice Production by Province, 2011-2030 (CNCM3)

CNCM3		Province	Base (2008-2010)	Projected Irrigated Rice Projection (2011-2030)											
				A1B Scenario				A2 Scenario							
				2011-2015	2016-2020	2021-2025	2026-2030	2011-2030	2011-2015	2016-2020	2021-2025	2026-2030	2011-2030		
..CAR															
....Abra	50,306	59,945	70,512	87,109	99,828	79,349	58,779	67,158	80,468	92,293	74,674				
....Apayao	68,836	70,108	76,923	90,299	100,516	84,461	68,807	80,033	88,907	101,717	84,866				
....Benguet	14,442	15,440	15,709	16,167	17,724	16,260	15,282	16,212	17,720	17,237	16,613				
....Ifugao	60,781	63,417	69,883	76,063	84,113	73,369	63,535	72,669	79,511	85,291	75,251				
....Kalinga	146,928	115,294	115,432	122,230	127,637	120,148	118,117	116,138	119,840	127,494	120,397				
....Mountain Province	15,529	17,344	18,889	19,661	20,397	19,073	17,542	19,955	21,389	21,660	20,137				
..ILOCOS REGION															
....Ilocos Norte	239,228	241,059	258,887	286,201	292,660	269,702	253,994	282,624	283,385	306,370	281,593				
....Ilocos Sur	100,083	107,643	111,860	116,404	131,065	116,743	106,204	113,556	120,388	127,282	116,858				
....La Union	87,413	80,839	84,923	88,820	95,834	87,604	80,281	91,069	92,574	93,900	89,456				
....Pangasinan	623,604	713,852	833,963	911,847	1,063,145	880,702	724,169	899,307	963,175	1,100,632	921,821				
..CAGAYAN VALLEY															
....Cagayan	550,631	521,150	563,795	546,387	565,892	549,306	533,436	552,050	553,449	566,410	551,336				
....Isabela	952,336	1,010,599	1,089,525	1,141,661	1,285,669	1,131,863	1,029,568	1,074,287	1,151,093	1,321,247	1,144,049				
....Nueva Vizcaya	211,669	201,422	201,176	207,053	219,237	207,222	201,110	204,836	216,971	219,384	210,575				
....Quirino	67,917	60,320	62,777	72,377	81,170	69,161	60,598	63,847	69,802	76,401	67,662				
..CENTRAL LUZON															
....Aurora	82,206	86,327	91,116	90,680	92,050	90,043	80,809	92,402	96,499	102,107	92,954				
....Bataan	128,591	125,265	136,447	137,701	139,209	134,556	132,750	145,676	141,253	151,492	142,793				
....Bulacan	246,039	246,051	306,589	342,069	382,514	319,306	251,677	298,909	348,756	398,295	324,409				
....Nueva Ecija	1,251,712	1,199,579	1,233,831	1,218,175	1,215,447	1,216,758	1,252,574	1,180,773	1,203,536	1,265,936	1,225,705				
....Pampanga	364,181	346,252	383,923	373,537	393,885	374,399	354,950	370,310	394,957	431,204	387,855				
....Tarlac	500,562	488,752	543,980	571,379	585,441	547,388	503,382	503,164	556,099	607,638	542,571				
....Zambales	80,300	80,582	92,090	97,136	95,219	91,257	84,506	97,462	97,647	105,594	96,302				
..CALABARZON															
....Batangas	41,219	35,048	40,136	48,325	50,727	43,559	35,457	43,336	43,850	46,232	42,219				
....Cavite	38,432	37,911	44,321	48,331	50,948	45,378	39,682	50,917	48,848	60,603	50,013				
....Laguna	122,344	103,123	102,904	97,597	106,423	102,512	106,102	112,070	104,912	109,497	108,145				
....Quezon	93,265	95,607	98,180	105,934	112,845	103,141	96,975	97,820	101,080	121,254	104,282				
....Rizal	25,635	26,022	26,684	27,309	25,317	26,333	26,574	27,786	27,243	29,075	27,670				
..MIMAROPA															
....Marinduque	10,193	8,678	8,727	9,023	9,386	8,953	8,996	9,007	9,224	9,208	9,109				
....Occidental Mindoro	202,389	214,748	227,426	257,175	283,383	245,683	219,666	240,848	261,786	281,767	251,017				
....Oriental Mindoro	235,924	246,926	240,435	231,259	231,762	237,595	253,858	235,879	242,032	245,434	244,300				
....Palawan	108,747	120,101	124,693	124,165	134,972	125,983	124,612	130,853	134,712	141,128	132,826				
....Romblon	18,470	18,335	17,702	17,639	18,107	17,946	18,215	17,507	17,472	18,411	17,901				
..BICOL REGION															
....Albay	136,073	139,258	133,686	130,957	130,219	133,530	138,066	133,184	132,866	147,722	137,960				
....Camarines Norte	48,932	51,548	49,261	48,692	49,239	49,685	48,513	46,033	47,063	54,924	49,133				
....Camarines Sur	433,898	456,065	451,531	440,217	453,521	450,334	450,342	437,467	466,931	510,725	466,367				
....Catanduanes	18,986	17,900	18,767	22,056	23,749	20,618	16,944	19,741	22,535	27,820	21,760				
....Masbate	24,623	27,968	28,178	27,239	29,279	28,166	24,515	26,010	28,085	28,983	26,898				
....Sorsogon	89,568	91,316	98,804	95,745	105,569	97,859	85,836	95,762	105,969	117,071	101,160				
..WESTERN VISAYAS															
....Aklan	69,585	61,324	63,215	69,806	73,800	67,036	63,859	67,524	72,094	73,710	69,297				
....Antique	152,673	125,622	135,341	147,529	159,080	141,893	128,403	142,406	147,591	155,228	143,407				
....Capiz	119,812	110,491	121,663	139,592	145,358	129,276	109,939	124,716	135,059	146,908	129,156				
....Guimaras	12,877	10,849	10,853	11,951	11,976	11,407	10,712	11,110	11,343	12,261	11,356				
....Iloilo	489,973	400,819	445,120	538,781	543,761	482,120	393,878	458,362	507,541	585,283	486,266				
....Negros Occidental	319,973	299,839	310,490	348,001	372,961	332,823	309,673	333,111	349,196	363,675	338,914				
..CENTRAL VISAYAS															
....Bohol	105,295	127,026	126,347	140,575	154,054	137,001	131,644	135,934	147,602	157,452	143,158				
....Cebu	15,028	15,432	18,070	22,005	24,625	20,033	15,545	19,006	21,859	24,865	20,319				
....Negros Oriental	56,413	57,804	58,664	64,183	68,150	62,200	56,964	59,277	62,996	74,528	63,441				
....Siquijor	2,628	2,627	2,562	2,672	2,835	2,674	2,652	2,667	2,829	3,043	2,798				
..EASTERN VISAYAS															
....Biliran	68,013	70,526	82,048	88,591	90,610	82,944	70,276	75,147	79,423	86,689	77,884				
....Eastern Samar	11,961	12,167	13,839	14,707	14,917	13,907	12,754	12,654	12,665	13,087	12,790				
....Leyte	389,182	389,585	449,673	473,533	484,981	449,443	387,654	414,952	440,658	466,396	427,415				
....Northern Samar	14,417	18,042	18,264	18,458	19,386	18,537	17,731	17,557	17,456	16,138	17,220				
....Southern Leyte	89,299	90,411	102,247	108,738	111,093	103,122	89,044	97,253	101,833	106,976	98,777				
....Samar (Western Samar)	16,360	17,114	19,893	21,059	20,359	19,606	17,850	17,792	18,403	19,860	18,476				
..ZAMBOANGA PENINSULA															
....Zamboanga del Norte	49,240	47,043	56,599	60,585	67,045	57,818	48,066	52,060	60,808	64,431	56,341				
....Zamboanga del Sur	233,782	222,143	265,326	264,779	298,431	262,670	209,633	243,780	290,200	305,204	262,204				
....Zamboanga Sibugay	75,610	74,426	86,576	89,404	101,797	88,051	75,259	78,398	91,205	90,149	83,753				

Province	Base (2008-2010)	Projected Irrigated Rice Projection (2011-2030)									
		A1B Scenario					A2 Scenario				
		2011-2015	2016-2020	2021-2025	2026-2030	2011-2030	2011-2015	2016-2020	2021-2025	2026-2030	2011-2030
..NORTHERN MINDANAO											
....Bukidnon	299,409	305,841	341,488	371,097	399,369	354,449	300,464	310,007	360,602	388,056	339,782
....Lanao del Norte	127,459	124,711	133,844	152,973	166,249	144,444	125,285	136,817	148,747	157,088	141,984
....Misamis Occidental	70,199	68,207	69,292	71,546	76,319	71,341	68,287	69,234	70,331	72,445	70,074
....Misamis Oriental	25,758	24,811	25,938	28,918	31,915	27,895	25,011	26,541	28,769	29,785	27,527
..DAVAO REGION											
....Davao del Norte	112,272	104,012	103,376	105,503	106,801	104,923	107,041	109,657	114,240	112,536	110,869
....Davao del Sur	121,572	117,626	111,583	113,726	111,669	113,651	119,871	113,495	120,591	116,327	117,571
....Davao Oriental	51,489	53,888	50,350	51,332	50,487	51,514	52,932	52,413	53,233	52,668	52,811
....Compostela Valley	82,726	90,862	92,243	97,086	97,340	94,383	90,114	93,603	99,625	97,934	95,319
..SOCCKSARGEN											
....North Cotabato	365,420	396,733	442,357	473,259	546,168	464,629	372,263	441,275	471,780	519,660	451,244
....Sarangani	32,748	31,431	34,006	36,606	38,482	35,131	32,362	32,932	36,239	37,792	34,831
....South Cotabato	259,596	250,965	257,803	317,227	348,032	293,507	249,782	267,038	319,316	353,536	297,418
....Sultan Kudarat	335,740	410,764	480,210	549,974	607,315	512,066	355,757	453,900	518,623	560,423	472,176
..CARAGA											
....Agusan del Norte	58,205	59,179	64,948	72,596	76,204	68,232	58,425	69,898	71,662	72,676	68,165
....Agusan del Sur	116,879	122,318	140,870	150,038	151,508	141,184	118,790	129,937	145,229	157,706	137,915
....Surigao del Norte	51,711	47,778	53,517	58,356	60,018	54,917	47,257	52,400	55,907	62,651	54,554
....Surigao del Sur	65,686	70,955	69,573	68,562	67,195	69,071	70,874	68,732	66,918	68,857	68,845
..ARMM											
....Basilan	2,580	3,504	3,734	4,563	4,732	4,133	3,706	3,886	4,921	4,978	4,373
....Lanao del Sur	65,001	53,379	50,790	62,728	70,407	59,326	59,026	53,066	61,660	66,352	60,026
....Maguindanao	148,171	127,938	117,950	133,663	152,959	133,128	135,576	137,549	157,092	149,599	144,954

