Institute of Development and Economic Alternatives

Agricultural Taxation in Punjab: The Missing Billions

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1 Introduction

Agricultural income tax (AIT) is potentially among the most important sources of provincial tax revenues. In the financial year (FY) 2013, the share of “important crops” and “other crops” in gross domestic product (GDP) was about 10 percent (at current prices). Agricultural income tax, which is levied on income from crop farming but effectively collected as a per-acre land tax, was less than Rs1 billion. In comparison, direct tax revenue—overwhelmingly, income tax—collected from non-agricultural sources of income or, more specifically, from non-crop sources of incomes, was Rs736 billion.

This contrast between the collection of income tax from the agricultural and non-agricultural sectors stems from a constitutional provision that empowers the Parliament (consisting of the President, the National Assembly and the Senate) to tax all sources of income except agricultural income, which is the exclusive preserve of the provincial assemblies.

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1 The other potentially major subnational taxes are sales tax on services and property tax.
2 According to Article 260 (1) of the Constitution of Pakistan (Government of Pakistan 2015): “‘Agricultural income’ means agricultural income as defined for the purpose of the law relating to income tax.” The relevant law at the time the Constitution was approved was the Income Tax Act 1922. The present income tax law is the Income Tax Ordinance 2001, which provides a definition of agricultural income. This definition can be interpreted in a narrow sense as income from crop farming and renting of land, or more broadly to include income from livestock, animal husbandry, poultry farming, horticulture, etc. We are not aware of a case law interpretation of agricultural income. However, from the circulars issued by the Central Board of Revenue (the predecessor of the Federal Board of Revenue, the tax administrative wing of the Ministry of Finance) and from the time-bound tax exemptions provided to various land-related business incomes, it is obvious that the federal government in Pakistan interprets agricultural income only in the narrower sense of the term, i.e., as income from crop farming and from renting of land (See Nasim [2013] for sources and references).
3 In FY2013, the federal tax revenues were Rs2,049 billion, compared with total provincial tax revenues of Rs151 billion. The major sources of federal tax revenues were direct taxes (Rs736 billion), sales tax (Rs841 billion), international trade taxes (Rs240 billion), federal excises (Rs119 billion), and surcharges (Rs142 billion). The major sources of provincial tax revenues were direct taxes (Rs7 billion), provincial excises (Rs5 billion), stamp duties (Rs18 billion), motor vehicles taxes (Rs14 billion), and others (Rs110 billion).
Additionally, agricultural income and land tax rates have not been revised periodically to reflect changes in the nominal income of farmers and landowners. In Punjab, which accounts for over 66 percent of the country’s cropped area, tax rates on agricultural land and incomes have remained frozen at the levels set in 2003 and 2000 respectively. The same is the case in Sindh, which accounts for 18 percent of the cropped area. Only Khyber Pakhtunkhwa, with 10 percent of the cropped area, revised its agricultural tax rate structure in 2014.

The issue of ineffective agricultural taxation was raised in the National Finance Commission (NFC) at the time of the 7th NFC Award and is likely to be debated before the next award as well. The 7th NFC Award stated that “Provinces would initiate steps to effectively tax the agriculture and real estate sectors.” In practice, some half-hearted attempts were undertaken to make AIT more effective. In the run-up to the Punjab annual budget for FY2014, proposals were considered for a withholding AIT and for amending the Punjab Agricultural Income Tax Act 1997 (Government of Punjab 2013) to extend the scope of compulsory submission of income tax returns to farmers cultivating 25–50 acres of irrigated land. (This requirement had thus far applied only to farmers cultivating more than 50 acres of irrigated land.) While the Punjab budget of FY2014 did not introduce amendments along these lines, the budget speech did promise to enforce PAITA 1997 more effectively. This stricter enforcement was expected to increase agricultural tax collection in Punjab from Rs0.86 billion in FY2013 (revised budget estimates) to Rs2.02 billion the following fiscal year. However, the revised estimate of agricultural tax collection in FY2014 was only Rs0.83 billion, almost the same level as the previous year.

