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Recent findings about agriculture and the economic transformation

J. Mellor;

N/a, , United States of America

Corresponding author email: jmellor@jmassocinc.com

Abstract:

Rapid agricultural growth causes substantial increase in the rural non-farm expenditure on the rural non-farm sector that eventually increases the rate of growth of market towns and hence a dispersing of urbanization away from the small number of large urban centers. That effect is greater for low income countries than middle income countries. Thus, the effect in low income countries sets the stage for longer term dispersion of urbanization. Rapid agricultural growth is the major cause of poverty decline in both low and middle income countries. The impact is greatest when it starts as a low income country and continues in middle income status. One of the down sides to modernization of agriculture is the common exclusion of women, including farmer's wife's, from reedy access to the new information require to take advantage of income increasing technological change in agriculture. The problem is easily solved by making extension demonstration the core of information spread and ensuring participation of farmer's wife's ae well as female headed farm households. That inclusion then facilitates women playing a major leadership role on the institutions of modernization such as rural cooperatives.

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RECENT FINDINGS ABOUT AGRICULTURE AND THE ECONOMIC TRANSFORMATION [1]

Growth in low and middle income countries brings structural transformation from one in which agriculture is the dominant sector to one in which the urban service and manufacturing sectors are dominant. Cities greatly increase their share of the population. Countries differ in the dispersion of cities, the incidence of poverty, and the participation of women. The agricultural growth rate is an important determinant of these differences.

Taiwan represents a pattern of geographically diffused urbanization with a high proportion of exports coming from medium-sized firms scattered in towns throughout the country (Lee 2003). Those firms with their geographic dispersion started servicing agriculture.

This is entirely different to the pattern derived from very large-scale industry centered in the major cities in South Korea, made possible by very large capital inflows from the United States. Many African countries, with their poor agricultural performance, mirror the South Korean urbanization pattern. In most European and North American countries there is a pattern of disbursed urbanization that grew out of the agriculture-oriented market towns. Chicago was once a "cow town."

This paper focuses on the effect of rapid agricultural growth on three aspects of the economic transformation:

1. Rapid agricultural growth fosters a disbursed pattern of urbanization in contrast to the alternative of concentration in a single major city as is the norm in countries, notably African countries, that neglect agriculture.

2. Rapid agricultural growth has a dominant impact on the rate of poverty reduction in both low and middle income countries.

3. Rapid agricultural growth shifts the information sources for farmer decision making from primarily the local village to outside sources. In that process women, including farmer's wives, become unnecessarily marginalized in family decision-making. The consequence is women's diminished role in the full range of household decisions and reduced scope for positions in modernization institutions such as coops.

To analyze these relationships we use a simplified four sector growth accounting framework and multipliers based on the assumptions underlying the two sector economic based fixed price models which assume that a regions tradable output is its economic base and its nontradeable output is perfectly elastic and determined solely by local demand (Haggblade S. J. Hammer and P. Hazell (199)

[1] The background materiel in the first pages of this paper are drawn from … and … as is the analytical model. The analysis that follows is original to this paper.

The next two sections describe the four sectors and the three variables that determine the pace and pattern of the economic transformation. That is followed by analysis of the three stated aspects of the economic transformation. To provide a range of examples we use Ethiopia as a low income country and Punjab Pakistan as a middle income example, and occasionally refer to Pakistan as a whole.

Definition of the Four Sectors of the Economy

Small Commercial Farmers

Agricultural production in most low- and middle-income countries is dominated by small commercial farmers (e.g., Mellor and Malik 2017; Jayne et al. 2006). They produce the bulk of agricultural output and are the source of the income growth the expenditure of which lifts the rural poor out of poverty and transforms the rural economy. They are central to the exposition in this paper.

For low- and middle-income countries the small commercial farmer is defined at the lower end as having enough land to produce sufficient food to lift the family's consumption above the World Bank defined poverty line. At the upper end, they have insufficient land (income) to support an urban import and capital- intensive lifestyle. They live in the rural areas along with other rural people and have a rural-based consumption pattern. These farmers are not poor by the standards of their community, are commercial, selling a minimum one-third of their production, to derive the non-food items in the above poverty line level of living. The class as a whole market well over half of its output and that rises over time. They are able to bear risk, to invest capital from their own income, and are interested in raising their farm income. Almost all their income comes from farming (Table 1). In table 1 for Pakistan they comprise the farms from 3 to 75 acres.