### Annex E.3 Projected Irrigated Rice Production by Province, 2011-2030 (MPEH5)

Province	Base (2008-2010)	Projected Irrigated Rice Projection (2011-2030)									
		A1B Scenario					A2 Scenario				
		2011-2015	2016-2020	2021-2025	2026-2030	2011-2030	2011-2015	2016-2020	2021-2025	2026-2030	2011-2030
..CAR											
....Abra	50,306	58,113	70,170	83,384	99,567	77,809	58,933	73,513	84,235	101,578	79,565
....Apayao	68,836	73,557	83,591	97,647	108,885	90,920	74,629	82,362	92,810	107,331	89,283
....Benguet	14,442	14,455	14,971	15,130	16,354	15,228	14,572	15,635	15,670	16,629	15,626
....Ifugao	60,781	61,358	66,830	75,683	78,698	70,643	61,574	62,010	68,248	74,270	66,525
....Kalinga	146,928	132,719	129,758	134,862	140,851	134,548	130,753	119,494	121,300	130,812	125,590
....Mountain Province	15,529	15,146	17,135	18,547	20,186	17,753	15,165	16,307	17,500	20,129	17,275
..ILOCOS REGION											
....Ilocos Norte	239,228	256,716	258,836	286,312	285,064	271,732	261,240	259,798	284,834	306,737	278,152
....Ilocos Sur	100,083	106,824	105,757	115,434	129,977	114,498	105,099	112,778	117,789	122,864	114,633
....La Union	87,413	81,744	84,660	91,959	95,231	88,399	81,167	83,204	87,877	89,944	85,548
....Pangasinan	623,604	744,140	839,780	942,041	1,042,273	892,059	752,521	887,879	1,010,909	1,070,289	930,399
..CAGAYAN VALLEY											
....Cagayan	550,631	562,248	590,328	591,743	624,653	592,243	548,039	576,952	569,943	596,998	572,983
....Isabela	952,336	969,311	1,117,344	1,219,654	1,345,488	1,162,949	1,007,861	1,121,995	1,279,917	1,288,023	1,174,449
....Nueva Vizcaya	211,669	197,613	208,466	219,254	235,074	215,102	200,646	210,229	219,495	236,351	216,680
....Quirino	67,917	64,902	73,080	81,792	89,260	77,258	64,729	71,326	83,722	90,332	77,527
..CENTRAL LUZON											
....Aurora	82,206	85,060	93,279	95,600	94,229	92,042	80,487	90,132	90,982	96,294	89,474
....Bataan	128,591	130,805	137,815	143,716	138,349	137,671	129,410	140,896	145,788	147,207	140,825
....Bulacan	246,039	255,308	304,393	346,526	378,445	321,168	253,431	311,776	351,655	393,632	327,624
....Nueva Ecija	1,251,712	1,312,684	1,332,603	1,327,514	1,273,850	1,311,663	1,231,733	1,264,075	1,305,317	1,336,675	1,284,450
....Pampanga	364,181	363,188	373,511	390,108	395,100	380,477	354,998	391,462	414,567	426,892	396,980
....Tarlac	500,562	525,770	560,135	579,631	591,009	564,136	519,539	582,385	614,931	650,668	591,881
....Zambales	80,300	85,947	97,324	100,566	98,619	95,614	83,496	91,260	100,338	105,192	95,071
..CALABARZON											
....Batangas	41,219	38,041	34,874	39,392	42,586	38,723	36,829	39,184	47,653	46,759	42,606
....Cavite	38,432	39,208	42,774	49,739	53,172	46,223	39,730	48,710	49,219	56,215	48,468
....Laguna	122,344	110,647	102,372	106,611	107,303	106,733	103,881	114,166	106,555	110,254	108,714
....Quezon	93,265	100,897	98,738	105,767	106,737	103,035	98,114	109,467	109,667	119,977	109,306
....Rizal	25,635	26,048	25,380	28,399	25,995	26,456	25,819	28,071	28,353	28,945	27,797
..MIMAROPA											
....Marinduque	10,193	8,846	8,809	9,016	9,474	9,036	8,906	8,847	9,180	9,375	9,077
....Occidental Mindoro	202,389	228,412	240,709	262,237	275,062	251,605	223,720	238,488	251,065	283,469	249,185
....Oriental Mindoro	235,924	255,244	250,202	244,360	237,059	246,716	251,948	243,114	242,733	243,295	245,273
....Palawan	108,747	127,293	121,834	123,741	128,033	125,225	127,526	127,074	129,798	130,024	128,605
....Romblon	18,470	18,180	18,021	18,134	18,785	18,280	18,120	17,737	18,647	18,910	18,353
..BICOL REGION											
....Albay	136,073	134,215	141,017	146,612	134,309	139,038	133,622	119,662	138,276	150,489	135,512
....Camarines Norte	48,932	48,558	51,252	52,906	51,316	51,008	48,353	47,806	51,170	55,066	50,599
....Camarines Sur	433,898	432,319	476,819	487,044	472,112	467,074	426,428	406,676	486,549	511,742	457,849
....Catanduanes	18,986	17,219	21,118	23,831	24,991	21,790	17,286	20,693	23,627	27,965	22,393
....Masbate	24,623	25,871	29,225	28,509	30,077	28,421	24,392	25,928	29,099	29,453	27,218
....Sorsogon	89,568	86,373	96,273	102,778	109,010	98,609	83,909	91,282	101,935	118,585	98,928
..WESTERN VISAYAS											
....Aklan	69,585	63,604	63,286	68,833	73,869	67,398	65,497	68,069	67,015	74,228	68,702
....Antique	152,673	130,062	129,997	147,272	157,093	141,106	129,033	139,942	140,487	156,900	141,590
....Capiz	119,812	111,330	120,362	134,178	143,159	127,257	115,926	123,167	131,585	145,641	129,080
....Guimaras	12,877	11,177	11,133	11,901	11,514	11,431	11,081	11,135	11,438	11,748	11,350
....Iloilo	489,973	403,190	454,784	549,792	557,486	491,313	409,676	474,048	499,144	557,983	485,213
....Negros Occidental	319,973	307,631	312,130	335,334	367,893	330,747	310,769	329,708	332,929	365,315	334,680
..CENTRAL VISAYAS											
....Bohol	105,295	131,106	135,266	141,025	149,558	139,238	134,937	141,182	142,608	150,814	142,385
....Cebu	15,028	15,298	18,320	20,893	23,827	19,584	16,021	18,816	21,397	24,622	20,214
....Negros Oriental	56,413	56,413	56,252	60,863	60,732	58,565	57,407	61,407	65,734	68,852	63,350
....Siquijor	2,628	2,716	2,603	2,731	2,751	2,700	2,724	2,700	2,680	2,717	2,705
..EASTERN VISAYAS											
....Biliran	68,013	71,326	77,681	83,041	86,274	79,580	70,553	68,900	80,160	82,636	75,562
....Eastern Samar	11,961	11,751	11,989	11,977	13,219	12,234	12,032	11,639	12,715	13,169	12,389
....Leyte	389,182	376,579	399,370	404,587	439,959	405,124	385,562	393,467	428,595	439,486	411,778
....Northern Samar	14,417	16,938	16,173	16,291	16,319	16,430	17,721	17,537	17,185	18,167	17,653
....Southern Leyte	89,299	91,075	98,947	101,789	103,699	98,878	89,362	91,103	101,410	107,418	97,323
....Samar (Western Samar)	16,360	16,381	16,685	17,014	18,248	17,082	16,185	15,350	16,355	16,611	16,125
..ZAMBOANGA PENINSULA											
....Zamboanga del Norte	49,240	44,830	52,231	58,346	61,584	54,248	47,653	53,767	59,787	63,538	56,186
....Zamboanga del Sur	233,782	215,966	255,183	279,896	289,435	260,120	239,656	257,094	286,142	290,651	268,386
....Zamboanga Sibugay	75,610	67,630	76,544	88,993	97,056	82,556	75,838	85,370	90,967	92,374	86,137

Province	Base (2008-2010)	Projected Irrigated Rice Projection (2011-2030)									
		A1B Scenario					A2 Scenario				
		2011-2015	2016-2020	2021-2025	2026-2030	2011-2030	2011-2015	2016-2020	2021-2025	2026-2030	2011-2030
..NORTHERN MINDANAO											
....Bukidnon	299,409	299,813	318,894	347,571	368,571	333,712	302,275	341,145	354,512	382,712	345,161
....Lanao del Norte	127,459	124,827	132,451	143,495	154,622	138,849	126,435	138,603	146,329	158,461	142,457
....Misamis Occidental	70,199	68,060	65,862	68,150	69,055	67,782	68,756	66,775	69,347	70,302	68,795
....Misamis Oriental	25,758	25,301	25,465	27,324	29,166	26,814	25,714	27,135	27,666	29,519	27,508
..DAVAO REGION											
....Davao del Norte	112,272	105,258	109,106	108,661	112,751	108,944	101,389	110,816	113,383	117,032	110,655
....Davao del Sur	121,572	116,983	113,970	113,138	118,024	115,529	110,034	107,694	115,016	116,213	112,239
....Davao Oriental	51,489	51,307	53,086	52,471	54,786	52,912	48,988	51,261	51,772	50,754	50,694
....Compostela Valley	82,726	88,990	99,752	98,072	100,129	96,736	87,875	94,357	95,635	94,621	93,122
..SOCCKSARGEN											
....North Cotabato	365,420	380,559	417,844	427,598	533,603	439,901	369,061	384,348	461,991	475,693	422,773
....Sarangani	32,748	33,749	34,973	35,558	37,717	35,499	33,893	35,730	36,100	38,748	36,118
....South Cotabato	259,596	243,106	280,663	314,932	366,017	301,180	255,573	276,456	298,307	352,120	295,614
....Sultan Kudarat	335,740	386,789	464,038	488,342	607,100	486,567	361,729	421,405	498,771	564,541	461,611
..CARAGA											
....Agusan del Norte	58,205	52,450	63,779	68,231	73,544	64,501	54,559	63,314	72,654	72,773	65,825
....Agusan del Sur	116,879	113,375	128,623	143,861	151,524	134,345	116,674	132,224	148,418	156,563	138,470
....Surigao del Norte	51,711	43,427	51,626	55,935	62,382	53,342	45,211	51,139	57,545	62,369	54,066
....Surigao del Sur	65,686	63,658	62,187	63,816	69,097	64,690	67,243	66,482	68,728	69,482	67,984
..ARMM											
....Basilan	2,580	3,772	3,956	4,228	4,861	4,205	3,721	4,236	4,551	5,101	4,402
....Lanao del Sur	65,001	61,178	53,946	58,334	55,358	57,204	55,411	55,457	59,177	57,545	56,897
....Maguindanao	148,171	128,970	118,610	121,376	151,395	130,088	125,857	130,092	112,478	136,255	126,170

## Annex G.1 Projected Rainfed Rice Production by Province, 2011-2030 (BCM2)

Projected Rainfed Rice Projection (2011-2030)											
Province	Base (2008-2010)	A1B Scenario					A2 Scenario				
		2011-2015	2016-2020	2021-2025	2026-2030	2011-2030	2011-2015	2016-2020	2021-2025	2026-2030	2011-2030
..CAR											
....Abra	26,175	22,646	22,920	23,581	23,661	23,202	23,633	23,864	24,833	24,506	24,209
....Apayao	30,731	26,589	30,103	42,123	48,426	36,810	27,307	23,837	38,767	43,730	33,410
....Benguet	1,939	2,032	2,508	2,851	3,131	2,631	2,396	3,077	3,378	3,707	3,139
....Ifugao	1,863	1,471	1,342	1,700	1,952	1,616	1,537	1,245	1,738	1,918	1,610
....Kalinga	5,928	4,301	5,118	5,980	5,388	5,197	4,689	5,152	6,106	6,188	5,534
....Mountain Province	2,284	1,755	2,220	2,440	2,200	2,154	1,899	2,127	2,532	2,629	2,297
..ILOCOS REGION											
....Ilocos Norte	46,938	55,174	62,359	68,683	70,684	64,225	52,401	60,998	62,456	68,627	61,120
....Ilocos Sur	84,536	98,147	115,411	123,987	125,608	115,788	91,847	108,471	115,196	112,836	107,088
....La Union	52,341	56,865	60,101	66,025	70,557	63,387	54,476	60,966	62,261	58,774	59,119
....Pangasinan	299,762	333,897	422,872	517,899	549,451	456,030	313,148	438,456	515,695	575,399	460,675
..CAGAYAN VALLEY											
....Cagayan	117,638	92,408	107,961	126,776	111,260	109,601	94,485	101,214	115,380	105,592	104,168
....Isabela	52,505	46,932	61,909	71,950	65,656	61,612	52,176	55,567	60,961	65,893	58,649
....Nueva Vizcaya	9,932	7,476	8,201	8,648	8,735	8,265	8,411	8,578	9,386	10,699	9,268
....Quirino	5,038	1,793	2,373	2,881	3,111	2,539	2,164	2,495	2,861	3,209	2,682
..CENTRAL LUZON											
....Aurora	6,024	5,294	4,924	4,892	5,720	5,207	5,119	4,771	5,344	5,972	5,302
....Bataan	2,659	2,076	2,290	2,464	2,653	2,370	2,016	2,498	2,588	2,854	2,489
....Bulacan	71,213	68,296	76,984	86,799	95,603	81,921	72,518	88,699	90,328	89,385	85,232
....Nueva Ecija	117,443	131,292	143,937	157,294	153,006	146,382	134,979	148,932	151,241	146,931	145,521
....Pampanga	10,889	10,653	11,918	13,508	13,450	12,382	11,229	12,686	13,256	14,033	12,801
....Tarlac	34,093	28,827	30,483	32,979	30,878	30,792	31,488	32,706	32,510	32,033	32,184
....Zambales	30,165	32,291	31,754	32,643	34,916	32,901	30,970	34,871	33,815	33,421	33,269
..CALABARZON											
....Batangas	15,261	12,693	14,311	15,011	17,902	14,979	12,930	13,150	15,066	17,539	14,671
....Cavite	4,044	3,608	3,520	3,352	3,590	3,518	3,347	3,559	3,858	3,363	3,532
....Laguna	1,639	1,453	1,203	1,117	1,398	1,293	1,312	1,301	1,346	1,053	1,253
....Quezon	56,596	45,560	52,840	54,424	65,013	54,459	46,306	47,170	53,538	64,073	52,772
....Rizal	2,001	1,204	1,146	815	1,383	1,137	1,293	1,377	1,472	1,462	1,401
..MIMAROPA											
....Marinduque	13,644	13,605	15,037	16,494	18,120	15,814	13,656	14,804	16,217	17,720	15,599
....Occidental Mindoro	108,234	99,301	104,423	117,152	126,606	111,871	98,811	100,403	103,770	108,303	102,822
....Oriental Mindoro	64,296	70,165	66,561	71,173	75,367	70,817	69,482	69,232	66,302	66,703	67,930
....Palawan	109,278	113,834	120,013	136,965	142,911	128,431	109,669	116,002	117,692	123,875	116,810
....Romblon	12,632	13,875	14,622	15,497	16,879	15,218	14,097	14,732	15,433	16,761	15,256
..BICOL REGION											
....Albay	35,402	37,394	34,720	32,511	35,403	35,007	32,717	34,504	33,510	37,088	34,455
....Camarines Norte	21,609	22,446	20,294	13,489	14,990	17,805	20,719	18,762	18,079	19,578	19,284
....Camarines Sur	109,553	104,942	101,139	87,816	101,491	98,847	93,107	100,639	105,150	110,630	102,381
....Catanduanes	17,423	19,320	19,600	17,482	22,947	19,837	18,490	22,915	24,929	24,407	22,685
....Masbate	81,907	92,102	97,882	81,123	84,634	88,935	89,953	96,280	89,468	96,171	92,968
....Sorsogon	23,412	18,464	21,470	20,051	19,832	19,954	17,210	20,213	19,738	24,645	20,451
..WESTERN VISAYAS											
....Aklan	54,848	46,802	45,138	51,121	52,020	48,770	46,006	44,957	45,934	45,438	45,584
....Antique	82,905	75,787	80,576	89,854	88,558	83,693	76,221	71,619	76,732	87,535	78,027
....Capiz	227,763	250,950	261,490	282,195	309,981	276,154	246,312	247,872	274,114	298,553	266,713
....Guimaras	35,930	34,274	33,702	37,067	38,316	35,839	34,160	32,415	33,811	38,541	34,732
....Iloilo	358,796	319,076	335,354	391,682	420,858	366,743	316,379	318,257	356,824	412,566	351,006
....Negros Occidental	117,320	113,997	110,900	119,637	127,329	117,966	111,365	106,662	107,604	116,534	110,541
..CENTRAL VISAYAS											
....Bohol	96,478	111,828	125,345	128,061	142,048	126,820	109,622	128,003	146,326	157,830	135,445
....Cebu	790	937	1,093	1,108	1,282	1,105	910	1,145	1,373	1,473	1,225
....Negros Oriental	9,476	10,866	10,970	9,869	10,391	10,524	10,393	11,743	12,788	13,249	12,043
....Siquijor	247	247	261	274	289	268	236	258	290	319	276
..EASTERN VISAYAS											
....Biliran	971	481	581	594	639	574	543	766	876	963	787
....Eastern Samar	36,452	48,613	51,763	57,171	67,354	56,225	53,425	57,769	64,428	67,738	60,840
....Leyte	163,887	157,764	167,542	159,154	160,635	161,274	161,290	167,746	195,011	218,524	185,642
....Northern Samar	81,838	99,499	90,168	84,158	93,296	91,780	111,786	104,250	99,843	86,815	100,673
....Southern Leyte	11,593	9,354	8,621	7,275	7,953	8,301	9,729	10,530	11,003	11,074	10,584
....Samar (Western Samar)	98,356	110,787	127,507	141,730	168,265	137,072	124,695	141,097	170,302	179,472	153,892
..ZAMBOANGA PENINSULA											
....Zamboanga del Norte	40,540	42,596	47,589	50,961	61,889	50,759	42,475	52,067	54,271	50,807	49,905
....Zamboanga del Sur	56,092	52,790	55,243	56,688	67,464	58,046	53,941	65,012	58,980	56,269	58,550
....Zamboanga Sibugay	76,123	80,360	79,588	81,584	101,149	85,670	78,792	89,724	88,462	77,062	83,510

