



*Organic balangon bananas,
Tupi, South Cotabato*
Photo by: Milo Alto Paz

04

**Competitive
and
Sustainable
Agriculture
and Fisheries
Sector**

Competitive & Sustainable Agriculture & Fisheries Sector

The agriculture and fisheries sector provides food and vital raw materials for the rest of the economy. It is itself a significant market for the products and services of the non-agricultural economy. As the sector grows and modernizes, it releases surplus labor to the industry and services sectors. Rising productivity and efficiency in the sector are critical in maintaining the affordability of food and purchasing power, especially among the poor. The sector's development is therefore vital in achieving inclusive growth and poverty reduction as well as attaining the targets under the MDGs.

The country, however, exhibits a slower structural transformation than other East Asian countries. The shares of agriculture in GDP and total employment have continued to decline, but the transfer of the labor released from this sector to higher-productivity jobs in industry and services has lagged owing to low skill levels among agricultural workers and distortions in other economic sectors.

Increasing demands on the sector's output have also put pressure on its natural resource base. Unsustainable practices employed to improve yields have resulted in land degradation and problems of water availability. Climate change has exacerbated the inherent vulnerabilities of the sector. Development efforts need to focus on transforming the sector into one that is not only highly productive but also climate-resilient, environment-friendly, and sustainable.

Assessment

Sector Performance

The sector remains an important part of and contributor to the economy.

Contribution to output and employment. From 2004 to 2010, agriculture and fisheries contributed an average of 18.4 percent to GDP and the sector grew at an average rate of 2.6 percent annually. This performance was significantly below the target of the previous Plan. Among the regions, the top contributors in 2009 have been Region 4-A (12.1%) followed by Region 3 (11%), Region 6 (10%), Region 10 (8.2%) and Region 12 (8.0%). In terms of employment, the sector

employed an average of 11.8 million people. These account for almost 35.1 percent of the total work force (Table 4.1). If the whole agriculture value chain is considered, the contribution to GDP and total employment would reach 35 percent and 50 percent, respectively.

Contribution of subsectors. The sector's growth was driven primarily by fishery (1.21%), palay (0.40%), corn (0.31%), banana (0.22%) and poultry (0.22%) as shown in Table 4.2 in the next page.¹ Growth in the fisheries sector is partly due to the expansion of aquaculture and robust demand for commodities such as seaweeds. The productivity of municipal fisheries, such as small-scale capture fisheries (less than 3 gross ton boats), has

¹ The values in parenthesis reflect growth rate as weighted against commodity share in the Agriculture, Fishery and Forestry (AFF) gross value added.

Table 4.1 Agriculture and Fishery (with Forestry) Performance and Contribution to Economy: 2004-2010

AFF Sector	2004	2005	2006	2007	2008	2009	2010	Average
Performance (in %)								
MTPDP Target	4.0 - 5.0	4.2 - 5.2	4.2 - 5.2	4.0 - 5.0	4.3 - 5.2	5.1 - 6.2	5.2 - 6.2	4.4 - 5.4
Actual Growth	5.2	2.0	3.8	4.9	3.1	0.01	(0.5)	2.6
Agri Gross Value Added (in Php M)	226,417	230,954	239,777	251,495	259,410	259,424	258,081	246,508
% share to GDP	19.6	19.1	18.8	18.4	18.3	18.1	16.8	18.4
Agri Employment (in '000 persons)	11,381	11,628	11,682	11,785	12,030	12,043	11,974	11,789
% share to total employment	36.0	36.0	35.8	35.1	35.3	34.3	33.2	35.1

Source: BAS, NSCB, 2011

Note: Revised growth target for 2008 and 2009 based on August 2008 DBCC Meeting

Table 4.2 Contribution of Sub-Sectors in Agriculture and Fishery Growth: 2004-2010

Sector	% contribution to growth							Average
	2004	2005	2006	2007	2008	2009	2010	
Palay	1.3	0.1	0.8	1.0	0.6	(0.5)	(0.5)	0.40
Corn	1.0	(0.2)	1.0	0.7	0.2	0.1	(0.6)	0.31
Coconut	0.0	0.1	0.0	(0.0)	0.1	0.1	(0.0)	(0.02)
Sugarcane	0.2	(0.2)	0.2	(0.2)	0.5	(0.2)	(0.4)	(0.02)
Banana	0.1	0.3	0.2	0.3	0.5	0.1	0.0	0.22
Other crops	0.1	0.2	(0.02)	1.3	(0.3)	(0.4)	0.4	0.16
Livestock	(0.1)	0.3	0.3	0.3	(0.1)	0.1	0.2	0.13
Poultry	0.5	0.0	(0.0)	0.0	0.5	0.2	0.4	0.22
Agricultural Activities	0.2	0.1	0.2	0.2	0.1	0.1	(0.1)	0.11
Fishery	1.9	1.3	1.3	1.6	1.3	0.6	0.4	1.21

Source: BAS, 2011

been declining, however. This can be partly attributed to overfishing and poor enforcement of fishery laws. The national stock assessment of the Bureau of Fisheries and Aquatic Resources (BFAR) suggests that two-thirds of the 12 major fishing bays in the country are already overfished.

The positive performance of palay and corn is due to the use of quality seeds, increase in yield, and rehabilitation of irrigation facilities. For banana, this is due to an expansion in area, an increase in yield, and good demand in the local and export markets.

Contribution to global trade. Between 2004 and 2010, agriculture and fisheries sector exports rose from US\$2.5 billion to US\$4.1 billion. The top agricultural exports, in terms of value are coconut oil, fresh banana, tuna, pineapple, tobacco, and seaweeds. The overall balance of trade in agriculture has become increasingly passive, with the deficit widening from US\$837 million in 2004 to US\$3.2 billion in 2010. The country recorded a favorable trade balance in some items, however, namely, vegetable and fruits (US\$634 million), fishery products (US\$497 million), and crude rubber (US\$31.7 million) in 2010 (Table 4.3). There was no significant change in the structure of exports in the period.

Share to total land area and number of farmers. In terms of land area, a total of 4.8 million agricultural farms in the country occupy 9.7 million hectares (2002 Census of Agriculture and Fisheries). These account for almost 32 percent of the total land area of the country. The top four crops with the highest hectareage are coconut (3.33 million hectares), followed by rice (2.47 million hectares), corn (1.35 million hectares), and sugarcane (0.36 million hectares). In terms of number of farmers and fisherfolk, about 1.61 million farmers are engaged in fishing (25.1%), 1.4 million are in coconut (21.7%), 1.35 million in rice (21.0%), 0.68 million in corn (10.6%), 0.07 million in sugarcane (1.0%) and around 1.32 million in other commodities (20.6%).