The small commercial farmer was not stated as such but was the target and implementer of the green revolution in Asia. Subsequently the focus became more on poverty and farmers were implicitly defined as the average of all landholding, excluding large scale farms. That in practice turned out to be the poor, subsistence farmer. For an example see Collier and Dercon 2014 .

This definition is not stated in terms of farm area. That is because the area encompassing the small commercial farm category varies according to a wide range of factors including land productivity. For any specific situation the definition can be converted to an area definition, as is done in this paper.

Ethiopia is broadly representative of low-income countries with respect to these household classes (see Jayne et al. 2006). Small commercial farmers dominate agricultural production (Mellor and Malik 2017.) They represent a little over half of the rural households but farm 77 percent of the land. The bulk of these farms are between 0.75 and 5.0 hectares.

Punjab, Pakistan represents a situation in which the small commercial farmer also dominates production, comparable to Ethiopia, but with a substantially larger large-scale farm component.

Small commercial farmers spend half of their incremental income on the local rural non-farm sector (Bell, Hazell, and Slade 1982.) That sector provides labor-intensive goods and services that are non-tradable—that is they do not have a market outside of the local community. Examples are house improvements, local furniture, traveling by bus with local drivers and conductors, local school tutoring, and a wide range of services.

Table 2 with data from Pakistan, shows that the market for all rural non-farm output is the tehsil - the lowest administrative level. This is an important feature of the rural non-farm sector in low- and middle-income countries. The table for Pakistan frames the issue clearly and is particularly convincing since Pakistan is a country in which urban areas are widespread with maximum opportunity to provide a market for the rural non-farm sector.

Table 1: Percentage of Each Source of Income in Total Income, by Size of Farm, Pakistan, 2010-11

Size of Farm (acres)	Crop Income	Livestock Income	Wages and salaries	Business Income	Rental and Pension Income	Other transfer Income	Remittances	Total Income
Landless	0	3	56	19	4	2	15	100
More than zero but less than 3 acres	27	20	24	13	3	2	12	100
3 to less than 5 acres	51	22	13	5	1	1	7	100
5 to under 12.5	65	17	8	4	1	1	4	100
12.5 to under 25	73	16	5	2	1	1	2	100
25 to under 50	70	17	4	3	1	0.2	5	100
50 to under 75	85	10	1	2	2	0.1	0.2	100
75 and above	80	8	5	5	1	0	1	100
Total	28	11	34	13	3	2	10	100

Source: Calculated from Pakistan Bureau of Statistics HIES 2010-11

Table 2: Sources of Demand for Rural Non-Farm Enterprises, Pakistan, (%)

Location of Demand	Production	Services	Trade
Same tehsil	74	98	100
Different tehsil in the same district	15	1	0
Different district in the same province	7	0	0
Other province	2	0	0
Other country	1	0	0

Source: Sur, et. al.. 2014

Rural Non-Farm Households

Rural non-farm households are defined as those with insufficient land to reach the poverty level from farming—that is less land than the bottom of the range for small commercial farmers. The category also includes the normally large component of rural landless families.

Table 2 shows that the demand for rural non-farm output comes almost entirely from local sources. Remittances are not a major source of income and their importance declines rapidly as size of farm increases (Table 1.) The bulk of rural non-farm households are poor and the bulk of the poor are rural non-farm. Long-term poverty reduction in low- and middle-income countries must focus on how growth can raise incomes in these largely non-farming households.

The rural non-farm households rely on a diverse set of income sources, largely as wage earners (Table 1.) On average, those with land derive half of their income from crop and livestock production. Essentially all in the rural non-farm class are net purchasers of food. Landless rural non-farm households derive essentially all of their income from non-farming activities. The small commercial farmers derive most of their income from farming. The local small commercial farmers are the prime source of demand for goods and services from the rural non-farm households and hence determine their prosperity.

In Ethiopia this group represents 46 percent of rural households and farms 13 percent of the land (Table 1.) In Pakistan they comprise 79 percent of rural households, 83 percent of impoverished households, and 61 percent of these households fall under the poverty line. Two-thirds of these households are landless. This class farms only eight percent of acreage available in Pakistan.