Province	Base (2008-2010)	Projected Rainfed Rice Projection (2011-2030)									
		A1B Scenario					A2 Scenario				
		2011-2015	2016-2020	2021-2025	2026-2030	2011-2030	2011-2015	2016-2020	2021-2025	2026-2030	2011-2030
..NORTHERN MINDANAO											
...Bukidnon	22,040	22,883	23,207	30,671	33,785	27,637	19,114	23,462	26,599	26,079	23,814
...Lanao del Norte	20,729	19,708	21,292	23,545	25,420	22,492	19,504	22,949	23,564	28,251	23,567
...Misamis Occidental	4,377	3,285	3,929	4,570	5,904	4,422	3,335	4,173	3,636	5,779	4,231
...Misamis Oriental	1,426	974	1,235	1,389	1,457	1,264	1,132	1,173	1,424	1,394	1,281
..DAVAO REGION											
...Davao del Norte	8,075	7,760	8,391	8,180	9,570	8,475	7,321	9,453	9,794	10,282	9,212
...Davao del Sur	1,420	1,374	1,607	1,680	2,077	1,685	1,283	1,948	2,214	2,249	1,923
...Davao Oriental	11,194	10,621	9,593	9,108	11,925	10,312	9,947	12,740	13,622	13,596	12,476
...Compostela Valley	12,131	12,501	10,813	9,776	12,536	11,406	11,578	13,989	13,960	13,563	13,273
..SOCCSKSARGEN											
...North Cotabato	114,441	112,415	103,927	102,376	130,514	112,308	114,796	133,761	136,085	147,784	133,106
...Sarangani	12,514	9,999	11,737	12,120	14,461	12,079	10,386	10,808	10,509	16,604	12,077
...South Cotabato	36,599	37,226	42,442	45,902	43,103	42,168	38,014	44,773	40,745	47,587	42,780
...Sultan Kudarat	59,274	65,889	66,476	62,361	85,947	70,169	66,975	71,946	79,501	92,539	77,740
..CARAGA											
...Agusan del Norte	19,995	15,547	17,617	24,485	19,202	19,213	17,246	17,197	18,001	20,682	18,281
...Agusan del Sur	66,381	60,168	65,720	80,588	79,452	71,482	66,463	67,404	75,927	85,919	73,928
...Surigao del Norte	20,581	13,698	15,690	15,464	17,357	15,552	16,501	16,217	14,487	13,231	15,109
...Surigao del Sur	23,127	19,413	22,591	22,500	24,258	22,190	22,376	21,737	21,446	21,875	21,858
..ARMM											
...Basilan	1,587	1,612	1,542	1,591	1,632	1,595	1,605	1,509	1,590	1,638	1,586
...Lanao del Sur	116,244	127,697	128,981	152,682	160,593	142,488	121,135	129,420	145,166	145,494	135,304
...Maguindanao	273,918	290,483	312,984	322,051	371,531	324,262	276,717	299,389	346,790	384,646	326,886

## Annex G.2 Projected Rainfed Rice Production by Province, 2011-2030 (CNCM3)

Projected Rainfed Rice Projection (2011-2030)											
Province	Base (2008-2010)	A1B Scenario					A2 Scenario				
		2011-2015	2016-2020	2021-2025	2026-2030	2011-2030	2011-2015	2016-2020	2021-2025	2026-2030	2011-2030
..CAR											
....Abra	26,175	24,767	22,862	19,937	19,745	21,828	23,273	15,707	20,298	23,026	20,576
....Apayao	30,731	28,343	30,361	33,919	41,439	33,516	28,091	28,586	38,233	40,379	33,823
....Benguet	1,939	2,413	2,987	2,776	2,733	2,727	2,072	2,065	2,471	2,907	2,379
....Ifugao	1,863	1,886	1,817	1,651	1,605	1,740	1,901	1,739	1,632	1,925	1,799
....Kalinga	5,928	4,835	5,454	5,193	4,532	5,003	4,594	4,384	5,385	6,185	5,137
....Mountain Province	2,284	2,069	2,454	2,276	1,848	2,162	1,901	1,707	2,083	2,449	2,035
..ILOCOS REGION											
....Ilocos Norte	46,938	44,969	51,092	47,399	39,167	45,657	50,710	57,348	51,801	53,000	53,215
....Ilocos Sur	84,536	93,300	112,129	112,662	112,353	107,611	98,524	106,656	110,250	125,770	110,300
....La Union	52,341	53,194	52,934	50,854	52,094	52,269	57,044	63,022	58,177	59,539	59,446
....Pangasinan	299,762	294,885	371,206	386,016	480,853	383,240	323,775	392,036	432,045	514,042	415,475
..CAGAYAN VALLEY											
....Cagayan	117,638	75,671	79,560	86,873	113,109	88,803	90,616	92,558	95,817	119,942	99,733
....Isabela	52,505	48,175	50,409	53,959	78,059	57,650	51,447	54,686	54,385	75,886	59,101
....Nueva Vizcaya	9,932	9,031	9,028	8,425	7,151	8,409	8,470	6,607	8,281	9,227	8,146
....Quirino	5,038	2,157	2,545	2,598	2,243	2,386	2,072	2,320	2,664	2,804	2,465
..CENTRAL LUZON											
....Aurora	6,024	5,130	4,447	4,389	4,775	4,685	4,719	4,492	5,427	5,312	4,988
....Bataan	2,659	1,652	2,094	1,976	2,249	1,993	1,968	2,475	2,397	2,693	2,383
....Bulacan	71,213	62,536	79,573	80,731	78,813	75,413	70,941	73,675	84,740	88,025	79,345
....Nueva Ecija	117,443	112,509	146,851	138,723	131,811	132,473	131,264	138,703	148,208	152,881	142,764
....Pampanga	10,889	9,352	11,854	10,949	11,247	10,851	10,243	11,474	12,327	12,857	11,725
....Tarlac	34,093	25,796	31,654	26,584	25,897	27,483	27,675	29,003	29,479	32,775	29,733
....Zambales	30,165	26,834	31,270	31,865	29,397	29,842	29,796	34,647	30,535	35,878	32,714
..CALABARZON											
....Batangas	15,261	13,693	15,546	18,666	20,557	17,115	13,702	15,241	17,710	19,738	16,598
....Cavite	4,044	2,356	3,004	2,470	1,589	2,355	2,529	4,061	2,161	2,827	2,895
....Laguna	1,639	1,484	1,219	1,116	715	1,133	1,191	1,368	1,016	1,389	1,241
....Quezon	56,596	49,690	57,764	70,570	79,048	64,268	49,018	55,897	65,970	75,503	61,597
....Rizal	2,001	1,104	1,208	982	542	959	1,048	1,515	997	1,327	1,222
..MIMAROPA											
....Marinduque	13,644	13,796	15,130	17,342	18,952	16,305	13,611	15,082	16,050	17,349	15,523
....Occidental Mindoro	108,234	109,848	122,961	137,853	161,634	133,074	108,920	117,233	138,716	134,929	124,949
....Oriental Mindoro	64,296	78,983	83,994	86,566	97,684	86,807	79,413	83,105	89,694	81,906	83,529
....Palawan	109,278	125,016	148,591	164,647	201,137	159,848	123,729	141,697	165,000	156,856	146,820
....Romblon	12,632	14,228	14,984	16,628	18,143	15,996	13,815	14,494	15,096	15,939	14,836
..BICOL REGION											
....Albay	35,402	31,961	30,828	19,657	18,660	25,277	32,877	30,717	23,015	32,722	29,833
....Camarines Norte	21,609	19,607	11,228	6,997	5,584	10,854	17,711	14,254	13,929	18,437	16,083
....Camarines Sur	109,553	77,528	31,135	25,719	26,841	40,306	86,445	86,021	74,485	97,886	86,209
....Catanduanes	17,423	15,213	8,610	10,049	12,032	11,476	15,085	13,917	16,370	23,769	17,285
....Masbate	81,907	82,884	52,558	29,117	41,240	51,450	65,854	65,593	74,954	62,322	67,181
....Sorsogon	23,412	17,751	15,632	7,741	12,399	13,381	19,356	18,482	17,877	20,095	18,952
..WESTERN VISAYAS											
....Aklan	54,848	52,201	46,728	44,298	49,547	48,194	49,957	47,882	50,296	47,217	48,838
....Antique	82,905	79,361	89,687	89,475	102,295	90,204	77,939	70,874	79,083	74,156	75,513
....Capiz	227,763	264,832	274,444	276,536	294,178	277,498	248,695	276,242	273,516	282,119	270,143
....Guimaras	35,930	38,763	41,802	40,301	45,984	41,712	35,779	38,455	37,418	38,086	37,434
....Iloilo	358,796	337,880	356,511	362,184	429,556	371,533	329,867	359,407	373,541	394,203	364,254
....Negros Occidental	117,320	119,120	127,283	123,621	135,472	126,374	119,745	116,635	130,462	121,972	122,204
..CENTRAL VISAYAS											
....Bohol	96,478	110,794	120,986	133,643	140,560	126,496	110,656	129,627	133,076	143,458	129,204
....Cebu	790	888	1,014	1,162	1,139	1,051	893	1,093	1,083	1,238	1,077
....Negros Oriental	9,476	10,173	10,245	10,297	8,334	9,762	10,129	11,225	9,638	10,197	10,297
....Siquijor	247	245	256	274	295	267	241	283	298	315	284
..EASTERN VISAYAS											
....Biliran	971	641	1,041	1,344	1,602	1,157	545	738	944	877	776
....Eastern Samar	36,452	60,454	78,991	83,654	93,838	79,234	54,169	67,952	78,377	77,547	69,511
....Leyte	163,887	183,773	231,499	228,776	238,227	220,569	170,723	194,070	206,971	195,119	191,721
....Northern Samar	81,838	121,792	124,896	117,561	124,956	122,301	107,658	108,401	113,162	110,013	109,809
....Southern Leyte	11,593	10,757	11,816	11,130	11,206	11,228	10,695	10,876	11,165	10,090	10,707
....Samar (Western Samar)	98,356	137,303	194,422	214,879	227,822	193,607	123,830	159,866	184,278	188,268	164,061
..ZAMBOANGA PENINSULA											
....Zamboanga del Norte	40,540	49,472	68,671	74,347	82,804	68,824	39,852	46,082	59,242	48,266	48,360
....Zamboanga del Sur	56,092	58,943	75,086	85,772	103,253	80,763	55,783	64,194	73,266	69,402	65,661
....Zamboanga Sibugay	76,123	90,123	113,213	133,415	169,191	126,486	89,355	99,306	110,985	107,064	101,677

Province	Base (2008-2010)	Projected Rainfed Rice Projection (2011-2030)									
		A1B Scenario					A2 Scenario				
		2011-2015	2016-2020	2021-2025	2026-2030	2011-2030	2011-2015	2016-2020	2021-2025	2026-2030	2011-2030
..NORTHERN MINDANAO											
...Bukidnon	22,040	18,528	14,168	22,356	24,579	19,908	25,973	24,972	32,611	30,037	28,399
...Lanao del Norte	20,729	18,538	14,862	27,006	29,707	22,528	16,149	20,750	21,046	23,416	20,340
...Misamis Occidental	4,377	3,738	3,601	5,261	5,639	4,560	3,991	4,657	4,622	5,100	4,592
...Misamis Oriental	1,426	1,123	1,082	1,424	2,058	1,422	1,011	1,203	1,417	1,425	1,264
..DAVAO REGION											
...Davao del Norte	8,075	7,148	8,363	9,131	9,282	8,481	7,596	8,560	7,973	9,336	8,366
...Davao del Sur	1,420	1,274	1,766	2,011	1,689	1,685	1,359	1,760	1,752	2,103	1,743
...Davao Oriental	11,194	9,722	10,527	11,572	10,081	10,476	9,901	10,490	10,077	12,764	10,808
...Compostela Valley	12,131	11,106	11,726	11,917	11,275	11,506	12,079	12,661	10,208	12,889	11,959
..SOCCSKSARGEN											
...North Cotabato	114,441	116,941	125,772	110,459	131,584	121,189	98,393	106,379	108,406	128,538	110,429
...Sarangani	12,514	12,562	8,024	11,504	8,866	10,239	10,794	10,527	13,506	14,146	12,243
...South Cotabato	36,599	37,510	40,343	41,940	37,996	39,448	38,926	42,453	41,319	44,805	41,876
...Sultan Kudarat	59,274	62,934	70,178	65,244	68,326	66,670	59,798	60,559	73,248	82,827	69,108
..CARAGA											
...Agusan del Norte	19,995	20,823	26,713	21,225	25,604	23,591	19,356	22,357	24,650	23,418	22,445
...Agusan del Sur	66,381	70,063	84,914	78,906	88,521	80,601	69,604	80,069	93,673	89,676	83,256
...Surigao del Norte	20,581	17,946	18,377	19,204	15,736	17,816	16,918	15,302	16,082	16,769	16,268
...Surigao del Sur	23,127	24,197	25,741	24,178	21,668	23,946	23,087	23,263	20,350	22,971	22,417
..ARMM											
...Basilan	1,587	1,622	1,552	1,650	1,667	1,623	1,615	1,585	1,624	1,706	1,633
...Lanao del Sur	116,244	123,203	136,173	148,759	156,426	141,141	117,742	145,117	147,531	152,478	140,717
...Maguindanao	273,918	284,771	327,569	381,265	391,422	346,257	304,692	337,213	374,917	415,172	357,999

