



Impact Assessment of the Agricultural
Production Support Services of the DA on
the Income of Poor Farmers/Fisherfolk:
Review of the Evidence

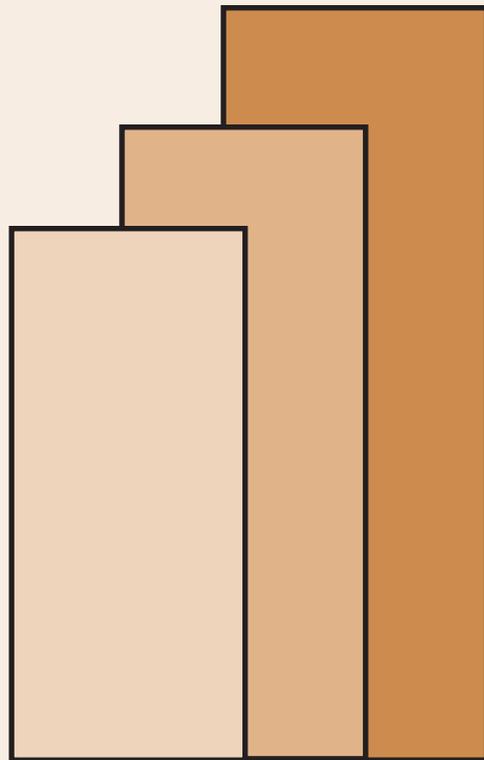
Roehlano M. Briones

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March 2013

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**Impact Assessment of the Agricultural Production Support Services of the Department of
Agriculture (DA) on the Income of Poor Farmers/Fisherfolk: Review of the Evidence**

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Submitted to:
Department of Budget and Management
4 March 2013

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LIST OF ACRONYMS

ACEF	Agricultural Competitiveness Enhancement Fund
AFMCFP	Agriculture and Fisheries Modernization Credit and Financing Program
AFMP	Agriculture and Fisheries Modernization Program
ARF	Agrarian Reform Fund
ASEAN	Association of Southeast Asian Nations
BAS	Bureau of Agricultural Statistics
CARP	Comprehensive Agrarian Reform Program
DA	Department of Agriculture
DAR	Department of Agrarian Reform
DBM	Department of Budget and Management
DOST	Department of Science and Technology
DS	dry season
FAO	Food and Agriculture Organization
FDC	fertilizer discount coupons
FIES	Family Income and Expenditure Survey
FMR	farm-to-market roads
GAA	General Appropriations Act
GDP	Gross Domestic Product
GFI	government financial institutions
GMA	Ginintuang Masaganang Ani
GOCC	government-owned and controlled corporation
HRCP	Hybrid Rice Commercialization Program
HVCC	high value crops commodity
LBP	Land Bank of the Philippines
LGU	local government unit
MAMFI	Masaganang Ani Para sa Magsasaka Foundation, Inc.
MAO	Municipal Agriculturist Officer
MFO	Major Final Output
MOAS	market oriented assistance services
NABCOR	National Agribusiness Corporation

NFA	National Food Authority
NGO	non-governmental organization
NIA	National Irrigation Administration
NPR	nominal protection rate
NSIC	National Seed Industry Council
PCAMRD	Philippine Council for Aquaculture and Marine Research and Development
PCARRD	Philippine Council for Agriculture and Resources Research and Development
PhilRice	Philippine Rice Research Institute
PO	people's organization
PSDFI	Philippine Social Development Foundation, Inc.
QUEDANCOR	Quedan and Rural Guarantee Credit Corporation
R&D	research and development
RCA	Revealed comparative advantage
RFU	regional field unit
ROR	rate of return
SRA	Sugar Regulatory Administration
TFP	Total Factor Productivity
WS	wet season
WTO	World Trade Organization
ZBB	Zero-Based Budgeting

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EXECUTIVE SUMMARY/ABSTRACT

Expenditures on agriculture have been rising over time, as expression of the state's commitment to reduce poverty, raise rural incomes and household welfare, and promote food security. However agriculture continues to exhibit disappointing performance, namely laggard growth, lack of diversification and competitiveness, tepid productivity growth, and persistent poverty among farmers. There is basis for attributing this performance at least in part to faulty design and execution of agricultural programs. Private goods provided as production support, most notably input subsidies, are contra-indicated based on case studies of past failures. Moreover a series of audit reports document leakages and anomalies in these types of programs. This is consistent with international evidence that favors a shift in public expenditure from provision of private goods to provision of public goods. Extension is flagged owing to problems in quality of services provided. Production support should be limited in duration and scope to goods characterized by market failure, most notably those embodying new technologies. Support for postharvest and processing facilities should be limited to strategic investments towards addressing coordination problems and facilitating market development. Among public goods (or goods with public good features), irrigation has not been found to be effective based on econometric evidence. This places in question the current plan to ramp up investment on irrigation, making it far the largest single item for public spending on agriculture. Such investment plans should be reviewed given studies point to design flaws and other implementation problems in past irrigation projects. The public goods that do show evidence of impact on agricultural incomes and productivity are infrastructure such as roads, ports, electrification (under other infrastructure), regulatory services, and R&D for technological change and agricultural modernization.

Keywords: public goods, farm subsidies, agricultural production support, impact assessment

Rejoinder to comments

This responds to the comments contained in the letter of Undersecretary Emerson Palad dated 21 February 2013, which I received by email on . I have done my best to accommodate the comments from DA considering the scope of work given to me by DBM.

1. Comment 1 pertains to a clear definition of assessment period. The report clarifies the period to be 2000 onwards (Paragraph 3.i.) Despite limitations in the data and available literature, every effort was made to include 2010 – 2012 in the assessment. The author thanks USec Palad for pointing out the mistake in the titling of Figure 4, which has been corrected.
2. Comment 2 pertains to paragraph 72 (previous numbering), objecting strongly to the wording of the assessment. I have considered the objection carefully but am constrained to maintain my wording. My summary statement pertains to trends over the decade. I will only change the wording if there is clear evidence of a break in trend. However, consider the following:
 - Growth: growth in agriculture in 2000 – 2010 was 3%; for 2010 – 2012 (latest available data), growth was only 2.7%.
 - Lack of diversification: no big changes in composition of agricultural output, as of 2011 (latest available data)
 - Competitiveness: similarly, no dramatic changes in export performance. Import reduction in rice mainly secured by tightening of import restrictions (see e.g. rampant smuggling due to restrictive trade policy).
 - Tepid productivity growth: under total factor productivity concept, also no clear evidence that trends had picked up. Note that rising yields (e.g. in rice) do not translate readily to TFP.
 - Persistent poverty: unfortunately there are no updates yet since 2009 (latest poverty estimate). Likewise there is no evidence that poverty in agriculture has improved significantly since 2009.
3. Comment 3 pertains to policy shifts under the new administration. It should be noted that this study is an impact assessment. Hence actual programs are only rated favorably when there is data pertaining to changes on the ground - which are not cited in the case coconut and high value crops. I have added paragraph 33 to reflect comments about performance by

sub-sector (for which there is data); in this paragraph I cite recent programs in rice and corn, as well as in fisheries. The new paragraph also includes assessment of overall growth since 2010.

Hopefully this addresses the comments of DA in a fair and balanced manner, removing all obstacles to final acceptance and publication of this study. I trust the published version will carry the standard disclaimer that the views expressed in the report are entirely the responsibility of the author, and not of Department of Budget and Management, nor any government agency, including the Philippine Institute for Development Studies.

1. INTRODUCTION

1. The Philippines' agricultural development strategy aims at inclusive growth and improved welfare for rural households, particularly poor farmers and fishers.¹ The lead agency for agricultural development is the Department of Agriculture (DA). The DA sets the policy framework, directs public investments, and, in partnership with local government units (LGUs), provides support services for agriculture and agri-based enterprises.

2. The DA and its attached agencies have in recent years experienced a dramatic increase in public funding, growing by four-fold over the past seven years (2005 – 2012). Such expansion has permitted the Department greater flexibility in its program allocation, which it has exercised by ramping up production support. Production support varies according to type of commodity program, i.e. crops, livestock/poultry, and fisheries. For the crops sector which include rice, corn and high-value commercial crops, interventions include inputs subsidy such as seeds, planting materials, fertilizer, biologics, farm implements, and the like. Major infrastructure provided for the crops sector includes small-scale irrigation system, large-scale irrigation projects of the National Irrigation Administration (NIA), and farm-to-market roads (FMRs). Other infrastructure consists of post-harvest facilities (e.g., drying machines, storage facilities), trading centers. Meanwhile, the interventions for livestock/poultry consist of animals/animal propagation, among others. In the fisheries sector, major interventions are composed of provision of fingerlings, mariculture parks, fishports, etc.

3. Production support for input subsidies has been controversial; the new administration has officially ended such schemes, but it continues to maintain commodity programs and sustained the budget expansion for production support. Given the various interventions provided by the DA to achieve the twin objectives of inclusive growth and poverty reduction, the study will assess which is more effective intervention: inputs subsidy, rural infrastructure/other structures, or other forms of assistance in order to increase the income of poor farmers/fisherfolks. The scope of work covers the following:

- i) Assess the various commodity programs of DA, i.e., rice, corn, coconut, fisheries, livestock, high value crops and evaluate the efficiency and effectiveness of the strategies/interventions used in providing agricultural support services needed for each commodity and their impact on increasing productivity and income of the poor farmers/fisherfolks, with focus on interventions from 2000 onwards;

- ii) Assess the appropriate mix of various agricultural interventions for each type of commodity, i.e., crops sector (rice, corn, high-value commercial crops) and fisheries that will optimize increase in income of poor farmers and fisher-folks.
 - iii) Assess which is more effective policy intervention of increasing the income of poor farmers/fisherfolk: (1) inputs subsidy; (2) rural infrastructure/other structures (3) other forms of assistance such as marketing strategy
 - iv) Come up with policy recommendations on the more effective policy intervention aimed at optimizing the income of poor farmers/fisherfolks.
4. The rest of this paper is organized as follows: Section 2 discusses the data sources, the framework of assessment, and the assessment method. Section 3 documents trends in public expenditures by type of spending. Section 4 presents the assessment based on the framework provided. Section 6 summarizes and concludes with a set of recommendations.