The constitutional provisions that allow provinces to tax agricultural incomes and the federal government to tax all other sources of income have allowed disparate tax treatment of income on the basis of its source. This not only creates inequities but also promotes tax evasion. However, a number of authors (e.g., Bird [1974] and Skinner [1991a, 1991b]) have shown

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4 Under the Punjab Agricultural Income Tax Act (PAITA) 1997, tax on irrigated cultivated land is charged at the rate of Rs0 per acre for cultivated land not exceeding 12.5 acres, Rs150 per acre for cultivated area exceeding 12.5 acres but not exceeding 25 acres, and Rs250 per acre for cultivated area exceeding 25 acres. Unirrigated land is also taxed, with two acres of unirrigated land treated as one acre of irrigated land. Irrigated orchards are taxed at the rate of Rs300 per acre and unirrigated orchards at the rate of Rs150 per acre. Under its Second Schedule, PAITA 1997 defines rates of income-based tax. There is an exemption limit of Rs80,000. The tax rates are 5 percent for income between Rs80,000 and Rs100,000 per annum; 7.5 percent for income between Rs100,000 and Rs200,000 per annum; 10 percent for income between Rs200,000 and Rs300,000 per annum; and 15 percent for income above Rs300,000 per annum.

5 Prior to its revision in 2014, the rate structure for agricultural income tax in Khyber Pakhtunkhwa was last revised in 2001, and the rate of land tax was revised in 2005. The 2005 revision of land tax rates had exempted cultivated land of up to 5 acres, which had previously been taxable.
that there is a case for differentiated tax treatment of agricultural income in developing countries. We review some of this literature in Section 3. In the context of Pakistan, this case is made on the grounds that there is a significant level of implicit tax on agriculture, and that the collection efficiency is low because the tax potential is small vis-à-vis the high collection cost (Chaudhry 1999).

While it is true that farmers in Pakistan were subjected to heavy implicit taxes in the early decades of the country’s existence, such taxation has been phased out largely, if not entirely, through price, trade and exchange rate reforms initiated in the 1980s (see World Bank et al. 2009). The collection inefficiency argument may still be important. It implies that equity gains of a non-differentiated tax system that treats agricultural incomes at par with other incomes for tax purposes could well be balanced by collection inefficiencies. Indeed, this is one of the reasons why policy makers recently considered levying an agricultural output tax as a form of withholding income tax. However, this overlooks the possibility that the revenue potential of a non-differentiated income tax may be substantial and the resulting equity gains may offset the cost of AIT collection.

A key objective of this paper is to estimate the revenue potential from different modes of agricultural land and income taxation in Punjab, and to allow for a more informed debate and discussion on the issue of agricultural taxation in Pakistan. We explore the revenue potential of four possible modes of taxation, including land-based taxation under PAITA 1997; a combination of land- and income-based taxes under PAITA 1997; entirely income-based taxation under PAITA 1997; and income-based taxation at rates specified by the Income Tax Ordinance (ITO) 2001 (Government of Pakistan 2014a) as amended under the Finance Act for the relevant fiscal years, for comparable non-agricultural incomes. Our findings reveal the great differences in revenue potential from these different taxation modes and show that taxing agricultural incomes at rates comparable with non-agricultural incomes could have raised over Rs53 billion in Punjab in FY2014. This could have financed the entire provincial government’s recurrent and development expenditure on health services in that year, which was about Rs51 billion.

Estimates of potential agricultural income tax for Punjab are also reported in Nasim (2012) and Nasim (2013) using data from Pakistan Agricultural Census 2000. The current paper uses data from Pakistan Agricultural Census 2010 (Government of Pakistan 2012). Compared with the previous work, our paper calculates gross value of output (GVO) of farmers using a larger
data set on crop yield, acreage and prices, so that the error in approximating actual GVO from a subset of crops is reduced. A different methodology is also used to calculate the cost of production to arrive at the taxable income. Moreover, this paper compares potential tax estimates under PAITA 1997 and ITO 2001 for FY2010 and extends the comparison for FY2011–2014.