### Annex G.3 Projected Rainfed Rice Production by Province, 2011-2030 (MPEH5)

MPEH5											
Province	Base (2008-2010)	Projected Rainfed Rice Projection (2011-2030)									
		A1B Scenario					A2 Scenario				
		2011-2015	2016-2020	2021-2025	2026-2030	2011-2030	2011-2015	2016-2020	2021-2025	2026-2030	2011-2030
..CAR											
....Abra	26,175	21,658	19,324	19,668	24,230	21,220	22,149	22,637	22,265	22,700	22,438
....Apayao	30,731	26,626	32,548	44,264	55,440	39,720	25,585	37,261	42,416	51,531	39,198
....Benguet	1,939	1,931	2,295	2,970	2,960	2,539	2,230	2,783	2,791	3,195	2,750
....Ifugao	1,863	1,597	1,838	2,147	2,251	1,958	1,496	2,025	2,202	2,256	1,995
....Kalinga	5,928	4,262	5,148	5,851	6,488	5,437	4,529	5,383	5,370	6,375	5,414
....Mountain Province	2,284	1,583	1,984	2,277	2,616	2,115	1,859	2,269	2,220	2,633	2,245
..ILOCOS REGION											
....Ilocos Norte	46,938	50,051	47,790	48,871	48,374	48,771	51,955	48,552	42,787	42,614	46,477
....Ilocos Sur	84,536	90,424	103,447	116,858	124,319	108,762	78,156	91,337	100,099	111,218	95,202
....La Union	52,341	54,491	55,695	58,192	62,841	57,805	53,651	55,115	57,097	52,992	54,714
....Pangasinan	299,762	315,119	396,480	489,808	590,055	447,866	294,123	410,911	479,348	553,191	434,393
..CAGAYAN VALLEY											
....Cagayan	117,638	102,318	109,325	125,246	130,391	116,820	105,469	129,712	120,825	151,698	126,926
....Isabela	52,505	45,891	65,763	70,608	70,966	63,307	52,253	51,939	72,740	80,698	64,407
....Nueva Vizcaya	9,932	7,670	7,733	8,647	9,536	8,397	7,919	8,791	8,470	9,572	8,688
....Quirino	5,038	1,946	2,415	2,894	2,886	2,535	2,066	2,456	2,520	3,030	2,518
..CENTRAL LUZON											
....Aurora	6,024	5,080	5,402	5,431	5,285	5,299	4,451	5,333	5,666	5,591	5,260
....Bataan	2,659	1,915	2,247	2,444	2,349	2,239	1,918	2,295	2,452	2,732	2,349
....Bulacan	71,213	70,001	80,359	87,369	93,094	82,706	70,477	83,143	89,824	95,391	84,709
....Nueva Ecija	117,443	135,302	149,763	153,488	161,453	150,001	131,577	146,961	158,121	155,718	148,094
....Pampanga	10,889	10,275	11,829	13,008	14,074	12,297	10,919	11,816	13,348	14,130	12,553
....Tarlac	34,093	28,626	31,366	31,876	32,830	31,174	29,757	30,370	30,347	32,665	30,785
....Zambales	30,165	29,319	31,209	31,727	31,230	30,871	28,866	31,166	32,360	34,925	31,829
..CALABARZON											
....Batangas	15,261	12,912	15,521	17,181	17,979	15,898	13,169	16,959	18,224	19,849	17,050
....Cavite	4,044	3,082	2,712	2,598	1,903	2,574	2,779	2,671	2,710	3,264	2,856
....Laguna	1,639	1,337	960	885	1,078	1,065	1,308	1,109	1,216	1,020	1,163
....Quezon	56,596	45,848	56,428	64,566	68,437	58,820	48,232	60,723	66,222	74,565	62,436
....Rizal	2,001	1,095	973	984	609	915	987	1,012	1,091	1,222	1,078
..MIMAROPA											
....Marinduque	13,644	13,555	14,870	16,127	18,230	15,696	14,062	15,248	16,067	17,701	15,769
....Occidental Mindoro	108,234	106,439	120,213	120,163	145,517	123,083	101,928	106,776	114,633	126,775	112,528
....Oriental Mindoro	64,296	76,341	79,530	78,871	83,947	79,672	72,556	71,120	73,655	76,686	73,504
....Palawan	109,278	125,629	149,887	154,390	177,987	151,973	114,439	123,284	132,220	145,691	128,909
....Romblon	12,632	14,069	14,756	15,324	17,168	15,329	14,357	14,908	15,483	16,718	15,366
..BICOL REGION											
....Albay	35,402	31,803	30,568	32,596	32,765	31,933	36,290	32,143	27,710	32,139	32,071
....Camarines Norte	21,609	22,057	19,683	19,901	15,539	19,295	16,852	14,093	12,736	13,800	14,370
....Camarines Sur	109,553	91,170	87,673	93,314	90,327	90,621	98,535	86,102	85,260	95,344	91,310
....Catanduanes	17,423	17,748	18,976	22,049	19,501	19,569	14,296	12,176	12,117	23,245	15,459
....Masbate	81,907	87,297	85,560	64,734	65,958	75,887	71,158	48,511	54,240	63,862	59,443
....Sorsogon	23,412	18,840	18,446	16,182	18,540	18,002	19,492	13,072	15,445	19,124	16,783
..WESTERN VISAYAS											
....Aklan	54,848	48,123	52,852	52,500	58,555	53,007	49,554	43,571	40,122	40,607	43,463
....Antique	82,905	82,778	77,916	66,511	81,044	77,062	82,879	81,146	79,317	75,650	79,748
....Capiz	227,763	247,963	276,406	294,382	332,920	287,918	247,072	262,098	286,265	287,121	270,639
....Guimaras	35,930	37,010	37,916	37,300	39,906	38,033	34,903	35,724	36,672	37,997	36,324
....Iloilo	358,796	322,191	353,219	376,694	433,059	371,291	316,715	336,170	363,490	385,752	350,532
....Negros Occidental	117,320	123,099	119,608	116,473	128,231	121,853	116,476	113,095	116,414	121,405	116,848
..CENTRAL VISAYAS											
....Bohol	96,478	109,083	117,729	128,721	138,949	123,620	111,850	127,536	133,903	148,980	130,567
....Cebu	790	892	978	1,086	1,188	1,036	930	1,114	1,219	1,390	1,163
....Negros Oriental	9,476	10,218	9,874	9,672	8,863	9,657	10,539	11,130	10,625	11,524	10,955
....Siquijor	247	236	238	259	269	250	241	261	272	302	269
..EASTERN VISAYAS											
....Biliran	971	543	720	779	902	736	471	491	676	803	610
....Eastern Samar	36,452	49,409	50,196	55,540	68,875	56,005	51,198	57,337	60,307	62,579	57,855
....Leyte	163,887	158,731	170,381	179,876	198,643	176,908	160,459	170,935	173,068	162,798	166,815
....Northern Samar	81,838	102,867	87,922	88,163	98,972	94,481	103,391	102,098	101,680	94,390	100,390
....Southern Leyte	11,593	9,814	9,497	8,979	8,138	9,107	9,253	9,130	9,129	9,438	9,237
....Samar (Western Samar)	98,356	114,594	127,273	149,196	181,348	143,102	119,883	146,175	156,465	152,388	143,728
..ZAMBOANGA PENINSULA											
....Zamboanga del Norte	40,540	41,322	59,514	65,721	71,672	59,557	40,685	41,937	51,267	60,572	48,615
....Zamboanga del Sur	56,092	49,153	65,188	74,761	73,757	65,715	51,812	54,828	61,478	75,500	60,904
....Zamboanga Sibugay	76,123	76,151	101,614	108,962	108,418	98,786	72,415	71,034	80,608	106,836	82,723

Province	Base (2008-2010)	Projected Rainfed Rice Projection (2011-2030)									
		A1B Scenario					A2 Scenario				
		2011-2015	2016-2020	2021-2025	2026-2030	2011-2030	2011-2015	2016-2020	2021-2025	2026-2030	2011-2030
..NORTHERN MINDANAO											
...Bukidnon	22,040	21,454	24,655	32,589	29,185	26,971	21,963	31,344	32,469	28,728	28,626
...Lanao del Norte	20,729	19,593	22,415	23,447	23,243	22,174	18,363	21,251	21,818	27,375	22,202
...Misamis Occidental	4,377	4,373	3,444	4,655	4,215	4,172	3,957	3,949	4,518	5,833	4,565
...Misamis Oriental	1,426	962	1,224	1,194	1,655	1,259	1,255	1,194	1,485	1,659	1,398
..DAVAO REGION											
...Davao del Norte	8,075	7,302	8,057	9,331	10,007	8,674	7,906	9,063	9,498	11,325	9,448
...Davao del Sur	1,420	1,229	1,612	1,811	1,970	1,655	1,366	1,795	1,843	2,343	1,837
...Davao Oriental	11,194	9,457	9,844	11,081	11,595	10,494	10,521	11,356	11,573	14,419	11,967
...Compostela Valley	12,131	11,149	10,874	12,648	12,537	11,802	11,964	12,077	12,498	14,764	12,826
..SOCCSKSARGEN											
...North Cotabato	114,441	85,041	110,164	94,542	125,298	103,761	100,740	94,584	116,530	152,137	115,998
...Sarangani	12,514	9,462	5,505	6,736	11,244	8,237	11,640	10,149	8,002	15,297	11,272
...South Cotabato	36,599	33,672	36,750	42,033	45,583	39,510	37,870	36,176	35,479	45,576	38,775
...Sultan Kudarat	59,274	54,019	65,779	71,393	77,775	67,241	55,754	61,617	60,846	84,504	65,680
..CARAGA											
...Agusan del Norte	19,995	15,032	17,206	18,627	23,391	18,564	16,773	18,453	17,617	18,164	17,752
...Agusan del Sur	66,381	61,889	73,474	79,328	69,100	70,948	70,406	65,900	68,324	73,161	69,448
...Surigao del Norte	20,581	12,428	14,859	15,241	16,823	14,838	15,715	14,843	17,659	16,789	16,251
...Surigao del Sur	23,127	16,731	20,158	20,083	21,371	19,586	23,249	22,358	23,956	23,385	23,237
..ARMM											
...Basilan	1,587	1,767	1,608	1,752	1,626	1,688	1,667	1,617	1,642	1,751	1,670
...Lanao del Sur	116,244	104,597	129,614	133,978	146,694	128,721	121,421	145,451	146,519	151,363	141,189
...Maguindanao	273,918	306,077	313,671	377,303	354,684	337,934	306,740	346,867	349,001	413,772	354,095

## Annex H.1 Ranking of Provinces by % Growth in Irrigated Palay Production<sup>11</sup> (BCM2)

Ranking of Provinces in Terms of Increase in Irrigated Production (in %)				Ranking of Provinces in Terms of Decrease in Irrigated Production (in %)				
Global Circulation Model	A1B Scenario		A2 Scenario	Global Circulation Model	A1B Scenario		A2 Scenario	
	Province	Rank	Province		Province	Rank	Province	Rank
BCM2	....Basilan	1	....Basilan	1	....Kalinga	1	....Kalinga	1
	....Abra	2	....Abra	2	....Guimaras	2	....Guimaras	2
	....Pangasinan	3	....Pangasinan	3	....Marinduque	3	....Marinduque	3
	....Sultan Kudarat	4	....Cavite	4	....Lanao del Sur	4	....Maguindanao	4
	....Bohol	5	....Sultan Kudarat	5	....Antique	5	....Davao del Sur	5
	....Cebu	6	....Bulacan	6	....Misamis Occidental	6	....Misamis Occidental	6
	....Cavite	7	....Bohol	7	....Maguindanao	7	....Antique	7
	....Apayao	8	....Cebu	8	....Davao del Sur	8	....Iloilo	8
	....Bulacan	9	....Ilocos Norte	9	....Iloilo	9	....Laguna	9
	....Ilocos Norte	10	....Apayao	10	....Laguna	10	....Davao del Norte	10
	....Occidental Mindoro	11	....Northern Samar	11	....Davao del Norte	11	....Aklan	11
	....Northern Samar	12	....Agusan del Sur	12	....Aklan	12	....Davao del Norte	12
	....Zambales	13	....Occidental Mindoro	13	....Romblon	13	....Romblon	13
	....North Cotabato	14	....Catanduanes	14	....Albay	14		
	....Palawan	15	....North Cotabato	15				
	....Isabela	16	....Zambales	16				
	....Agusan del Sur	17	....Biliran	17				
	....South Cotabato	18	....Masbate	18				
	....Ilocos Sur	19	....Isabela	19				
	....Tarlac	20	....Tarlac	20				
	....Agusan del Norte	21	....Palawan	21				
	....Masbate	22	....Agusan del Norte	22				
	....Ifugao	23	....Aurora	23				
	....Zamboanga Sibugay	24	....Southern Leyte	24				
	....Quezon	25	....Rizal	25				
	....Negros Oriental	26	....Quezon	26				
	....Quirino	27	....Bataan	27				
	....Bukidnon	28	....South Cotabato	28				
	....Zamboanga del Norte	29	....Quirino	29				
	....Biliran	30	....Compostela Valley	30				
	....Bataan	31	....Negros Oriental	31				
	....Compostela Valley	32	....Benguet	32				
	....Zamboanga del Sur	33	....Ifugao	33				
	....Catanduanes	34	....Sorsogon	34				
	....Mountain Province	35	....Zamboanga Sibugay	35				
	....Lanao del Norte	36	....Bukidnon	36				
	....Sarangani	37	....Ilocos Sur	37				
	....Eastern Samar	38	....Zamboanga del Sur	38				
	....Aurora	39	....Mountain Province	39				
	....Sorsogon	40	....Eastern Samar	40				
	....Pampanga	41	....Zamboanga del Norte	41				
	....Southern Leyte	42	....Batangas	42				
	....Capiz	43	....Lanao del Norte	43				
	....Rizal	44	....Camarines Norte	44				
	....Siquijor	45	....Sarangani	45				
	....Surigao del Norte	46	....Pampanga	46				
	....Surigao del Sur	47	....Camarines Sur	47				
	....Samar (Western Samar)	48	....Capiz	48				
	....Misamis Oriental	49	....Rizal	49				
	....Oriental Mindoro	50	....Surigao del Norte	49				
	....Camarines Sur	51	....Samar (Western Samar)	50				
	....Nueva Ecija	52	....Surigao del Sur	51				
	....Samar (Western Samar)	53	....Negros Occidental	52				
	....La Union	54	....Misamis Oriental	53				
	....Benguet	55	....Oriental Mindoro	54				
	....Davao Oriental	56	....Nueva Vizcaya	55				
	....Cagayan	57	....Albay	56				
	....Leyte	58	....Misamis Oriental	58				
	....Nueva Vizcaya	59	....La Union	59				
	....Nueva Ecija	60	....Siquijor	60				
	....Camarines Norte	61	....Cagayan	61				
			....Davao Oriental	62				

<sup>11</sup> Refers to the % increase of the 2011-2030 average vs. the 2008-2010 average.