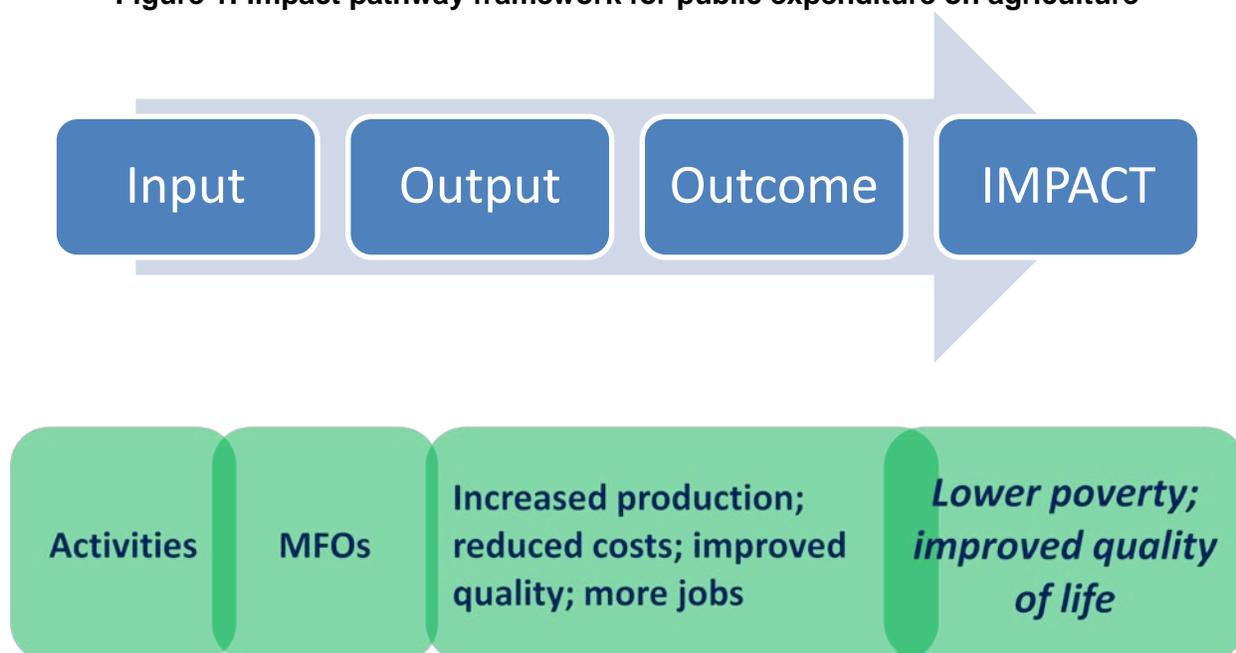
2. FRAMEWORK AND METHOD

Impact framework

5. The study adopts the standard impact pathway approach involving input, output, outcome, and impact (Figure 1). The inputs are the resources allocated for agricultural development interventions; the outputs are the goods and services that have been provided using these resources. The *outcomes* are intermediate effects that result from the goods and services delivered. Finally the impact refers to changes in terms of ultimate societal goals.

6. The impact pathway can be further concretized by the DA's Logical Framework (bottom part of Figure 1) under Results-Based Budgeting (DBM, 2010). Inputs roughly correspond to *Activities*; Output corresponds to the *Major Final Outputs*; Outcomes correspond to *increased production, reduced cost, improved quality, and more jobs*; and finally, impacts correspond to *lower poverty and improved quality of life*.

Figure 1: Impact pathway framework for public expenditure on agriculture



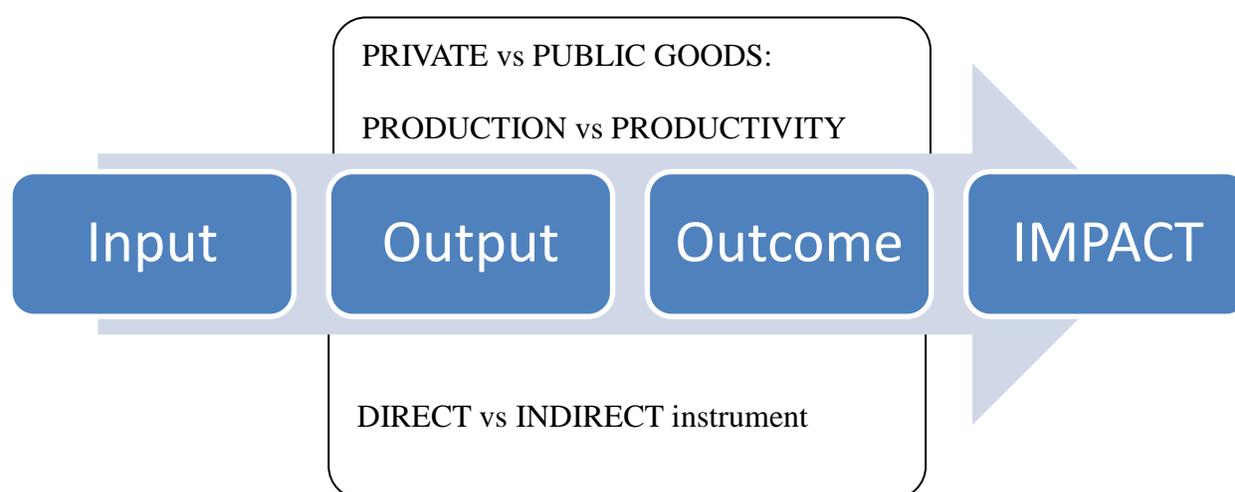
7. The Major Final Outputs are classified under three main headings, namely:
- i) MFO 1: *Agriculture and fishery support services delivered*
 - ii) MFO 2: *Regulations developed, monitored, and enforced*
 - iii) MFO 3: *Plans and policies developed, monitored, implemented*

8. MFO 1 can be further disaggregated into sub-outputs; note that R&D is included under production support; alternatively it could be separately reported with sufficient disaggregation in the budget and expenditure line items. The sub-outputs are:

- i) Production support services: seeds, planting materials, animals, fingerlings, etc.; including R&D
- ii) Market development services
- iii) Credit facilitation services
- iv) Irrigation development services
- v) Other infrastructure and/or postharvest development services
- vi) Extension support, education, and training

9. What specifically are the transmission channels from the MFOs to the final impact? The pathways are elaborated further in Figure 2. Goods and services are inputs to agricultural production; from the production process, increased rural incomes are generated, either from higher net returns to the operator (whether farmer or fisher), and/or increased employment and wages. Goods and services can be categorized as *private* or *public*; private goods are normally provided by the market, whereas public goods are undersupplied or not supplied at all by the market, and require public sector provision.²

Figure 2: Schematic of evaluation framework



10. Public provision of private goods under subsidy can provide a short-term boost to production and net income of operators. This gain materializes only because the cost of the private good is shouldered by the state (rather than by the farmer/fisher). Withdrawal of the

subsidy removes the output effect as well as the net income benefit; hence the sustainability of public provision of private goods is questionable.

11. Moreover, even if this strategy does raise incomes of farmers and fishers, cost-effectiveness remains an issue: given the same benefit, would an alternative instrument incur lower cost for government? In particular, direct transfers to the poor (e.g. cash) may be more cost-effective compared to indirect instruments such as input subsidies.

12. In contrast, public goods typically involve spillover benefits that often have long-lasting effects on agricultural productivity (rather than just production), e.g. R&D, farm-to-market roads, irrigation, etc. Unfortunately productivity gains may involve a relatively long gestation period (i.e. research lag, construction period for irrigation project, etc.). Subsidies for private goods provide greater political traction, compared to investments in public goods.

13. The public – private good dichotomy is a admittedly a simplification; some goods do have both private and public characteristics, hence may be provided by the private sector but subject to market failure. For instance, private sector R&D is active, but is limited to innovations whose benefits can be appropriated by the inventor – for instance, by trade secret (e.g. drug formulation) or by product characteristic (e.g. hybrid seed). We recognize the diversity of goods and services characteristics in our concluding section.

14. These comprise the main theoretical arguments favoring market provision of private goods, and state provision of public goods as well as direct income transfers to target groups. Of course, such *a priori* arguments are insufficient basis for public policy; only factual evidence can provide such a basis. We now turn to the framework for compiling and examining the evidence.

Evaluation framework

15. The ideal method for evaluating impact is to compare a with-intervention to a without-intervention scenario, with respect to end-goals of poverty reduction and improved quality of life. Such a with-and-without comparison pins down causality. Unfortunately, this is literally speaking impossible, because of the *fact* that government did intervene; hence the hypothetical without-intervention scenario is called a *counter-factual*. The best that impact assessment can do is to make a reasonable conjecture or scenario of the without-intervention scenario.

16. No impact assessment study, conducted at this level of rigor, has been carried out for the entire range of DA interventions. Nevertheless, we note that extensive past research is already available which may be synthesized to address the scope of work of this study. Hence in lieu of a new effort to collect primary data, the method selected for this study is desk review.

The review applies this evaluation framework to organize the evidence into a coherent analytical piece, based on indirect evidence, as follows:

- i) **Examination of trends in agricultural performance:** this approach is admittedly prone to the attribution problem; for instance a decline in production after commencing a program does not mean the program caused the decline – there may have been other factors, such as bad weather, prospects of lower prices, etc. However a before-after analysis does have its place in building a cumulative case for impact (or lack of it).
- ii) **Case studies of specific interventions in the country in recent years:** compared to examination of trends, case studies are better at pinning down causality. While the specificity of case **studies** raises questions about generalizability, review of specific past interventions is still useful, again as part of building a cumulative case.
- iii) **Review of statistical evidence:** econometric analysis offers an even stronger type of evidence for impact. However, lack of data may constrain such types of analysis. Obviously results based on Philippine data provides the most direct evidence for impact; nevertheless, international evidence is still useful, to buttress generalizability of findings from Philippines-based case studies and statistical analysis.

Data sources

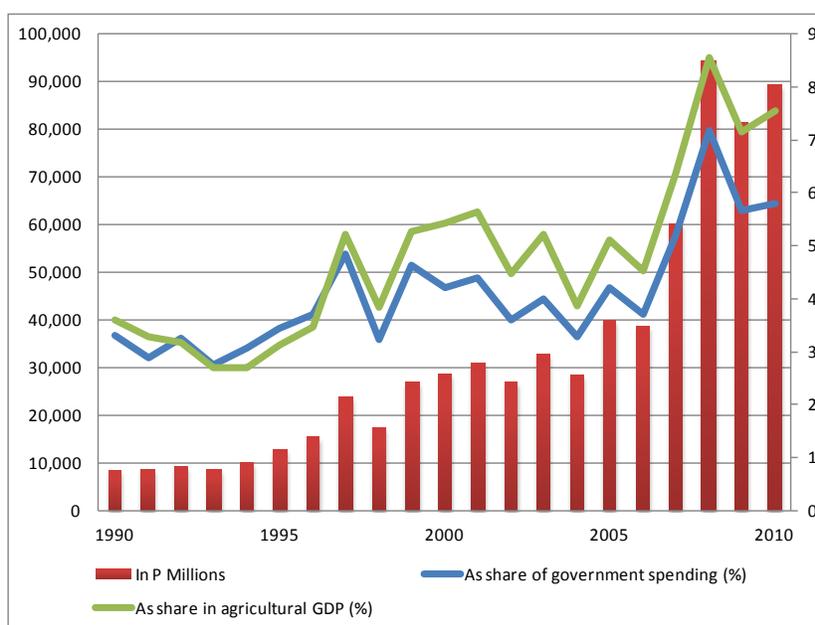
17. Part of the assessment is to document the levels of public spending on agriculture by category. Data would be obtained from official sources, mostly from DBM and DA; secondary sources in the literature would also be reported. The categories are MFOs and sub-MFOs; note that to pinpoint "input subsidy", we should at least separate R&D from MFO 1.1 (Production support), where possible. Moreover, the itemization should also attempt to distinguish the major commodities, i.e. rice, corn, coconut, sugarcane, high value crops, livestock and poultry, and fisheries.