The scheme of the paper is as follows. The analysis of revenue potential under different taxation modes in Section 2 is followed by a section on political economy of agricultural taxation in which we briefly review/discuss (i) the history of agricultural taxation in Pakistan, (ii) the work by Skinner (1991a, 1991b) on the experience of some developing countries with land taxation and the reasons for countries opting for commodity taxation over land taxation, (iii) the administrative and intergovernmental aspects that impede an effective implementation of a full-fledged AIT in the short and medium terms, and (iv) the incidence of a land tax and of an agricultural income tax. In Section 4 we explore some agricultural tax options for the short and medium term, including the withholding AIT proposed recently in Punjab, addressing the important policy issue of whether an agricultural output tax can substitute for an income tax. The paper ends with some concluding remarks.

2 Revenue Potential from Agricultural Land and Income Taxation in Punjab

This section presents estimates of the potential revenue that can be raised by taxing land and/or income from crop farming in Punjab. A land-based tax was introduced in Punjab through PAITA 1997. Although the act was amended in 2001 to include a provision for the tax to be levied on agricultural incomes, the tax is effectively collected as a land-based tax, which has remained unchanged since 2003.

In order to assess the revenue potential from taxing land or from AIT, four separate modes of taxation are explored in this paper. These include:

1. *Land-based taxation under PAITA 1997*: Levying a land tax on all cultivated land under PAITA 1997;\(^6\)

2. *A combination of land-based and income-based taxes under PAITA 1997*: Levying the land-based tax on persons cultivating less than 50 acres of irrigated land or the

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\(^6\) This is the mode under which the bulk of agricultural land/income tax is presently collected. From now on, this tax will be referred as land-based agricultural tax.
equivalent, and an income tax under PAITA 1997 on “large” farmers cultivating 50 acres or more of irrigated land or the equivalent;

3. Income-based taxation under PAITA 1997: Levying income-based AIT on all farms as per the provisions of PAITA 1997; and


Our tax estimates from agricultural incomes are based on the assumption that the supply of agricultural output is inelastic in the presence of higher taxes on farm incomes. While this may hold in the short run, farmers’ long-run responses in the form of a shift in labour supply from farm to non-farm activities, a lower level of capital investment in farming, substitution between equity capital and debt capital, and the parceling of landholdings among family members could have implications for both agricultural output as well as the revenue potential of agricultural taxation.

2.1 Data Sources

To derive estimates of the tax potential, our principal data sources include the Agricultural Census 2010 (Government of Pakistan 2012); the Agricultural Statistics of Pakistan 2009/10 (Government of Pakistan 2011); the Pakistan Economic Survey 2012/13 (Government of Pakistan 2014b); and the Agriculture Policy Institute (formerly Agriculture Prices Commission).

The Agricultural Census 2010 provides data on cultivated area, separately for irrigated and unirrigated farms, under all important crops and orchards. It also provides information on farm households by tenure status, classifying them as tenant farmers, owner-cum-tenant farmers, or owner farmers, as well as farm sizes. These data were used to obtain revenue estimates for all four modes of taxation explored.

2.2 Methodology for Estimating Revenue Potential in FY2010

The methodology adopted for calculating potential from the first mode, i.e., the land-based tax, is straightforward. Data for cultivated land under crops and orchards, both irrigated and

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7 PAITA 1997 treats one acre of irrigated land as equivalent to two acres of unirrigated land.
unirrigated, for each farm size are obtained from the Agricultural Census 2010. Tax rates for land-based tax are given in the First Schedule of PAITA 1997 and have been outlined in footnote 4. By applying these rates to each type of farm size and type of farm (i.e., owner, owner-cum-tenant and tenant farms), we obtain the estimate of revenue potential for the land-based agricultural tax.

For the remaining three modes of agricultural taxation, income derived from crop farming for each farm size and type is estimated through a process detailed later in this discussion. Tax rates are then applied to the estimated agricultural income in each farm size category and for each type of farm to obtain per farm tax liability for income-based agricultural taxation. This is then multiplied by the number of farms in each category to get the overall revenue potential of income-based agri-tax for that category.

For mode 2 of levying agri-tax, which entails a combination of land- and income-based taxes, the revenue potential of an income tax calculated for “large” farms is added to the revenue potential of the land-based tax calculated for farmers cultivating less than 50 acres of irrigated land (or equivalent) to obtain the overall revenue potential. For the remaining two modes, revenue estimates of income-based tax are aggregated across farm sizes and across farm types to obtain estimates of overall revenue potential.