Large Commercial Farmers

Large commercial landholders have sufficient agricultural income to take on urban-oriented consumption patterns (widespread focus groups participated in by the author and colleagues in Pakistan and East Africa provided this description). They commonly live in urban areas. For Pakistan they are defined as those with more than 75 acres of farmed land. Such farms comprise 18 percent of the area in Punjab, thus they are an important but not dominant category (Table

1). They are more important in a few East African countries, but never dominant, except in the Union of South Africa. Large commercial farmers spend their income in urban areas substantially on capital- and import-intensive goods and services that create little employment, and of course none in rural areas (focus groups and individual informants in Ethiopia and Pakistan, including the chairman of the large farmers' association in Pakistan).

Large commercial farms tend to have technically competent management, relatively small labor forces, substantial mechanization, and a high level of factor productivity. Where governments do not provide the institutional infrastructure essential to the success of small commercial farmers, the large commercial farmers are more productive than the small commercial farms. That gives the wrong impression that the future of high productivity lies with them, even though they rarely control a high proportion of the land. Rather, governments need to provide those institutions and services to the small commercial farmer, as is done in all high income countries and now in most of Asia.

The fourth household category is the undifferentiated urban sector.

Variables that Determine Agriculture's Impact on the Economic Transformation

The processes by which rapid agricultural growth affect the economic transformation start with the small commercial farmer and go through the rural non-farm population. Three variables dominate the size of the impact: the magnitude of increased income to the small commercial farmer from modernization and its expenditure on the rural non-farm sector; the size of the rural non-farm sector relative to the small commercial farm sector, and the absolute size of both; and the employment elasticity of each rural sector (the percentage increase in employment derived from a given percentage increase in production).

Expenditure by the Small Commercial Farmer

The driving engine of agriculture's impact on the economic transformation is the biological science-based, technological change that radically and continually increases the productivity and income of small commercial farmers. They spend half of increments to income on the rural non-farm sector.

There is a large literature supporting the latter position. The initial study, for Malaysia, that provides the half of expenditure spent on the rural non-farm sector result was by Bell et al. (1982). That was followed by a large number of studies from the International Food Policy Research Institute (IFPRI) including a key paper (Hazell and Roell1983) and a book co-authored by Hazell and Ramasamy (1991), and a review paper by Delgado and his colleagues (1998). Studies by Mead and Liedholm (1998) of the rural non-farm sector confirm that farmers are the source of demand for the sector. That is further reinforced for Egypt by Gavian et al. (2002).

There are three striking impressions in observing areas of rapid agricultural growth. I draw on widespread travel across modernizing agriculture in eight countries of Asia and Africa and focus

group discussions with officials in those areas—most notably the Provincial Governor of a prosperous rural province in Egypt, who impatiently noted "everyone knows that prosperous farmers bring vibrant market towns!".

The market towns in areas of rapid agricultural growth are vibrant in stark contrast to the stagnant atmosphere in market towns surrounded by stagnant agriculture. New shops open regularly, there are crowded streets, a lot of bus traffic. Villages are notable for the dramatic change in housing: thatched roofs, dirt floors, and mud brick walls are replaced by solid plastered brick and other solid durable materials. The amount of locally made furniture increases dramatically. The frequency of bus travel is notable. Everyone wants to travel, and rising incomes permit it. The buses are staffed and repaired locally (and frequently!). The better the infrastructure, the stronger all this derived growth.

Most of these goods and services are pure labor—there is little or no capital. Because of the large underemployment of labor in the rural non-farm sector, these labor-intensive goods and services are low in price compared to purchased goods from outside. Farmers have an ample incentive to continue spending heavily in the local area. As growth occurs these activities migrate to the nearby market towns where there are external economies for their activities. The suppliers of these goods and services note the changing needs of prospering farmers and so the composition changes over time, but remains labor intensive.

In addition to being labor intensive in production, these goods and services are also non-tradable, meaning there is no market for them outside the local area. Table 2 corroborates this. It is not urban income driving these enterprises. It is and must be local agriculture.