18. To the extent possible the data on expenditure would use the "obligation" concept; this is still a few steps removed from actual payment for goods and services (as documented by receipts, e.g. payslips, invoices, etc.) Nevertheless it is sufficiently close as it entails a legal obligation for government to make a payment. If however the level of detail is insufficient we may fall back on earlier stages of the expenditure process, such as the line items of the General Appropriations Act (GAA), which is the legislature's authorization to allocate funds for a designated purpose.

3. TRENDS IN PUBLIC SPENDING ON AGRICULTURE

19. **On an obligation basis, spending on agriculture has risen steeply since the mid-2000s.** Public expenditures on agriculture (in current prices) started out at fairly low levels in the 1990s, in levels (less than P10 billion) as well as relative to the size of national government spending or the agricultural GDP (Figure 1). This was followed by an upward but erratic trend; by 2006 spending was still below 5% of agricultural GDP, or under P40 billion in absolute terms. From 2007 onwards spending clearly spiked, approaching one-tenth of agricultural GDP in 2008. This hike in spending coincides with the worldwide commodity price boom, which amplified into a food price crisis in 2008.

Figure 3: Public expenditures on agriculture, 1990 - 2010



Source: BAS

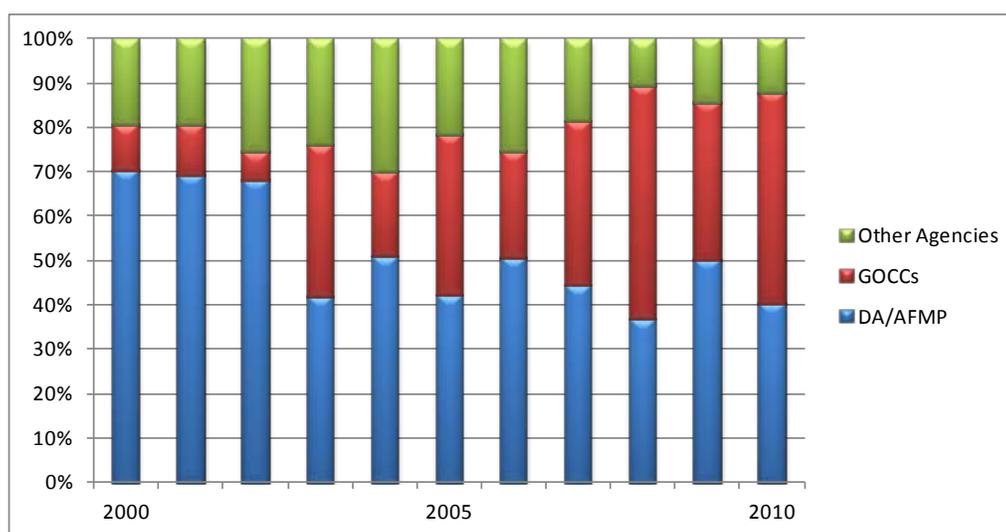
20. **DA accounts for the biggest share of public spending on agriculture, with a sizable component under direct control of the Office of the Secretary; recently the share of attached agencies has ballooned (mainly because of market operations of the National Food Authority).** The DBM classifies under public expenditure for agriculture the annual obligated funds of the following institutions: DA; its attached agencies such as National Irrigation Authority (NIA); the Department of Agrarian Reform (DAR); Land Bank of the Philippines (LBP) budget from the Agrarian Reform Fund (ARF); the Philippine Council for Agriculture and Resources Research and Development (PCARRD) and Philippine Council for Aquaculture and

Marine Research and Development (PCAMRD) of the Department of Science and Technology (DOST).

21. The DA has historically accounted for the bulk of expenditure, being the lead agency for agricultural development (Figure 4). Note that we have included under DA funds allocated to the Agriculture and Fisheries Modernization Program (AFMP), mandated by the Agriculture and Fisheries Modernization Act (AFMA); the AFMP offers only negligible allocations for other agencies (such as under the ARF).

22. In recent years the allocation to attached agencies organized as government-owned and controlled corporations (GOCCs) has risen quite rapidly; this is mainly due to the subsidy extended to the National Food Authority (NFA). The NFA ramped up its spending on its subsidized rice retail program, in an effort to continue providing affordable rice, despite rising cost of procuring stocks due to high world prices.

Figure 4: Public spending on agriculture by agency, 2000 - 2010



23. **The biggest share of DA expenditures is allocated to support services; next to irrigation, the expenditure is mostly allocated to subsidies of various types of private goods.** A breakdown of expenditure under DA by major final output is shown in Table 1.³ Note that until 2009, the budget for DA and AFMA was recorded separately, though the latter is mostly controlled by the DA. As described in the Table Notes, the World Bank reports both DA and AFMA budgets for 2001 to 2003 (which are combined), and only the AFMA budget for 2003

– 2006; the data allow separate itemization for R&D. From 2007 onwards the Table uses DBM data, based on information from the OPIF system that was put in place that year.

Table 1: Department of Agriculture expenditures by Major Final Output (MFO), 2001 - 2010

	2001	2002	2003	2007	2008	2009	2010
MFO 1 Agriculture support services	20,199	21,758	18,702	14,748	20,803	36,006	33,858
MFO 1.A. Production support	2,523	2,468	4,608	na	na	na	na
MFO 1.B. Market development	267	143	115	na	na	na	na
MFO 1.C. Credit	312	124	184	na	na	na	na
MFO 1.D. Irrigation	9,981	13,124	9,044	na	na	na	na
MFO 1.E. Other infrastructure	2,800	2,012	1,667	na	na	na	na
MFO 1.F. Extension	2,630	2,514	2,126	na	na	na	na
MFO 1.G. R&D	1,686	1,373	958	na	na	na	na
MFO 2 Regulation	512	2,257	2,244	689	1,186	1,197	1,353
MFO 3 Plans and policies	2,076	1,382	1,103	3,059	1,767	2,469	2,617
Total	22,787	25,397	22,049	18,496	23,756	39,672	37,828

Sources: World Bank (2007), and DBM (2011).

Notes:

1. Data for MFOs for 2001 – 2003 is from World Bank (2007), summing up DA and AFMA tables.
2. Data for MFOs for 2004 – 2006 is from World Bank (2007), covering only AFMA.
3. Data for MFOs for 2007 onwards is from OPIF data of DBM.
4. Data in Subsidies rows are from Cororaton (2011).

24. Despite patchiness of the budget information, it is clear at least that agricultural support service receives the biggest allocation. Up to 2003, the biggest share goes to irrigation, followed by MFO 1.A. production support *sans* R&D (our proxy for input subsidy). The allocation appears to be growing. For comparison, estimates by Cororaton (2011) place subsidies at P5.57 billion in 2008, of which P2.64 billion are input subsidies. The estimate is lower than that of MFO 1.A, but exhibits likewise an increasing trend, up to 2008. For 2001 Cororaton (2011) estimates total subsidies of P1.34 billion, of which input subsidies were P1.19 billion.

25. A more complete breakdown of MFOs with separate itemization of the national commodity programs is found in Table 2; such breakdown is only available for 2011.⁴ Note that R&D is separately itemized as well; moreover in this Table the distinction between DA and AFMA is dropped.

26. MFO 1.A. accounts for about a fifth of the DA expenditure, second only to irrigation; farm-to-market roads, previously a prominent part of the DA production support, is no longer included. Among the commodity programs, rice by far accounts for the largest share. However even the allocation for the national rice program vastly underestimates the priority placed on rice in the DA budget; for example the irrigation budget is almost entirely a subsidy for rice growing areas

Table 2: Spending on major final outputs by commodity program, 2011

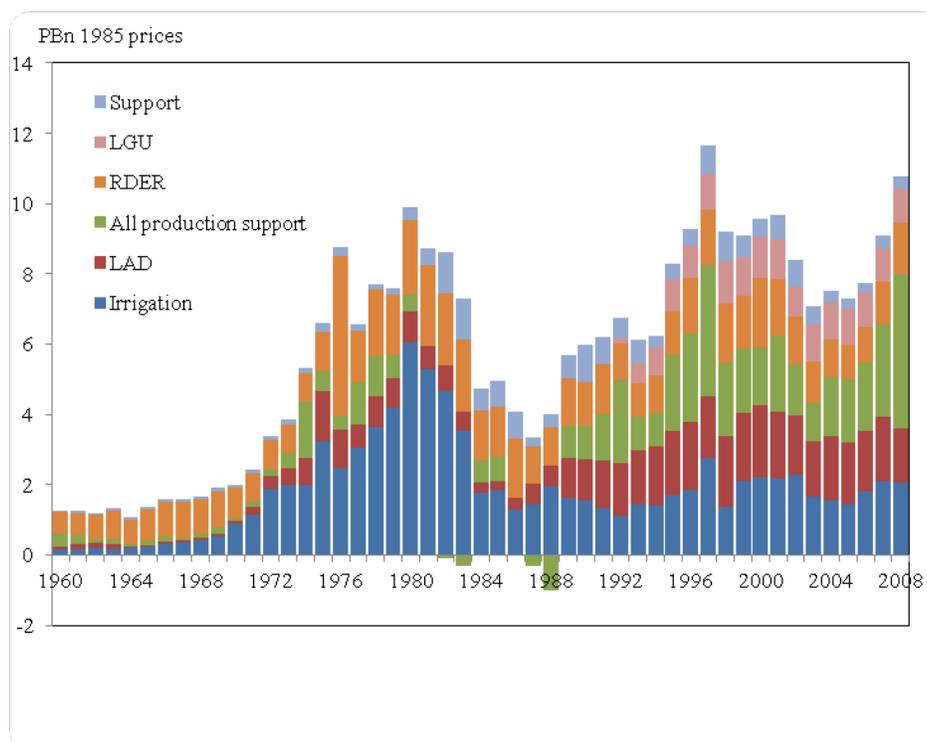
	Commodity Programs				Others	Total
	Rice	Corn	HVCC	Livestock		
Research and Development	52,218	15,825	30,467	80,590	1,005,663	1,184,763
Information Support	6,324	1,690	1,760	3,926	73,450	87,150
MFO 1	2,203,243	349,343	445,778	262,650	17,100,157	20,361,171
A. Production support	1,201,439	274,036	264,792	123,340	3,111,328	4,974,935
B. Market development	3,632	1,749	13,129	1,265	222,441	242,216
C. Credit	-	-	4,508	120	18,063	22,691
D. Irrigation	451,015	-	49,957	-	12,051,226	12,552,198
E. Other infrastructure	139,966	358	19,492	31,955	523,903	715,674
Other infrastructure	-	-	-	-	131,129	131,129
Post-harvest facilities	139,966	358	19,492	31,955	392,774	584,545
Farm-to-market roads	-	-	-	-	-	-
Extension	407,191	73,200	93,900	105,970	1,173,196	1,853,457
MFO 2	60,782	3,157	3,392	22,407	930,361	1,020,099
MFO 3	120,842	34,814	42,056	43,179	1,529,115	1,770,006
GASS and Other Support	-	-	-	-	2,532,055	2,532,055
TOTAL	2,384,867	387,314	491,226	328,236	22,091,688	25,683,331

Note: "HVCC" is High Value Crops Commodity Program

Source: DA Budget Division.