Income from crop farming is obtained by calculating revenue from crop farming and subtracting from it the cost of production (COP). An estimate of revenue from crop farming or gross value of output (GVO), by farm size, is obtained by using average yield of each crop, multiplying it by the cropped area under that crop (by farm size), and multiplying this crop output (by farm size) with the harvest price of the crop. The estimate for GVO by farm-size is obtained for each farm type. The distinction by farm type is relevant when considering cost of production and taxable income (see below). As an illustration, calculation of GVO of wheat of owner (self-cultivated) farms is shown in Table 1.

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8 We treat all orchards as mature orchards, which would overestimate the tax potential slightly.
9 In the aggregate data for Punjab, the Agriculture Census includes Islamabad, the federal capital. To estimate the revenue potential, the latter was netted out to get data only for Punjab province.
10 Data on average crop yields in Punjab were obtained from Pakistan Agriculture Statistics.
Table 1: Calculating GVO from Wheat Crop for Owner-Farmers, Punjab, 2010

<table>
<thead>
<tr>
<th>Farm Size (Acres)</th>
<th>Cropped Area (Acres)</th>
<th>Output (Tons) (Yield=1.05 tons/acre)</th>
<th>GVO of Crop (Rs billions) (Harvest Price= Rs23,466/ton)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1</td>
<td>181,056.90</td>
<td>189,906.80</td>
<td>4.5</td>
</tr>
<tr>
<td>1–2.5</td>
<td>1,554,947.40</td>
<td>1,630,952.00</td>
<td>38.3</td>
</tr>
<tr>
<td>2.5–5</td>
<td>2,333,436.80</td>
<td>2,447,493.40</td>
<td>57.4</td>
</tr>
<tr>
<td>5–7.5</td>
<td>2,451,636.00</td>
<td>2,571,470.10</td>
<td>60.3</td>
</tr>
<tr>
<td>7.5–12.5</td>
<td>2,812,003.50</td>
<td>2,949,452.00</td>
<td>69.2</td>
</tr>
<tr>
<td>12.5–25</td>
<td>2,365,679.10</td>
<td>2,481,311.70</td>
<td>58.2</td>
</tr>
<tr>
<td>25–50</td>
<td>1,107,320.80</td>
<td>1,161,445.70</td>
<td>27.3</td>
</tr>
<tr>
<td>50–100</td>
<td>445,325.30</td>
<td>467,092.50</td>
<td>11</td>
</tr>
<tr>
<td>100–150</td>
<td>163,884.70</td>
<td>171,895.20</td>
<td>4</td>
</tr>
<tr>
<td>&gt;150</td>
<td>228,531.60</td>
<td>239,702.00</td>
<td>5.6</td>
</tr>
<tr>
<td>Total</td>
<td>13,643,822.10</td>
<td>14,310,721.50</td>
<td>335.8</td>
</tr>
</tbody>
</table>

The GVO for wheat, rice, maize, jawar, barley, cotton, sugarcane, oilseeds, pulses, and vegetables was calculated. To obtain aggregate GVO, we have to account for GVO of all other crops (e.g., fodder) and of orchards, for which data on yield and prices are more intractable. In order to obtain aggregate GVO, we assume that the average GVO per cropped acre in the aggregate is the same as the average GVO per cropped acre calculated over the ten crops.\(^\text{11}\)

\(^{11}\) Aggregate GVO was adjusted upwards by multiplying the GVO calculated from the ten crops by the ratio of total cropped area to the cropped area under the ten crops. The cropped area under the ten crops accounted for 87 percent of the total cropped area. Of the remaining cropped area, fodder accounted for 11 percent, orchards for 1 percent and “others” for 1 percent of the cropped area. Thus the crops that are not part of the group of 10 crops consist of some high value crops (fruits) which tend to push the average GVO upwards but this effect on average GVO is very likely offset or reversed by the relatively low value crop, fodder, which dominates the former in
The next step is to derive taxable income from GVO by subtracting from it the production cost. Three different approaches for deriving COP estimates for FY2010 have been adopted; these and the resulting cost estimates are discussed in Annex I. We work with a cost of production estimate of about 40 percent of GVO (excluding depreciation). Including depreciation cost adds another 5.6 percent (under PAITA 1997) to 7.25 percent (under ITO 2001). The methodology for estimating depreciation cost is also provided in Annex I.

