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Characterization of Agricultural Workers in the Philippines

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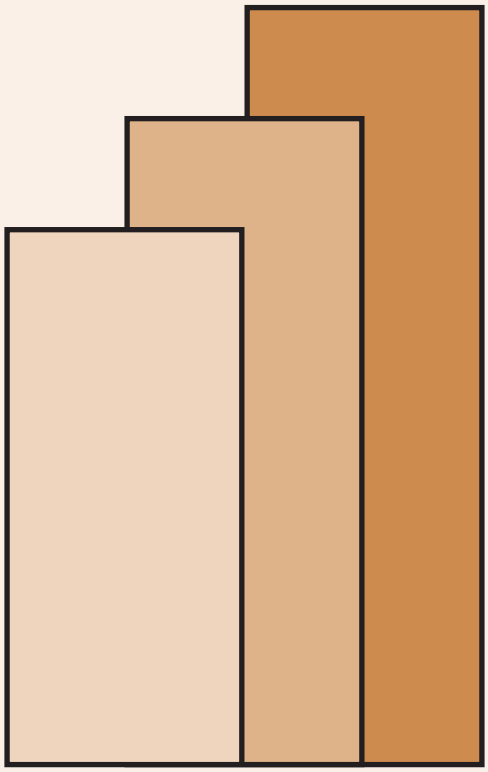

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Characterization of Agricultural Workers in the Philippines

Draft Report

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Abstract:

Inclusive growth requires boosting incomes of workers currently in agriculture, either by shifting them to better-paying jobs outside agriculture, or raising wages within agriculture. A comprehensive socioeconomic profile of agricultural workers will facilitate identification and prioritization of their problems, opportunities, and constraints. This study undertakes a review of secondary data towards such a profile. The review synthesizes a set of stylized facts about agricultural workers in the Philippines, while identifying the following gaps:

- Spells of underemployment and degree of deficit in work hours
- Breakdown of activities for which wages are paid
- Past employment history of agricultural workers
- Other relevant worker and household characteristics such as memberships in cooperatives and associations; other types of training such as technical and vocational education; other activities including outside agriculture; household assets; and so on.
- Community level variables such as access to roads and other infrastructure, and technologies such as farm machinery

These gaps will inform the strategy of data gathering using follow-up survey of agricultural households. The primary data thereby gathered, upon suitable analysis, will assist in recommend policies and design of programs that help sustain and accelerate growth of remunerative employment.

Keywords: Agriculture, employment, wage, human capital, structural change

1. Introduction

As the Philippine economy expands, its structure changes. The output share of agriculture fell by 14 percentage points over the period 1986 – 2015 while its employment share fell by 21 percentage points. And while agriculture still provides employment for a sizable 29 percent of workers, its output share is only 10 percent. Hence, productivity of the average worker in agriculture is only about a third that of the average worker. Likewise, the basic pay of an average agricultural worker is below half that of the average worker. In 2012, most of the working poor (66 percent) were in agriculture.

Average daily basic pay in agriculture in 2015 was virtually identical to its level in 2001 in real terms. Availability of full-time work is limited, compared to the industry and services sectors. In 2015, the visible underemployment rate in agriculture was 20 percent, compared to 11 percent for the economy as a whole. About forty percent of all underemployed workers are in agriculture. It is unclear to what extent workers in agriculture have benefitted from the recent growth acceleration and tightening of labor markets, in which per capita GDP increased by an annualized rate of 4.8 percent from 2011 – 2016, while unemployment fell from 8.8 percent to 5.5 percent.

Clearly, inclusive growth requires boosting incomes of workers currently in agriculture, either by shifting than to better-paying jobs outside agriculture, or raising wages within agriculture. The two options are interrelated in rather complex ways; for instance, increasing demand for labor outside agriculture may induce migration of agricultural workers, and push up farm wages. A further consideration is the widening base of the rural economy, which encompasses more than just agriculture – as in most other countries, rural workers in the Philippines may engage in either or both farm and nonfarm occupations.

A comprehensive socioeconomic profile of agricultural workers will facilitate identification and prioritization of their problems, opportunities, and constraints, and design appropriate programs for rural households and their employment. The formulation of appropriate rural employment strategies however is however stymied by the lack of socio-economic characterization of agricultural workers. To address this, the author has proposed a socio-economic survey of agricultural workers, to be conducted in 2018. Additionally, the information could be applied in modeling for the agricultural labor market outcomes in the context of the author's parallel work on applied general equilibrium modeling of the Philippine economy and agriculture.

In preparation for the data gathering, this study undertakes a review, covering available literature and secondary data to determine the scope and limits of existing data. The results of this review are presented in this Report.

2. Conceptual framework and related studies

Dual economy model

The behavior of rural employment over the course of development may be understood within the context of a dual economy undergoing structural change, as manifested in the changing composition of output and employment over time. For virtually all economies with rising per capita income, the share of agriculture in GDP and employment declines. Moreover, agriculture's share in GDP falls faster than its share in employment. Within the neoclassical tradition, structural change may be explained in terms of demand (e.g. Kongsamut et al 2001): as income increases, household income shifts to non-food (non-agricultural) products (the Engel effect), leading to structural change. Alternatively, one may posit supply-side explanations: capital deepening over time, shifting resources away from the labor-intensive sector to the capital-intensive sector (Acemoglou and Guerrieri, 2008).

Another set of supply-side explanations uses dual economy type explanations. Structural change is within a narrative of transition from a traditional to a modern sector proposed by Lewis (1954), and subsequently formalized and related to economic sectors by Ranis and Fei (1961). Within the modern sector – coinciding with industry – wage is set equal to marginal product. Meanwhile for the traditional sector – coinciding with agriculture – labor supply is of such abundance as to contain surplus labor. In contrast to the modern sector where wages are set equal to marginal product, in the traditional sector wages are set by community norms equal to its average product. Wages in the modern sector are driven down to levels equal to the traditional sector wage (plus any differential to compensate for cost of migration and urban residence). Finally, the modern sector is the locus of the economy's capital accumulation; the rate of capital formation limits the pace at which labor is able to move from the traditional to the modern sector.

The Lewis model posits homogeneous labor in the agricultural and non-agricultural sectors, as well as integration between urban and rural labor markets. Masson (2001) proposes that urban employment on average entails higher levels of human capital than rural employment; hence members of a rural household must first undertake investment in human capital prior to migrating. However, collateral constraints tie the acquisition of capital to initial wealth endowment, thereby perpetuating a gap between urban and rural wages and productivity. Structural transformation is enabled by education investments of rural households.

Empirical application

Surplus labor is technically defined in the dual economy model as labor that can move from traditional and modern sector with negligible effect on output of the former. This is difficult to test empirically; rather, the empirically observable phenomenon **underemployment** is taken as a correlate of the level of surplus labor.

Another key empirical feature of the dual economy model is dynamic: Consider an economy just beginning to develop, currently endowed with large quantities of surplus labor. As output increases, wages remain at institutionally determined levels, until surplus labor is exhausted. This is referred to as the *Lewis turning point*, after which economic growth is accompanied by growth in rural and agricultural wages.

Intersectoral migration has been studied extensively by Butzer, Mundlak, and Larson (2003), within a multi-country analysis (Indonesia, Philippines, and Thailand). They found that

migration is a key factor behind convergence in sector incomes. The rate of migration is positively affected by the following factors:

- Relative profitability of agriculture
- Agricultural density
- Unutilized capacity in industry-service
- Growth rate of output in industry-service sector
- Industry-service labor force growth rate
- Education

Interestingly, the degree of integration of rural areas with labor markets (as measured by state of physical infrastructure) is *negatively* related to the pace of migration.

Estudillo et al (2006) undertakes empirical work that broadly seems to confirm the human capital investment story of movement from traditional to modern sectors. The empirics is based on a panel of households in villages of Central Luzon and Panay Island from the 1970s onward. The Green Revolution and land reform in the 1970s enabled rice farming households with access to land to increase incomes and therefore invest more in children's education. This resulted in entry of the resulting workers into nonfarm occupations, both urban and rural. Indirectly, even farm workers without access to land benefited as labor scarcity in farm employment caused an increase in agricultural wages.