27. Another estimate of production support is made by David et al (2012), reproduced in Figure 5. This study consolidates agricultural spending from various agencies (based on DBM classification), together with spending by LGUs, and miscellaneous government spending items; however subsidy for the NFA is omitted. Categorization of policy instruments covers "production support" which includes outlays for rural credit, market infrastructure, postharvest equipment and facilities, seeds, fertilizers, farm machineries, integrated development projects, and related expenditures; again this corresponds closely to provision of private goods. According to this report, beginning from implementation of the Comprehensive Agrarian Reform Program (CARP) in 1988, "the combined share of various production support services also increased sharply to an average of 25 percent and reaching 40 percent by 2008 (David et al, 2012, p. 19)."

Figure 5: Public expenditures on agriculture using the input support estimates



Source: David (2012).

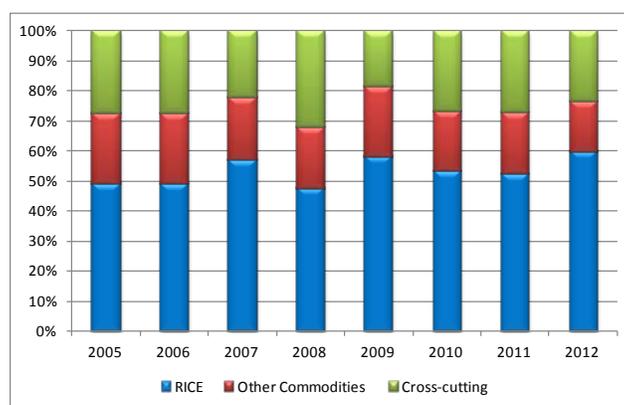
28. As noted earlier, rice has received by far the largest share of spending on commodities, through the commodity programs, irrigation support, R&D, etc. A more complete accounting of public expenditures for rice is possible by exploiting the level of detail in the GAA (Figure 6). The drawback though is that these figures refer to authorized spending (as explained earlier,

obligations data is a better estimate). However this is a close enough approximation. We note that the share going to rice is about half or more of public agricultural expenditure.

29. Historically the government has targeted rice self-sufficiency; this has become the priority for agricultural development and food security since 2008, following the price crisis that roiled the global rice market. That year the country adopted a self-sufficiency timeline with 2013 as the target year for self-sufficiency. The share of rice in agricultural spending are understandably highest in 2009 and 2012

30. Another reason for the large allocation for rice is its large size; among the major crops rice contributes the largest share of gross value added in agriculture, at about 23% in 2011. Nevertheless the amount of spending on rice is considerable even accounting for size of the rice sector. Table 3 presents spending by commodity, based on GAA data, as a proportion of commodity production; also presented is that same figure as a percent of the farmgate price.

Figure 6: Appropriations for agriculture by commodity, 2005 - 2012



Source of basic data: General Appropriations Act (various years)

31. Spending on rice had already dwarfed the other major commodities even in 2005; the allocation increased over time rising to 11% of rice output (by value) in 2010. Spending on corn and coconut also rose over time, but very erratically, compared to the steep and sustained ascent of public funding for rice.

Table 3: Relative public spending on commodities , 2005 – 2010

	unit	2005	2006	2007	2008	2009	2010
RICE	P/kg	0.49	0.46	0.67	0.78	1.66	1.68
	% price	4.65	4.42	5.98	5.54	11.37	11.27
CORN	P/kg	0.05	0.04	0.04	0.06	0.20	0.15

	% price	0.35	0.37	0.44	0.62	2.06	1.69
COCONUT	P/kg	0.08	0.09	0.13	0.18	0.21	0.35
	% price	1.10	1.09	2.24	4.07	2.90	7.44

Note: "% price" denotes the ratio of spending per kg to the farmgate price in pesos per kg.

Source of basic data: BAS, GAA

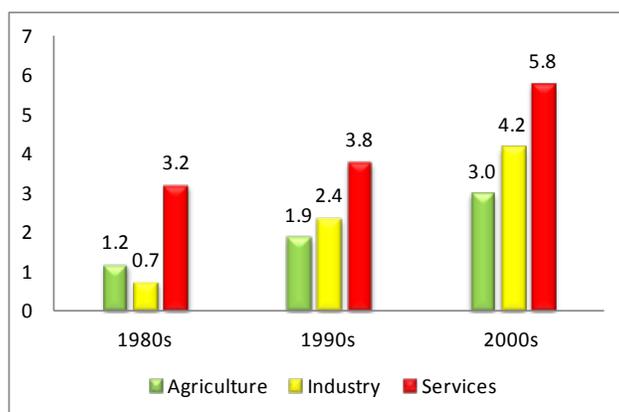
4. ASSESSMENT

Performance of agriculture

32. Among the basic sectors, output growth has been slowest in agriculture. Growth peaked in the 1970s, then leveled off, and recently enjoying a recovery period in the 2000s. Consistent with the story of structural change in terms of output composition, growth has been slowest in agriculture compared with other basic sectors (Figure 7). Hence the share of agriculture in output and employment tends to decline with growth in per capita incomes. Growth in agriculture did recover in the 2000s, together with growth in the rest of the economy.

33. Since 2010, growth of the crop sub-sector picked up dramatically (4.5%, compared to 2.4% over the period 2000-2010), led by rice and corn. Similarly growth in poultry rose to 4.4% compared to 3.4% over the decade. However this was negated by weakening growth of livestock (1.5% down from 2.0% over the decade), and especially that of fisheries, which exhibited negative growth (-1.9%, compared to 4.5% over the decade). Overall growth slowed down to 2.7%. Note that the negative growth of fisheries is more consistent with long-term sustainability. Improved sustainability was enforced through more stringent fisheries management policies since 2010, e.g. enforcement of closed season in Zamboanga and the Visayan sea, increased budget for *Bantay Dagat*, etc.

Figure 7: Average growth rates by basic sector, 1981 – 2010 (%)



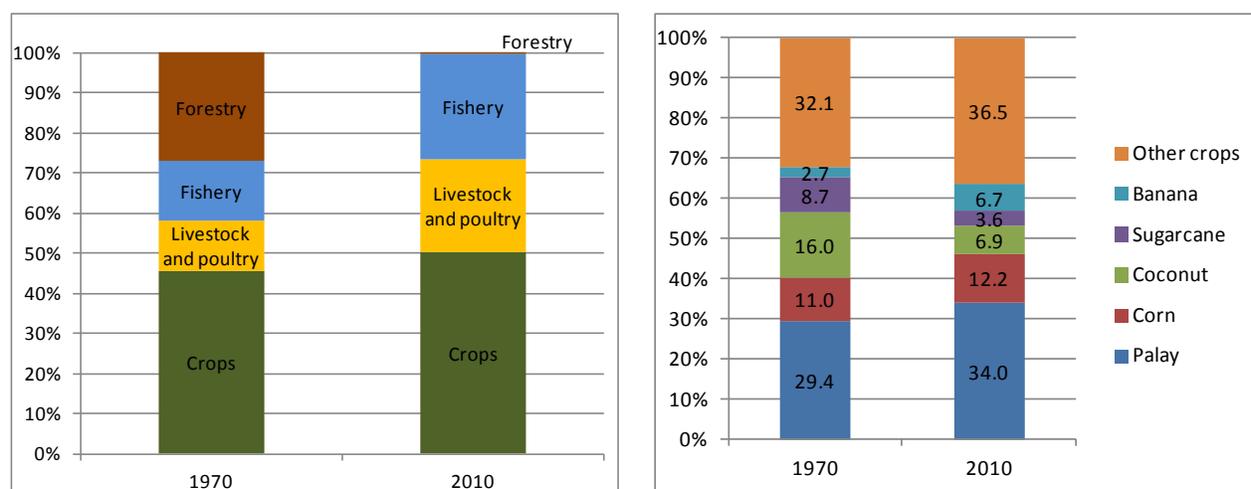
Source of basic data: NSCB

34. Output composition within agriculture is also changing (Figure 8); however the process of agricultural diversification proceeds at a slow pace, particularly within the crops sub-sector; the share of cereals (primarily rice and corn) is growing over time. This contrasts with the expectation of a more diversified agriculture accompanying its modernization; for instance, from

1980 to 2010, the share of cereals in agricultural area fell from 62 percent to 53 percent in the case of China. For Malaysia the same share went from 25 percent to 12 percent. Even Thailand which has a comparative advantage in cereal (e.g. rice) production, the share of cereals suffered a moderate decline from 67 to 64 percent.⁵

Figure 8: Composition of agriculture by gross value added and area harvested, 1970 and 2010 (%)

(a) Composition by gross value added (b) Composition by area harvested



Source: BAS.

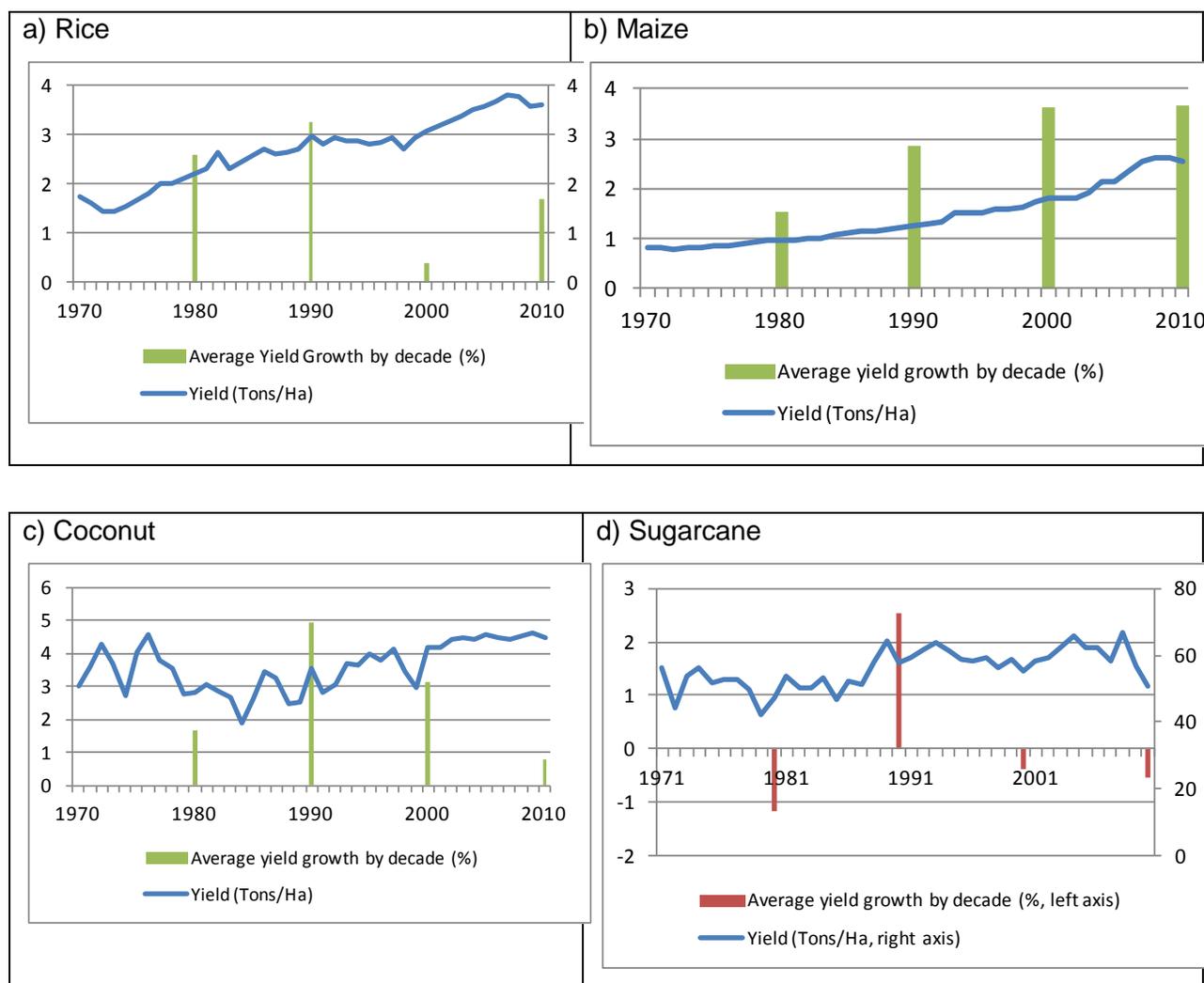
35. **The productivity growth record is mixed; generally highs and lows of productivity growth tend to coincide with the pattern of agricultural output growth.** Growth can occur simply by expanding inputs to agriculture. However this is not necessarily associated with rising net farm income if cost of inputs rises faster than additional revenues. Furthermore this is subject to resource constraints, with agricultural area in particular subject confronting a land frontier. Hence growth in productivity should also be examined together with growth in output.