Agribusiness land development. Through the efforts of three rural development agencies, namely the DA, DAR and DENR, under the National Convergence Initiative (NCI), over 1.83 million hectares of land have been developed for agribusiness, generating about 2.67 million jobs between 2005 and 2010 (Table 4.4).

The NCI is a strategic development approach that can contribute to sustainable development in the countryside through complementation of efforts in the rural sector. In December 2010, the three agencies signed the Joint Memorandum Circular (JMC) adopting a shared "Policy and Implementation Framework for the

Table 4.3 Value of Philippine Agricultural Exports and Imports: 2004 and 2010 (in million \$US)

Item	2004			2010*		
	Export	Import	Trade Balance	Export	Import	Trade Balance
Meat and Meat Preparations	4.3	150.9	(146.5)	39.4	381.6	(342.3)
Dairy Products and Bird's Eggs	75.1	482.5	(407.4)	142.1	743.7	(601.6)
Fish and Fish Preparations	413.4	37.0	376.4	633.8	136.8	497.0
Cereal and Cereal Preparations	44.5	659.2	(614.7)	98.5	2,446.3	(2,347.8)
Vegetables and Fruits	783.4	102.9	680.5	916.6	282.7	633.9
Sugar and Sugar Preparations	102.3	70.2	32.1	105.1	369.5	(264.4)
Coffee, Tea, Cocoa, Spices	14.1	90.0	(75.9)	13.0	237.6	(224.7)
Crude Rubber	36.1	31.9	4.1	55.9	24.2	31.7
Fixed Vegetable Oils and Fats	581.3	71.0	510.2	1,269.8	39.1	1,230.7
Others (e.g., tobacco, fertilizer, machinery etc.)	452.1	1,647.7	(1,195.6)	823.6	2,669.6	(1,846.0)
Total Agricultural Exports/Imports	2,506.7	3,343.5	(836.8)	4,097.6	7,331.2	(3,233.6)

Source: BAS, 2011

Note: *2010 figures are preliminary

Table 4.4 Agribusiness Lands (including Agroforestry) Developed: 2005-2010

Agency	2005-2007		2008		2009		2010		Total	
	Areas	Jobs Generated	Areas	Jobs Generated	Areas	Jobs Generated	Areas	Jobs Generated	Areas	Jobs Generated
DA	812,096	1,334,678	335,948	479,747	295,524	436,677	30,408	52,767	1,473,976	2,303,869
DAR	247,493	237,387	19,579	27,492	31,605	41,981	2,106	2,106	300,783	308,966
DENR	8,759	8,759	1,967	1,967	50,024	50,024	-	-	60,750	60,750
TOTAL	1,068,348	1,580,824	357,494	509,206	377,153	528,682	32,513	54,873	1,835,508	2,673,585

Source: National Convergence Initiative Secretariat, December 2010

Table 4.5 Land Acquisition and Distribution Performance: 2004-2010

Year	MTPDP Target (in ha)	Funded Target* (in ha)	Accomplishment			
			Hectares	No. of ARBs	in %	
					Per MTPDP	Per Funded Target
2004	212,121	110,046	104,069	71,682	49	95
2005	122,931	130,000	131,069	88,152	107	101
2006	214,000	130,000	125,177	72,280	58	96
2007	214,000	130,000	134,041	94,807	63	103
2008	220,453	130,000	146,275	90,738	66	113
Sub-total	983,505	630,046	640,631	417,659	65	102
2009	-	85,764	59,488	43,792	-	69
2010	-	200,000	107,179	63,298	-	54
Total		915,810	807,298	524,749		88

Source: DAR, 2011

Note: *Targets based on approved/reenacted budgets

Enhanced National Convergence Initiative among DA, DAR, and DENR”.

Extension of land reform. The accomplishment of land acquisition and distribution (LAD) for the period 2004-2010 compared to the funded target is at 88 percent. On the other hand, the accomplishment in terms of the previous Medium Term Philippine Development Plan (MTPDP) 2004-2010 target is around 65 percent (Table 4.5). The target projection in the previous Plan states the commitment to finish land distribution by the end of 2008, the last year of the 10-year extension provided under the Comprehensive Agrarian Reform Program (CARP). A total of 807,298 hectares were distributed to 524,749 agrarian reform beneficiaries (ARBs) during the period. From 1987, the cumulative area distributed has now reached 4,113,347 hectares.

Extending the CARP for the second time was a challenge unlike the first when RA 8532 was passed by the legislative branch before the Ramos Administration ended on June 30,

1998. This time, no second extension law was passed by Congress after the 10-year extension period. From July 1, 2008 to June 30, 2009, CARP continued to be implemented only under a Joint House-Senate Resolution. On August 7, 2009, RA 9700, otherwise known as the CARP Extension with Reforms or CARPer, was signed into law mandating the completion of land distribution in five years. It also provided an additional appropriation of Php150 billion for the implementation of the major components of CARP.

Gains in the sector have been achieved, but its full potential is unrealized.

Growth below target. During the period 2004-2010, the average growth, while positive at 2.6 percent annually, has been below the target of the previous Plan, which is a sustained growth of 4.4 percent to 5.4 percent. The occurrence of the global financial crisis, a fuel price spike in 2008, and climate-related events in 2009 (e.g., El Niño, typhoons) all contributed to the nonattainment of the target. The devastation from the typhoons Ondoy and Pepeng resulted in damage to agriculture and fisheries estimated at

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Table 4.6 Land Productivity in Selected Southeast Asian Countries

Commodity	Land Productivity, 2009 (in mt/hectare)				
	Indonesia	Malaysia	Philippines	Thailand	Vietnam
Rice (paddy)	5.0	3.7	3.6	2.9	5.2
Corn	4.2	5.6	2.6	4.2	4.0
Coffee (green)	0.7*	0.6*	0.8	1.0	2.2*
Banana	59.7	21.8	20.2	13.6	14.3*
Coconut	6.6*	2.8	4.6	5.8	7.9*
Mango, mangosteen & guava	11.6	4.1	4.1	8.0	7.1
Abaca	1.0*	no data	0.5	no data	no data
Papaya	85.1	10.0	19.6	17.0	no data
Pineapple	74.2	34.7	37.4	20.9	13.0
Sugarcane	63.1	46.7	56.8	71.7	58.6
Vegetables (fresh)	10.6	13.2	8.0	8.4	12.6