## Annex H.2 Ranking of Provinces by % Growth in Rainfed Palay Production (BCM2)

Ranking of Provinces in Terms of Increase in Rainfed Production (in %)				Ranking of Provinces in Terms of Decrease in Rainfed Production (in %)				
Global Circulation Model	A1B Scenario		A2 Scenario	Global Circulation Model	A1B Scenario		A2 Scenario	
	Province	Rank	Province		Province	Rank	Province	Rank
BCM2	....Eastern Samar	1	....Eastern Samar	1	....Quirino	1	....Quirino	1
	....Pangasinan	2	....Benguet	2	....Rizal	2	....Rizal	2
	....Cebu	3	....Samar (Western Samar)	3	....Biliran	3	....Surigao del Norte	3
	....Samar (Western Samar)	4	....Cebu	4	....Southern Leyte	4	....Laguna	4
	....Ilocos Sur	5	....Pangasinan	5	....Surigao del Norte	5	....Biliran	5
	....Ilocos Norte	6	....Bohol	6	....Laguna	6	....Aklan	6
	....Benguet	7	....Davao del Sur	7	....Camarines Norte	7	....Ifugao	7
	....Bohol	8	....Sultan Kudarat	8	....Nueva Vizcaya	8	....Cavite	8
	....Bukidnon	9	....Ilocos Norte	9	....Sorsogon	9	....Sorsogon	9
	....Zamboanga del Norte	10	....Catanduanes	10	....Aurora	10	....Aurora	10
	....Nueva Ecija	11	....Negros Oriental	11	....Ifugao	11	....Cagayan	11
	....Capiz	12	....Ilocos Sur	12	....Cavite	12	....Camarines Norte	12
	....Lanao del Sur	13	....Nueva Ecija	13	....Kalinga	13	....Misamis Oriental	13
	....La Union	14	....Zamboanga del Norte	14	....Misamis Oriental	14	....Southern Leyte	14
	....Romblon	15	....Northern Samar	15	....Abra	15	....Agusan del Norte	15
	....Apayao	16	....Romblon	16	....Aklan	16	....Abra	16
	....Davao del Sur	17	....Capiz	17	....Bataan	17	....Quezon	17
	....Sultan Kudarat	18	....Bulacan	18	....Camarines Sur	18	....Nueva Vizcaya	18
	....Maguindanao	19	....Maguindanao	19	....Tarlac	19	....Kalinga	19
	....Palawan	20	....Pampanga	20	....Davao Oriental	20	....Camarines Sur	20
	....Isabela	21	....South Cotabato	21	....Cagayan	21	....Bataan	21
	....Marinduque	22	....Lanao del Sur	22	....Compostela Valley	22	....Antique	22
	....South Cotabato	23	....North Cotabato	23	....Mountain Province	23	....Negros Occidental	23
	....Bulacan	24	....Marinduque	24	....Surigao del Sur	24	....Tarlac	24
	....Catanduanes	25	....Davao del Norte	25	....Agusan del Norte	25	....Surigao del Sur	25
	....Pampanga	26	....Lanao del Norte	26	....Quezon	26	....Occidental Mindoro	26
	....Zamboanga Sibugay	27	....Masbate	27	....Sarangani	27	....Batangas	27
	....Northern Samar	28	....Leyte	28	....North Cotabato	28	....Sarangani	28
	....Negros Oriental	29	....La Union	29	....Batangas	29	....Misamis Occidental	29
	....Oriental Mindoro	30	....Siquijor	30	....Leyte	30	....Guimaras	30
	....Zambales	31	....Isabela	31	....Albay	31	....Albay	31
	....Masbate	32	....Davao Oriental	32	....Guimaras	32	....Iloilo	32
	....Siquijor	33	....Agusan del Sur	33			....Basilan	33
	....Lanao del Norte	34	....Zambales	34				
	....Agusan del Sur	35	....Zamboanga Sibugay	35				
	....Davao del Norte	36	....Compostela Valley	36				
	....Zamboanga del Sur	37	....Apayao	37				
	....Occidental Mindoro	38	....Bukidnon	38				
	....Iloilo	39	....Palawan	39				
	....Misamis Occidental	40	....Oriental Mindoro	40				
	....Antique	41	....Zamboanga del Sur	41				
	....Negros Occidental	42	....Mountain Province	42				
	....Basilan	43						

### Annex H.3 Ranking of Provinces by % Growth in Irrigated Palay Production (CNCM3)

Ranking of Provinces in Terms of Increase in Irrigated Production (in %)					Ranking of Provinces in Terms of Decrease in Irrigated Production (in %)				
Global Circulation Model	A1B Scenario		A2 Scenario		Global Circulation Model	A1B Scenario		A2 Scenario	
	Province	Rank	Province	Rank		Province	Rank	Province	Rank
CNCM3	....Basilan	1	....Basilan	1	CNCM3	....Kalinga	1	....Kalinga	1
	....Abra	2	....Abra	2		....Laguna	2	....Guimaras	2
	....Sultan Kudarat	3	....Pangasinan	3		....Marinduque	3	....Laguna	3
	....Pangasinan	4	....Sultan Kudarat	4		....Guimaras	4	....Marinduque	4
	....Cebu	5	....Bohol	5		....Maguindanao	5	....Lanao del Sur	5
	....Bohol	6	....Cebu	6		....Lanao del Sur	6	....Antique	6
	....Bulacan	7	....Bulacan	7		....Antique	7	....Davao del Sur	7
	....Northern Samar	8	....Cavite	8		....Davao del Norte	8	....Romblon	8
	....North Cotabato	9	....Mountain Province	9		....Davao del Sur	9	....Maguindanao	9
	....Mountain Province	10	....Occidental Mindoro	10		....Aklan	10	....Nueva Ecija	10
	....Apayao	11	....Ifugao	11		....Romblon	11	....Davao del Norte	11
	....Biliran	12	....North Cotabato	12		....Nueva Ecija	12	....Iloilo	12
	....Occidental Mindoro	13	....Apayao	13		....Nueva Vizcaya	13	....Nueva Vizcaya	13
	....Agusan del Sur	14	....Palawan	14		....Albay	14	....Aklan	14
	....Ifugao	15	....Isabela	15		....Iloilo	15	....Quirino	15
	....Samar (Western Samar)	16	....Zambales	16		....Cagayan	16	....Misamis Occidental	16
	....Isabela	17	....Northern Samar	17					
	....Bukidnon	18	....Agusan del Sur	18					
	....Cavite	19	....Ilocos Norte	19					
	....Zamboanga del Norte	20	....Agusan del Norte	20					
	....Agusan del Norte	21	....Ilocos Sur	21					
	....Ilocos Sur	22	....Compostela Valley	22					
	....Zamboanga Sibugay	23	....Benguet	23					
	....Eastern Samar	24	....Catanduanes	24					
	....Palawan	25	....South Cotabato	25					
	....Leyte	26	....Biliran	26					
	....Southern Leyte	27	....Zamboanga del Norte	27					
	....Masbate	28	....Bukidnon	28					
	....Compostela Valley	29	....Aurora	29					
	....Zambales	30	....Sorsogon	30					
	....Lanao del Norte	31	....Samar (Western Samar)	31					
	....South Cotabato	32	....Negros Oriental	32					
	....Ilocos Norte	33	....Zamboanga del Sur	33					
	....Benguet	34	....Quezon	34					
	....Zamboanga del Sur	35	....Lanao del Norte	35					
	....Quezon	36	....Bataan	36					
	....Negros Oriental	37	....Zamboanga Sibugay	37					
	....Aurora	38	....Southern Leyte	38					
	....Tarlac	39	....Leyte	39					
	....Sorsogon	40	....Masbate	40					
	....Catanduanes	41	....Tarlac	41					
	....Misamis Oriental	42	....Rizal	42					
	....Capiz	43	....Capiz	43					
	....Sarangani	44	....Camarines Sur	44					
	....Surigao del Norte	45	....Eastern Samar	45					
	....Batangas	46	....Misamis Oriental	46					
	....Surigao del Sur	47	....Pampanga	47					
	....Bataan	48	....Siquijor	48					
	....Negros Occidental	49	....Sarangani	49					
	....Camarines Sur	50	....Negros Occidental	50					
	....Pampanga	51	....Surigao del Norte	51					
	....Rizal	52	....Surigao del Sur	52					
	....Quirino	53	....Oriental Mindoro	53					
	....Siquijor	54	....Davao Oriental	54					
	....Misamis Occidental	55	....Batangas	55					
	....Camarines Norte	56	....La Union	56					
	....Oriental Mindoro	57	....Albay	57					
	....La Union	58	....Camarines Norte	58					
	....Davao Oriental	59	....Cagayan	59					

#### Annex H.4 Ranking of Provinces by % Growth in Rainfed Palay Production (CNCM3)

Ranking of Provinces in Terms of Increase in Rainfed Production (in %)				Ranking of Provinces in Terms of Decrease in Rainfed Production (in %)				
Global Circulation Model	A1B Scenario		A2 Scenario	Global Circulation Model	A1B Scenario		A2 Scenario	
	Province	Rank	Province		Province	Rank	Province	
CNCM3	...Eastern Samar	1	...Eastern Samar	1	....Camarines Sur	1	....Quirino	1
	...Samar (Western Samar)	2	....Samar (Western Samar)	2	....Quirino	2	....Rizal	2
	...Zamboanga del Norte	3	....Pangasinan	3	....Rizal	3	....Cavite	3
	...Zamboanga Sibugay	4	....Cebu	4	....Camarines Norte	4	....Camarines Norte	4
	...Northern Samar	5	....Palawan	5	....Sorsogon	5	....Laguna	5
	...Palawan	6	....Northern Samar	6	....Cavite	6	....Abra	6
	...Zamboanga del Sur	7	....Bohol	7	....Masbate	7	....Camarines Sur	7
	...Benguet	8	....Zamboanga Sibugay	8	....Catanduanes	8	....Surigao del Norte	8
	...Oriental Mindoro	9	....Maguindanao	9	....Laguna	9	....Biliran	9
	...Leyte	10	....Ilocos Sur	10	....Albay	10	....Sorsogon	10
	...Cebu	11	....Oriental Mindoro	11	....Bataan	11	....Masbate	11
	...Bohol	12	....Bukidnon	12	....Cagayan	12	....Nueva Vizcaya	12
	...Pangasinan	13	....Agusan del Sur	13	....Aurora	13	....Aurora	13
	...Ilocos Sur	14	....Davao del Sur	14	....Tarlac	14	....Albay	14
	...Romblon	15	....Benguet	15	....Sarangani	15	....Cagayan	15
	...Maguindanao	16	....Nueva Ecija	16	....Abra	16	....Kalinga	16
	...Capiz	17	....Capiz	17	....Kalinga	17	....Tarlac	17
	...Occidental Mindoro	18	....Lanao del Sur	18	....Nueva Vizcaya	18	....Misamis Oriental	18
	...Agusan del Sur	19	....Zamboanga del Norte	19	....Surigao del Norte	19	....Aklan	19
	...Lanao del Sur	20	....Romblon	20	....Aklan	20	....Mountain Province	20
	...Marinduque	21	....Zamboanga del Sur	21	....Bukidnon	21	....Bataan	21
	...Biliran	22	....Leyte	22	....Ifugao	22	....Antique	22
	...Davao del Sur	23	....Sultan Kudarat	23	....Davao Oriental	23	....Southern Leyte	23
	...Agusan del Norte	24	....Occidental Mindoro	24	....Mountain Province	24	....North Cotabato	24
	...Guimaras	25	....Siquijor	25	....Compostela Valley	25	....Davao Oriental	25
	...Quezon	26	....South Cotabato	26	....Southern Leyte	26	....Ifugao	26
	...Nueva Ecija	27	....Marinduque	27	....Ilocos Norte	27	....Surigao del Sur	27
	...Sultan Kudarat	28	....La Union	28	....Zambales	28	....Sarangani	28
	...Batangas	29	....Ilocos Norte	29	....Pampanga	29	....Lanao del Norte	29
	...Isabela	30	....Isabela	30	....Misamis Oriental	30	....Compostela Valley	30
	...Apayao	31	....Agusan del Norte	31	....La Union	31	....Catanduanes	31
	...Antique	32	....Bulacan	32				
	...Lanao del Norte	33	....Apayao	33				
	...Siquijor	34	....Quezon	34				
	...South Cotabato	35	....Batangas	35				
	...Negros Occidental	36	....Negros Oriental	36				
	...Bulacan	37	....Zambales	37				
	...North Cotabato	38	....Pampanga	38				
	...Davao del Norte	39	....Misamis Occidental	39				
	...Misamis Occidental	40	....Guimaras	40				
	...Iloilo	41	....Negros Occidental	41				
	...Surigao del Sur	42	....Davao del Norte	42				
	...Negros Oriental	43	....Basilan	43				
	...Basilan	44	....Iloilo	44				