The overall cost of production thus obtained is subtracted from GVO to get the taxable income (TI) for owner farmers.

Obtaining the potential tax revenue from owner farmers involves the following steps:

1. The TI for each farm size is divided by the number of farms (in that size category) to obtain the TI per farm.
2. The tax liability per farm is calculated by applying the appropriate income tax rate to the TI per farm; the tax rates relevant for each of the last three modes of taxation are applied to get revenue potential in each case.
3. The tax liability per farm is multiplied by the number of farms in the relevant size category.
4. Finally, the tax revenue calculated in step (3) is aggregated over all farm sizes.

To calculate the TI for tenant farmers, GVO is computed in the same way as for owner farmers but in calculating the COP, we allow for the rental income payable to landowners. For owner-cum-tenants, the TI on own land is calculated as for owner farmers; for rented land, the TI is calculated as for tenant farmers.

The cost of rented land is taken to be 50 percent of GVO excluding cost of purchased inputs, hired labour, capital depreciation, and markup on investment.

For the fourth mode of taxation explored, i.e., income-based taxes at rates specified in ITO terms of cropped area. Given that the ten crops account for 87 percent of the cropped area, even if the GVO per cropped acre for the ten crops diverges from that of the remaining crops, the average GVO per cropped acre is unlikely to be very different from that of the ten crops.  

12 This cost ratio applies only to purchased inputs, hired labour, rented machinery and equipment, and interest payments on loans taken for agricultural investment and production. As per practice for taxing non-agricultural income, actual or imputed income attributable to the family’s own labour, owned machinery and equipment and interest on investment loans taken from other members of the family is taken as part of income and is not included in this cost ratio.
2001, tax estimates from crop farming are combined with tax estimates from rental income of landowners to obtain total income tax potential from crop farming and renting out of agricultural land in Punjab.\textsuperscript{13}

The following section presents our estimates of potential tax revenue under the four different taxation modes as outlined above.

### 2.3 Estimates of Revenue Potential for FY2010

**Land-Based Taxation under PAITA 1997**

Under the first mode of taxation explored, i.e., land-based taxation according to PAITA 1997, Punjab’s potential revenue from land-based agri-tax in FY2010 is estimated at Rs2.1 billion. A breakdown of this figure is provided in Table 2.

<table>
<thead>
<tr>
<th>Farm Size (Acres)</th>
<th>Cropped Irrigated</th>
<th>Cropped Unirrigated</th>
<th>Orchards Irrigated</th>
<th>Orchards Unirrigated</th>
<th>Total Potential Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1</td>
<td>0</td>
<td>0</td>
<td>0.001</td>
<td>0</td>
<td>0.001</td>
</tr>
<tr>
<td>1–2.5</td>
<td>0</td>
<td>0</td>
<td>0.004</td>
<td>0</td>
<td>0.005</td>
</tr>
<tr>
<td>2.5–5</td>
<td>0</td>
<td>0</td>
<td>0.011</td>
<td>0.001</td>
<td>0.012</td>
</tr>
<tr>
<td>5–7.5</td>
<td>0</td>
<td>0</td>
<td>0.017</td>
<td>0.003</td>
<td>0.02</td>
</tr>
<tr>
<td>7.5–12.5</td>
<td>0</td>
<td>0</td>
<td>0.024</td>
<td>0.006</td>
<td>0.03</td>
</tr>
<tr>
<td>12.5–25</td>
<td>0.693</td>
<td>0</td>
<td>0.027</td>
<td>0.002</td>
<td>0.722</td>
</tr>
<tr>
<td>25–50</td>
<td>0.619</td>
<td>0.047</td>
<td>0.018</td>
<td>0.001</td>
<td>0.685</td>
</tr>
<tr>
<td>50–100</td>
<td>0.297</td>
<td>0.043</td>
<td>0.014</td>
<td>0</td>
<td>0.355</td>
</tr>
<tr>
<td>100–150</td>
<td>0.094</td>
<td>0.013</td>
<td>0.006</td>
<td>0</td>
<td>0.113</td>
</tr>
<tr>
<td>&gt;150</td>
<td>0.164</td>
<td>0.017</td>
<td>0.012</td>
<td>0</td>
<td>0.192</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1.866</strong></td>
<td><strong>0.12</strong></td>
<td><strong>0.133</strong></td>
<td><strong>0.014</strong></td>
<td><strong>2.134</strong></td>
</tr>
</tbody>
</table>