Source: Food and Agriculture Organization Corporate Statistical Database

Note: *2008 data; 2009 is preliminary data

Table 4.7 Revealed Comparative Advantage (RCA) in Selected ASEAN Countries: 2007

Commodity	RCA in 2007				
	Indonesia	Malaysia	Philippines	Thailand	Vietnam
Rice (milled)	0.002	0.000	0.001	23.423	37.510
Corn	0.117	0.002	0.010	0.507	0.003
Coffee (green)	4.173	0.005	0.002	0.085	30.556
Banana	0.011	0.035	26.329	0.082	0.039
Coconut (desiccated)	11.618	0.472	66.303	0.033	0.000
Fruits (dried)	0.458	0.038	0.372	10.716	2.759
Tropical fruits (dried)	0.000	0.000	251.868	0.000	0.000
Mango, mangosteen & guava	0.145	0.058	11.972	3.834	0.162
Abaca	0.155	0.000	30.805	0.000	0.000
Papaya	0.007	1.754	7.417	0.157	0.000
Pineapple	0.050	0.241	47.533	0.628	0.038
Sugar (raw)	0.000	0.000	2.220	5.453	0.204
Vegetables (fresh)	0.110	0.807	1.598	5.163	0.504
Total Agri Products	2.393	1.003	0.975	1.880	1.854

Source: Habito et al., 2010

PhP24.7 billion in 2009 pulling down the sector's growth to only one-tenth of a percent in the same year.

Declining productivity and competitiveness. While the productivity of the agricultural workforce has increased annually by an average of 1.66 percent from PhP19,894 in 2004 to PhP21,553 in 2010, land productivity in terms of yields of traditional crops (e.g., rice, corn, sugarcane and coconut) has stagnated or declined.

The Philippines ranked fourth in rice, coconut, sugarcane and fifth in corn out of five ASEAN countries namely Indonesia, Malaysia, Philippines, Thailand and Vietnam (Table 4.6). In terms of price (producer price), rice in the Philippines is the most expensive (US\$318.8/MT), which can be attributed to the lack of factor endowments such as a contiguous land area and big river systems. Furthermore, the growth of total

factor productivity (TFP) growth in agriculture has remained at a low level in the Philippines, namely 0.2 percent per year over the past two decades, compared to 1.0 percent per year in Thailand, 1.5 percent per year in Indonesia, and 4.7 percent in China (WB, 2010).

Comparative advantage not fully exploited. The country actually has a revealed comparative advantage (RCA)² not only in its lead exports such as coconut, banana, mango, pineapple, but also in sugar, abaca, papaya, dried tropical fruit, fresh fruit and fresh vegetables (Table 4.7). Despite the export potential of these commodities, however, particularly the emerging crops, the country's share (8.3%) and value of agricultural products (US\$3.2 billion) to total exports is among the lowest in comparable ASEAN countries.

The country also continues to be the only agricultural net-importer among comparable ASEAN members, with an agricultural trade deficit of US\$2.4 billion in 2009 (Table 4.8). The total value of agricultural imports amounted to US\$5.6 billion, the top six agricultural imports being rice, wheat, soya bean products, milk and cream products, tobacco, and

urea. The value of agricultural exports in 2009 for the Philippines was only US\$3.2 billion³ (WTO, 2010). This is small compared to those of Indonesia, Malaysia and Thailand which had over US\$20 billion each.

Elusive rice self-sufficiency. For the period 2004-2010, domestic rice production has met only 84.71 percent of the country's annual average rice requirements, notwithstanding substantial public investments in the rice sector (DA, 2011). During the global food crisis in 2008, the Philippines imported some 2.4 million MT of rice valued at US\$1.9 billion to supplement its domestic rice stocks.

Increase in food commodities prices. The average increase in the prices of rice and corn were the highest among basic commodities for the period 2004-2010, at 7.8 percent and 7.5 percent, respectively (Table 4.9). This is largely due to the global food crisis in 2008 which saw the retail price of rice increased by as much as 29.1 percent. The 6.4-percent inflation in selected food commodities prices is higher compared to the national headline inflation rate of 5.6 percent. Higher prices of food commodities erode purchasing power, especially among the poor, and highlight the grave threats to food security due to extreme shocks, affecting not only production, but also marketing systems.

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Table 4.8 International Trade of Agricultural Products: 2000 and 2009

Country	Export			Import			Trade Balance 2009
	Value 2009 (in US \$ B)	% Share		Value 2009 (in US \$ B)	% Share		
		2000	2009		2000	2009	
Indonesia	25.3	11.9	21.1	11.4	13.1	12.4	13.9
Malaysia	20.9	8.2	13.3	12.3	5.6	10.0	8.5
Philippines	3.2	5.1	8.3	5.6	8.4	12.2	(2.4)
Thailand	28.0	17.7	18.4	9.4	7.2	7.0	18.6
Vietnam	10.7	27.3	18.7	9.3	8.1	13.2	1.4

Source: World Trade Organization

² RCA is the share of a product in total Philippine exports as a ratio of the share of the same product in total world exports.

³ This is slightly higher than the value of exports in Table 4.8 since WTO category is broader than the figures released by NSO.