As agricultural modernization proceeds, labor bottlenecks appear that are met with farm mechanization, often initially with quite small machines. A few of the many workshops that do repairs, outside of agriculture as well as within, will gravitate to manufacturing a wide variety of items and selling outside the region. That forwards the process of development of larger market towns and a gradual disconnect from agriculture. Rapid agricultural growth fosters a disbursed pattern of urbanization, much of which eventually has little connection with agriculture but does benefit from relatively lower wage rates and household capital availability.

With half of incremental income spent in the rural non-farm sector, the other half is equally divided between increased food consumption and modern, urban supplied, manufactured goods. The latter drives increased urban production. However, it is less important than the half of income spent on the rural non-farm sector. That is partly because the former goes for capital-intensive goods often with an import content, and thus generates much less employment than in the labor-intensive rural non-farm sector.

Relative Size of the Rural Non-Farm Sector

What is the percentage increase in income of the rural non-farm households generated by a given increase in income of the small commercial farm? Obviously the larger the increase in income,

the greater the impact on local urbanization and poverty. Likewise, the larger the small commercial farm sector, the bigger the impact. But the impact also depends on the relative size of small commercial farm and rural non-farm sectors.

If the rural non-farm sector is larger than the small commercial farm sector, then the percentage rise in income of the rural non-farm sector is proportionately less and vice versa if it is smaller. More precisely, to arrive at the percentage increase, the incremental expenditure by the small farmer sector has to be multiplied by the ratio of the sizes of the two sectors.

As is the case for Pakistan, a long period of population growth with little growth in agriculture results in division of farms, more and more falling into the rural non-farm category, increasing poverty, and a diminishing impact of a given agricultural growth rate on rural non-farm incomes.

Employment Elasticity by Sector

The three rural household classes differ dramatically in the percentage increase in employment in response to a given percentage increase in income. These elasticities are very important and surprisingly there is little measurement of them. The following relies on just a few studies and is based heavily on the underlying logic. All the results are highly sensitivity to differences in employment elasticities. The spread sheet accommodates new data or assumptions.

The small commercial farm in the context of yield-increasing technology change experiences substantial increase in labor productivity. Data from the Indian Green Revolution showed that each ten percent increase in output from that technology resulted in only a three percent increase in labor used (Rao 1975). That is an employment elasticity of 0.3 (Rao 1975). That elasticity would be even lower for large commercial farmers because they are mechanized.

In sharp contrast, the rural non-farm sector, producing labor-intensive goods and services and operating at very low wage rates experiences little increase in labor productivity as utilization rises. Increased demand will be met by increased supply of labor with little or no increase in productivity or wages. That will continue until the initially large supply of underemployed labor is absorbed.

Ellen McCullough (2016) in a detailed analysis cutting across several Sub-Saharan African countries of the World Bank's large data sets on labor utilization finds "vast reserves of underemployed labor." Those data are strongly supportive of the assumption that lack of demand is the constraint to expansion of the rural non-farm sector and that relief of the demand constraint is in a context of highly elastic supply of labor and an employment elasticity close to 1.0.

Thus the employment elasticity is conservatively estimated at 0.9. Note that this exposition is fully consistent with Lewis's (1954) seminal position of "unlimited supplies of labor." However, the nature and location of that employment is radically different to Lewis's exposition.

Rural labor markets do tighten surprisingly early in rapid growth. That is because of the big employment impact in the rural non-farm sector. As that happens, labor productivity for much of the sector can slowly increase—retail labor becomes more efficient, carpenters use somewhat better tools. The employment elasticity does not change much.

Data for the increase in urban employment in response to output increase give a mixed picture, but generally it is low. Some studies show no increase in employment even with quite a significant increase in urban manufacturing production. Urban manufacturing is in labor-intensive industries and tends to be connected to competitive international markets with the consequent need to increase labor productivity—that is, to reduce labor content. Some urban services have quite a high elasticity. The judgment reached is that 0.5 is the highest level to be found and is an average between quite a high elasticity for the services sector and a very low one for the manufacturing sector. We use this as being conservative from the point of view of measuring agriculture's impact.

Measuring the Impact of Agricultural Growth on Economic Transformation

The following sections measure the impact, by household sector, of rapid growth in agricultural production. It does so by accommodating the variables described in the preceding chapter in a spreadsheet and calculating and comparing the effect of a six percent and a three percent growth rate in agricultural production.