A more detailed study of the interaction between education and migration is provided by Thinh et al (2015) for Vietnam. They note that the literature on skill-specific migration is limited. Based on data from a nationwide migration survey, the find that education is a key factor: basic education stimulates only unskilled migration, while higher education stimulates skilled migration. However, agricultural technology improvement has a *negative* short-term impact on unskilled migration; this contrasts with the positive long run impact of agricultural productivity on skilled migration in Masson (2001) and Estudillo et al (2006). Lastly, a dense network of unskilled migrants encourages unskilled migration (by reducing migration cost per worker).

Other issues: seasonality, mechanization, gender

Observations of underemployment in the context of an agricultural economy is however complicated by seasonality. Underemployment may decline or even vanish in during the peak agricultural season, only to return during the off-peak season. The seasonality dimension is necessary for a complete characterization of agricultural underemployment.

This nuance is essential for understanding mechanization trends. Mechanization has been increasing, reaching 2.31 horsepower(hp) per ha in 2013, up from 2.0 hp/ha in 2012 (this is still lower than Thailand's mechanization rate of 4.23 hp/ha). A study by Philippine Center for Postharvest Development and Mechanization (PhilMech) and UPLB found that 22 percent of surveyed farms suffered labor shortage during peak planting and harvest season. With

seasonality of employment, such shortages (and corresponding incentive to mechanize) are consistent with existence of underemployment the remainder of the crop year.[1]

So far the discussion has differentiated only between labor of different educational attainment and skill. Another key difference is *gender*. In 2015, the proportion of females in the agricultural work force was 25.7 percent. A study of differences between male and female-headed households in rice farming (holding other factors constant under a treatment effects regression) finds that female-headed households generated more gross income, but lower net income, owing to higher costs related to fixed cost, and variable cost related to seed and labor (Mishra et al, 2017).

[1] http://afmis.da.gov.ph/index.php/whats-new/496-30-hpha-for-ricecorn-farms-by-2016.html.

3. Sources of data

Secondary data will originate mainly from the following sources:

- Labor Force Survey (LFS)
- Family Income and Expenditure Survey (FIES)
- Agricultural Labor Survey (ALS)

Other potential data sources are the Registry System for Basic Sectors in Agriculture (RSBSA); the Census of Population; and the Census of Agriculture (CA). These potential sources are discussed at the end of this section.

Labor Force Survey

The LFS is an quarterly survey of households held in January, April, July, and October. It providies data on employment and wages of household members over the past week, disaggregated by basic sector. For this study the LFS public use files are available from 2008 to 2015.

Employment concepts.[2] The LFS classifies a person as *employed* if they are of working age (at least 15 years old), and reports working for at least one hour over the reference period. However, included among the employed are: persons with a job or business, but not working owing to illness, injury, vacation, leave of absence, bad weather, labor dispute, or other reasons. A person expecting a future start (i.e. to report for work or resume business within two weeks) is deemed employed.

A worker is employed *full-time* if reporting least 40 hours during the reference week. A worker is *underemployed* if expressing a desire for additional hours of work, whether in the present job; in an additional job; or a new job with longer hours. An undermployed worker is *visibly underemployed* if working less than forty hours.

A worker's job is classified by occupation and industry, based on categories of the 1977 Philippine Standard Occupational Classification and Philippine Standard Industrial Classification. Persons employed at two or more jobs are reported in the job at which they worked the greatest number of hours during the past week.

Wage concept. In the LFS, wage is proxied by average *daily basic pay*, defined as payment for normal time rendered, prior to deductions for social security, withholding taxes, and so on; but excluding allowances, bonuses, commissions, overtime pay, and benefits. [3]

Family Income and Expenditure Survey

The FIES is a household level survey which provides data on household incomes, disaggregated by activity, as well as primary occupation of household head. The FIES has been conducted trienially (the last in 2015) since 1985. The survey is performed in two rounds, one in January and one in July, each with a one-semester reference period, to arrive at full-year estimates. In the FIES, salaries and wages from employment includes all forms of compensation whether in cash or in kind received by family members who are regular or

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[2] Technical Notes on the Labor Force Survey. https://psa.gov.ph/content/technical-notes-labor-force-survey-lfs.
[3] https://psa.gov.ph/sites/default/files/attachments/cls/Tab20_5.pdf.

occasional/seasonal workers in agricultural and non-agricultural industries (Ericta and Fabian, 2009).

Agricultural Labor Survey[4]

The ALS is a survey of workers in palay, corn, coconut, and sugarcane farms started in 1974. For palay and corn, it is conducted every January and July with a reference period of the past six months. For coconut and sugarcane, the survey is conducted in January with the past year as reference period. The ALS is conducted nationwide, covering 81 provinces for palay, 53 provinces for corn, 48 provinces for coconut and 19 provinces for sugarcane.

Average wage is computed at the regional level, based on the ratio of amount paid to labors in all provinces to the number of mandays of work in all provinces. The totals are obtained by a weighted average using number of farms by type as weights, based on the 2002 CA. Wages can be disaggregated by crop and sex of worker.

Other data sources

Potential sources data on agricultural labor are RSBSA of 2012; the CA of 2012; and the Census of Population and Housing (CPH) of 2010. The CA focuses on farm operators, rather than farm workers (including own account and unpaid family workers), which is the focus of this study. Meanwhile CPH contains data on migration, but unfortunately fails to disaggregate by basic sector of employment.

Finally, the RSBSA was established in early 2012 in 20 provinces, and later extended to 55 provinces. It collected information for farmers, farm workers, and fisherfolk, pertaining to: Name; age; sex; marital status; highest educational attainment; membership in agricultural organization; and membership in Pantawid Pamilyang Pilipino Program (4Ps). Moreover, farm workers were asked about kind of work performed, and form of payment. According to the Department of Agriculture (2012), of the 8.3 million agricultural workers in RSBSA, 33 percent are registered as farm workers only; another 21 percent are registered as farm workers, while simultaneously working as farmers, fishers, or both. The remaining 46 percent are registered as farmers only.

However, a validation check of RSBSA finds that the registry omits many agricultural producers; it also includes agricultural producers who are deceased, have migrated, or operate only backyard gardens. In the case of one municipality (Manolo Fotich, Bukidnon), there were striking discrepancies between the RSBSA and data kept by the local government unity (LGU). The LGU lists 5,519 farmers, while RSBSA lists only 1,528, a discrepancy of 72.3 percent. The LGU records 7,323 ha planted to rice, while RSBSA records only 2,034 ha (Reyes and Gloria, 2017). Hence, RSBSA and census data are omitted in this review.

[4] http://countrystat.psa.gov.ph/?cont=2.

4. Profile of workers

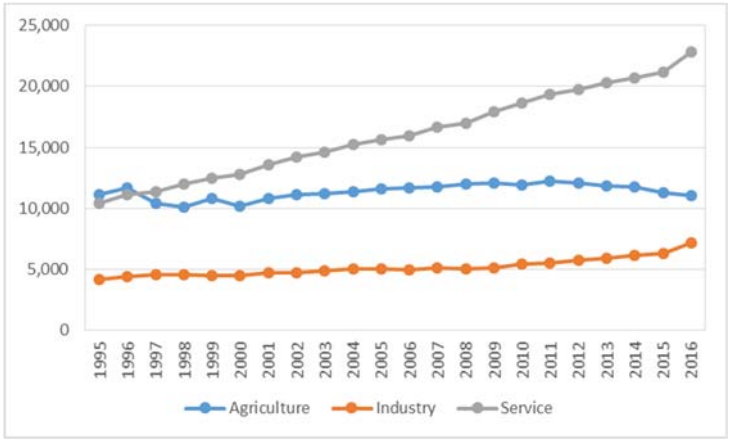
National level

Employment by sector

The sector with the least number of workers is industry, followed by agriculture; the number of workers in agriculture has been in decline since 2011, while that in industry and, especially, in services have been increasing.

The sector with the most workers is services (Figure 1). Initially, the number of agricultural workers exceeded that of services in 1995-96, but was overtaken by 1997. The number of workers in agriculture suffered short-term dips in 1997-98 due to climate shock (a severe El Nino). However since 2011 the number of agricultural workers has fallen consistently, as an average of 250,000 workers per year left the sector. The reason is unrelated to climate (the next severe El Niño struck only in late 2015). Instead, economic factors, namely rapid economic growth and tightening labor markets, are driving this decline.