36. Trends in land productivity or yield are shown in Figure 9. Yield has grown over the past four decades, doubling in the case of rice and tripling in the case of corn. In the case of rice, growth was most rapid in the 1970s, tapering off in the 1980s and leveling off in the 1990s. In the case of corn, yield was stagnant until the 1990s, when growth accelerated; this was largely due to expansion of yellow corn production for field, and the shift away from production of white corn in marginal lands (David, 2003).

37. For the export crops, yield trends are very erratic. Yields of coconut have recovered since its rapid deterioration in the 1970s, but remained moribund over most of 2000s, despite a

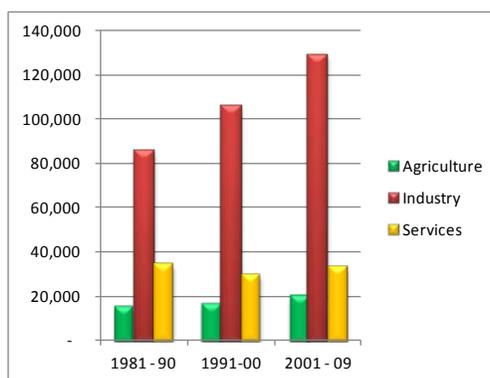
commodity boom towards the latter part of the decade. Inconsistent yield trends are most evident for sugarcane, which since the 1990s has exhibited a yield deterioration.

Figure 9: Yield indicators for major crops, 1970 - 2010



Note: All data from FAOStat, except sugarcane yield: 1971 – 94 is from SRA, 1995 – 2010 is from BAS.

Source: FAO; SRA; BAS.

Figure 10: Gross value added per worker by basic sector, P thousands (1985 prices)

Source: BAS

38. Growth of labor productivity meanwhile has largely stagnated, relative to labor productivity in industry (Figure 10); however growth in agricultural output, together with the movement of labor out of agriculture has pushed up labor productivity growth in the 2000s. It is noteworthy that growth in labor productivity in services has been declining despite being the biggest contributor to output growth, due to rapid absorption of labor coming from agriculture.

39. The foregoing are all partial productivity measures (i.e. ratio of output measure to one of the inputs, be it land or labor). Table 4 reports the Total Factor Productivity (TFP) measure, which aggregates all the inputs to obtain a more comprehensive measure of productivity. Note that the TFP measure is more data intensive and subject to choice of aggregation method. Hence estimates vary widely by source. In general though the trend follows that of overall output growth, namely peak TFP growth in the 1970s, decline, and recovery in the 2000s.

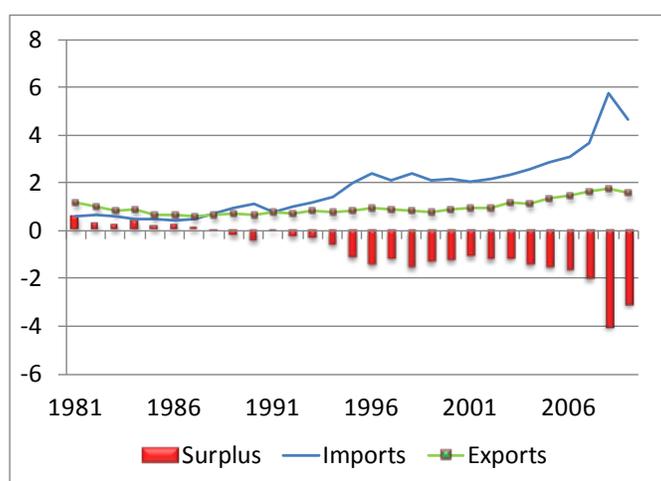
Table 4: Total Factor Productivity (TFP) estimates for Philippine agriculture

Period	TFP growth (%)	Source
1970s	1.4 to 5.3	Evenson and Sardido (1986)
1980-1984	-0.1	
1980s	-5.4	Cororaton and Cuenca (2001)
1990s	4.2	
1960s-1970s	0.8	Mundlak, Larson, and Butzer (2004)
1980s	0.5	
1990s	0.3	
1970s	2.2	Teruel and Kuroda (2005)
1980s	-0.5	
1990s	1.4	
1975 – 1984	3.7	Teruel and Dumagan (2009)
1985 – 1994	0.5	
1995 – 2004	2.9	
1975 – 2004	2.2	

Source: compiled by Briones (2010)

40. **Key agricultural commodities receiving the bulk of agricultural support remain uncompetitive.** For most of its history the Philippines has been a net exporter of food. Since 1988, the country lost its status as a net food exporter and became consistently a net food importer (Figure 11). From the late 80s onward, the growth of imports usually exceeds that of exports, resulting in a widening gap. Exports peaked at \$2.3 billion in 2008, whereas that same year imports reached \$5.9 billion, with much of the uptick owing to rice importation.

Figure 11: Food exports, imports, and net exports, 1981 – 2009 (\$ billions)



Source: FAO (<http://.faostat.org>)

41. The magnitude of border protection for import-competing sectors can be measured by the called the nominal protection rate (NPR), which is the difference between domestic and world price, as a proportion of the world price. In 2010 the highest NPR is observed for rice, followed by pork and corn. NPRs peaked in the late 1990s and early 2000s with implementation of the WTO Agreement, for which the country successfully negotiated high levels of bound tariffs. NPRs declined in the latter part of the decade as tariff protection declined and world prices increased. Historically products with the highest protection have been sugar, rice, and chicken (David et al, 2012).

Table 5: Nominal protection rates for selected importables, 1990 – 2008 (%)

	1990-94	1995-99	2000-04	2005-08	2009/2010
Rice	21	53	51	5	43
Corn	63	79	55	32	22
Sugar	49	97	79	49	4
Beef	28	28	10	10	--
Pork	25	21	-8	-10	26
Chicken	57	42	52	46	5

Sources: David et al (2012) for 1990 – 2008; Gergeley (2010) for 2010

42. Revealed comparative advantage (RCA), another measure of competitiveness, shows that the country has no comparative advantage in importables such as cereals (rice) and meat products, together with onion and coffee. The countries which do have comparative advantage in rice are Thailand and Vietnam (as shown by their high values of RCA). However it has comparative advantage in exportables such as coconut, mango, and pineapple.

Table 6: Revealed comparative advantage measure for selected agricultural commodities, ASEAN 5 countries (2010)

	Indonesia	Malaysia	Philippines	Thailand	Vietnam
Banana	0.0	0.0	26.4	0.1	0.0
Coconut oil	32.0	0.3	123.4	3.3	0.4
Coffee, green	4.2	0.0	0.0	0.1	30.1
Maize	0.2	0.0	0.0	0.5	0.0
Mango	0.1	0.1	12.0	3.8	0.2
Onion	3.5	0.0	0.0	2.2	0.0
Pineapple	0.1	0.2	47.5	0.6	0.0
Rice, milled	0.0	0.0	0.0	23.4	37.5
Bacon, ham	0.0	0.0	0.1	0.0	0.0
Cattle meat	0.0	0.0	0.0	0.0	0.0

Chicken meat	0.0	0.0	0.2	0.2	0.0
Chicken, canned	0.0	0.2	0.0	19.4	0.0

Source: Habito et al (2011)

43. **Poverty among agricultural households remains high; conversely, the bulk of the country's poor derive their livelihood from agriculture.** According to the government's logical framework for agricultural development, the ultimate goal of public spending on agriculture is to raise rural household welfare and reduce poverty. By 2009 however, poverty incidence among households dependent on agriculture was 40 percent, compared to just 19 percent among nonagricultural households (Table 7). Of the poor households, the proportion who are chronically poor is greater for those in agriculture. Conversely, of all poor households the overwhelming proportion is in agriculture; the share is even higher for households who are chronically poor.

Table 7: Profile of poor households by temporal poverty and occupation, Philippines, 2009

	Occupation of household head	
	Agriculture	Non-agriculture
Percent of sample households		
All poor households	39.9	18.7
Under chronic poverty	27.6	10.8
Under transient poverty	12.3	7.8
Percent of poor households		
All poor households	73.8	26.2
Under chronic poverty	77.1	22.9
Under transient poverty	67.4	32.6

Source: Reyes et al (2010)

44. To summarize: **fundamental problems in agriculture, manifesting in erratic growth, lack of competitiveness, and poverty among agriculture-dependent households, persist despite decades of public spending for agricultural development.** This lack of impact suggests one or more of the following:

- i) spending was insufficient;
- ii) other factors thwarted the programs from achieving their aims for the sector;
- iii) programs suffered from faulty selection, design, and implementation.

45. Without discounting i) and ii), we argue that item iii) is a suitable explanation for the lack of impact, using a case study as well as review of international evidence on development strategies similar to those pursued in the country.