The methodology focuses on a small number of key variables that can be managed in a simple spreadsheet that in turn facilitates changing the coefficients as better data become available and testing for sensitivity. The spreadsheet is available, which is important given the current paucity of data and the expectation that this paper will stimulate more empirical analysis of these variables. Mellor and Malik (2017) explain in detail the derivation of the variables.

Each of the following sections present two tables covering a six percent and a three percent agricultural growth rate. The six percent growth rate is the carefully derived CAADP recommendation for Sub-Saharan Africa, and is somewhat slower than that actually achieved in Ethiopia over the past 20 years. The three percent rate is what a traditional agriculture might achieve in the context of high population growth rates. That is faster than the actual agricultural growth rate in a substantial number of low- and middle-income countries. The growth rate for the urban sector is assumed at a substantial eight percent.

Ethiopia in its overall economic structure and proportions of the major rural household classes is broadly representative of other low-income countries (see Mellor and Malik 2017 and Jayne et al. 2006 for Africa). Ethiopia is of course exceptional in its continuous long-term success in achieving a high agricultural growth rate. Ethiopia's urban production sector is large, but not dominant, at 42 percent of GDP and 20 percent of national employment (Table 3.1).

Punjab of Pakistan is taken as representative of a middle income country including the slow growth of the agricultural sector over the last few decades. The most important difference

between middle income Punjab and low income Ethiopia is the Punjab's urban production sector is far larger at 69 percent of GDP and 60 percent of employment.

The following three sections explore the three economic transformation issues stated at the beginning of the paper.

Issue 1: Rapid agricultural growth fosters a geographically disbursed pattern of urbanization compared to the alternative of concentration in a single major city as is the norm in African countries that neglect agriculture.

The core example in this paper is Ethiopia. Aside from being a reasonably representative low income country Ethiopian statistics count as rural the small and market towns of rural areas. This is sensible in that they in large part depend on agriculture for their primary market.

Consistent with the definition we describe two urban sectors: urban towns and cities, mostly large cities that grow largely apart form agriculture, and market towns and rural non-farm households related to agriculture, particularly with respect to their market. The small commercial farmer is the ultimate source for the bulk of demand for the latter urban areas.

Thus we see the rural non-farm population as to some extent in rural areas but increasingly moving into the market towns to gain scale economies in those locations. Of course the real world is more complex and some firms in this sector relate to larger urban areas rather than to the agricultural sector.

In the base situation employment in the rural non-farm sector is twice that of the urban (Table 3.). On GDP share the urban is 75 percent larger than the rural non-farm. The rural non-farm population has substantial

Table 3 Sectorial Employment and Income Growth Rates with a 6.0 Percent Rate of Growth of the Agricultural Sector, Ethiopia

Sector	Base Employment %	Base GDP %	GDP Growth %	Employment elasticity	Employment Growth %	Incremental Employment %	Incremental GDP %
Small Commercial Farming Households	37	30	6	0.3	1.8	18	28
Rural Non-farming Households	43	24	5.7	0.9	5.1	60	22
Large Commercial Farming Households	Less than 1	4	6	0.3	1.8	Less than 1	4
Rural Households, Total	80	58	5.5	0.6	3.6	78	54
Urban Households, Total	20	42	8	0.5	4.0	22	46
TOTAL/AVERAGE	100	100	6.4	0.6	3.7	100	100

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underemployment thus in a sense overstating the importance of the employment share. Rapid agricultural growth will soak up this underemployed share so that represents the situation some years into the future. However, GDP in rural non-farm tends to undercount compared to urban areas. Perhaps, all aspects considered the rural/small towns and urban shares are comparable.

When we look at the growth shares in a fast agricultural growth scenario the rural non-farm is three times that of the urban. The small town share of the urban population is increasing more rapidly than the urban share. In GDP however, the urban share is growing at twice the rate of the rural non-farm. The employment share is important because it sets the base for further growth in the rural non-farm sector and hence in the dispersion of urbanization.

Rapid growth in the employment share also explains why rural labor markets in rapid agricultural growth low-income countries so often tighten, with rising real wages, much earlier in development than had been expected.

In the case of modeling slow agricultural growth (which of course did not characterize the reality of Ethiopia), the share of incremental growth of urban GDP is four times that of the rural non-farm, while in employment the rural non-farm is less than 50 percent larger (Table 2.) The economic transformation proceeds more slowly with less dispersed urbanization.