## Annex H.5 Ranking of Provinces by % Growth in Irrigated Palay Production (MPEH5)

Ranking of Provinces in Terms of Increase in Irrigated Production (in %)				Ranking of Provinces in Terms of Decrease in Irrigated Production (in %)				
Global Circulation Model	A1B Scenario		A2 Scenario	Global Circulation Model	A1B Scenario		A2 Scenario	
	Province	Rank	Province		Province	Rank	Province	
MPEH5	...Basilan	1	...Basilan	1	....Laguna	1	....Maguindanao	1
	...Abra	2	...Abra	2	....Maguindanao	2	....Kalinga	2
	...Sultan Kudarat	3	...Pangasinan	3	....Lanao del Sur	3	....Lanao del Sur	3
	...Pangasinan	4	...Sultan Kudarat	4	....Marinduque	4	....Guimaras	4
	...Bohol	5	...Bohol	5	....Guimaras	5	....Laguna	5
	...Apayao	6	...Cebu	6	....Kalinga	6	....Marinduque	6
	...Bulacan	7	...Bulacan	7	....Antique	7	....Davao del Sur	7
	...Cebu	8	...Apayao	8	....Batangas	8	....Antique	8
	...Occidental Mindoro	9	...Cavite	9	....Davao del Sur	9	...La Union	9
	...Isabela	10	...Isabela	10	....Misamis Occidental	10	....Misamis Occidental	10
	...North Cotabato	11	...Occidental Mindoro	11	....Aklan	11	....Davao Oriental	11
	...Cavite	12	...Northern Samar	12	....Davao del Norte	12	....Davao del Norte	12
	...Zambales	13	...Agusan del Sur	13	....Surigao del Sur	13	....Samar (Western Sam	13
	...Biliran	14	...Zambales	14	....Romblon	14	....Aklan	14
	...Compostela Valley	15	...Palawan	15			....Iloilo	15
	...Ifugao	16	...Tarlac	16			....Romblon	16
	...South Cotabato	17	...Catanduanes	17			....Albay	17
	...Masbate	18	...Quezon	18				
	...Palawan	19	...Ilocos Norte	19				
	...Agusan del Sur	20	...North Cotabato	20				
	...Catanduanes	21	...Bukidnon	21				
	...Ilocos Sur	22	...Zamboanga del Sur	22				
	...Mountain Province	23	...Ilocos Sur	23				
	...Northern Samar	24	...Quirino	24				
	...Quirino	25	...Zamboanga del Norte	25				
	...Ilocos Norte	26	...Zamboanga Sibugay	26				
	...Tarlac	27	...South Cotabato	27				
	...Aurora	28	...Agusan del Norte	28				
	...Bukidnon	29	...Compostela Valley	29				
	...Zamboanga del Sur	30	...Negros Oriental	30				
	...Agusan del Norte	31	...Lanao del Norte	31				
	...Southern Leyte	32	...Mountain Province	32				
	...Quezon	33	...Biliran	33				
	...Zamboanga del Norte	34	...Masbate	34				
	...Sorsogon	35	...Sorsogon	35				
	...Zamboanga Sibugay	36	...Sarangani	36				
	...Lanao del Norte	37	...Bataan	37				
	...Sarangani	38	...Ifugao	38				
	...Camarines Sur	39	...Pampanga	39				
	...Cagayan	40	...Southern Leyte	40				
	...Bataan	41	...Aurora	41				
	...Capiz	42	...Rizal	42				
	...Benguet	43	...Benguet	43				
	...Nueva Ecija	44	...Capiz	44				
	...Oriental Mindoro	45	...Misamis Oriental	45				
	...Pampanga	46	...Leyte	46				
	...Samar (Western Samar)	47	...Camarines Sur	47				
	...Camarines Norte	48	...Negros Occidental	48				
	...Misamis Oriental	49	...Surigao del Norte	49				
	...Leyte	50	...Cagayan	50				
	...Negros Oriental	51	...Oriental Mindoro	51				
	...Negros Occidental	52	...Eastern Samar	52				
	...Rizal	53	...Surigao del Sur	53				
	...Surigao del Norte	54	...Camarines Norte	54				
	...Davao Oriental	55	...Batangas	55				
	...Siquijor	56	...Siquijor	56				
	...Eastern Samar	57	...Nueva Ecija	57				
	...Albay	58	...Nueva Vizcaya	58				
	...Nueva Vizcaya	59						
	...La Union	60						
	...Iloilo	61						

## Annex H.6 Ranking of Provinces by % Growth in Rainfed Palay Production (MPEH5)

Ranking of Provinces in Terms of Increase in Rainfed Production (in %)				Ranking of Provinces in Terms of Decrease in Rainfed Production (in %)				
Global Circulation Model	A1B Scenario		A2 Scenario	Global Circulation Model	A1B Scenario		A2 Scenario	
	Province	Rank	Province		Province	Rank	Province	
MPEH5	....Eastern Samar	1	....Eastern Samar	1	....Rizal	1	....Quirino	1
	....Pangasinan	2	....Cebu	2	....Quirino	2	....Rizal	2
	....Zamboanga del Norte	3	....Samar (Western Samar)	3	....Cavite	3	....Biliran	3
	....Samar (Western Samar)	4	....Pangasinan	4	....Laguna	4	....Camarines Norte	4
	....Palawan	5	....Benguet	5	....Sarangani	5	....Cavite	5
	....Cebu	6	....Bohol	6	....Surigao del Norte	6	....Laguna	6
	....Benguet	7	....Bukidnon	7	....Biliran	7	....Sorsogon	7
	....Zamboanga Sibugay	8	....Davao del Sur	8	....Sorsogon	8	....Masbate	8
	....Apayao	9	....Maguindanao	9	....Southern Leyte	9	....Surigao del Norte	9
	....Capiz	10	....Apayao	10	....Abra	10	....Aklan	10
	....Ilocos Sur	11	....Nueva Ecija	11	....Camarines Sur	11	....Southern Leyte	11
	....Bohol	12	....Northern Samar	12	....Bataan	12	....Camarines Sur	12
	....Nueva Ecija	13	....Isabela	13	....Nueva Vizcaya	13	....Abra	13
	....Oriental Mindoro	14	....Romblon	14	....Surigao del Sur	14	....Aurora	14
	....Maguindanao	15	....Capiz	15	....Aurora	15	....Nueva Vizcaya	15
	....Bukidnon	16	....Lanao del Sur	16	....Misamis Oriental	16	....Bataan	16
	....Romblon	17	....Zamboanga del Norte	17	....Camarines Norte	17	....Catanduanes	17
	....Isabela	18	....Bulacan	18	....Albay	18	....Agusan del Norte	18
	....Zamboanga del Sur	19	....Palawan	19	....North Cotabato	19	....Sarangani	19
	....Davao del Sur	20	....Davao del Norte	20	....Tarlac	20	....Kalinga	20
	....Bulacan	21	....Negros Oriental	21	....Kalinga	21	....Albay	21
	....Northern Samar	22	....Marinduque	22	....Mountain Province	22	....Kalinga	22
	....Marinduque	23	....Pampanga	23	....Masbate	23	....Antique	23
	....Occidental Mindoro	24	....Oriental Mindoro	24	....Agusan del Norte	24	....Iloilo	24
	....Sultan Kudarat	25	....Ilocos Sur	25	....Antique	25	....Misamis Oriental	25
	....Pampanga	26	....Batangas	26	....Davao Oriental	26	....Mountain Province	26
	....Catanduanes	27	....Sultan Kudarat	27	....Misamis Occidental	27	....Ilocos Norte	27
	....Lanao del Sur	28	....Quezon	28	....Aklan	28	....Negros Occidental	28
	....La Union	29	....Siquijor	29	....Compostela Valley	29		
	....South Cotabato	30	....Zamboanga Sibugay	30	....Cagayan	30		
	....Leyte	31	....Zamboanga del Sur	31				
	....Davao del Norte	32	....Cagayan	32				
	....Lanao del Norte	33	....Lanao del Norte	33				
	....Agusan del Sur	34	....Ifugao	34				
	....Basilan	35	....Davao Oriental	35				
	....Guimaras	36	....South Cotabato	36				
	....Ifugao	37	....Compostela Valley	37				
	....Batangas	38	....Zambales	38				
	....Quezon	39	....Basilan	39				
	....Ilocos Norte	40	....Agusan del Sur	40				
	....Negros Occidental	41	....La Union	41				
	....Iloilo	42	....Misamis Occidental	42				
	....Zambales	43	....Occidental Mindoro	43				
	....Negros Oriental	44	....Leyte	44				
	....Siquijor	45	....North Cotabato	45				
			....Guimaras	46				
			....Surigao del Sur	47				

## Annex I.1 Ranking of Provinces by *Incremental Irrigated Palay Production (in MT)*<sup>12</sup> (BCM2)

Ranking of Provinces in Terms of Increase in Irrigated Production (in MT)					Ranking of Provinces in Terms of Decrease in Irrigated Production (in MT)				
Global Circulation Model	A1B Scenario		A2 Scenario		Global Circulation Model	A1B Scenario		A2 Scenario	
	Province	Rank	Province	Rank		Province	Rank	Province	Rank
BCM2	....Pangasinan	1	....Pangasinan	1	BCM2	....Kalinga	1	....Iloilo	1
	....Isabela	2	....Isabela	2		....Iloilo	2	....Kalinga	2
	....Sultan Kudarat	3	....Sultan Kudarat	3		....Antique	3	....Maguindanao	3
	....Tarlac	4	....Tarlac	4		....Maguindanao	4	....Davao del Sur	4
	....Bulacan	5	....Bulacan	5		....Davao del Sur	5	....Antique	5
	....North Cotabato	6	....North Cotabato	6		....Lanao del Sur	6	....Laguna	6
	....Ilocos Norte	7	....Ilocos Norte	7		....Misamis Occidental	7	....Misamis Occidental	7
	....Occidental Mindoro	8	....Nueva Ecija	8		....Laguna	8	....Guimaras	8
	....South Cotabato	9	....Occidental Mindoro	9		....Davao del Norte	9	....Davao del Norte	9
	....Bohol	10	....South Cotabato	10		....Aklan	10	....Aklan	10
	....Bukidnon	11	....Bohol	11		....Guimaras	11	....Lanao del Sur	11
	....Pampanga	12	....Bukidnon	12		....Marinduque	12	....Marinduque	12
	....Abra	13	....Camarines Sur	13		....Albay	13	....Romblon	13
	....Zamboanga del Sur	14	....Abra	14		....Romblon	14		
	....Apayao	15	....Pampanga	15					
	....Palawan	16	....Agusan del Sur	16					
	....Agusan del Sur	17	....Zamboanga del Sur	17					
	....Camarines Sur	18	....Apayao	18					
	....Zambales	19	....Bataan	19					
	....Ilocos Sur	20	....Palawan	20					
	....Negros Occidental	21	....Zambales	21					
	....Bataan	22	....Cavite	22					
	....Quezon	23	....Negros Occidental	23					
	....Cavite	24	....Southern Leyte	24					
	....Lanao del Norte	25	....Quezon	25					
	....Zamboanga Sibugay	26	....Biliran	26					
	....Oriental Mindoro	27	....Aurora	27					
	....Cagayan	28	....Ilocos Sur	28					
	....Agusan del Norte	29	....Lanao del Norte	29					
	....Capiz	30	....Sorsogon	30					
	....Compostela Valley	31	....Compostela Valley	31					
	....Ifugao	32	....Agusan del Norte	32					
	....Quirino	33	....Oriental Mindoro	33					
	....Biliran	34	....Quirino	34					
	....Negros Oriental	35	....Leyte	35					
	....Sorsogon	36	....Zamboanga Sibugay	36					
	....Southern Leyte	37	....Capiz	37					
	....Aurora	38	....Nueva Vizcaya	38					
	....Leyte	39	....Ifugao	39					
	....Zamboanga del Norte	40	....Negros Oriental	40					
	....Nueva Ecija	41	....Cagayan	41					
	....Cebu	42	....Masbate	42					
	....Masbate	43	....Zamboanga del Norte	43					
	....La Union	44	....Cebu	44					
	....Northern Samar	45	....Albay	45					
	....Sarangani	46	....Camarines Norte	46					
	....Surigao del Norte	47	....Rizal	47					
	....Surigao del Sur	48	....Catanduanes	48					
	....Nueva Vizcaya	49	....Batangas	49					
	....Batangas	50	....Northern Samar	50					
	....Catanduanes	51	....Surigao del Norte	51					
	....Rizal	52	....Surigao del Sur	52					
	....Mountain Province	53	....Sarangani	53					
	....Basilan	54	....Benguet	54					
	....Eastern Samar	55	....Basilan	55					
	....Misamis Oriental	56	....Mountain Province	56					
	....Davao Oriental	57	....La Union	57					
	....Samar (Western Samar)	58	....Eastern Samar	58					
	....Benguet	59	....Samar (Western Samar)	59					
	....Siquijor	60	....Misamis Oriental	60					
	....Camarines Norte	61	....Davao Oriental	61					
			....Siquijor	62					

<sup>12</sup> Refers to the average of 2011-2030 minus the average of 2008-2010.