Table 4.9 Inflation Rates by Commodity for All Households (in percent)

Country	2004	2005	2006	2007	2008	2009	2010	Average
Rice	2.6	7.0	3.7	3.4	29.1	7.5	1.1	7.8
Corn	10.7	5.5	4.7	4.4	23.2	6.1	-1.8	7.5
Eggs	5.4	3.5	5.6	6.8	6.9	6.8	2.7	5.4
Fish	8.0	6.6	5.2	3.3	9.1	6.1	3.1	5.9
Fruits and Vegetables	6.0	5.0	8.8	2.9	11.7t	5.9	0.5	5.8
Meat	13.0	5.9	2.4	2.6	8.9	5.4	4.1	6.0
Average	7.6	5.6	5.1	3.9	14.8	6.3	1.6	6.4
Philippines (headline inflation)	6.0	7.6	6.2	2.8	9.3	3.3	3.8	5.6

Source: NSO, 2011

Table 4.10 Poverty Incidence and Magnitude in the Philippines: 2003, 2006 and 2009

Item	Poverty Incidence (%)			Magnitude of Poor (in M)			Change in Average Real Income (bottom 30%) 2009 vs. 2006
	2003	2006	2009	2003	2006	2009	
Families	20.0	21.1	20.9	3.3	3.7	3.9	8.3
Population	24.9	26.4	26.5	19.8	22.2	23.1	no data

Source: NSO, 2011

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Stagnant poverty headcount. Despite positive growth and gains in productivity in some subsectors, there has been almost no change in the welfare of almost 6.4 million farmers, fisherfolk and other workers dependent on the sector. The poverty incidence of families has changed slightly between 2003 and 2009 at 20.0 percent and 20.9 percent, respectively (Table 4.10), while poverty in terms of population has increased from 24.9 percent to 26.5 percent, respectively. This is despite an increase in average income of the bottom 30 percent of families of 8.3 percent in real terms from 2006 to 2009.⁴

As such, any variability in prices directly translates to an increase or decrease in the prices of agricultural commodities, especially at the farm level. The increase in international prices of commodities and the fuel price spike in 2008 contributed to the high prices of domestic fertilizer and corn. The price of fertilizer rose by as much as 135 percent in 2008 compared to 2007 and contributed to a decrease of 2.2 percent in palay production in the fourth quarter of 2008.

Inefficient Supply Chain and Logistics Systems

Inefficiencies along the agricultural supply chain result in postharvest losses, higher transaction and distribution costs, and lower productivity. The Philippine logistics system has been characterized as being cost-inefficient, unresponsive to customers and market requirements, and unreliable. Compared to developed countries, distribution and processing costs in the country are 20-30 percent higher with logistics costs

Challenges

Growth in production and productivity faces formidable constraints.

High Cost of Production Inputs

Inputs such as fertilizers and pesticides typically account for 20-30 percent of total production cost while livestock and poultry feeds account for as much as 70

⁴ The poverty estimation methodology was refined by the NSCB in February 1, 2011. However, urban-rural disaggregation is not yet available when the official poverty statistics was released last February 8, 2011.

accounting for almost 30-40 percent of total marketing costs (NEDA-UNDP, 2005).

The ineffective logistics services coupled with inappropriate postharvest handling have, likewise, resulted in huge postharvest losses. For rice and corn, about 14.75 percent and 7.2 percent of the total production are lost during postharvest operations, respectively. Losses are even higher in horticultural crops: losses in fruits range from 5 to 48 percent, while losses in vegetables range from 16 to 40 percent. These postharvest losses, when translated into monetary values, sizeably reduce the income of farmers and their households (BPRE, 2010).

Inadequate Provision of Irrigation Infrastructure

As of 2009, the total area provided with irrigation service is 1.54 million hectares wherein 765,000 hectares are under the National Irrigation Systems (NIS). Communal Irrigation Systems (CIS) cover around 558,000 hectares. The total service area represents 49 percent of the potential irrigable area of 3.126 million hectares. However, the pace of irrigation development in the country has been estimated at less than 1 percent per year. While quick-gestating irrigation development activities such as rehabilitation and improvement of existing systems and facilities were envisioned to fast-track irrigation development, the sector remains hampered by lack of funds to sustainably operate and maintain these irrigation systems, inadequate technical capacity of Irrigator's Associations (IA) and the National Irrigation Authority (NIA) field personnel, as well as inadequate water supply. The succeeding Chapter 5, Infrastructure Development, offers a detailed assessment of rural infrastructure, particularly irrigation bottlenecks and narrates strategic directions to overcome these bottlenecks.

Low Rate of Adoption of Technologies, Including Mechanization

Despite the availability of science and technology packages and products such as organic fertilizer, high-yielding varieties, cost-reducing farming practices, and value-adding technologies, adoption by farmers has been slow because of: (a) weak links between technology producers and extension workers and farmers/fisherfolk; (b) lack of media and public awareness of the benefits of the technologies; and (c) financial or capacity constraints of intended users.

Similarly, the use of mechanization in Philippine agriculture has been low. The current mechanization level of the sector, which is 1.68 horsepower (hp)/hectare, is far below other Asian countries such as Korea (4.11 hp/hectare) and China (3.88 hp/hectare). Among rice and corn farmers, only 21.7 percent have mechanized while the rest continue to use manual labor and farm animals in production activities (UPLB, 2009). The inadequacy of aftersales service, substandard machinery, and the sporadic, fragmented and disorganized implementation of agricultural and fishery mechanization have contributed to low mechanization in the sector.

Limited Access to Formal Credit and Financing

From 2004-2009, the annual proportion of agrifishery and forestry (AFF) loans to total loans granted by banks was at a low average of 2.5 percent. The limited access to credit by small farmers and fisherfolk, despite the banking sector's reported large amount of funds available for lending, has been due to: (a) the lack of track record among farmers; (b) lack of knowledge on accessing formal or bank financing, particularly putting together the required documents; (c) lack of acceptable collateral; delayed release of loans; and (d) numerous documentary requirements that formal lending institutions require from farmers upon commencement of

Inefficiencies along the agricultural supply chain result in postharvest losses, higher transaction and distribution costs, and lower productivity.

The Philippines has long been vulnerable to weather risks, a fact exacerbated by climate change. Since the 1980s, the growth in agricultural gross value-added (GVA) has been erratic partly owing to the impact of severe weather risks and the periodic occurrence of the El Niño and La Niña phenomena. Aside from typhoons *Ondoy* and *Pepeng*, the El Niño in 2010 caused damages to agriculture and fishery estimated at PhP8.4 billion over a total area of 355,986 hectares.

transactions. On the part of the banks, their aversion to high-risk and low-income agricultural projects, the high cost of administering small loans, and poor repayment performance of agricultural loans, among others, have constrained the provision of credit to farmers and fisherfolk (ACPC, 2010).

Competing uses of agricultural lands. Agriculture, together with the natural resource sector, has been adversely affected by shifts towards competing uses. Particularly sensitive for its implication for food security is the conversion of prime agricultural lands to nonagricultural uses (i.e., residential, commercial and institutional) and the rising demand for industrial crops (e.g., biofuel). Alternative land use activities have also encroached upon ecologically fragile lands. These point to the need for a national land use policy that will rationalize the optimal allocation of land among competing uses.