We conclude that in a low income country rapid agricultural growth increases the share of overall urban employment in the widely dispersed market towns even though the share of GDP declines. Such a country is on the way to a widely dispersed urban pattern, with those towns and cities gradually getting a life of their own detached from agriculture. With slow agricultural growth the

share of employment still increases somewhat for the rural and small town areas but the share of GDP drops drastically.

Table 4 Sectorial Employment and Income Growth Rates with a 3.0 Percent Rate of Growth of the Agricultural Sector, Ethiopia

Sector	Base Employment %	Base GDP %	GDP Growth %	Employment elasticity	Employment Growth %	Incremental Employment %	Incremental GDP %
Small Commercial Farming Households	37	30	3.0	0.3	0.9	15	19
Rural Non-farming Households	43	24	2.9	0.9	2.6	49	15
Large Commercial Farming Households	Less than	4	3.0	0.3	0.9	Less than 1	2
Rural Households, Total	80	58	2.7	0.6	1.8	64	36
Urban Households, Total	20	42	8	0.5	4.0	36	64
TOTAL/AVERAGE	100	100	4.7	0.6	2.2	100.00	100

Punjab is not only a middle income province but for the past several decades it has had a slow growth rate in agricultural production. Punjab shows what happens to urban structure after a considerable period of slow agricultural growth. The rural non-farm sector base is twice the urban for Ethiopia but half the urban for Punjab. For GDP, the urban is six times the size of the rural non-farm, compared to less than two times for Ethiopia.

In Punjab, for several decades' agriculture has been growing very slowly while the urban sector has had modest growth rates. As expected that has caused the urban population to grow very rapidly compared to market town based urban growth. That has provided a substantial further concentration of urban development. If the rapid growth rate in agriculture of the 1970's had continued that urban relationship would be very different.

With the reality of slow agricultural growth on the existing base, employment in the urban sector grows at two times the employment in the rural non-farm sector (Table 5.) Employment grows in the urban sector nearly four times that of the rural non-farm sector. Urbanization is concentrating in the largest cities not spreading geographically. GDP grows in the urban sector

at twenty-two times that of the rural non-farm. The concentration is in the large city urban areas is immense.

Even with rapid agricultural growth employment grows in the urban sector at twice the rate in the rural non-farm – concentrating urbanization. (Table 6.) The stage for such large scale urban dominance was set by the decades of slow agricultural growth.

Table 5 Sectorial Employment and Income Growth Rates with a 3.0 Percent Rate of Growth of the Agricultural Sector, Punjab

Sector	Base Employment %	Base GDP %	GDPGrowth %	Employment elasticity	Employment Growth %	Incremental Employment %	Incremental GDP %
Small Commercial Farming Households	8	15	3.0	0.3	0.9	2	7
Rural Non-farming Households	32	12	2.4	0.9	2.1	21	4
Large Commercial Farming Households	Less than 1	4	3.0	0.3	0.9	Less than 1	2
Rural Households, Total	40	31	2.8	0.8	1.8	23	13
Urban Households, Total	60	69	8.0	0.5	4.0	77	87
TOTAL/AVERAGE	100	100	6.4	0.6	3.1	100.00	100.00

Table 6 Sectorial Employment and Income Growth Rates with a 6.0 Percent Rate of Growth of the Agricultural Sector, Punjab

Sector	Base Employment %	Base GDP %	Employment elasticity GDP Growth %	Employment Growth %	Incremental Employment %	% Incremental GDP %
Small Commercial Farming Households	8	15	6	0.3	1.8	4	12
Rural Non-farming Households	32	12	4.7	0.9	4.2	34	8
Large Commercial Farming Households	Less than 1	4	6	0.3	1.8	Less than 1	3
Rural Households, Total	40	31	5.5	0.8	3.7	38	23
Urban Households, Total	60	69	8	0.5	4	62	77
TOTAL/AVERAGE	100	100	7.2	0.6	3.9	100	100

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<u>Issue 2: Rapid agricultural growth has a dominant impact on poverty reduction in both low and middle income countries.</u>

We use employment growth as a proxy for poverty reduction. With rapid agricultural growth in Ethiopia, the rate of growth of employment in the rural non-farm sector is 5.1 percent compared to 2.6 percent with the low agricultural growth rate. The latter is modestly above the population growth rate providing little poverty reduction. In contrast, the faster rate is close to three times the population growth rate. The difference between the two growth rates is the difference between little growth in employment and hence poverty reduction and rapid reduction in poverty. The actual experience of Ethiopia has been agricultural growth somewhat more rapid than the high growth rate shown here.