Figure 1: Number of workers by basic sector, 1995 – 2016 (thousands)



Source of basic data: PSA CountryStat (2017) and Decent Work Statistics-Philippines (DeWS-Philippines,2016)

The employment share of agriculture has been steadily falling while that of industry has been relatively constant. The decline in agriculture's employment share has recently accelerated.

From 43 percent of workers in 1995, the employment share of agriculture fell to just 27 percent in 2015 (Figure 2). Meanwhile the employment share of industry is fairly constant at 15 – 17 percent of workers; hence the declining share of agriculture in employment was essentially equivalent to the increase in share of services in employment. The fall in agriculture's share in the 2000s was much slower than in 1995 – 2000 and in 2011 – 2016, when the number of agricultural workers was shrinking.

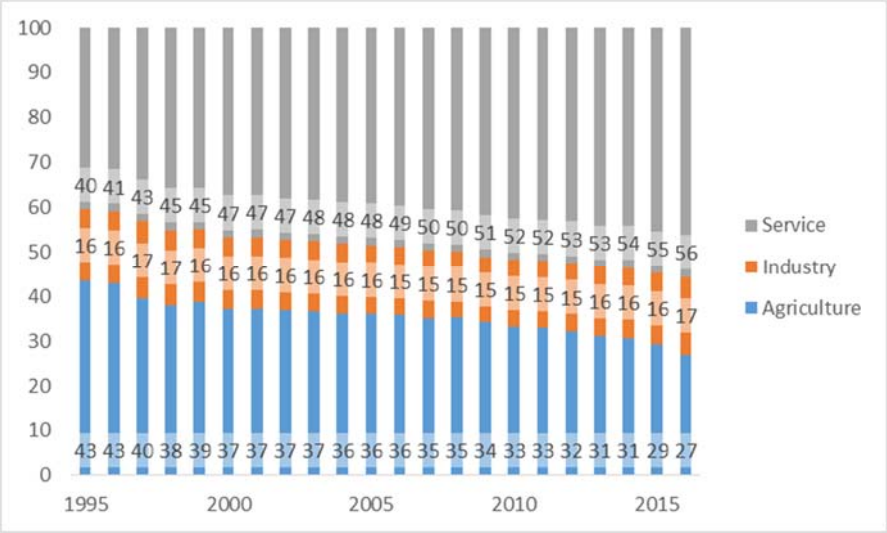
Sex and age of worker

Agriculture and industry are male-dominated sectors; services employ equal proportions of males and females.

Distribution of workers by sex is stable over time, hence Figure 3 presents only figures for 2015. Owing to differences in labor force participation, majority of all workers (60 percent) are male. However the proportion of male workers in agriculture is far higher, at nearly three-

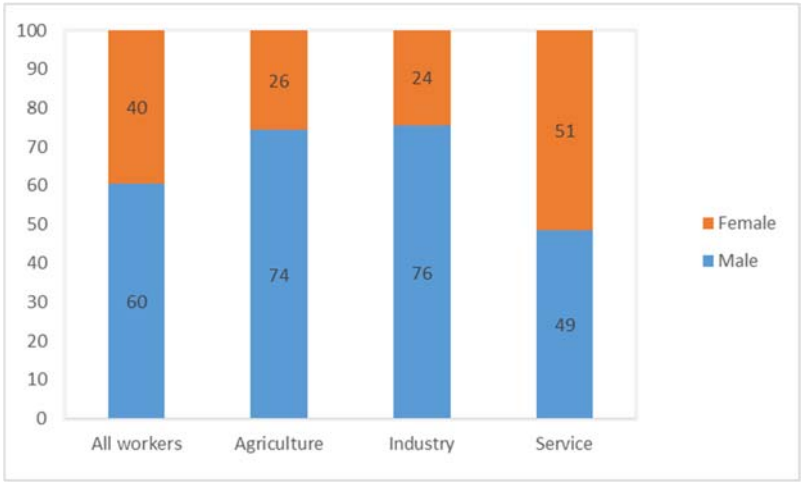
fourths. Agriculture is not unique in this proclivity, as industry also hires a slightly higher proportion of male workers. It is in services where male and female workers are at parity or slightly favoring females.

Figure 2: Basic sector shares in employment, 1995 – 2015 (%)



Source of basic data: PSA CountryStat (2017) and DeWS-Philippines (2016)

Figure 3: Distribution of workers by sex, 2015 (%)



Source of basic data: PSA LFS

Workers in agriculture tend to be older and on average age faster than other workers.

In 2015, over two-thirds of all workers in Philippines were in the prime working age bracket of 25-54 years (Table 1). The next largest group (19 percent) are the youngest workers (15-24 years). Older workers (55-64 years) account for 10 percent, while elderly workers (beyond the official working age of 65 years) are only 4 percent. The proportions have been basically unchanged since 2008. By basic sector however, agriculture has greater tendency to hire workers from the older and elderly brackets. Services most closely matches the average age profile, while industry tends to higher towards the lowest age bracket.

Table 1: Distribution of workers by age bracket and basic sector, 2015 and 2008 (%)

	All sectors	Agriculture	Industry	Services
2015				
15-24	18.7	18.8	20.6	18.1
25-54	67.6	61.5	70.1	70.0
55-64	9.7	12.5	7.3	8.9
65<	4.0	7.1	2.0	2.9
Total	100.0	100.0	100.0	100.0
2008				
15-24	19.3	20.6	19.1	18.4
25-54	67.4	60.8	72.2	70.5
55-64	9.2	11.5	6.6	8.3
65<	4.2	7.0	2.1	2.7
Total	100.0	100.0	100.0	100.0

Source of basic data: PSA LFS

Since 2008, the age profile of agricultural workers has increased slightly, i.e. higher proportion of older workers, and smaller proportion of youngest workers. This is consistent with long term trends in farming: the average age of farmers in a long term longitudinal survey has been increasing, from a mean age of 46 years in 1966, to 59 years in 1966. (The panel has replaced numerous respondents over time who have exited farming.) Aging of farmers is common to developing countries, where younger workers tend to opt for nonfarm occupations (Moya et al., 2015).

Education of worker

Majority of workers in the Philippines have finished at least secondary school; however, better educated workers tend to work outside agriculture.

In 2015, secondary school finishers (but tertiary undergraduates) account for the biggest share of workers at 42 percent (Table 2). The next largest group (about a quarter of workers) are primary school finishers (but secondary undergraduates). Only 16 percent of workers are tertiary graduates; a similar proportion of workers did not finish primary school.

Agriculture tends to have the least educated work force among the basic sectors. About one-third of agricultural workers did not finish primary school, compared to only 11 percent for industry and 7 percent for services. About 38 percent are secondary school undergraduates, compared to 29 percent for industry and 19 percent for services. Whereas about half of workers in industry and services are tertiary undergraduates, only a quarter of agricultural workers are. The most educated workers tend to work in services, followed by industry.

Over time, there has been a gradual improvement in educational attainment of workers, with the share of the bottom brackets falling by six percentage points. Similarly, educational attainment of workers in agriculture have been improving with a four percentage point shift to the higher education brackets.

Table 2: Distribution of workers by educational attainment and basic sector, 2015 and 2008 (%)

	All sectors	Agriculture	Industry	Services
2015				
Undergraduate, primary	15	33	11	7
Undergraduate, secondary	26	38	29	19
Undergraduate, tertiary	42	26	50	49
Tertiary graduate	16	2	10	25
All workers	100	100	100	100
2008				
Undergraduate, primary	18	35	11	8
Undergraduate, secondary	30	40	30	23
Undergraduate, tertiary	38	23	48	46
Tertiary graduate	14	2	10	24
All workers	100	100	100	100

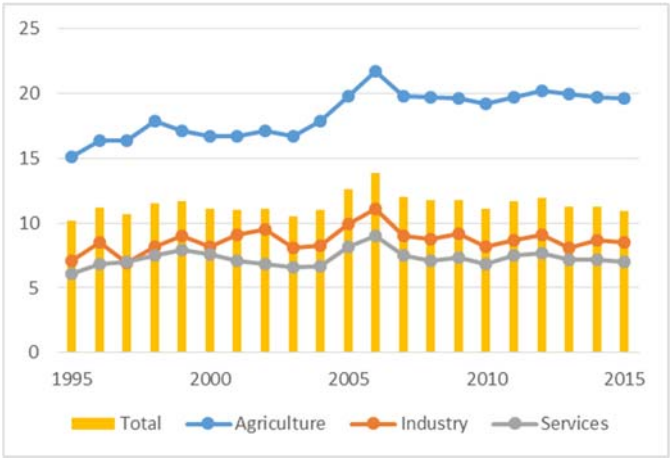
Source of basic data: PSA LFS

Visible underemployment

Visible underemployment of workers has fallen to 11 percent from a peak of 14 percent in 2006. However, about one-fifth of workers in agriculture have remained visibly underemployed since that year.