Case study on input subsidy: The hybrid rice program

46. As discussed above, the pre-eminent crop in the country is rice, and the key strategy for achieving food security is rice self-sufficiency. The flagship program for improving productivity in rice farming is the Hybrid Rice Commercialization Program (HRCP). The Program involves the dissemination of hybrid seeds, which exploits the genetic phenomenon of heterosis (or *hybrid vigor*) to obtain increase yields compared to existing systems based on inbred seeds. Dissemination is supported by input subsidies for purchase of seed and fertilizers. From 2001 to 2005 alone, David (2006) estimates a total of nearly P10 billion had been spent on HRCP, most of which is from DA (6.5 billion) followed by LGUs (2 billion) and Congressional PDAF (1 billion), with the remainder (0.5 billion) from DAR. This jibes with the estimate of the ZBB study on GMA Rice Program, estimating annual allocation for HRCP at about P2 billion.

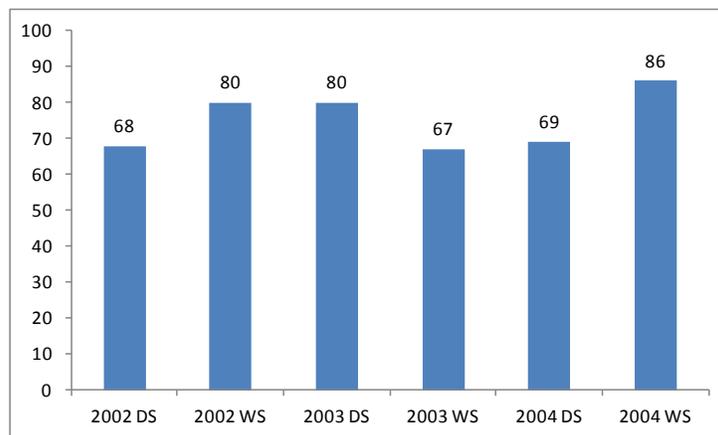
47. Based on field reports of DA, adoption rate rose to 11% of the country's rice growing area. The PhilRice and STRIVE Foundation conducted several rounds of a farm-level survey of from 2002 WS to 2004 DS (STRIVE Foundation, 2005; Casiwan, 2006). The findings from the farm-level surveys are as follows:

- i) **Yield advantage:** On average, dry season yield of hybrid rice farmers exceed those inbred rice farmers by 13 percent in the dry season (with standard deviation of 1.5 to 2.4, depending on location); in the wet season the yield advantage is 9% (standard deviation of 1.2 to 1.7).
- ii) **Cost disadvantage:** on average, cost (at unsubsidized price) of hybrid rice production is higher by P1,500 pesos per ha. The **reason** is due to higher cost of hybrid seed, as well as higher labor cost.
- iii) **Profit advantage:** despite higher cost, the yield advantage (together with a price premium) pushed profit per ha during the dry season at P3,800 to P4,900 higher for hybrid rice farms, compared with inbred rice farms. The difference is statistically significant. However for the wet season, the difference in profit per ha across types of farms is statistically insignificant.

48. David (2006) however questions reliability of field data of DA on hybrid rice adoption; she cites data from the Rice and Corn Production Survey (conducted by BAS) which finds an adoption of rate of only five percent in the 2005 dry season. Moreover, adoption appears not to

have been sustained. Based on the municipal master lists, she finds that a very high percentage of "adopters" drop out after only one season (Figure 12).

Figure 12: Adopters who discontinued planting hybrid rice in the succeeding season (%)



Source: David (2006)

49. According to the ZBB study, hybrid rice accounted for 15% of production in 2005, but the share fell to 8 percent 2008 and 7.3 percent in 2009. Likewise Jamora et al (2009) state that adoption in 2006 – 2007 was only 6 percent nationwide, with most of the adopting farmers concentrated in Cagayan Valley, Central Luzon, and Davao regions.

50. Why is there such low and sporadic uptake for the technology, considering the favorable profit indicators in the impact assessment study? As explained by David (2006), a simple cross-sectional comparison, even if statistically significant, does not actually rule out other factors that could affect differences in yield and profitability. For instance, hybrid rice tends to be adopted by the more affluent farmers with access to irrigation, and larger farm sizes. Early adopters (across all types of technologies) are typically more advanced in terms of education, financial capability, and other attributes.

51. David (2006) furthermore points out severe design flaws in the program, namely:

- i) **The government performed functions that are properly private sector roles.** Decisions on pricing, procurement, and distribution were made by government rather than by market competition based on supply and demand.
- ii) **The government's regulatory functions were often compromised.** Some new hybrids were procured and distributed sans the standard criteria of the National Seed Industry

Council (NSIC). In at least two instances imported hybrids were found susceptible to pests and had to be withdrawn.

- iii) **Seed payments have been marred by anomalies.** It had been very difficult to ensure that the government pays the procurement or guaranteed price only on hybrid seeds that farmers actually bought and planted.
- iv) **Subsidies on agricultural inputs cannot be justified on efficiency nor equity grounds.** For instance, foliar fertilizers and soil conditioners on rice are inappropriate on scientific and economic grounds. Excessive subsidies distort varietal choice of seed growers and farmers.

Audit reports on input subsidies

52. To buttress further the findings from the case study approach, we cite here annual audit reports of COA to support claims of anomalies by David (2006) and the ZBB study (2010). The adverse findings are quite lengthy and detailed. Here we present only a small sample.

53. The 2005 Annual Audit Report looked at fund transfers to NGOs/POs of P1.71 billion sourced from the DA regular budget and the Priority Development Assistance Funds of the legislators. Adverse findings are as follows:

- i) Liquidation was low, at 22%, leaving a balance of P1.32 billion by year end
- ii) The Philippine Social Development Foundation, Inc. (PSDFI) and Masaganang Ani Para sa Magsasaka Foundation, Inc. (MAMFI), both with questionable existence, ranked with biggest share on fund releases. Six NGOs were not found in their given addresses.
- iii) Canvass of fertilizers purchased in RFUs V and VII and XI disclosed excess prices of P32.12 million.
- iv) Purchase, receipt, and distribution of farm inputs and fertilizers were done without establishing accountability and without ensuring that the items reached farmers.
- v) Validation of distribution of fertilizers and sprayers (2nd and 3rd district of Pangasinan) showed items worth P3.98 million were not acknowledged as received by Barangay Captains; signatures were forged and fictitious names were listed as beneficiaries
- vi) Audit of the P52 million farm inputs and farm implements released by RFU VIII to the LGUs based on the documents gathered from the latter, since the RFU office was gutted by fire, disclosed excess cost/short delivery totalling P26.45 million in the purchase of fertilizers, and various infraction in the purchase documents.
- vii) Based on sampling, an average of 42 percent of the samples costing P2.72 million were not received by the listed farmer-beneficiaries. There was no system to establish accountability,

no even simple coordination with local authorities. These were evident from documents that appeared to be obviously falsified.

54. The 2008 Annual Audit Report looked at the GMA Rice Program distribution of fertilizer discount coupons worth P1.3 billion. Adverse findings include the following:

- i) FDCs presented by the farmers were not accepted by the accredited fertilizer dealer/s even before the deadline on October 31, 2008 allegedly, because the suppliers were not paid on their previous billings by the RFU
- ii) Only few accredited dealers in their locality thus, farmers incurred transportation cost in availing the coupon in other localities. Savings on FDCs cannot compensate for the travel time and cost;
- iii) The release of LGU counterpart was delayed until the availment of FDCs already lapsed late/no information dissemination;
- iv) In most RFUs, audit disclosed that there were discrepancies between the masterlist submitted by the Municipal Agriculturist Officer (MAO) to the RFUs and the masterlist attached to the claims of the suppliers thus, the RFU returned the claims without payment for the LGU to make the necessary corrections.
- v) In particular, RFU VIII did not maintain proper records on the receipt and issuances of the pre-numbered FDCs from the DA RFU to the MAO thus, FDCs could not be properly accounted for.
- vi) The 2009 Annual Audit Report examined propriety of payments totalling P809.8 by various DA offices. Their findings include:
 - vii) The propriety of payments to claimants cannot be established for failure to submit complete documentation. These were also not in conformity with the Procurement Law and other laws, rules and regulations.
 - viii) In particular for purchase of inputs by RFU XI for distribution to farmers, invitation to bid was published only once in the Global Orient Newspaper which is not of a general nationwide circulation . Important data in the PO was not filled-up such as Place, Date of Delivery and Terms of Delivery on the said transactions.

Other private goods

55. Our assessment has thus far centered on fertilizer and seed subsidies; by extension the argument applies as well to other planting materials, livestock dispersal, and veterinary inputs (except for epidemic control). **However the private-public sector dichotomy extends as well**

to other private goods. In the following we consider two related items, namely provision of agricultural machinery and postharvest facilities; and credit programs.

Provision of agricultural machinery and postharvest facilities

56. MFO 1 includes provision of agricultural machineries, postharvest facilities (e.g. dryers and multi-purpose drying pavements), as well as processing facilities (rice mills, warehouses, etc.) to farmer associations by way of matching grant; private millers may also avail of the government program under soft loan basis (Amongo et al, 2011). There is a limited justification for government support towards providing larger facilities (i.e. postharvest and processing) to address coordination problems. However in practice the bulk of the expenditure on these programs end up subsidizing private goods.

57. As with other private goods subsidies, these expenditure items are also prone to anomalies. According to the 2007 Annual Report of COA, the NABCOR engaged in uncoordinated acquisition of post harvest facilities totaling P300 million, which could not be validated. The NABCOR again figured in the 2008 Annual Report in which DA engaged in the circuitous and unnecessary transfer of funds from the regular fund and PDAF to NABCOR, amounting to nearly P2 billion. Finally the 2010 Annual Report noted that the provision of 513 flatbed dryers delivered to RFUs did not achieve its objective. Sixty two percent costing P213.9 million were found to be non-operational, due to recipients' lack of training and information, inferior quality of driers, lack of supervision by RFUs, and farmers' preference for solar driers.

58. Donation of a mechanical dryer to a rice farmer cooperatives has been justified as a means to boost farmer income by reducing postharvest losses. If however there is an income boost then the cooperative could itself acquire the dryer, say with bank financing. Government should rather focus on addressing the facilitating the links between farmers and business services, such as credit, to realize these enabling investments. We return to this discussion below under market development.

Credit programs

59. Credit programs (MFO 1.C.) represents another major government outlay on agriculture. While agricultural finance is attended with market failure, financial services are arguably a private good. Recognizing the role of markets in credit provision, government implemented AFMA provisions phasing out credit subsidies. Funds from direct credit programs were

consolidated into the Agro-Industry Modernization Credit and Financing Program (AMCFP). The AMCFP channels funds to government financial institutions (GFIs) as well as GOCCs such as the Quedan and Rural Guarantee Credit Corporation (QUEDANCOR), who are then to relend to for agricultural uses.

60. Despite market-oriented reforms agricultural credit system, credit subsidies remain considerable: according to Geron and Casuga (2012), over the period 2003 – 2008, subsidies accounted for 64% of loans extended under the AMCFP (about P692 million), mostly due to default subsidies, i.e. inability to collect on past due loans. About half of these loans went to QUEDANCOR. This confirms the finding that non-bank government agencies (even if organized as a corporation) make a poor credit conduit as they are not specialized credit institutions under Bangko Sentral regulation (Lamberte et al, 1999). Note that the above subsidy figure underestimates the true magnitude of default subsidies in agricultural programs, as it omits other major credit conduits, namely Land Bank and ACEF.