## Annex I.2 Ranking of Provinces by *Incremental Rainfed Palay Production (in MT)* (BCM2)

Ranking of Provinces in Terms of Increase in Rainfed Production (in MT)					Ranking of Provinces in Terms of Decrease in Rainfed Production (in MT)				
Global Circulation Model	A1B Scenario		A2 Scenario		Global Circulation Model	A1B Scenario		A2 Scenario	
	Province	Rank	Province	Rank		Province	Rank	Province	Rank
BCM2	....Pangasinan	1	....Pangasinan	1	BCM2	....Camarines Sur	1	....Cagayan	1
	....Capiz	2	....Samar (Western Samar)	2		....Cagayan	2	....Aklan	2
	....Maguindanao	3	....Maguindanao	3		....Aklan	3	....Iloilo	3
	....Samar (Western Samar)	4	....Capiz	4		....Surigao del Norte	4	....Camarines Sur	4
	....Ilocos Sur	5	....Bohol	5		....Camarines Norte	5	....Negros Occidental	5
	....Bohol	6	....Nueva Ecija	6		....Sorsogon	6	....Surigao del Norte	6
	....Nueva Ecija	7	....Eastern Samar	7		....Tarlac	7	....Occidental Mindoro	7
	....Lanao del Sur	8	....Ilocos Sur	8		....Southern Leyte	8	....Antique	8
	....Eastern Samar	9	....Leyte	9		....Abra	9	....Quezon	9
	....Palawan	10	....Lanao del Sur	10		....Leyte	10	....Sorsogon	10
	....Ilocos Norte	11	....Northern Samar	11		....Quirino	11	....Quirino	11
	....La Union	12	....North Cotabato	12		....Quezon	12	....Camarines Norte	12
	....Sultan Kudarat	13	....Sultan Kudarat	13		....North Cotabato	13	....Abra	13
	....Bulacan	14	....Ilocos Norte	14		....Nueva Vizcaya	14	....Tarlac	14
	....Zamboanga del Norte	15	....Bulacan	15		....Surigao del Sur	15	....Agusan del Norte	15
	....Northern Samar	16	....Masbate	16		....Davao Oriental	16	....Surigao del Sur	16
	....Zamboanga Sibugay	17	....Zamboanga del Norte	17		....Rizal	17	....Guimaras	17
	....Isabela	18	....Agusan del Sur	18		....Aurora	18	....Southern Leyte	18
	....Iloilo	19	....Palawan	19		....Agusan del Norte	19	....Albay	19
	....Masbate	20	....Zamboanga Sibugay	20		....Kalinga	20	....Aurora	20
	....Oriental Mindoro	21	....La Union	21		....Compostela Valley	21	....Nueva Vizcaya	21
	....Apayao	22	....South Cotabato	22		....Cavite	22	....Rizal	22
	....Bukidnon	23	....Isabela	23		....Sarangani	23	....Batangas	23
	....South Cotabato	24	....Catanduanes	24		....Biliran	24	....Cavite	24
	....Agusan del Sur	25	....Oriental Mindoro	25		....Albay	25	....Sarangani	25
	....Occidental Mindoro	26	....Zambales	26		....Laguna	26	....Kalinga	26
	....Zambales	27	....Lanao del Norte	27		....Bataan	27	....Laguna	27
	....Romblon	28	....Apayao	28		....Batangas	28	....Ifugao	28
	....Catanduanes	29	....Romblon	29		....Ifugao	29	....Biliran	29
	....Marinduque	30	....Negros Oriental	30		....Misamis Oriental	30	....Bataan	30
	....Zamboanga del Sur	31	....Zamboanga del Sur	31		....Mountain Province	31	....Misamis Occidental	31
	....Lanao del Norte	32	....Marinduque	32		....Guimaras	32	....Misamis Oriental	32
	....Pampanga	33	....Pampanga	33				....Basilan	33
	....Negros Oriental	34	....Bukidnon	34					
	....Antique	35	....Davao Oriental	35					
	....Benguet	36	....Benguet	36					
	....Negros Occidental	37	....Compostela Valley	37					
	....Davao del Norte	38	....Davao del Norte	38					
	....Cebu	39	....Davao del Sur	39					
	....Davao del Sur	40	....Cebu	40					
	....Misamis Occidental	41	....Siquijor	41					
	....Siquijor	42	....Mountain Province	42					
	....Basilan	43							

### Annex I.3 Ranking of Provinces by *Incremental Irrigated Palay Production (in MT) (CNCM3)*

Ranking of Provinces in Terms of Increase in Irrigated Production (in MT)					Ranking of Provinces in Terms of Decrease in Irrigated Production (in MT)				
Global Circulation Model	A1B Scenario		A2 Scenario		Global Circulation Model	A1B Scenario		A2 Scenario	
	Province	Rank	Province	Rank		Province	Rank	Province	Rank
CNCM3	....Pangasinan	1	....Pangasinan	1	CNCM3	....Nueva Ecija	1	....Kalinga	1
	....Isabela	2	....Isabela	2		....Kalinga	2	....Nueva Ecija	2
	....Sultan Kudarat	3	....Sultan Kudarat	3		....Laguna	3	....Laguna	3
	....North Cotabato	4	....North Cotabato	4		....Maguindanao	4	....Antique	4
	....Bulacan	5	....Bulacan	5		....Antique	5	....Lanao del Sur	5
	....Leyte	6	....Occidental Mindoro	6		....Davao del Sur	6	....Davao del Sur	6
	....Bukidnon	7	....Ilocos Norte	7		....Iloilo	7	....Iloilo	7
	....Tarlac	8	....Tarlac	8		....Davao del Norte	8	....Maguindanao	8
	....Occidental Mindoro	9	....Bukidnon	9		....Lanao del Sur	9	....Guimaras	9
	....South Cotabato	10	....Leyte	10		....Nueva Vizcaya	10	....Davao del Norte	10
	....Bohol	11	....Bohol	11		....Aklan	11	....Nueva Vizcaya	11
	....Ilocos Norte	12	....South Cotabato	12		....Albay	12	....Marinduque	12
	....Abra	13	....Camarines Sur	13		....Guimaras	13	....Romblon	13
	....Zamboanga del Sur	14	....Zamboanga del Sur	14		....Cagayan	14	....Aklan	14
	....Agusan del Sur	15	....Abra	15		....Marinduque	15	....Quirino	15
	....Palawan	16	....Palawan	16		....Romblon	16	....Misamis Occidental	16
	....Lanao del Norte	17	....Pampanga	17					
	....Ilocos Sur	18	....Agusan del Sur	18					
	....Camarines Sur	19	....Negros Occidental	19					
	....Apayao	20	....Ilocos Sur	20					
	....Biliran	21	....Apayao	21					
	....Southern Leyte	22	....Zambales	22					
	....Negros Occidental	23	....Lanao del Norte	23					
	....Ifugao	24	....Ifugao	24					
	....Zamboanga Sibugay	25	....Bataan	25					
	....Compostela Valley	26	....Compostela Valley	26					
	....Zambales	27	....Sorsogon	27					
	....Pampanga	28	....Cavite	28					
	....Agusan del Norte	29	....Quezon	29					
	....Quezon	30	....Aurora	30					
	....Capiz	31	....Agusan del Norte	31					
	....Zamboanga del Norte	32	....Biliran	32					
	....Sorsogon	33	....Southern Leyte	33					
	....Aurora	34	....Capiz	34					
	....Cavite	35	....Oriental Mindoro	35					
	....Bataan	36	....Zamboanga Sibugay	36					
	....Negros Oriental	37	....Zamboanga del Norte	37					
	....Cebu	38	....Negros Oriental	38					
	....Northern Samar	39	....Cebu	39					
	....Mountain Province	40	....Mountain Province	40					
	....Masbate	41	....Surigao del Sur	41					
	....Surigao del Sur	42	....Surigao del Norte	42					
	....Samar (Western Samar)	43	....Northern Samar	43					
	....Surigao del Norte	44	....Catanduanes	44					
	....Sarangani	45	....Masbate	45					
	....Batangas	46	....Benguet	46					
	....Misamis Oriental	47	....Samar (Western Samar)	47					
	....Eastern Samar	48	....Sarangani	48					
	....Benguet	49	....La Union	49					
	....Oriental Mindoro	50	....Rizal	50					
	....Catanduanes	51	....Albay	51					
	....Basilan	52	....Basilan	52					
	....Quirino	53	....Misamis Oriental	53					
	....Misamis Occidental	54	....Davao Oriental	54					
	....Camarines Norte	55	....Batangas	55					
	....Rizal	56	....Eastern Samar	56					
	....La Union	57	....Cagayan	57					
	....Siquijor	58	....Camarines Norte	58					
	....Davao Oriental	59	....Siquijor	59					

#### Annex I.4 Ranking of Provinces by *Incremental Rainfed Palay Production (in MT) (CNCM3)*

Ranking of Provinces in Terms of Increase in Rainfed Production (in MT)					Ranking of Provinces in Terms of Decrease in Rainfed Production (in MT)				
Global Circulation Model	A1B Scenario		A2 Scenario		Global Circulation Model	A1B Scenario		A2 Scenario	
	Province	Rank	Province	Rank		Province	Rank	Province	Rank
CNCM3	....Samar (Western Samar)	1	....Pangasinan	1	CNCM3	....Camarines Sur	1	....Camarines Sur	1
	....Pangasinan	2	....Maguindanao	2		....Masbate	2	....Cagayan	2
	....Maguindanao	3	....Samar (Western Samar)	3		....Cagayan	3	....Masbate	3
	....Leyte	4	....Capiz	4		....Camarines Norte	4	....Antique	4
	....Capiz	5	....Palawan	5		....Albay	5	....Aklan	5
	....Palawan	6	....Eastern Samar	6		....Sorsogon	6	....Abra	6
	....Zamboanga Sibugay	7	....Bohol	7		....Aklan	7	....Albay	7
	....Eastern Samar	8	....Northern Samar	8		....Tarlac	8	....Camarines Norte	8
	....Northern Samar	9	....Leyte	9		....Catanduanes	9	....Sorsogon	9
	....Bohol	10	....Ilocos Sur	10		....Abra	10	....Tarlac	10
	....Zamboanga del Norte	11	....Zamboanga Sibugay	11		....Surigao del Norte	11	....Surigao del Norte	11
	....Lanao del Sur	12	....Nueva Ecija	12		....Quirino	12	....North Cotabato	12
	....Occidental Mindoro	13	....Lanao del Sur	13		....Sarangani	13	....Quirino	13
	....Zamboanga del Sur	14	....Oriental Mindoro	14		....Bukidnon	14	....Nueva Vizcaya	14
	....Ilocos Sur	15	....Agusan del Sur	15		....Cavite	15	....Cavite	15
	....Oriental Mindoro	16	....Occidental Mindoro	16		....Nueva Vizcaya	16	....Aurora	16
	....Nueva Ecija	17	....Sultan Kudarat	17		....Aurora	17	....Southern Leyte	17
	....Agusan del Sur	18	....Zamboanga del Sur	18		....Ilocos Norte	18	....Kalinga	18
	....Iloilo	19	....Bulacan	19		....Rizal	19	....Rizal	19
	....Negros Occidental	20	....Zamboanga del Norte	20		....Kalinga	20	....Surigao del Sur	20
	....Quezon	21	....La Union	21		....Davao Oriental	21	....Laguna	21
	....Sultan Kudarat	22	....Isabela	22		....Bataan	22	....Lanao del Norte	22
	....Antique	23	....Bukidnon	23		....Compostela Valley	23	....Davao Oriental	23
	....North Cotabato	24	....Ilocos Norte	24		....Laguna	24	....Bataan	24
	....Guimaras	25	....Iloilo	25		....Southern Leyte	25	....Sarangani	25
	....Isabela	26	....South Cotabato	26		....Zambales	26	....Mountain Province	26
	....Bulacan	27	....Quezon	27		....Ifugao	27	....Biliran	27
	....Agusan del Norte	28	....Negros Occidental	28		....Mountain Province	28	....Compostela Valley	28
	....Romblon	29	....Apayao	29		....La Union	29	....Misamis Oriental	29
	....South Cotabato	30	....Zambales	30		....Pampanga	30	....Catanduanes	30
	....Apayao	31	....Agusan del Norte	31		....Misamis Oriental	31	....Ifugao	31
	....Marinduque	32	....Romblon	32					
	....Batangas	33	....Marinduque	33					
	....Lanao del Norte	34	....Guimaras	34					
	....Surigao del Sur	35	....Batangas	35					
	....Benguet	36	....Pampanga	36					
	....Davao del Norte	37	....Negros Oriental	37					
	....Negros Oriental	38	....Benguet	38					
	....Davao del Sur	39	....Davao del Sur	39					
	....Cebu	40	....Davao del Norte	40					
	....Biliran	41	....Cebu	41					
	....Misamis Occidental	42	....Misamis Occidental	42					
	....Basilan	43	....Basilan	43					
	....Siquijor	44	....Siquijor	44					