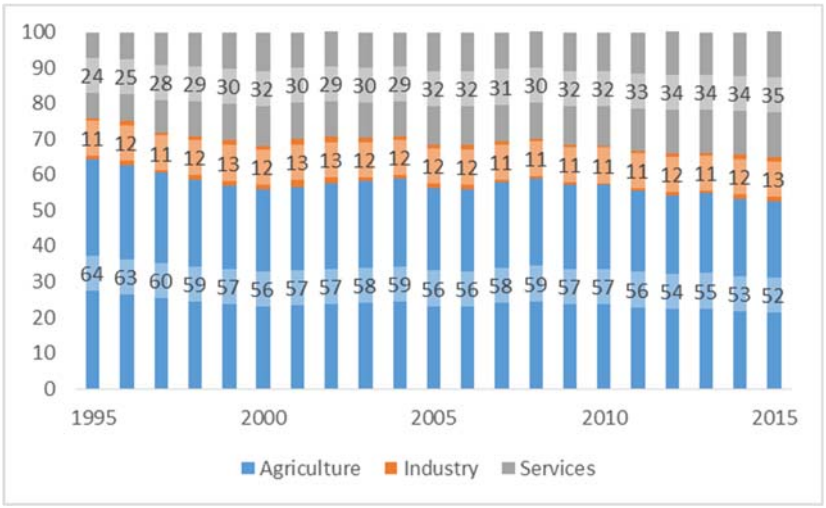
The rate of visible underemployment is lowest for services, followed closely by industry (Figure 4). There is a large gap between rates of visible underemployment for services and agriculture (averaging 11 percentage points). Despite having only one-third of workers, agriculture accounts for 64% of visibly underemployed in 1995, dropping to 52 percent in 2015 (Figure 5). The rates of visible underemployment also tend to vary together, though agriculture since 2007 has taken an independent track.

Figure 4: Visible underemployment rates by basic sector, 1995 – 2015 (%)



Source of basic data: PSA DeWS-Philippines (2016)

Figure 5: Distribution of visibly underemployed by basic sector, 1995 – 2015 (%)



Source of basic data: PSA DeWS-Philippines (2016)

Educational attainment for agricultural workers are the same whether fully employed or visibly underemployed, but industry and services workers who are visibly underemployed tend to have lower educational attainment.

Clearly, lower levels of educational attainment characterize the visibly underemployed (Table 3), compared to fully employed workers (Table 3).

Table 3: Distribution of visibly underemployed workers, by educational attainment and sector, 2015 and 2008 (%)

	All sectors	Agriculture	Industry	Services
2015				
Undergraduate, primary	24	34	17	11
Undergraduate, secondary	35	38	36	29
Undergraduate, tertiary	36	25	43	50

Tertiary graduate	5	2	4	10
All workers	100	100	100	100
2008				
Undergraduate, primary	26	34	18	13
Undergraduate, secondary	39	42	41	33
Undergraduate, tertiary	30	22	38	44
Tertiary graduate	5	2	3	11
All workers	100	100	100	100

Source of basic data: PSA LFS

In 2015, nearly sixty percent of visibly underemployed workers belonged to the bottom half of educational attainment, compared to just 41 percent of all workers. However, it appears that schooling levels are low for agricultural workers as a whole, and did not seem to greatly affect their status as fully employed or visibly underemployed. In contrast, visibly underemployed workers in industry and services did appear to be disadvantaged by lower levels of schooling.

Across sectors there is a mild tendency for underemployment to decline in the fourth quarter and increase in the second quarter.

Perhaps surprisingly, the rate of visible underemployment exhibits little variation within the year across quarters (Table 4). Lack of quarterly variation holds even for agriculture, for which much more seasonality in underemployment might be expected. It may simply be the case that the survey method of LFS – i.e. a quarterly schedule over a past week reference period – may be too blunt to capture the swings of employment peaks and troughs within agriculture. What small variations are captured, hold across the board: underemployment tends to decline in the last quarter (known to be a peak expenditure season), and be higher in the second quarter. However, direction of change for the first and third quarters may differ depending on year (hence may not be due to seasonality pattern within a year).

Table 4: Visible underemployment rate by quarter, 2015 and 2008 (%)

	Average	January	April	July	October
2015					
Agriculture	19.6	20.2	20.5	19.6	18.3
Industry	8.5	8.8	10.1	7.7	7.4
Services	7.0	7.0	7.3	7.3	6.4
National	10.9	11.2	11.6	10.8	10.1
2008					
Agriculture	19.7	20.7	19.1	20.5	18.7
Industry	8.8	8.7	9.4	8.4	8.7
Services	7.1	6.8	7.7	7.4	6.4
National	11.8	11.9	12.0	12.1	11.1

Source of basic data: PSA LFSPoverty profile

Poverty remains mostly a rural and agricultural phenomenon that is highly correlated with underemployment.

Table 5 presents a summary of employment and poverty incidence indicators using a merged data set combining FIES 2015 with LFS 2016 First Quarter. Merging involves matching of households in the two surveys. The first three rows provides population level information (using FIES weights). The poverty incidence in the merged data set (23.3 percent) approximates the official poverty line using the entire FIES (21.6 percent), hence the merging involves no serious loss of information. About sixty percent of the population is rural, where poverty incidence is substantially higher, at 30.7 percent. Hence, close to four-fifths of the poor are rural.

The unemployed (2.8 percent of the labor force) tend to be less poor than the average member of the labor force, hence unemployed workers contribute minimally to poverty in the labor force. Among workers, the major determinant of poverty is sector of employment; agricultural workers account for 35 percent of workers but exhibit a poverty incidence of 35.7 percent. Hence the large majority (62.4 percent) of all poor workers are primarily employed in agriculture. Lastly, poverty is also associated with visible underemployment; poverty incidence of visibly underemployed workers is 34.2 percent; in all, more than one-fifth of poor workers are visibly underemployed.

Table 5: Shares by group and sub-group, in workers and population, 2015 (%)

Group	Subgroup	In group	Of poor, in subgroup	Of poor, in group
Population		100.0	23.3	100.0
	Rural	60.1	30.7	79.0
	Urban	39.9	12.3	21.0
Labor Force		100.0	20.0	100.0
	Unemployed	2.8	18.8	2.6

Workers		100.0	20.0	100.0
	Underemployed	23.6	29.0	34.2
	Visibly underemployed	12.1	34.2	20.6
	Agricultural workers	35.0	35.7	62.4
Agricultural workers		100.0	35.7	100.0
	Rice	17.0	26.5	12.6
	Corn	11.0	51.8	15.9
	Coconut	6.2	38.2	6.7
	Vegetables	3.7	26.9	2.8
	Other crops	4.2	38.2	4.5
	Farm workers	32.9	39.6	37.8
	Underemployed	34.1	43.4	54.8
	Visibly underemployed	18.9	43.8	33.1

Source of basic data: PSA FIES 2015 merged with LFS 2016 First Quarter

Corn farmers, farm workers, underemployed, and visibly underemployed, are poorer than the average worker in agriculture.

The middle column in Table 5 shows a poverty incidence of 35.7 percent among agricultural workers; higher poverty incidence is exhibited by farm workers and the underemployed, whether or not visibly underemployed. These sub-groups contribute disproportionately to poverty among agricultural workers, with contribution from the underemployed rising to 55 percent. A remarkable 52 percent of corn farmers are poor, compared to rice farmers who are less poor than the average aricultural worker.