\textsuperscript{13} We ignore here the adjustment in tax revenue, as given in Nasim (2013, p. 34), to account for the discrepancy between the reported figures on area rented out by landowners and the area rented in by tenants and owner-cum-tenants.
Compared with the three other modes of taxation considered in this paper, land-based taxation under PAITA 1997 has the lowest revenue potential. As Table 6 shows, when income from crop farming is treated at par with business income for tax purposes, potential tax revenue is about Rs52 billion.

The rather low estimate of revenue potential from land-based taxation signifies three major weaknesses of the tax. First, the exemption limit is overly generous, as it removes about 95 percent of farms and 63 percent of cultivated land from the tax base. Second, the tax rates are very low, as the weighted average of potential tax comes out to be about Rs73 per acre. Had the farmers’ income from cultivation of land been assessed as business income, as described for tax mode 4, the estimated average income per acre would have been about Rs27,284 per annum (including rental income from land) with an average tax of about Rs1,800 per acre.\(^\text{14}\) This implies that, even if the full potential of land tax had been realized in FY2010, farmers still would have paid only 4 percent of the tax of a comparable business income.

Finally, the tax lacks buoyancy. With fragmentation of land causing more and more farms to fall in the exempt or lower tax brackets, the fixed rate implies that revenue from the tax could increase only by (1) irrigating a larger share of cultivated area; (2) a sizeable switch from crop farming to orchards; or (3) improving collection of the tax. With 87 percent of cultivated area already irrigated and a large change in cropping pattern very unlikely even in the medium run, the major source of improved revenue is likely to come from improved collection and major changes in the tax structure (i.e., reducing the exemption limit and raising the tax rates).

In order to assess the changes over time in the revenue potential of land-based tax, we applied the same rates and methodology adopted for estimating the revenue potential from Agricultural Census 2010 data to data from Agricultural Census 2000. It was found that despite a very minor increase in cultivated area (by 0.6 percent per annum), and some improvement in irrigation, the revenue potential decreased from Rs2.5 billion in 2000 to Rs2.1 billion in 2010 (or by 1.8 percent per annum). This was mainly because of land fragmentation.\(^\text{15}\)

\(^\text{14}\) Measured in terms of cultivated area, land tax potential was Rs79 per cultivated acre in FY2010; average income was Rs29,584 per cultivated acre, and average tax would have been Rs1,944 per cultivated acre on a comparable business income.

\(^\text{15}\) While in the period between 2000 and 2010, the number of farms has increased by 3.1 percent per annum, cultivated area increased by only 0.6 percent per annum. As such per farm cultivated area declined by 2.4 percent per annum.
We note that while the revenue potential of the presently administered tax is relatively low, collection of the tax is even lower. As mentioned earlier, even though a bulk of revenue collected under PAITA 1997 is from land tax, collection of the tax during FY2005–2014 has not increased beyond one half of the estimated potential.16

2.3.2. A Combination of Land-based and Income-based Taxes

While presently agricultural land/income tax is collected mainly as a land tax, PAITA 1997 makes a provision of levying a full-fledged income tax on crop farming as well.17 In section 4, PAITA 1997 makes it mandatory for larger farms (50 acres or more of irrigated land and 100 acres or more of unirrigated land) to file income tax returns. While PAITA 1997 does not state that income-based tax is to be levied only on large farms, the rules framed by the government to carry out the purposes of the act imply that only larger farms are to pay income-based tax, while smaller farms are only to pay the land-based tax. Working with this interpretation of PAITA 1997 and using tax rates as given in its first and second schedule (see footnote 4), the estimated revenue potential of a combination of land-based taxes (for smaller farms) and income-based taxes (for larger farms) is nearly Rs8.9 billion, as shown in Table 3.