Households dependent on agriculture are especially vulnerable to climate variability and extreme events.

Climate Change

The Philippines has long been vulnerable to weather risks, a fact exacerbated by climate change. Since the 1980s, the growth in agricultural gross value-added (GVA) has been erratic partly owing to the impact of severe weather risks and the periodic occurrence of the El Niño and La Niña phenomena. Aside from typhoons *Ondoy* and *Pepeng*, the El Niño in 2010 caused damages to agriculture and fishery estimated at PhP8.4 billion over a total area of 355,986 hectares.

The DOST-PAGASA scenarios for 2020 and 2050 project widespread warming in most parts of the country. Longer hot days and shorter cold days are expected. The number of days with maximum temperature of more than 35 °C is

expected to increase in all parts of the country in 2020 and 2050. Projected seasonal mean temperatures in the Philippines are expected to rise by about 0.5-0.9 °C for 2020 and 1.2- 2.0 °C by 2050. Extreme rainfall is also projected to increase in Luzon and the Visayas while a decreasing trend is projected in Mindanao (MDGF-1656, 2010).

These changes bring further pressures on agricultural production, which is already stressed by other resource scarcities and economic challenges. Changing rainfall patterns, rising temperatures, increasing frequency and intensity of typhoons and dry spells, and sea level rise are expected as a result of climate change. These impacts will spell a difference in terms of cropping calendars, unpredictability of yields, pest pressures, crop losses, livestock and fisheries production, and damages to existing infrastructure. Sea level rise is already being experienced in parts of the country, reducing the productive coastal areas for agriculture and fisheries. Salt water intrusion in the lowlands and in aquifers for irrigation and domestic uses is also already being experienced.

Environmental Degradation

Of the country's total land area, 5.2 million hectares (about 17%) are severely eroded and another 8.34 million hectares (27.3%) are vulnerable to drought, alternating with floods and typhoons on an annual basis. In the lowlands, continued use of unsustainable production practices such as the extensive use of chemical inputs, expansion of grazing lands, slash and burn practices, and deforestation especially in watershed areas have resulted in land degradation (i.e., erosion, declining soil fertility) and problems of water quality and availability. In the upland ecosystem, climatic drivers and human-induced activities have resulted not only in land degradation but also in the loss of biodiversity (BSWM, 2004).

Agricultural development is also undermined by flawed policies and institutions.

Weak Agricultural Extension Service

Devolution of agricultural support services and extension, beset by lack of LGUs absorptive capacities, has resulted in weak extension services. The decentralization of the agricultural extension service was pursued on the premise that the constraints to production and service requirements of farmers and fisherfolk would be best addressed through an LGU-led, NG-supported agriculture service system. The devolution, however, has been beleaguered with poor absorptive capacities of LGUs to take on the task of extension service provision. With the social, infrastructure, and economic sectors, agriculture has been less prioritized in the development agenda of many LGUs. Hence, funding allocation is minimal and often times dependent on the support of the DA. This has resulted in inadequate manpower and weak extension services of local agriculture offices, both at the provincial and municipal levels (Balisacan, 2006).

Contradictory Rice Policy

Vested with the function of stabilizing the supply and prices of rice, the country's staple, the NFA's operations aim to raise farmgate prices to secure farmers' profit, and at the same time, maintain retail prices at an affordable level for consumers. Government intervention on both sides of the market has led to huge public losses, increased the volatility of domestic prices, reduced the welfare of both consumers and producers, and discouraged the private sector from investing in distribution and storage facilities (Balisacan et al., 2006).

The NFA support price has on average led to an increase in consumer prices in ten regions of the country and contributed little to price stabilization (Purdue University, 2005). It is worth noting that among NFA rice consumers, only 46.6 percent are considered poor. In addition, among all poor households who are supposed to benefit from NFA rice, only 24 percent have been able to access them (Reyes et al., 2009).

Incomplete Implementation of Asset Reforms

The long period of implementation and pending completion of the CARP has resulted in underinvestment in the sector, largely owing to the uncertainty faced by landowners. Landowners are reluctant to invest while their farms are undergoing acquisition processing. On the other hand, for lands that have been awarded, support services to the ARBs are insufficient to improve productivity. The implementation of asset reforms must therefore be completed in the next five years as provided in RA 9700, including the allocation and release of the PhP150 billion budget for the program. The full implementation of the CARPer will facilitate asset reform and serve as an incentive to farmers and other stakeholders to invest in rural areas (Habito & Briones, 2005).

Limited Investments in Public Goods

Public goods are important because their benefits are shared by the community; they yield high social returns on investment and have long-term impacts, and they are not readily provided by the private sector but important to society as a whole. On the other hand, other interventions, such as subsidies on fertilizer have benefits limited to target groups, have impacts which are short-run, are costly to government, and do compete with or crowd out the private sector. The current spending on agricultural research and development (R&D), a public good of demonstrated benefits, is a mere 0.10

The current spending on agricultural research and development, a public good of demonstrated benefits, is a mere 0.10 percent of agriculture GVA. This is one-tenth of the 1.0 percent benchmark suggested by international practice.

Food security exists “when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life”.

percent of agriculture GVA. This is one-tenth of the 1.0 percent benchmark suggested by international practice. In the case of rice (which is indicative of the pattern for other products), the contribution of R&D, infrastructure and extension to rice production is estimated at 2.5 percent, 40 percent, and 15 percent respectively, while returns on investments are: (a) 77.1 percent for R&D; (b) 80 percent for extension; and (c) 18 percent for irrigation (Balisacan, 2006).

Public good provision must consider quality. Many infrastructure and postharvest facilities deteriorate rapidly. Field reports document the poor quality of flat bed dryers and rice straw choppers for organic fertilizers. Graft and corruption eat up a large part of the outlays.

In 2004-2010, funds allocated for marketing assistance accounted for only 1.1 percent of the average annual budget of the DA. This is 7 percent lower than the prescribed allocation under the AFMA of 1997. The timely access and dissemination of market and market-related information is critical to making optimal business decisions that in turn impact on revenue, consumer prices, and supply conditions. Likewise, the availability of real-time market intelligence is useful in identifying potential markets as well as information on supply requirements.