Regional level

Sector of employment

Distribution of agricultural workers by region has been largely unchanged over time, though most regions have experienced a decline in the number of agricultural workers.

Whereas the country's population (and workers) tend to concentrate in NCR, Central Luzon, CALABARZON, Western Visayas, and Central Visayas (54 percent of the total), the country's agricultural workers are more evenly dispersed throughout the country; of the sixteen regions, the top eight in terms of share of agricultural workers are: Cagayan Valley, Central Luzon, and Bicol in Luzon; Western and Central Visayas in Visayas; and Northern Mindanao, SOCCSKSARGEN, and ARMM in Mindanao (for a total of 62 percent).

Most of these regions have experienced a decline in number of workers since 2010, except for Cagayan Valley, Bicol Region, and ARMM. The sharpest decline by far is in Eastern Visayas, driven largely by the adverse shock of Typhoon Yolanda; in 2013 – 2016, the average annual drop in number of agricultural workers was 18 percent.

Table 6: Agricultural workers by region, 2011 and 2015

	Number of workers			Share in total (%)	
	2010	2015	Annualized grrowth (%)	2010	2015
Philippines	11,956	11,294	-1.1	100.0	100.0
NCR	25	26	0.8	0.3	0.2
CAR	375	365	-0.5	3.0	3.2
Ilocos Region	752	635	-3.3	6.2	5.6
Cagayan Valley	797	823	0.6	6.9	7.3
Central Luzon	802	751	-1.3	6.8	6.6
CALABARZON	759	649	-3.1	6.0	5.7
MIMAROPA	618	578	-1.3	5.3	5.1
Bicol Region	844	871	0.6	6.9	7.7
Western Visayas	1,155	1,173	0.3	9.9	10.4
Central Visayas	863	898	0.8	7.4	8.0
Eastern Visayas	743	442	-9.9	6.3	3.9
Zamboanga Peninsula	712	614	-2.9	5.7	5.4
Northern Mindanao	805	759	-1.2	6.7	6.7
Davao Region	683	641	-1.3	6.1	5.7
SOCCSKSARGEN	819	810	-0.2	6.8	7.2
CARAGA	392	386	-0.3	3.2	3.4
ARMM	812	874	1.5	6.5	7.7

Source of basic data: PSA LFS

Sex, age, and education of worker

The regions share a similar profile of agricultural workers in terms of sex, educational attainment, and age group.

All the regions exhibit a preponderance of males among agricultural workers (Table 7), though there is some regional variation in the shares. The largest share of women in the agricultural work force is observed in CAR, while the most male-dominated agricultural work force is in Central Luzon. Meanwhile the regions with the largest proportion of less educated workers is Central Visayas at 81 percent, followed closely by Eastern Visayas at 79 percent; the region with the lowest proportion is Ilocos Region at just 50 percent.

Across regions, the proportion of workers within the prime working age bracket is cluster closely around the national average of 67 percent. Meanwhile the proportion of workers in the youngest and oldest groups vary widely across regions; the regions with the largest share of 15-24 youth workers are ARMM, Zamboanga Peninsula, and ARMM; those with the biggest share of oldest workers are Central Visayas, CALABARZON, Eastern Visayas, and Caraga.

Table 7: Share in agricultural workers by region, by sex, age, and education, 2015 (%)

	Male	Incomplete secondary and below	Aged 15-24	Aged 25-54	Aged 55 and up
CAR	63	67	20	65	15
Ilocos Region	76	50	17	69	14
Cagayan Valley	71	63	19	69	12
Central Luzon	82	67	19	67	13
CALABARZON	79	65	11	71	18
MIMAROPA	72	72	20	66	14
Bicol Region	77	74	18	66	16
Western Visayas	74	73	18	66	16
Central Visayas	65	81	15	66	19
Eastern Visayas	79	79	19	64	17
Zamboanga Peninsula	73	76	22	65	13
Northern Mindanao	68	77	22	64	14
Davao Region	79	79	17	67	16
SOCCSKSARGEN	75	73	18	70	12
CARAGA	76	77	18	66	17
ARMM	77	78	22	69	9

Source of basic data: PSA LFS

Visible underemployment

Within agriculture, the visible underemployment rate varies over time and across regions; some regions with large contributions to agricultural employment have above average rates of visible underemployment.

The regions with largest contribution to overall visible underemployment are Bicol Region, Western Visayas, and Northern Mindanao; these regions also exhibit more pronounced annual variations of underemployment rate from 2008 to 2015; hence the stability of the visible underemployment rate for the country does not carry over to the regions. Other regions with highly variable annual rates of visible underemployment are Ilocos, Cagayan Valley, Central Luzon, and MIMAROPA.

The top three contributors to visible underemployment in 2015 also exhibit unusually high rates of visible underemployment (except Western Visayas); Eastern Visayas also exhibits a visible underemployment rate far above average. On the other hand, ARMM exhibits the lowest rate of visible underemployment among the regions.

Table 8: Shares in agricultural workers, by region (%)

	Workers visibly underemployed			Share in visibly underemployed, Philippines
	2008-11	2012-15	2015	2015
NCR	16.9	13.5	12.4	0.1
CAR	10.7	12.1	14.3	2.3
Ilocos Region	15.3	18.7	19.3	5.5
Cagayan Valley	14.1	12.0	11.2	4.1
Central Luzon	9.0	11.8	11.3	3.8
CALABARZON	18.9	19.7	21.3	6.2
MIMAROPA	22.7	20.3	20.0	5.2
Bicol Region	31.5	31.5	28.5	11.1
Western Visayas	27.4	24.6	22.9	12.0
Central Visayas	14.9	17.4	17.9	7.2
Eastern Visayas	21.5	22.9	25.3	6.5
Zamboanga Peninsula	23.4	25.2	22.2	6.1
Northern Mindanao	25.6	27.5	26.6	9.0
Davao Region	16.2	17.2	17.5	5.0
SOCCSKSARGEN	18.2	19.4	20.4	7.4
CARAGA	25.1	26.9	14.3	4.6
ARMM	12.5	11.1	10.4	4.1

Note: Final column is share in underemployed divided by share in employed (all agricultural workers.)

Source of basic data: PSA LFS

5. Productivity and wages

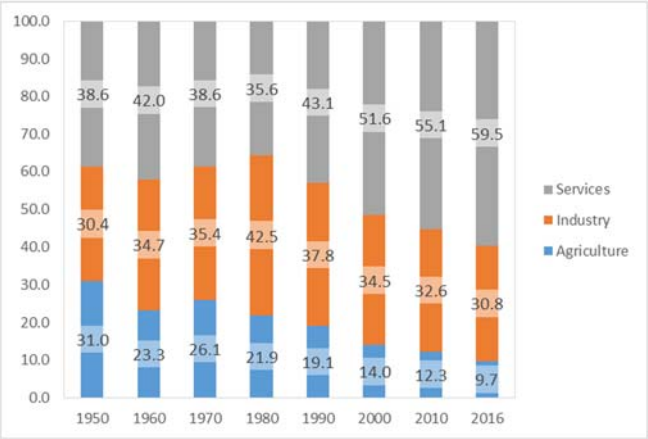
National level

Composition of GDP

The long term decline of agriculture's share in GDP has been on-goin since the 1970s, though the rising share of services commenced only in the 1980s.

Agriculture's share in GDP even rose in the 1960s (Figure 6), peaking at 27.4 percent in 1974. Subsequently it would trend downward to under a tenth of GDP in 2016. Initially the sector rising in the face of agriculture's decline is industry, peaking at 42.9 percent of GDP in 1981; afterwards it too would decline, as services share climbed from 36 to 60 percent by 2016.