Subsidizing private goods: evidence from other countries

61. Among neighboring countries, Indonesia's circumstances and agricultural strategy share some similarities with the Philippines. It has also pursued rice self-sufficiency assiduously, with tremendous outlays for input subsidies (mainly fertilizer). The classic study by Rosegrant et al (1997) measures the sources of output growth of major Indonesian crops (rice, corn, cassava, and soybean) based on econometric methods. They find that more than half of output growth is attributable to research and extension; in the case of rice the share is 55 percent, and for corn that share is 74 percent. Price changes account for only 21 percent of growth of rice output, and 14 percent for corn output. Despite fertilizer subsidies and market protection (especially for rice), only a minor role is assigned to price impact due to low output elasticities with respect to price. For instance in rice the output elasticity to input prices ranges from -0.02 (fertilizer) to -0.08 (land). That is a 10 percent drop in fertilizer price increases output of rice by only 0.2 percent. Rosegrant et al conclude (p. 351):

In the late 1980s and early 1990s, the annual fiscal cost of fertilizer subsidies was over Rp 750 billion, nearly equal to the expenditures on irrigation development and seven times larger than expenditures on agricultural research and extension. The results shown here indicate that the fertilizer subsidy represents a serious misallocation of public resources. The high output response to public investment in technology, combined with the very low output response to fertilizer prices, shows that elimination of fertilizer subsidies and transfer of the

fiscal savings from elimination of the subsidy into investments in research, extension, and irrigation would have large benefits.

62. Likewise, for Latin American countries, Lopez and Galinato (2007) have found that reducing the share of subsidies to private goods in the government budget has a significant and large positive impact on per capita incomes in rural areas and contributes to poverty reduction. The 2008 World Development Report (World Bank, 2008) notes that in transforming and urbanizing countries (of which the Philippines is an example), agricultural spending is frequently skewed toward subsidizing private goods; in India, agricultural subsidies in 1975 accounted for 40 percent of agricultural public expenditures; by 2002 the share rose to 75 percent. Such spending is less productive than investments in such as agricultural research, rural infrastructure, education, and health.

Production support for public goods

63. Based on case studies and international evidence we have found that input subsidies are an ineffective instrument for agricultural support; the latter indicate that R&D and other public goods are better instruments. We now review evidence on the impact of public goods provision for Philippine agriculture.

64. Balisacan et al (2011) look at determinants of household agricultural income based on provincial panel data from the FIES. They found the following items to be statistically significant factors (with expected positive relationship): one is **electrification rate** of the province; second is **national road density**. In addition, for coastal households, presence of a seaport is statistically significant. Interestingly, irrigation is found to be not significant.

65. Other studies relate public goods to agricultural productivity. Llanto (2010) adopt agricultural GDP per worker as their productivity measure. Using a regional panel, they identify **regional road density** and **regional electrification rate** as positive and statistically significant factors. Again noteworthy is the negative finding on statistical significance of regional irrigation service coverage, which characterizes as well the next two studies.

66. Teruel and Dumagan (2010) use TFP as their productivity index. Based on a regional panel, they likewise find in favor of **road density** and **electrification rate**; their proxy of technological progress, which is adoption rate for modern varieties, is also found to be positive and statistically significant. In the study of Francisco and Bordey (2010), technological progress

is incorporated in terms of **research and development**, which is found to be statistically significant in reducing cost per unit of rice production.

67. The failure to find a statistically significant impact for irrigation is mystifying given its crucial role in the Green Revolution. Teruel and Kuroda (2005) in an earlier study of TFP determinants for 1970-2000, find that irrigation did have a measurable impact, but this declined over time. This coincides with the timing of the Green Revolution (1970s), together with the pioneering investments in irrigation during that period. In the later period (1990s onwards), expenditures had had to contend with rehabilitation of poorly maintained systems, together with exhaustion of favorable environments with high irrigation potential. A study by David (2008) covered the period of AFMA implementation (1998 – 2003) found that, though service area rose by only 9K/yr, deterioration was about 134K/yr. His case study of irrigation in Ilocos Norte found that irrigation intensity averaged only 27% during the dry season. Low intensity is attributed mainly to design mistakes, and over-optimistic estimates of the service area in design stage.

68. In short, it is not enough to expand the quantity of irrigation investment; **more important is to ensure quality and sustainability of irrigation service**. Furthermore investments should be rigorously guided by benefit-cost analysis; unfortunately the rice self-sufficiency imperative rides roughshod over considerations of efficiency.

Market development

69. Market development includes hard interventions, namely construction of market facilities, and soft interventions, i.e. market oriented assistance services (MOAS). The public nature of market infrastructure is arguable; at best, these are quasi-public goods because of externalities and thick market effects. The current thrust is to adopt private-public sector approaches for hard interventions; **this is the preferred approach given the mixture of private commercial interest with public interest**. Projects with 100 percent grant component should be avoided.^{vi}

70. For soft interventions, the arguments in favor of MOAS is the establishment of value chains in agriculture, an essential element of agricultural diversification and modernization in a middle income country (World Bank, 2008). According to FAO (2011), MOAS cover a wide range include a range of economic, social, technical and legal services that include:

- i) Technical expertise towards increasing the volume and quality of production and the timing of the supply of raw materials;

- ii) Economics, marketing and business management expertise;
- iii) Post-production expertise for improved postharvest handling, packaging, storage and distribution, while meeting food safety and quality requirements;
- iv) Support in strengthening producer and other value chain stakeholder groups through improved collective marketing, business management, financial management, leadership, negotiation skills and networking;
- v) Support in coordination of production, negotiation of contracts, brand development, linking producers to buyers as well as providing advice on legal, regulatory and certification issues.

71. There is some anecdotal evidence that MOAS is effective. In the Philippines the case of NorminVeggies is often cited (FAO, 2011). The Northern Mindanao Vegetable Producers Association was set up as an association of smallholder producers to gain access to institutional markets. The experience highlighted the need for networking and alliance building with government (national and local), resource organizations, NGOs, businesses and research organizations, which helped small producers achieve breakthroughs to modern markets.

72. The government may consider expanding budgetary outlays for MOAS, as complement to improved quality of regulatory services (MFO 2). As discussed in Lacson (2005) as well as Briones, Israel, and Galang (2012), government has gravely underspent for regulatory services, undermining consumer trust, competitiveness, and access to markets, especially abroad.

5. SUMMARY AND CONCLUSION

73. Expenditures on agriculture have been rising over time, as expression of the state's commitment to reduce poverty, raise rural incomes and household welfare, and promote food security. However agriculture continues to exhibit disappointing performance, namely laggard growth, lack of diversification and competitiveness, tepid productivity growth, and persistent poverty among farmers. There is basis for attributing this performance at least in part to faulty design and execution of agricultural programs.

74. The following matrix summarizes this study's findings on spending performance. We list the major final outputs (see Table 2) along the rows, while labelling the columns by the typology of goods, i.e. private, public, and the in-between case, i.e. private goods supplied under market failure. The labelling denotes more of a practical distinction in terms of what characterizes most such MFO items in reality. Empty cells imply that the column is basically inapplicable to the MFO item, e.g. farm-to-market roads with 100% private good characteristics. Note that each MFO item can be marked in more than one column. As noted earlier, private R&D is active, but much R&D activity to benefit small farmers (e.g. improved inbred rice) is not supplied by the private sector.

75. Under the idea of zero-based budgeting, the default allocation to each MFO item is zero. We allocate an "x" mark where no deviation from default is warranted. A tick mark on the other hand suggests that there is warrant to allocate public funds for that MFO item with the characteristics noted in the column heading, and/or exhibit signs of under-investment. A flag is marked when desk review suggests that past record of wastage indicate stronger checks to ensure misallocation is avoided.

76. Private goods provided as production support, most notably input subsidies, are contra-indicated based on case studies of past failures. Moreover a series of audit reports document leakages and anomalies in these types of programs. This is consistent with international evidence that favors a shift in public expenditure from provision of private goods to provision of public goods.

77. Extension is flagged owing to problems in quality of services provided.^{vii} Production support should be limited in duration and scope to goods characterized by market failure, most notably those embodying new technologies. Support for postharvest and processing facilities should be limited to strategic investments towards addressing coordination problems and

facilitating market development.^{viii} Credit support should exercise greater care to avoid default subsidies – one concrete measure is to restrict outlays to government-owned banks.

	Private	Private, with market failure	Public
R&D		x	√
Extension			√ ☐
Information support			√
Production support services	x	√ ☐	
Market development		√	
Credit support	x	√ ☐	
Irrigation support			√ ☐
Postharvest facilities	x	√ ☐	
Farm-to-market roads			√ ☐
Other infrastructure		√	√
Regulation			√
Policy and planning			√

78. Among public goods (or goods with public good features), irrigation has not been found to be effective based on econometric evidence. This places in question the current plan to ramp up investment on irrigation, making it far the largest single item for public spending on agriculture. Such investment plans should be reviewed given studies point to design flaws and other implementation problems in past irrigation projects. Projects should be judiciously selected on the basis of economic criteria (i.e. high ROR) rather than debatable objectives, such as rice self-sufficiency.

79. The public goods that do show evidence of impact on agricultural incomes and productivity are infrastructure such as roads, ports, electrification (under other infrastructure), regulatory services, and R&D for technological change and agricultural modernization.^{ix} To this we may add improved regulatory services, complemented by market advisory and PPP for market infrastructure as part of a package towards market development in agriculture. This does not of course absolve these items from further scrutiny in terms of cost effectiveness and other considerations of appropriate design. However it does provide general guidance for responsible budget allocation to surmount at last the challenge of agricultural development.

Appendix: Response of DA to the study findings

December 4, 2012

MEMORANDUM

For: **EMERSON U. PALAD**
Undersecretary and Chief of Staff

Through: **ANTONIO A. FLETA**
Undersecretary for Administration and Finance

From: **OPHELIA P. AGAWIN**
Assistant Secretary for Finance

Subject: Comments on the ZBB study entitled “ Impact Assessment of Agricultural Production Support Services of the Department of Agriculture”

Comments on the ZBB study entitled “Impact Assessment of Agricultural Production Support Services of the Department of Agriculture on the income of Poor Farmers / Fisherfolk” submitted by the Philippine Institute for Development Studies (PIDS):

The study was an evaluation of the implementation of projects of past administrations. For this administration, the Department of Agriculture, strongly advocates for the successful implementation of the Food Staples Sufficiency Program.