<table>
<thead>
<tr>
<th>Owners</th>
<th>Revenue Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owner-cum-Tenants</td>
<td>1.96</td>
</tr>
<tr>
<td>Tenants</td>
<td>0.43</td>
</tr>
<tr>
<td>Land-Based on Small Farms</td>
<td>0.72</td>
</tr>
<tr>
<td>Total</td>
<td>8.89</td>
</tr>
</tbody>
</table>

If this variant of land tax/AIT were being levied in Punjab in 2010, tax collection as a ratio of potential tax would have been less than 10 percent.

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16 It is appropriate to mention here that the calculation of potential revenue is based on the scenario as it exists today, i.e., it represents the maximum revenue that could be collected if land-based provisions of PAITA were applied to all farms in Punjab. Actual agricultural land/income tax collection in Punjab has not crossed the Rs1 billion level during the past ten-year period (FY2005–2014), whereas our estimate of potential revenue was Rs2.3 billion in FY2005, which, because of fragmentation, has dropped to Rs2.0 billion by FY2014. The collection to potential ratio increased from 37 percent in FY2005 to 41 percent in FY2014, mainly because of declining potential.

17 See footnote 4 for income tax rates under PAITA 1997.
2.3.3 Income-based Tax on All Farms under PAITA 1997

As mentioned earlier, PAITA 1997 makes it mandatory for the larger farms to file income tax returns, but it does not state that income-based tax is to be levied only on large farms. In fact, under sub-section 4 of section 3, PAITA 1997 clearly states that the higher of the assessed tax liability under the land-based and income-based taxes would be charged to the assessee. As Table 4 shows, under a fully income-based tax regime using the tax rates specified in PAITA 1997, the estimated revenue potential amounts to Rs54.4 billion.

Table 4: Revenue Potential for Income-Based Agricultural Tax under PAITA 1997, Punjab, FY2010 (Rs billions)

<table>
<thead>
<tr>
<th>Farm Size (Acres)</th>
<th>Owners</th>
<th>Owner-cum-Tenants</th>
<th>Tenants</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1–2.5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2.5–5</td>
<td>4.95</td>
<td>0</td>
<td>0</td>
<td>4.9</td>
</tr>
<tr>
<td>5–7.5</td>
<td>6.24</td>
<td>0.6</td>
<td>0</td>
<td>6.9</td>
</tr>
<tr>
<td>7.5–12.5</td>
<td>9.11</td>
<td>1.1</td>
<td>0.6</td>
<td>10.9</td>
</tr>
<tr>
<td>12.5–25</td>
<td>11.38</td>
<td>2</td>
<td>0.7</td>
<td>14.1</td>
</tr>
<tr>
<td>25–50</td>
<td>6.43</td>
<td>2</td>
<td>0.4</td>
<td>8.9</td>
</tr>
<tr>
<td>50–100</td>
<td>3.13</td>
<td>1.2</td>
<td>0.2</td>
<td>4.6</td>
</tr>
<tr>
<td>100–150</td>
<td>1.27</td>
<td>0.3</td>
<td>0</td>
<td>1.6</td>
</tr>
<tr>
<td>150&lt;</td>
<td>1.79</td>
<td>0.6</td>
<td>0.2</td>
<td>2.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>44.3</strong></td>
<td><strong>7.9</strong></td>
<td><strong>2.2</strong></td>
<td><strong>54.4</strong></td>
</tr>
</tbody>
</table>
2.3.4 *Income-based Tax on All Farms at Rates Specified in ITO 2001*

To estimate the potential of AIT when farm income is treated at par with income from non-farm sources, we calculated the tax potential from crop farming as well as from renting of farm land using the rates specified in ITO 2001, treating farm income as the business income of an *individual*. Where we distinguish between farm income and rental income, the tax rates used for rental income are those relevant to *income from property*. Ignoring rental income, we estimated potential AIT in Punjab to be Rs50 billion in FY2010 (Table 5). When rental income is included, the tax potential increases to Rs52 billion (Table 6).