Figure 6: Distribution of GDP by sector, 1950 – 2016, selected years (%)



Source of basic data: PSA - BSP[5]

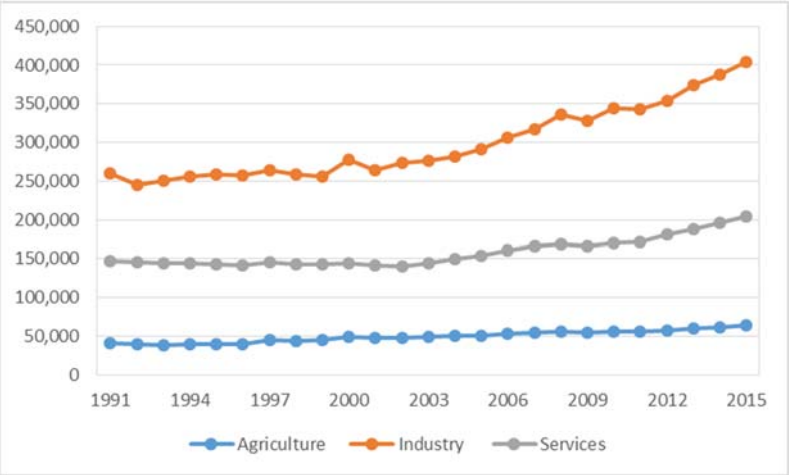
Labor productivity

Labor productivity is lowest in agriculture, but has been on a converging trend with that of industry and services, except from 2011 onward.

The contrast between output share and employment share already implies the productivity disadvantage of agriculture relative to industry and services (Figure 7). The lopsided proportion for industry (17 percent employment share versus 30 percent output share) implies this sector having the highest productivity, followed by services (for which output and employment shares are near parity). A worker in industry generates six times the output of the worker in agriculture on average. That gap had been declining from 1995 – 2009 (narrowing from 6.5 times to 5.9 times) as annual growth in labor productivity was highest for agriculture (2.4 percent) compared to industry (2.1 percent) or services (1.2 percent). From 2010 onward, labor productivity growth in agriculture accelerated to 2.8 percent per year; however, that of industry and service accelerated even faster (3.2 and 3.8 percent, respectively), despite the growing number of workers in these sectors. Hence output p[er worker by sector would begin to diverge from 2010 onward.

[5] Bangko Sentral ng Pilipinas (BSP) Statistics (http://www.bsp.gov.ph/statistics/efs_fiscalnia.asp)

Figure 7: Output per worker by sector, 1991 - 2015, pesos at constant 2000 prices



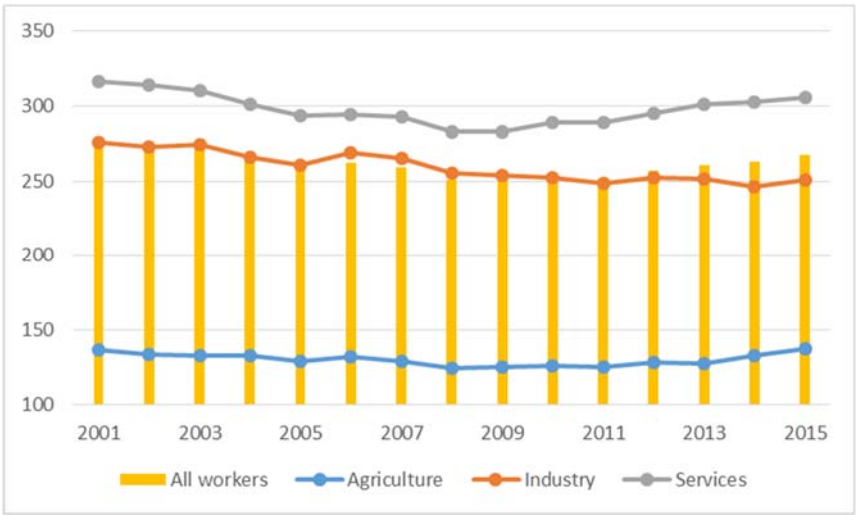
Source of basic data: PSA, National Accounts of the Philippines and LFS

Daily basic pay

Daily pay in agriculture is lowest among the sectors; over the period 2001 – 2015 daily pay has been on average unchanged in real terms across sectors, though is higher now than in 2010.

The highest daily pay is in service, despite its productivity lagging behind industry (Figure 8). Daily pay in services averages 2.2 to 2.3 times that of agriculture. Daily pay in industry is now only 1.8 times that of agriculture, compared to double in 2001. From 2001 to 2010, daily pay had been falling for all sectors, though pay began to increase from 2010 onward, except for industry. Daily pay in real terms would on average decline by 0.6 percent per year for industry and 0.2 percent for service, but increase by 0.04 percent for agriculture. Given these low average rates, daily pay has basically stagnated since 2001, even as output per worker has been increasing over the same period.

Figure 8: Average daily basic pay by sector of employment, pesos at constant 2006 prices



Source of basic data: PSA DeWS-Philippines (2016)

Agricultural wages

Daily pay in agriculture is higher for workers who are male, better educated, and in prime working age; over time, disadvantaged workers tend to enjoy higher increases in daily pay.

Males not only dominate the work force in agriculture; they are also better paid than females (Table 9). Over time though females have enjoyed faster growth in daily pay in real terms. Also earning higher pay are better-educated workers; completing a schooling level (primary or secondary) leads to a 9 – 11 percent jump in daily pay in 2008; completing tertiary schooling more than doubles daily pay. In 2015 the differences in daily pay among educational levels has narrowed in real terms, as least educated workers enjoy faster growth in daily pay; college graduates actually suffered a decline in daily pay.

Lastly, highest pay is earned by prime age workers (25 – 54 years old). Youngest and oldest workers are paid least. Over time, real daily pay of the oldest workers have grown fastest, followed by real daily pay of youngest workers.

Table 9: Daily pay of agricultural workers, 2008 and 2015, pesos per day in constant 2006 prices

	2008	2015	Change (%)
All workers	248	267	1.1
All agriculture workers	123	137	1.5
Males	127	141	1.5
Females	109	123	1.7
Undergraduate, primary	112	127	1.9
Undergraduate, secondary	122	136	1.6
Undergraduate, tertiary	136	146	1.1
Graduate, tertiary	281	258	-1.2
15-24	112	127	1.8
25-54	130	142	1.3
55-64	118	137	2.1
65<	105	122	2.1

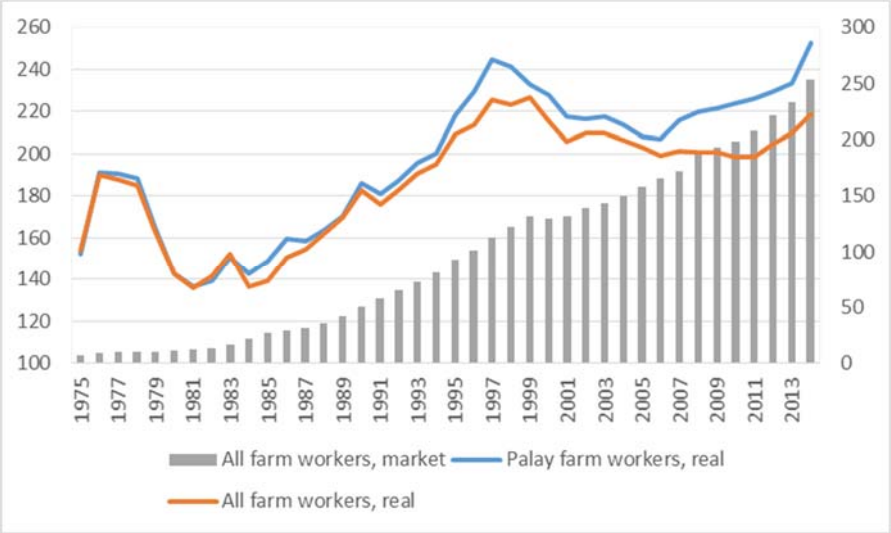
Source of basic data: PSA LFS

Real wages in agriculture have been increasing in recent years, but remain slightly below historic peak reached in 1997. Fastest growth of real wages is observed for palay since 2009.

Since 1975 when agricultural wage data began to be collected, the market or nominal wage has been rising steadily over time (Figure 9). Wage rose from about 7 pesos per day in 1975 to 253 pesos per day in 2014 (the most recent year). However, in real terms the wage trend has been erratic owing to high volatility in the Consumer Price Index (CPI) until recently. Real wages fell steeply in late 1970s to early 1980s owing to accelerating inflation (which peaked at 51 percent in 1984). As inflation stabilized real wage began to increase up until 1998 after which it fell into a prolonged decline. From 2011 the trend reversed to an upward direction. The typical palay worker earned about as much as the typical farm worker, until about the mid-1980s when palay farm workers began to receive more than the average farm wage.