Limited Investments on Commodities with Comparative Advantage

While public investment for the rice sector has been substantial in the past years, amounting to almost 60 percent (PhP22.56 billion) of the 2009 AFMA fund, the allocations for high value and export commodities such as fruit trees, vegetables, tree crops and fisheries have been inadequate. Net returns from vegetable and fruit tree production are higher than from rice production by a range of PhP5,000-100,000 (BAS, 2009).

The opportunity cost of underinvesting in other commodities is therefore very high. Focusing on commodities where we have comparative advantage will not only result in increasing income but also improving access to food, higher purchasing power, and enhanced overall welfare of the rural sector.

Incomplete Implementation of the Strategic Agriculture and Fishery Development Zones (SAFDZs) and Preparation of Integrated Development Plans (IDPs)

The identification of SAFDZs as provided under AFMA has not been fully implemented (AFMA Review, 2007). Programs in the sector should also focus on areas of high agriculture potential to avoid spreading investments too thinly resulting in small impact in the rural areas. The SAFDZs will also facilitate prioritization of investment programming in the sector. The identification of these areas should be initiated by LGUs, with technical support from the DA and DENR to ensure that priorities are consistent with local development thrusts and strategies, as well as aligned with the national policies.

Delay in the Implementation of Rationalization Plans

Efficient and effective institutions and bureaucracy are essential to creating an enabling environment that encourages private, LGU and foreign investments in the economy. However, the country’s agricultural bureaucracy is continuously beset with problems related to overcentralization, fragmentation of agencies, weak coordination, overlapping of functions, politicization and corruption, making it ineffective in spurring growth and development for the sector (Habito and Briones, 2005). At the national level, there is a

need to rationalize the DA to focus its core functions on public goods and services, such as R&D extension, and regulation; and maintain its “steering” role in the development of the sector.

Strategic Framework

Vision

The Plan’s vision is a competitive, sustainable and technology-based agriculture and fisheries sector, driven by productive and progressive farmers and fisherfolk, supported by efficient value chains and well-integrated in the domestic and international markets, contributing to inclusive growth and poverty reduction.

Goals and Strategies

Within six years, through prudent use of resources, the agriculture and fisheries sector shall have attained the following: (a) improved food security and increased rural incomes; (b) increased sector resilience to climate change risks; and (c) enhanced policy environment and governance.

Goal 1: Food Security Improved and Incomes Increased

This Plan takes the view that food security exists “when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (FAO, 2002).

This goal will be further fleshed out with the release of the Food Staples Self-Sufficiency Roadmap (FSSR) 2011-2016. The FSSR aims to attain self-sufficiency in staples by focusing on irrigation and instituting reforms in the NFA.

For the sector to fulfill its role in reducing rural poverty and to achieve food security in the long term, increased incomes, productivity and production shall be prioritized. Increased investments and employment are to be fostered and ARBs transformed into profitable entrepreneurs.

Strategy 1.1 Raise productivity⁵ and incomes of agriculture and fishery-based households and enterprises.

Raising productivity and incomes is an important first step towards modernizing the sector. Productivity enhancements will make agriculture and fishery products more competitive, contributing to the growth of the other economic sectors. Chapter 3 on Competitive Industry and Services Sectors further reinforces the important linkage between the agriculture and non-agriculture sector, especially in the promotion of agribusiness and exports. The increased income of agriculture and fishery-based households and enterprises shall lead to the improvement of the quality of lives and capital accumulation for investments. Below are the measures that shall be taken to implement the above strategy:

- a) Diversify production:
 - Facilitate and promote diversification of production and livelihood options;
 - Update SAFDZs as bases for identifying investment areas;
- b) Complete the delineation of municipal waters for better fishery resource management;
- c) Improve rural infrastructure and facilities:
 - Establish climate-resilient agriculture infrastructure through enhanced technical design of irrigation and drainage systems and facilities, farm-to-market roads (FMRs), postharvest

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⁵ Productivity refers to land, labor and capital.

- facilities (PHF), trading posts, among others;
- Provide irrigation services and facilities focusing on rehabilitation and restoration of national irrigation systems; maintain existing systems and establishment of small scale irrigation systems; enhance cost-sharing/counterpart mechanisms for financing with LGUs; and adopt an integrated water resource management approach to ensure water supply;
 - Increase the effectiveness⁶ and efficiency of the rural infrastructure system, including agricultural logistics and various facilities such as farm-to-market roads (FMR), postharvest and information systems (see also Chapter 5: Infrastructure Development); based on a master plan, identify priority FMR projects that strategically link production and consumption areas; and
 - Tap private sector participation in the construction of the needed support infrastructure for the sector;
- d) Develop markets and sharpen regulatory competence:
- Provide effective market assistance, marketing support and information systems, product development, market intelligence, and encourage participation in product promotion activities, both in the domestic and international markets;
 - Provide trade facilitation, including provision of trade and fiscal incentives to encourage participation and investments from the private sector. This will, likewise, entail reforms and law enforcement of agriculture trade policies, and strengthen market access initiatives and technical assistance to SMEs and cooperatives, among others; and
- Sharpen regulatory competence through technical and legal training, improvements in laboratories and equipment, and alignment of domestic with internationally accepted standards, including those for organic inputs, food, and *Halal* certification;
- e) Strengthen Research, Development and Extension (RD&E):
- Update databases and information systems for the formulation of a reliable and responsive National RD&E agenda;
 - Increase investments in integrated RD&E programs that promote productivity enhancement, develop environment-friendly and efficient technologies throughout the value chain, in partnership with selected higher education institutions, LGUs, private and business sector;
 - Harmonize all agricultural and fisheries mechanization programs and projects of all concerned national government agencies, LGUs, and higher education institutions;
 - Rationalize and strengthen the extension system to improve complementation of national, local and private sector entities along the value chain in the provision of extension services;
 - Expand and sustain the sector's human resource base (see also Chapter 8: Social Development); and
 - Encourage the participation of farmers, fisherfolk and their organizations in research and promotion activities;

⁶ Effectiveness refers to cost effectiveness, applicability in the area or suitability with the needs of end-users.

f) Improve the sector's credit access:

- Form stronger partnerships between government and private financial institutions;
- Strengthen the AFMA-mandated Agro-Industry Modernization Credit Financing Program (AMCFP);
- Implement capacity building programs to improve the credit-worthiness of farmers, fisherfolk and their organizations;
- Promote long-term financing for long-gestating crops such as coconut, rubber, oil palm, coffee, cacao and fruit trees similar to Indonesia, Malaysia and Thailand;
- Develop and pilot test innovative financing schemes that would target farmer and fisherfolk who have no collateral and credit track record; and
- Intensify information dissemination of credit, guarantee and insurance programs.

g) Secure food availability and affordability:

- Ensure the availability of food staples (rice, white corn, and other starchy food) at reasonable prices at all times;
- Focus on long-term productivity-enhancing measures for agriculture and fisheries such as irrigation, R&D and extension services instead of short-term interventions (i.e., direct input subsidies);
- Engage proactively with LGUs and the private sector to provide strategic agricultural infrastructure and services;

- Optimize productivity in mariculture parks and broaden the aquaculture base;
- Transform the NFA into an agency focused on addressing extreme shocks to food supply and prices, while maintaining a predictable regulatory environment for rice trade; and
- Management of consumption and diversification of staples.