1. Secretary Proceso J. Alcala in his foreword for the publication “Food Staples Sufficiency Program” stated that: “We will continue to employ traditional strategies and approaches that have worked. However, where the strategies and plans failed to deliver the desired results, innovations are in order.”
2. Secretary Alcala further stated: “Drawing from direct feedback, site visits, and observations, the Department of Agriculture has pursued innovations that have been initiated and will continue to be tested for farmer level results are the following:
 - a. Local procurement of buffer stock: Imports will be reduced significantly as production increases. Itatama ang presyo para sa ani ng magsasaka.
 - b. Front loading of investment in public goods: Spending on irrigation, and concreting of farm to market roads and other rural infrastructure has been increased in the early rather than spread out during the six year period, in order to boost production. Sapat na tubig sa irrigation at maayos na kalsada bilang suporta sa pagsasaka.
 - c. Research on and dissemination of flood-and drought-tolerant varieties and improved farming systems including ways to reduce input costs through organic farming: Mga angkop na binhi at tamang pagsasanay upang mabawasan ang pagbaba ng ani.

- d. Multi-agency approach to production credit, loan guarantees, and crop insurance: Pautang at crop insurance na kakayanin ng magsasaka, habang ang credit retailers ay makakaasa sa loan guarantees.
- e. Farm mechanization and post harvest facilities: Through agri-roadshows, manufacturers can demonstrate the value of their farm equipment for more transparent procurement. Mga kagamitang magpapahusay sa produksyon, magpapagaan at magpapabilis ng trabaho, at magpapataas ng halaga ng produkto ng magsasaka.
- f. Improved yields in rainfed and upland areas: Production will be increased through programs such “Palayamanan”, deployment of Rice Sufficiency Officers, and construction of shallow tube wells and small farm reservoirs. Katulong din sa pagpapaunlad ng ani ang magsasaka sa sahod-ulan at bulubunduking lugar.
- g. Non-rice staples production: Assistance will be extended to farmers planting white corn, cassava, kamote, adlay, bananas, and other food crops that serve as staples in various communities. Susuportahan ang mais, kamote, at iba pang nakagawian nang pagkain sa ibang komunidad.
- h. Demand management: Consumers will be encouraged to cook or buy rice in quantities they eat to avoid wastage. Other staples will be popularized. Palay, bigas, kanin – huwag sayangin.
- i. Partnership with LGU, CSO, and private sector: DA and its attached agencies (DA Family) by themselves cannot achieve our goals. We need partnerships with local government units, civil society, and private sector organizations – in the service of farmers, for their sake and that of consumers. Buong komunidad ng DA ay pakikilusin, katuwang ang LGU, CSO, at pribadong sector upang makinabang ang magsasaka at buong sambayanan.
- j. Transparent and accountable agriculture governance: Direct communication with farmers in the field, as well as LGUs and CSOs close to them, is a priority, in order to foster greater transparency and accountability. The use of maps the location of farm-to-market roads and irrigated areas (geo-tagging) will be mandatory. Anyone seeking commissions on contracts will be dealt with severely. Matuwid na daan tungo sa kasaganaan.”

3. Reaction on the comment that irrigation has not been found to be effective:

Irrigation is an important investment for agriculture because water is vital for agricultural production:

- a. The irrigation infrastructure is multi-purpose in nature and the economic benefits include the electricity generated through the discharge of water for irrigation;
- b. Environmental benefits include the improvement of the micro-climate in the project area and groundwater recharge;
- c. Increase in cropping intensity for the service areas of the irrigation projects is due to the availability of sufficient moisture for a second and possibly a third crop. The cropping pattern could be a rice-rice-cash crop or a rice-cash crop-cash crop depending on the

- volume of water available for irrigation;
- d. Early planting of the rice crop could be implemented if there are predictions from PAGASA of climatic extremes.

REFERENCES

- Amongo, R.M., L. Amongo, and M.V. Larona, 2011. Mechanizing Philippine Agriculture for Food Sufficiency. Paper presented in the UNAPCAEM and FAO Joint Roundtable Meeting on Sustainable Agricultural Mechanization in Asia, Bangkok, 8 – 9 December.
- Balisacan, A., Mapa, D., Fuwa, N., Abad Santos, C., Piza, S., 2011. Addressing Infrastructure Constraints to the Development of the Rural Non-farm Sector: Implications for Poverty and Rural Development. AusAID and Asia-Pacific Policy Center.
- Briones, R., 2010. Scenarios and Options for Productivity Growth in Philippine Agriculture: An Application of the AMPLE. PIDS Discussion Paper Series No. 2010–05. Makati City: Philippine Institute for Development Studies.
- Briones, R., Israel, D., and Galang, I., 2012. The ASEAN Economic Community Blueprint: Implementation and Effectiveness Assessment for Philippine Agriculture. Report prepared for Economic Research Institute for ASEAN and East Asia.
- Casiwan, C., 2006. Use of hybrid rice in suitable areas can improve farmers' yield and income. In: *Why Does the Philippines Import Rice? Meeting the Challenges of Trade Liberalization*. Dawe, D., Moya, P., and Casiwan, C., eds. International Rice Research Institute (IRRI) and the Philippine Rice Research Institute (PhilRice).
- Cororaton, C., Cuenca, S., 2001. Estimates of Total Factor Productivity in the Philippines. Discussion Paper Series No. 2001-02. Makati City: Philippine Institute for Development Studies.
- Commission on Audit. 2005. Observations and Recommendations. In *Annual Audit Report of the Department of Agriculture*.
- Commission on Audit. 2008. Observations and Recommendations. In *Annual Audit Report of the Department of Agriculture*.
- Commission on Audit. 2009. Observations and Recommendations. In *Annual Audit Report of the Department of Agriculture*.
- David, C., R. Briones, A. Inocencio, P. Intal, M.P. Geron, and M. Ballesteros, 2012. Monitoring and Evaluation of Agricultural Policy Indicators. Discussion Paper No. 2012-26. PIDS, Makati.
- David, C., 2003. Agriculture. In: *The Philippine Economy: Development, Policies, and Challenges*. A. Balisacan and H. Hill, eds. Ateneo de Manila University Press, Quezon City.

- David, C., 2006. The Philippine Hybrid Rice Program: A Case for Redesign and Scaling Down. Research Paper Series No. 2006-03. Makati City: Philippine Institute for Development Studies.
- David, W., 2008. Impact of AFMA on Irrigation and Irrigated Agriculture. *The Philippine Agricultural Scientist* 91 (3) 315-328.
- Department of Budget and Management, 2010. OPIF Reference Guide: A Guide to Results-based Budgeting in the Philippines using the Organizational Performance Indicator Framework. Final Draft. Department of Budget and Management.
- Evenson, R.E. and M.L. Sardido, 1986. "Regional Total Factor Productivity Change in Philippine Agriculture." *Journal of Philippine Development* 23(13): 40-61.
- Food and Agriculture Organization, 2011. Market-Oriented Advisory services in Asia: A Review and Lessons Learned. Italy: Rome.
- Gergely, N., 2010. Quantitative Assessment of Comparative Advantage for Major Agricultural Crops in the Philippines. Food and Agriculture Organization, World Bank.
- Geron, M.P., and M. Casuga, 2012. Credit subsidies in Philippine Agriculture. Discussion Paper No. 2012-28. PIDS, Makati.
- Habito, C., Clarete, R., de la Pena, B., Israel, D., and Ponce, E. 2011. Fostering Our Farms, Fisheries and Food: Technical Assistance for the Formulation of the Successor Agriculture and Fisheries Modernization Plan (AFMP) of the Department of Agriculture (DA). Final comprehensive report submitted to the World Bank.
- Jamora, N., Moya, P., Mataia, A., Dawe, D., 2009. How has Rice Farming in the Philippines Changed in the Last 10 Years?. IRRI Research Brief 4.
- Lacson, L., 2005. Philippines. In: Sanitary and Phytosanitary Measures. Sonneveld, C. (ed.) Asian Productivity Organization.
- Lamberte, M., M. Casuga, and D.C. Erfe, 1999. Credit Programs for the Poor: A Tale of Two Studies. Policy Notes 99 – 06. PIDS, Makati.
- Llanto, G., 2012. The Impact of Infrastructure on Agricultural Productivity. PIDS Discussion Paper Series No. 2012–12. Makati City: Philippine Institute for Development Studies.
- López, R. and Galinato, G., 2007. Should Governments Stop Subsidies to Private Goods? Evidence from Rural Latin America. *Journal of Public Economics*, 91, pp. 1071-94.
- Mundlak, Y., Larson, D., and Butzer, R., 2004. Determinants of agricultural growth in Thailand, Indonesia, and the Philippines. *Rural Development and Agricultural Growth*. Asia Pacific Press, Canberra.
- Oliveros, N., 2010. Department of Agriculture –FY 2011 Budget. Memorandum for the Secretary of Budget and Management dated July 13, 2010. BMB-E, Department of Budget and Management.

- Reyes, C., A. Tabuga, C. Mina, R. Asis, and M.B. Datu, 2010. Chronic and Transient Poverty. Discussion Paper Series No. 2010-30 (Revised). Makati City: Philippine Institute for Development Studies.
- Rosegrant, M., Kasryno, F., Perez, N., 1998. Output Response to Prices and Public Investment in Agriculture: Indonesian Food Crops. *Journal of Development Economics* 55, 333-352.
- Strive Foundation, 2005. Midterm impact assessment of hybrid rice technology. Processed.
- Teruel, R., and Dumagan, J., 2010. Total Factor Productivity Growth in Philippine Agriculture. Report prepared for the Productivity Growth in Philippine Agriculture Project, Southeast Asian Regional Centre for Graduate Studies and Research in Agriculture, College, Laguna.
- Teruel, R., and Kuroda, Y., 2005. Public Infrastructure and Productivity Growth in Philippine Agriculture, 1974-2000. *Journal of Asian Economics* 16 555-576.
- World Bank (2008). World Development Report 2008.
- World Bank Group. 2007. "Philippines: Agriculture Public Expenditure Review". Technical Working Paper. Rural Development, Natural Resources and Environment Sector Unit, Sustainable Development Department, East Asia and Pacific Region.

ENDNOTES

¹ Throughout the paper, the term "agriculture" and its variants subsumes fisheries.

² Economic theory posits two main features of private goods, namely *rivalry* and *excludability*. Under the former, one person's consumption reduces the amount available to other persons; under the latter, a seller is able to limit the benefits from consumption to an intended consumer. A market typically develops for rival and excludible goods. However for public goods one or both features are missing and market fail to provide the good. For example, rice is a private good, as it is both rival and exclusive. Likewise, fertilizer is a private good. However a farm-to-market road fails to exhibit excludability, hence is a public good. Essentially a public good is characterized by spillover benefits that cannot be wholly appropriated at the margin by the seller. .

³ The first best option would have been to obtain a breakdown of DA expenditures since 2001 by MFO. However only the 2011 breakdown is available on obligation basis.

⁴ Data covering previous years was requested, but this is apparently not available at the required level of disaggregation.

⁵ Data from FAO (<http://faostat.fao.org/>).

^{vi} The government may study the alternative of providing a matching contribution to projects with existing private sector proponents.

^{vii} Responsibility for extension lies with LGUs; however the national government still has a role of building capacity and providing technical support.

^{viii} The industry Road Map initiative of the DTI is an excellent effort to identify such strategic interventions.

^{ix} Ports and electrification are not traditionally implemented by DA, but remain within the ambit of government; allocation for port and utility services should take into account potential benefits to agriculture via the supply chain.