### Annex I.5 Ranking of Provinces by *Incremental Irrigated Palay Production (in MT) (MPEH5)*

Ranking of Provinces in Terms of Increase in Irrigated Production (in MT)					Ranking of Provinces in Terms of Decrease in Irrigated Production (in MT)				
Global Circulation Model	A1B Scenario		A2 Scenario		Global Circulation Model	A1B Scenario		A2 Scenario	
	Province	Rank	Province	Rank		Province	Rank	Province	Rank
MPEH5	....Pangasinan	1	....Pangasinan	1	MPEH5	....Maguindanao	1	....Maguindanao	1
	....Isabela	2	....Isabela	2		....Laguna	2	....Kalinga	2
	....Sultan Kudarat	3	....Sultan Kudarat	3		....Kalinga	3	....Laguna	3
	....Bulacan	4	....Tarlac	4		....Antique	4	....Antique	4
	....North Cotabato	5	....Bulacan	5		....Lanao del Sur	5	....Davao del Sur	5
	....Tarlac	6	....North Cotabato	6		....Davao del Sur	6	....Lanao del Sur	6
	....Nueva Ecija	7	....Occidental Mindoro	7		....Davao del Norte	7	....Iloilo	7
	....Occidental Mindoro	8	....Bukidnon	8		....Batangas	8	....La Union	8
	....Cagayan	9	....Ilocos Norte	9		....Misamis Occidental	9	....Davao del Norte	9
	....South Cotabato	10	....Bohol	10		....Aklan	10	....Guimaras	10
	....Bukidnon	11	....South Cotabato	11		....Guimaras	11	....Misamis Occidental	11
	....Bohol	12	....Zamboanga del Sur	12		....Marinduque	12	....Marinduque	12
	....Camarines Sur	13	....Pampanga	13		....Surigao del Sur	13	....Aklan	13
	....Ilocos Norte	14	....Nueva Ecija	14		....Romblon	14	....Davao Oriental	14
	....Abra	15	....Abra	15				....Albay	15
	....Zamboanga del Sur	16	....Camarines Sur	16				....Samar (Western Sam	16
	....Apayao	17	....Leyte	17				....Romblon	17
	....Agusan del Sur	18	....Cagayan	18					
	....Palawan	19	....Agusan del Sur	19					
	....Pampanga	20	....Apayao	20					
	....Leyte	21	....Palawan	21					
	....Zambales	22	....Quezon	22					
	....Ilocos Sur	23	....Lanao del Norte	23					
	....Compostela Valley	24	....Zambales	24					
	....Biliran	25	....Negros Occidental	25					
	....Lanao del Norte	26	....Ilocos Sur	26					
	....Oriental Mindoro	27	....Bataan	27					
	....Negros Occidental	28	....Zamboanga Sibugay	28					
	....Ifugao	29	....Compostela Valley	29					
	....Aurora	30	....Cavite	30					
	....Quezon	31	....Quirino	31					
	....Southern Leyte	32	....Sorsogon	32					
	....Quirino	33	....Oriental Mindoro	33					
	....Bataan	34	....Capiz	34					
	....Sorsogon	35	....Southern Leyte	35					
	....Cavite	36	....Agusan del Norte	36					
	....Capiz	37	....Biliran	37					
	....Zamboanga Sibugay	38	....Aurora	38					
	....Agusan del Norte	39	....Zamboanga del Norte	39					
	....Zamboanga del Norte	40	....Negros Oriental	40					
	....Cebu	41	....Ifugao	41					
	....Masbate	42	....Cebu	42					
	....Nueva Vizcaya	43	....Nueva Vizcaya	43					
	....Albay	44	....Catanduanes	44					
	....Catanduanes	45	....Sarangani	45					
	....Sarangani	46	....Northern Samar	46					
	....Mountain Province	47	....Masbate	47					
	....Negros Oriental	48	....Surigao del Norte	48					
	....Camarines Norte	49	....Surigao del Sur	49					
	....Northern Samar	50	....Rizal	50					
	....Surigao del Norte	51	....Basilan	51					
	....Basilan	52	....Misamis Oriental	52					
	....Davao Oriental	53	....Mountain Province	53					
	....Iloilo	54	....Camarines Norte	54					
	....Misamis Oriental	55	....Batangas	55					
	....La Union	56	....Benguet	56					
	....Rizal	57	....Eastern Samar	57					
	....Benguet	58	....Siquijor	58					
	....Samar (Western Samar)	59							
	....Eastern Samar	60							
	....Siquijor	61							

## Annex I.6 Ranking of Provinces by *Incremental Rainfed Palay Production (in MT) (MPEH5)*

Global Circulation Model	Ranking of Provinces in Terms of Increase in Rainfed Production (in MT)				Global Circulation Model	Ranking of Provinces in Terms of Decrease in Rainfed Production (in MT)				
	A1B Scenario		A2 Scenario			A1B Scenario		A2 Scenario		
	Province	Rank	Province	Rank		Province	Rank	Province	Rank	
MPEH5	....Pangasinan	1	....Pangasinan	1	MPEH5	....Camarines Sur	1	....Masbate	1	
	....Capiz	2	....Maguindanao	2		....North Cotabato	2	....Camarines Sur	2	
	....Maguindanao	3	....Capiz	3		....Masbate	3	....Aklan	3	
	....Samar (Western Samar)	4	....Samar (Western Samar)	4		....Antique	4	....Iloilo	4	
	....Palawan	5	....Bohol	5		....Surigao del Norte	5	....Camarines Norte	5	
	....Nueva Ecija	6	....Nueva Ecija	6		....Sorsogon	6	....Sorsogon	6	
	....Bohol	7	....Lanao del Sur	7		....Abra	7	....Surigao del Norte	7	
	....Ilocos Sur	8	....Eastern Samar	8		....Sarangani	8	....Abra	8	
	....Zamboanga Sibugay	9	....Palawan	9		....Surigao del Sur	9	....Albay	9	
	....Eastern Samar	10	....Northern Samar	10		....Albay	10	....Tarlac	10	
	....Zamboanga del Norte	11	....Bulacan	11		....Tarlac	11	....Antique	11	
	....Oriental Mindoro	12	....Isabela	12		....Quirino	12	....Quirino	12	
	....Occidental Mindoro	13	....Ilocos Sur	13		....Southern Leyte	13	....Southern Leyte	13	
	....Leyte	14	....Cagayan	14		....Camarines Norte	14	....Agusan del Norte	14	
	....Northern Samar	15	....Oriental Mindoro	15		....Aklan	15	....Catanduanes	15	
	....Iloilo	16	....Apayao	16		....Nueva Vizcaya	16	....Nueva Vizcaya	16	
	....Lanao del Sur	17	....Zamboanga del Norte	17		....Cavite	17	....Sarangani	17	
	....Bulacan	18	....Zamboanga Sibugay	18		....Agusan del Norte	18	....Cavite	18	
	....Isabela	19	....Bukidnon	19		....Rizal	19	....Rizal	19	
	....Zamboanga del Sur	20	....Sultan Kudarat	20		....Cagayan	20	....Aurora	20	
	....Apayao	21	....Quezon	21		....Aurora	21	....Kalinga	21	
	....Sultan Kudarat	22	....Zamboanga del Sur	22		....Davao Oriental	22	....Laguna	22	
	....La Union	23	....Occidental Mindoro	23		....Laguna	23	....Negros Occidental	23	
	....Bukidnon	24	....Agusan del Sur	24		....Kalinga	24	....Ilocos Norte	24	
	....Agusan del Sur	25	....Leyte	25		....Bataan	25	....Biliran	25	
	....Negros Occidental	26	....Romblon	26		....Compostela Valley	26	....Bataan	26	
	....South Cotabato	27	....La Union	27		....Biliran	27	....Mountain Province	27	
	....Romblon	28	....South Cotabato	28		....Misamis Occidental	28	....Misamis Oriental	28	
	....Quezon	29	....Marinduque	29		....Mountain Province	29			
	....Catanduanes	30	....Batangas	30		....Misamis Oriental	30			
	....Guimaras	31	....Pampanga	31						
	....Marinduque	32	....Zambales	32						
	....Ilocos Norte	33	....North Cotabato	33						
	....Lanao del Norte	34	....Negros Oriental	34						
	....Pampanga	35	....Lanao del Norte	35						
	....Zambales	36	....Davao del Norte	36						
	....Batangas	37	....Benguet	37						
	....Benguet	38	....Davao Oriental	38						
	....Davao del Norte	39	....Compostela Valley	39						
	....Cebu	40	....Davao del Sur	40						
	....Davao del Sur	41	....Guimaras	41						
	....Negros Oriental	42	....Cebu	42						
	....Basilan	43	....Misamis Occidental	43						
	....Ifugao	44	....Ifugao	44						
	....Siquijor	45	....Surigao del Sur	45						
			....Basilan	46						
			....Siquijor	47						

### Annex J. Actual Irrigated Palay Production Ranking of Provinces (2008-2010)<sup>13</sup>

Province	2008-2010	Rank
	Production (in MT)	
....Nueva Ecija	1,251,712	1
....Isabela	952,336	2
....Pangasinan	623,604	3
....Cagayan	550,631	4
....Tarlac	500,562	5
....Iloilo	489,973	6
....Camarines Sur	433,898	7
....Leyte	389,182	8
....North Cotabato	365,420	9
....Pampanga	364,181	10
....Sultan Kudarat	335,740	11
....Negros Occidental	319,973	12
....Bukidnon	299,409	13
....South Cotabato	259,596	14
....Bulacan	246,039	15
....Ilocos Norte	239,228	16
....Oriental Mindoro	235,924	17
....Zamboanga del Sur	233,782	18
....Nueva Vizcaya	211,669	19
....Occidental Mindoro	202,389	20
....Antique	152,673	21
....Maguindanao	148,171	22
....Kalinga	146,928	23
....Albay	136,073	24
....Bataan	128,591	25
....Lanao del Norte	127,459	26
....Laguna	122,344	27
....Davao del Sur	121,572	28
....Capiz	119,812	29
....Agusan del Sur	116,879	30
....Davao del Norte	112,272	31
....Palawan	108,747	32
....Bohol	105,295	33
....Ilocos Sur	100,083	34
....Quezon	93,265	35
....Sorsogon	89,568	36
....Southern Leyte	89,299	37
....La Union	87,413	38
....Compostela Valley	82,726	39
....Aurora	82,206	40
....Zambales	80,300	41
....Zamboanga Sibugay	75,610	42
....Misamis Occidental	70,199	43
....Aklan	69,585	44
....Apayao	68,836	45
....Biliran	68,013	46
....Quirino	67,917	47
....Surigao del Sur	65,686	48
....Lanao del Sur	65,001	49
....Ifugao	60,781	50

Province	2008-2010	Rank
	Production (in MT)	
....Agusan del Norte	58,205	51
....Negros Oriental	56,413	52
....Surigao del Norte	51,711	53
....Davao Oriental	51,489	54
....Abra	50,306	55
....Zamboanga del Norte	49,240	56
....Camarines Norte	48,932	57
....Batangas	41,219	58
....Cavite	38,432	59
....Sarangani	32,748	60
....Misamis Oriental	25,758	61
....Rizal	25,635	62
....Masbate	24,623	63
....Zamboanga City	19,561	64
....Catanduanes	18,986	65
....Romblon	18,470	66
....Samar (Western Samar)	16,360	67
....Mountain Province	15,529	68
....Cebu	15,028	69
....Benguet	14,442	70
....Northern Samar	14,417	71
....Guimaras	12,877	72
....Eastern Samar	11,961	73
....Marinduque	10,193	74
....Davao City	9,171	75
....Dinagat Islands	4,135	76
....Siquijor	2,628	77
....Basilan	2,580	78
....Camiguin	2,255	79
....Sulu	222	80

<sup>13</sup> Basic data from PSA-BAS

## Annex K. Actual Rainfed Palay Production Ranking of Provinces (2008-2010)<sup>14</sup>

Province	2008-2010	Rank
	Production (in MT)	
....Iloilo	358,796	1
....Pangasinan	299,762	2
....Maguindanao	273,918	3
....Capiz	222,763	4
....Leyte	163,887	5
....Cagayan	117,638	6
....Nueva Ecija	117,443	7
....Negros Occidental	117,320	8
....Lanao del Sur	116,244	9
....North Cotabato	114,441	10
....Camarines Sur	109,553	11
....Palawan	109,278	12
....Occidental Mindoro	108,234	13
....Samar (Western Samar)	98,356	14
....Bohol	96,478	15
....Ilocos Sur	84,536	16
....Antique	82,905	17
....Masbate	81,907	18
....Northern Samar	81,838	19
....Zamboanga Sibugay	76,123	20
....Bulacan	71,213	21
....Agusan del Sur	66,381	22
....Oriental Mindoro	64,296	23
....Sultan Kudarat	59,274	24
....Quezon	56,596	25
....Zamboanga del Sur	56,092	26
....Aklan	54,848	27
....Isabela	52,505	28
....La Union	52,341	29
....Ilocos Norte	46,938	30
....Zamboanga del Norte	40,540	31
....South Cotabato	36,599	32
....Eastern Samar	36,452	33
....Guimaras	35,930	34
....Albay	35,402	35
....Tarlac	34,093	36
....Apayao	30,731	37
....Zambales	30,165	38
....Abra	26,175	39
....Sorsogon	23,412	40
....Surigao del Sur	23,127	41
....Bukidnon	22,040	42
....Camarines Norte	21,609	43
....Lanao del Norte	20,729	44
....Surigao del Norte	20,581	45
....Agusan del Norte	19,995	46
....Catanduanes	17,423	47
....Batangas	15,261	48
....Marinduque	13,644	49
....Romblon	12,632	50
....Sarangani	12,514	51
....Compostela Valley	12,131	52
....Southern Leyte	11,593	53
....Davao Oriental	11,194	54
....Pampanga	10,889	55
....Nueva Vizcaya	9,932	56
....Negros Oriental	9,476	57
....Davao del Norte	8,075	58
....Aurora	6,024	59
....Kalinga	5,928	60
....Zamboanga City	5,624	61
....Davao City	5,146	62
....Quirino	5,038	63
....Misamis Occidental	4,377	64
....Cavite	4,044	65
....Sulu	3,045	66
....Bataan	2,659	67
....Mountain Province	2,284	68
....Rizal	2,001	69
....Benguet	1,939	70
....Ifugao	1,863	71
....Laguna	1,639	72
....Basilan	1,587	73
....Misamis Oriental	1,426	74
....Davao del Sur	1,420	75
....Dinagat Islands	1,388	76
....Biliran	971	77
....Tawi-tawi	901	78
....Cebu	790	79
....Siquijor	247	80
....Camiguin	9	81

<sup>14</sup> Basic data from PSA-BAS