Strategy 1.2 Increase investments and employment across an efficient value chain.

New investments are particularly important since the sector employs a large share of the labor force and accounts for a majority of the poor population. Making the sector competitive and modern, however, may render some workers redundant, as in the case of mechanization. For the released rural workers to find gainful employment in the industry and services sector, capital accumulation must rise sufficiently such as in agroindustries and agricultural services (e.g., marketing and logistics). In addition, complementary education and training can make rural workers more adaptable and flexible. Expanding the markets of agriculture and fishery products through value-adding and scaling-up of operations can also provide additional employment opportunities.

- a) Create job opportunities by expanding existing markets, aggressively exploring new markets and promoting private investments on agroindustries, agriservices (i.e., custom-hiring), agroforestry and fisheries, in both PPP and private sector-led modes;
- b) Localize agricultural promotion and development in accord with the subsidiarity principle. Regional strategies must take precedence in championing local commodities and promoting sector competitiveness;

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It is important to strengthen ARBs' capacities for agricultural production and transform them into entrepreneurs capable of improving the productivity of the awarded lands, adding substantial value to their produce, engaging in off-farm endeavors, and improving their access to the markets.

- c) Promote more value-adding into products and develop the capacities of stakeholders for value-chain management;
 - d) Promote vertical and horizontal integration of input, production, and marketing (e.g., agroindustry clustering);
 - e) Strengthen the country's agricultural exports by focusing resources on high-value crops (fruits and vegetables, ornamentals, rubber, oil palm, coffee, coconut, etc.) and fishery products (e.g., grouper, seabass, seaweeds, etc.), where comparative advantage is high; and
 - f) Expand investments in aquaculture and other food production areas.
- (CLOA) or at least through collective CLOA;
 - b) Strengthen the organizational capacity of ARBs and ARB organizations to develop and manage agrienterprises;
 - c) Scale-up microenterprises into formal and viable SMEs through the clustering of ARCs and establishing networks of enterprises;
 - d) Liberalize access to credit by ARBs;⁷
 - e) Provide enterprise-based legal support for ARBs and ARB organizations to strengthen their structures and mechanisms; and
 - f) Establish physical infrastructure (FMR, irrigation systems and postharvest facilities, among others) in strategic ARCs and clusters.

Strategy 1.3 Transform agrarian reform beneficiaries (ARBs) into viable entrepreneurs.

The CARP intends to improve the living conditions and wellbeing of the ARBs, lifting them out of poverty and empowering them to improve their socioeconomic future. Awarded agricultural lands, the ARBs' basic input for their economic activities, must therefore be harnessed for this purpose, taking into consideration ecological sustainability and gender equality/equity. It is important to strengthen ARBs' capacities for agricultural production and transform them into entrepreneurs capable of improving the productivity of the awarded lands, adding substantial value to their produce, engaging in off-farm endeavors, and improving their access to the markets:

- a) Achieve land tenure stability of the ARBs in the CARP-awarded lands, preferably through individual certificates of land ownership award

Goal 2. Sector Resilience to Climate Change Risks Increased

The resiliency of the country's agriculture sector is threatened by climate change and extreme weather events. Damage to rural infrastructure and losses to crops, livestock and fishing grounds, water allocation and the competing priorities in the use of water supply are a few emerging problems that should be dealt expediently. Sound scientific advice is needed regarding appropriate crop varieties, cropping patterns, and climate-vulnerable structures, including irrigation systems.

⁷ In compliance with Section 14 of Republic Act 9700

Strategy 2.1 Reduce climate change-related risks and the vulnerability of natural ecosystems and biodiversity through ecosystem-based management approaches, conservation efforts, and sustainable environment and natural resources-based economic endeavors such as agri-ecotourism.

- a) Adopt Integrated Water Resource Management (IWRM) and Sustainable Land Management (SLM) Technologies in the development of water, land, and related resources;
- b) Promote environment-friendly and sustainable production systems that use the farming systems approach, employ good agriculture/aquaculture practices, and promote organic agriculture, as embodied in RA10068 or the Organic Agriculture Act of 2010;
- c) Improve the climate change resilience of fisheries through the restoration of fishing grounds, stocks and habitats and through investment in sustainable and climate change-responsive fishing technologies and products; and
- d) Strengthen sustainable, multisectoral and community-based resource management mechanisms.

Strategy 2.2 Increase the resilience of agriculture communities through the development of climate change-sensitive technologies, establishment of climate-resilient agricultural infrastructure and climate-responsive food production systems, and provision of support services to the most vulnerable communities.

- a) Strengthen R&D for the improvement of crop, livestock and fishery varieties (i.e., resistant

to temperature increase, drought-tolerant, resistant to stresses such as water logging and pests);

- b) Promote viable and competitive crop, livestock and fishery varieties that can tolerate climate variability;
- c) Establish climate-resilient agriculture infrastructure through enhanced technical design of irrigation facilities, FMR, PHF, etc. that take climate risks and extreme climate events into account; and
- d) Strengthen agricultural extension and support services to raise farmers' knowledge and capacity to adopt climate-sensitive farming and fishing technologies.

Strategy 2.3 Strengthen the agriculture and fisheries insurance system as an important risk sharing mechanism.

- a) Improve risk-reducing mechanisms (i.e., guarantee, insurance) to encourage more banks and other lending conduits such as cooperatives and NGOs to lend to agriculture and fisheries; and
- b) Introduce innovative risk-transfer mechanisms such as weather-based/index insurance systems.