Since 2009, growth rate of palay worker wages has averaged 3.3 percent, in contrast with that of the average farm worker at 2.1 percent.

Figure 9: Daily wage of farm workers, 1975- 2014, pesos at 2010 prices, unless otherwise indicated

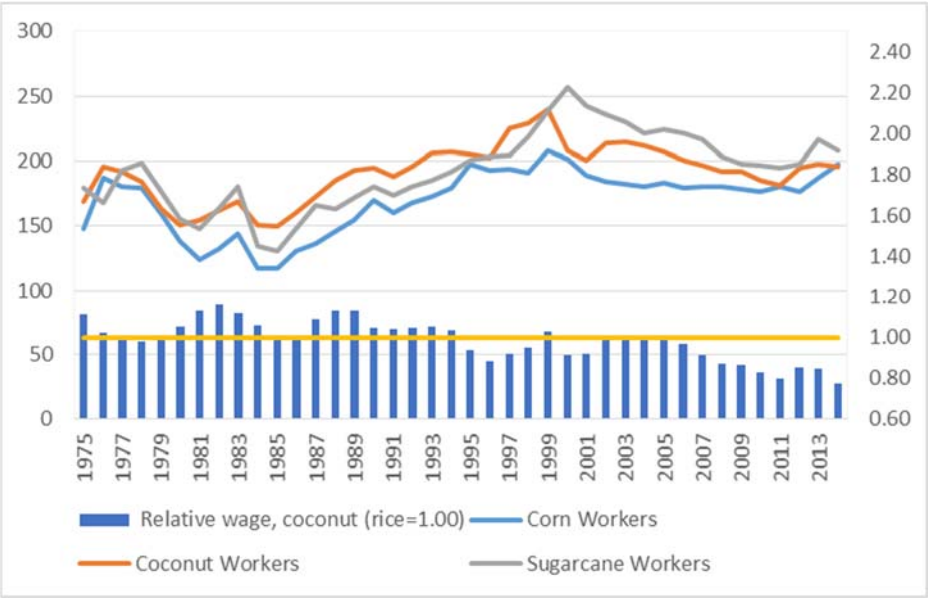


Source of basic data: PSA CountryStat

Wages in other major crops co-move with the average; wages in corn are usually lowest; coconut paid highest wages in 1980s and 1990s, while sugarcane paid highest in the 2000s.

Wages for the other major crops, tend to move together with the average wage (Figure 10). Highest wages are paid initially by coconut in the 1980s to 1990s; then sugarcane wages become ascendant in the 2000s.

Figure 10: Daily wages in coconut, corn, and sugarcane, 1975 – 2014, in pesos at constant 2010 prices

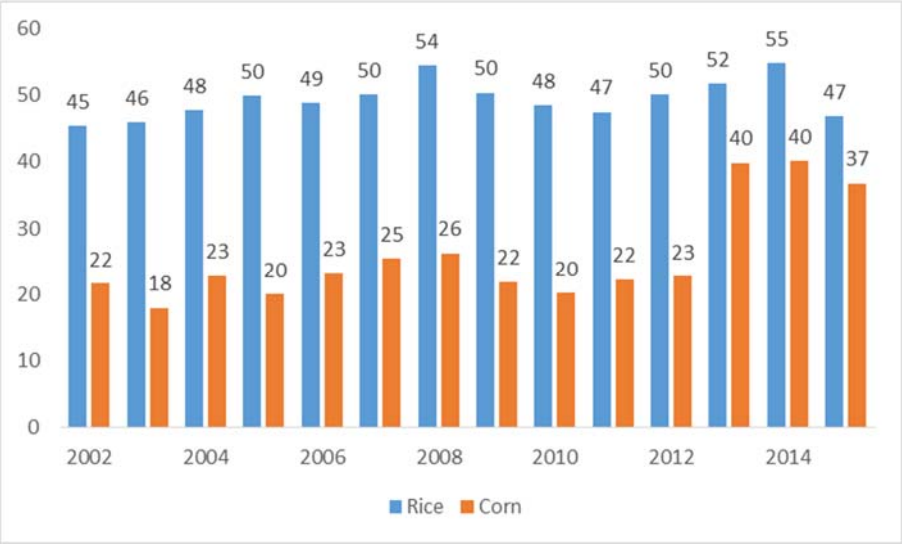


Source of basic data: PSA CountryStat

However in the 2010s, coconut and sugarcane wages approached parity. Coconut wages in 1975 – 1995 matched or exceeded palay wages; however by the 2010s, coconut wages were under 80 percent that of palay wages. Lastly, throughout the period, corn workers tend to earn lowest wages among the major crops.

Palay is relatively more protected than other sectors. Based on data from Cost and Returns survey, more than half of palay workers' compensation comes in-kind payment (Figure 11). In comparison, corn workers earn only about one-fourth of wages in-kind, though the proportion has risen by 2015. Hence when palay price rises, transmission to wages is much faster compared to other sectors where wages are paid in cash.

Figure 11: Share of payment in-kind to labor, rice and corn farming, 2002 – 2015 (%)



Source of basic data: PSA Cost and Returns

Agricultural wages of female workers are lower than those of male workers, though for some crops male and female workers are close to parity in recent years.

Gender disparity in wages is not unique to industry or services, but is also observed in agricultural wages (Table 10). The disparity is most striking in the early 2000s, but subsequently narrows to an average of 6 percent, down from 16 percent in 2002-5. Convergence has been most rapid for coconut workers for which wages are close to parity by 2011-14. In contrast, there has been no convergence in male and female wages in the case of sugarcane. While the disparity may be simply due to discrimination, it is important to disaggregate tasks by gender to see if different wages are being paid for equal work, or for different work.

Table 10: Ratio of male to female wage in agriculture, by type of farm, 2002 - 2014

	2002-05	2005-08	2008-11	2011-14
All farm workers	1.16	1.09	1.06	1.06
Palay workers	1.13	1.10	1.09	1.10
Corn Workers	1.15	1.08	1.05	1.06
Coconut Workers	1.22	1.09	1.05	1.02

Sugarcane Workers	1.18	1.18	1.17	1.18

Source of basic data: PSA CountryStat.

Regional level

Output share and labor productivity

Regions with the highest shares of agriculture in regional GDP tend to have the lowest levels of agricultural productivity per worker, with no tendency towards faster than average growth during the growth acceleration phase.

Regions with large shares of agriculture in GDP tend to have low regional index of agricultural productivity; the exceptions are Ilocos Region, and Northern Mindano. The region with the second lowest agricultural productivity, namely ARMM, has by far the largest share of agriculture in GDP. Meanwhile regions experiencing the least growth during the recent acceleration phase, namely CAR, MIMAROPA, Bicol Region, Western Visayas, Central Visayas, Zamboanga Peninsula, Caraga, and ARMM, also (except for Davao Region) exhibit low regional productivity index.

Table 11: Indicators of regional GDP in constant 2000 prices, by region (%)

	Share of agriculture in GDP, 2015	Agricultural GDP per worker regional index, 2010 (Philippines = 100)	Annualized growth of agricultural GDP per worker, 2010 - 15
Philippines	10.3	100	2.8
CAR	9.8	63	-0.1
Ilocos Region	22.4	113	5.7
Cagayan Valley	37.3	86	4.6
Central Luzon	16.0	204	6.3
CALABARZON	5.7	159	4.7
MIMAROPA	26.9	79	2.0
Bicol Region	23.0	63	1.8
Western Visayas	22.6	90	0.8
Central Visayas	6.7	58	-0.4
Eastern Visayas	19.2	82	4.7
Zamboanga Peninsula	22.0	86	1.3
Northern Mindanao	24.5	122	4.9
Davao Region	19.0	114	0.4
SOCCSKSARGEN	29.3	106	2.6
Caraga	20.8	72	1.3
ARMM	60.8	68	-2.3

Source of basic data: PSA CountryStat.