A comprehensive analysis of Ethiopia by the World Bank showed that from 1994 to 2014 poverty dropped from the initially very high level of a little over 50 percent of the rural population to a little over 25 percent (World Bank 2014). The earlier number is typical of low-income countries.

The latter is lower than some middle-income countries such as Pakistan.

In middle income Punjab agricultural growth has a lower effect on employment growth rates and hence poverty reduction, because of its lesser weight in the economy. This is of course a natural effect of growth from low to middle income status. However rapid agricultural growth still dominates poverty reduction as is the case for low income countries.

In the case of the slow agricultural growth rate rural non-farm employment grows at only 2.1 percent suggesting little reduction in rural poverty. With the rapid agricultural growth rate, the employment growth rate for the rural nom-farm sector is 4.2 percent, far above the population growth rate and providing a substantial reduction in poverty. That reinforces the argument that it is important to poverty reduction to obtain rapid agricultural growth at an early stage of development and to maintain it consistently.

Tables 4 and 5 show the disastrous impact in a low-income country of the traditional three percent agricultural growth rate. Typically, Sub-Saharan African countries have been averaging less than three percent agricultural growth rates.

For Punjab poverty will increase, even while the GDP growth rate moves along at 6.4 percent well above the population growth rate. The overall employment growth rate in the rural non-farm sector is 2.1 percent.

For Ethiopia, with the three percent growth rate in agricultural production, GDP growth is also well above the population growth rate at 4.7 percent, but the employment growth rate in the rural non-farm sector is only 2.6 percent at best holding poverty relatively steady.

<u>Issue 3: Women become unnecessarily marginalized as information important to farm decisions moves from within the village to outside sources with a consequently diminished role in the full range of household decisions and poor scope for positions in modernization institutions such as coops.</u>

Consistent rapid agricultural growth derives from a national research system and associated extension that provides a steady flow of improved agricultural production technology. Unpublished focus group studies of farmer's wives and female headed farm households carried out as part of USAID financed agricultural growth program in Ethiopia showed a widespread complaint that they had excellent access to information in a traditional context but that as the knowledge system moved outside of the village (e.g. to extension agents) they lost access. The result was loss of the basis for discussing not only farm issues but a more general loss of access in family discussions.

The solution to this problem is simple. In Ethiopia a major international seed firm runs agricultural demonstrations as social affairs. The male household head is under pressure to include his wife in such and female headed households would also feel pressure to participate despite the

pressures on their time. Women's participation is close to universal. And from that comes greater influence in family discussions.

A further benefit would be for many more women to be seen as able to contribute in organizations such as cooperatives, leading to entry into a broadening of influential positions. The point is that as outside technical knowledge becomes important in the village women need it have full access to the information channels. That apparently does not happen naturally but requires a conscious effort as with the Ethiopian seed company example.

Conclusion

Rapid agricultural growth causes substantial increase in the rural non-farm expenditure on the rural non-farm sector that eventually increases the rate of growth of market towns and hence a dispersing of urbanization away from the small number of large urban centers. That effect is greater for low income countries than middle income countries. Thus, the effect in low income countries sets the stage for longer term dispersion of urbanization.

Rapid agricultural growth is the major cause of poverty decline in both low and middle income countries. The impact is greatest when it starts as a low income country and continues in middle income status.

One of the down sides to modernization of agriculture is the common exclusion of women, including farmer's wife's, from reedy access to the new information require to take advantage of income increasing technological change in agriculture. The problem is easily solved by making extension demonstration the core of information spread and ensuring participation of farmer's wife's ae well as female headed farm households. That inclusion then facilitates women playing a major leadership role on the institutions of modernization such as rural cooperatives.

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MISSING LAST COLUMNS TABLES 3 AND

TABLE 3	TABLE 3.3
28	12
22	8
4	3
54	33
6	77
100	100