Strategy 2.4 Incorporate natural hazards and climate risk in the agricultural land use plan or the Comprehensive Land Use Plan (CLUP)

- a) Pursue the passage of a National Land Use Law as a basis for effective land use policy and planning; and
- b) Use land use planning at national and local levels to identify hazardous areas and as a basis for implementing adaptation and mitigating measures in climate risk- and disaster-prone areas.

The NCI is a multisectoral and integrated planning approach adopted by the DA, DAR, and the DENR towards more efficient use of resources. Through the NCI, the three rural development agencies undertake joint planning, programming and budgeting as well as monitoring and evaluation in the achievement of the sectoral goals and targets of the Plan.

Strategy 2.5 Strengthen the capacity of communities to respond effectively to climate risks and natural hazards.

- a) Conduct IEC campaigns and capacity building activities for the purpose at the local level; and
- b) Establish community-based early warning systems, agrometeorology stations, automatic weather stations (AWS) and climate field schools.

Strategy 2.6 Continue vulnerability and adaptation assessments especially in food production areas.

- a) Produce updated weather-based dynamic cropping calendars to address the irregularity of wet and dry seasons, and develop optimal planting windows based on medium-range weather forecasts; and
- b) Undertake a study to assess groundwater resources availability and vulnerability to ensure food security during period of drought.

Goal 3. Policy Environment and Governance Enhanced

As a complement to the preceding goals, the policy environment and governance shall be enhanced through: (a) the NCI; (b) the use of an effective common management strategy among agencies concerned; (c) budgetary reforms; (d) PPP; and (e) a review of laws and policy issuances.

Strategy 3.1 Reaffirm the mechanisms and objectives of the National Convergence Initiative (NCI).

The NCI is a multisectoral and integrated planning approach adopted by the DA, DAR, and the DENR towards more efficient use of resources. Through the NCI, the three rural development agencies undertake joint planning, programming and budgeting as well as monitoring and evaluation in the achievement of the

sectoral goals and targets of the Plan. The objectives of the NCI include:

- a) Accelerating the completion of the CARPer up to 2014;
- b) Rationalizing land use policies and strengthen the system of land property rights;
- c) Promoting sustainable agriculture and preserve the land resource base;
- d) Enhancing the investment and opportunity climate for agribusiness;
- e) Promoting sustainable upland development and forest management; and
- f) Initiating CCA and mitigation measures.

Strategy 3.2 Adopt Managing for Development Results (MfDR) as a common approach among rural development agencies.

MfDR is a management strategy that focuses on development performance and sustainable improvements in outcomes, providing both framework and practical tools for strategic planning, risk management, progress monitoring, and outcome evaluation (OECD Policy Brief, March 2009). By focusing on clear and measurable results, government resources are translated into programs and projects that deliver development outcomes.

Strategy 3.3. Implement budgetary reforms.

The current budget system for the sector is commodity- and production-oriented and is not geared to promoting competitiveness. Funding for key functional areas under the AFMA, such as market and information services, regulatory functions, research, etc., is currently allocated to commodity programs, which are centrally managed

and lack the ability to prioritize strategically across the entire sector.

A revised budget format shall correct this shortcoming by introducing a system based on priorities, functional responsibilities and market needs, consistent with the AFMA's goals. The revised format will also provide for a greater alignment between the planning and budget processes. This budgetary reform is also inherently linked with the MfDR strategy.

Strategy 3.4 Pursue PPP especially for infrastructure and value chain development.

The private sector will be tapped to participate in government's efforts in delivering immediately the needed infrastructure and services in the agricultural and fisheries sectors. Among the projects that may be eligible under PPP include irrigation infrastructure, food supply chain and postharvest services (i.e., bulk handling facilities, food/grains terminals and processing, storage, handling and port/transport facilities), production centers for various farm inputs, fish farming infrastructure, and market and trading centers.

Strategy 3.5 Review critical legislation (i.e., AFMA, Fisheries Code) and policy issuances (i.e., sugar trade).

A review of laws and policies shall be a continuing activity to ensure the responsiveness of such issuances to current developments in the sector. The AFMA of 1997 and Fisheries Code of 1998, mandates a mandatory review every five years. Corn and sugar trade policies will also be reviewed, to take into account the latest global trends and market forces, and to ensure supply adequacy supply, price stability, and affordability.

Legislative Agenda

Pursue the Passage of a National Land Use Law

The passage of the bill, pending for two decades now, is expected to provide legal and other mechanisms not only for land reform areas, but also zoned areas for water and water uses, especially for agriculture. This is especially important in anticipation of the end of the agrarian reform program and the subsequent opening of the land market. Further, it is envisioned that the policy shall serve as guide to the optimum allocation of land among competing uses within the framework of sustainable development. It shall also provide a mechanism for resolving land use policy conflicts taking into consideration the principles of social equity and economic efficiency.

Institute Reforms in the NFA

The NFA Reorganization Act will further rationalize grains-sector trading. It restructures the agency by separating its regulatory and proprietary functions. The NFA shall grant import permits for rice to all applicants as a ministerial function, subject to the payment of applicable taxes, duties, and service fees. The quantitative restriction on rice must be reviewed in light of the WTO exemption that expires in 2012. The proposed law enables NFA to engage in activities consistent with its renewed mandate.

Rationalize DA, DAR and DENR

The agriculture bureaucracy should be rationalized through the efficient and effective convergence and complementation of the agriculture, agrarian reform and natural resources (AARNR) service agencies and related offices by taking measures to sort out institutional overlaps. The convergence effort will operationalize sustainable development by integrating the social, economic, and environmental aspects of rural development. The proposed legislation will rationalize and strengthen

the provision of extension services towards improving national, local and private sector complementation.

Work for the Accelerated Irrigation Act

Under this law, the NIA shall undertake a six-year accelerated irrigation program to construct irrigation projects in the remaining unproductive but potentially irrigable lands nationwide to an extent to be determined in a full inventory of potential areas for irrigation, and of potential irrigation projects in accordance with technical, economic, and environmental criteria.

Work for a Food Safety and Food Labelling Law

This measure puts in place a coordinated food safety and certification system, clearly defining the functions and mandates of the agencies concerned; establishing a system for public laboratories to ensure the credibility of test results; and strengthening the participation of food supply industries in the global food trade, among others. Consumers' right to information should also be protected through proper labelling of raw materials and ingredients of processed food products, including those sourced from genetically-modified organisms.