Wages in agriculture

Tables 11 and 12 show wage data in agriculture across regions. Over the time series (2008 – 2015), the market wage is deflated by the regional CPI (2006 = 100); in addition, across regions

a fixed cost-of-living index is applied across regions, based on the computed rural poverty line by region in 2015 (Western Visayas = 1.00).

Daily basic pay in agriculture diverges widely across regions with little tendency towards convergence over time.

The region with one of the lowest daily basic pay in agriculture is Western Visayas, which has the most number of workers (Table 12). The regions with the highest remuneration for agriculture is CALABARZON, followed by Davao Region. While daily pay may be expected to be lower for regions with a high rate of undremployment, in fact there are appears to be no relationship between the two variables.

Table 12: Real daily basic pay in agriculture, by region: index and growth rate, selected years

	Regional index (Western Visayas = 1.00)		Annualized growth (%)
	2008	2015	2010 - 15
CAR	1.3	1.2	0.7
Ilocos Region	1.3	1.3	1.8
Cagayan Valley	1.1	1.2	3.1
Central Luzon	1.3	1.4	2.6
CALABARZON	1.7	1.7	0.5
MIMAROPA	1.2	1.2	1.7
Bicol Region	1.3	1.3	2.5
Western Visayas	1.0	1.0	1.8
Central Visayas	1.0	1.1	2.5
Eastern Visayas	1.2	1.1	2.7
Zamboanga Peninsula	1.0	1.0	2.1
Northern Mindanao	1.2	1.2	1.0
Davao Region	1.6	1.5	0.0
SOCCSKSARGEN	1.3	1.1	0.2
Caraga	1.4	1.4	0.8
ARMM	1.1	1.2	2.1

Source of basic data: PSA LFS.

Over time, the daily basic pay index shows no tendency to narrow towards unity, i.e. to converge. During the interval of rapid growth (2010 – 15), growth rates in real daily basic pay vary greatly across region, with no tendency for regions with low daily pay to grow faster.

Over a decade (2002 to 2012), wages across crops within a region exhibit a tendency to converge.

The breakdown of regional agricultural wage by crop permits a check of whether there is convergence within a region across crops; one may expect such convergence to transpire faster than across regions within a crop, given greater ease of movement of agricultural workers within a geographic region. Wage rates by crop, relative to rice, are summarized in Table 13.

Note that sugarcane is omitted as too many regions exhibit missing values for sugarcane wages. In 2002, consistent with Figures 9 and 10, corn and coconut wages tend to be low relative to rice, with corn exhibiting a larger disparity. By 2012, where comparison is possible, there is a tendency for the index to converge towards unity; for two regions (Central Visayas and Eastern Visayas), coconut pays higher wages than rice.

Table 13: Relative wage rates by crop and region (rice = 1.00), 2002 and 2012

	Corn		Coconut	
	2002	2012	2002	2012
CAR	1.07	1.18	-	-
Ilocos Region	0.78	0.91	0.88	-
Cagayan Valley	0.79	0.91	0.83	0.91
Central Luzon	0.89	-	0.97	-
CALABARZON	0.76	0.90	0.91	-
MIMAROPA	0.84	0.88	0.87	0.94
Bicol	0.77	0.88	0.87	-
Western Visayas	0.85	0.93	0.87	0.90
Central Visayas	0.91	0.93	0.96	1.12
Eastern Visayas	0.90	0.92	1.07	1.13
Zamboanga Peninsula	0.76	0.80	0.79	0.90
Northern Mindanao	0.79	0.83	0.91	0.96
Davao Region	0.71	0.72	0.79	0.96
SOCCSKSARGEN	0.70	0.75	0.80	0.75
Caraga	0.80	0.93	0.93	0.99
ARMM	0.84	0.90	0.76	-

Source of basic data: PSA CountryStat.

6. Implications for further research

Summary of findings

Agricultural workers tend to be older, predominantly male, and less educated, compared to the average worker (though the average worker in industry is likewise equally likely to be male). The traits of the typical agricultural worker tend to be stable over time, though there seems to be a gradual tendency towards ageing of agricultural workers, and improved educational attainment. Visible underemployment rate is highest in agriculture, where the rate remains elevated and stable despite falling in other sectors since 2007.

Among the regions, the biggest contributor to agricultural employment are Cagayan Valley, Central Luzon, and Bicol in Luzon; Western and Central Visayas in Visayas; and Northern Mindanao, SOCCSKSARGEN, and ARMM in Mindanao. Similar characteristics and trends over time are observed across the regions. However, visible underemployment rates differ widely across regions; moreover, visible underemployment rates exhibit greater volatility for some regions compared to the national average.

Agriculture has been in long term decline in terms of output share and employment share. The growth acceleration period (2011 onward) has however introduced some dramatic changes. During this period, the decline of agriculture's employment share accelerated as the absolute number of agricultural workers fell. The last episode of such decline was observed only in 1995 – 2000, when agriculture was reeling from climate shocks; the recent episode by contrast appears to have been due to pull factors (rising demand for workers in other sectors) rather than push factors.

At the same time, labor productivity has been growing across all sectors. Previously that of agriculture had been growing fastest; however from 2011 onwards, the output per worker in industry and services began to outpace that of agriculture. Over the same period, daily pay of workers began to increase in real terms, after a decade of stagnation. Within agriculture, the same trend would hold for farm wages by crop, though palay farm workers experienced the largest gains since 2011. At the regional level, agricultural productivity seems to be negatively related to the region's dependence on agriculture. During the growth acceleration phase, regions with low productivity do not tend to grow faster; nor is there movement towards convergence of agricultural wages across regions, or agricultural wages (differentiated by crop) within regions.

These patterns and trends appear broadly consistent with some features of the dual economy model. High underemployment in agriculture in agriculture implies surplus labor of low skill. Expansion of industry and service output is beginning to exhaust surplus labor, leading to an increase in agricultural wage (i.e. the Lewis turning point). With continued growth in the rest of the economy, agricultural wages will continue to rise and structural change accelerate.

However, the consistency of stylized facts with the dual economy model does not prove validity of the latter. Alternative explanations may account for the patterns and trends, such as spread of mechanization. Hence validity of the model's predictions remains in doubt.

Areas for further research

The overriding concern in observing all these trends is making growth more inclusive by long term improvement in the welfare of agriculture-dependent households. Several questions therefore arise considering the stylized facts uncovered in this review:

- What is driving the increase in agricultural wages? Will this trend be sustained? Under what conditions?
- What is driving the decreasing number of workers in agriculture? Will this trend be sustained? What are the implications for growth of agriculture and agricultural incomes?
- Whereas agricultural wages are growing and workers are leaving agriculture, why is there persistent rate of underemployment in agriculture? Under what conditions will it decline?

While a large amount of information has been shown to be available from secondary sources, there are significant gaps in the socio-economic profile of agricultural workers. Some of these gaps are as follows:

- The limited duration of the reference period of the LFS severely constrains information on seasonality. No information is available on spells of underemployment; how severe the shortfall from full-time work.
- A breakdown of activities for which wages are paid is not available, nor is the relationship between these activities and skill level or other entry barriers (e.g. access to equipment or draft animals). A more detailed disaggregation by product (i.e. crop, livestock raising, fishing, aquaculture), is also essential. These data will be useful to quantify heterogeneity of labor supply, say in relation to education, sex, and other worker characteristics.
- Past employment history of agricultural workers is basically unknown. Did they migrate from elsewhere? Did they work in other sectors previously?
- Other relevant worker and household characteristics may be useful, such as memberships in cooperatives and associations; other types of training such as technical and vocational education; other activities including outside agriculture; household assets; member of household sending migrant remittances; and so on.
- Also critical are community level variables such as access to roads and other infrastructure (ports, the main power grid, potable water), and technologies such as farm machinery; these will determine level of development and economic diversification at the barangay level, as well as potential displacement of labor by machinery (especially in relation to seasonality of job opportunities).

Concluding remarks

This scoping exercise has pinpointed the key knowledge gaps which constrain the development of a detailed socio-economic profile of agricultural workers. Identification of these gaps informs the strategy of data gathering using survey of workers in agricultural households (proposed to commence in 2018). The primary data thereby gathered, upon suitable analysis, will assist in recommend policies and design of programs that help sustain and accelerate growth of remunerative employment opportunities in agriculture.

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