**Table 5: Revenue Potential for Income-Based Agri-Tax as per ITO 2001 Rates, Punjab, FY2010 (Rs billions)**

<table>
<thead>
<tr>
<th>Farm Size (Acres)</th>
<th>Owners</th>
<th>Owner-cum-Tenants</th>
<th>Tenants</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1–2.5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2.5–5</td>
<td>0.5</td>
<td>0</td>
<td>0</td>
<td>0.5</td>
</tr>
<tr>
<td>5–7.5</td>
<td>3</td>
<td>0.1</td>
<td>0</td>
<td>3.1</td>
</tr>
<tr>
<td>7.5–12.5</td>
<td>6.1</td>
<td>0.7</td>
<td>0.2</td>
<td>7</td>
</tr>
<tr>
<td>12.5–25</td>
<td>10.9</td>
<td>1.8</td>
<td>0.5</td>
<td>13.1</td>
</tr>
<tr>
<td>25–50</td>
<td>8.8</td>
<td>2.5</td>
<td>0.4</td>
<td>11.8</td>
</tr>
<tr>
<td>50–100</td>
<td>5.6</td>
<td>1.8</td>
<td>0.3</td>
<td>7.7</td>
</tr>
<tr>
<td>100–150</td>
<td>2.2</td>
<td>0.6</td>
<td>0.1</td>
<td>2.8</td>
</tr>
<tr>
<td>150&lt;</td>
<td>3</td>
<td>1</td>
<td>0.3</td>
<td>4.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>39.9</strong></td>
<td><strong>8.6</strong></td>
<td><strong>1.8</strong></td>
<td><strong>50.2</strong></td>
</tr>
</tbody>
</table>

2.4 *Methodology and Revenue Estimates for FY2011–2014*

To calculate the revenue potential of land-based agricultural tax for FY2011–2014, we assumed that the changes which occurred in cropped agriculture between 2000 and 2010 will continue at the same rate for at least the next four years. In other words, average annual change in revenue potential over the 2000–2010 period will also apply to the period 2011–2014 (assuming tax rates will remain unchanged at the level at which they have remained frozen since 2003).
Under these assumptions, the revenue potential of land-based tax will decline from Rs2.13 billion in FY2010 to Rs1.98 billion in FY2014.

To estimate the revenue potential for FY2011–2014 from the other three modes, the GVO (by farm size) is updated for each year by assuming that it has increased annually at the same rate as the nominal growth rate of the crop sector. Once the GVO has been updated in this manner for all four tax years, i.e., 2011 to 2014, the TIs and potential tax revenues for each of the three modes of agricultural tax are calculated following the methodology outlined in Section 2.2.18

Estimates of potential tax revenues for tax years 2010 to 2014 are given in Table 6.

<table>
<thead>
<tr>
<th>Mode of Taxation</th>
<th>FY2010</th>
<th>FY2011</th>
<th>FY2012</th>
<th>FY2013</th>
<th>FY2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land-Based</td>
<td>2.134</td>
<td>2.095</td>
<td>2.057</td>
<td>2.02</td>
<td>1.983</td>
</tr>
<tr>
<td>Mix of Land-Based and Income-Based</td>
<td>8.893</td>
<td>12.69</td>
<td>10.952</td>
<td>12.834</td>
<td>15.146</td>
</tr>
<tr>
<td>Income-Based with PAITA 1997 Rates</td>
<td>54.395</td>
<td>89.918</td>
<td>73.454</td>
<td>91.52</td>
<td>113.734</td>
</tr>
<tr>
<td>Income-based with ITO 2001 Rates (as amended under the relevant Finance Acts) excluding rental income</td>
<td>50.226</td>
<td>74.363</td>
<td>51.022</td>
<td>30.059</td>
<td>45.659</td>
</tr>
<tr>
<td>Income-based with ITO 2001 Rates (as amended under the relevant Finance Acts) including rental income</td>
<td>52.426</td>
<td>78.191</td>
<td>54.131</td>
<td>33.958</td>
<td>53.685</td>
</tr>
</tbody>
</table>

The potential tax revenue between FY2010 and FY2014 varies considerably, mainly because growth in cropped agriculture has been quite volatile during this period. In the case of

18 As in Section 2.2, the cost of production is taken to be 40 percent of GVO (excluding depreciation). Depreciation adds another 5.6 percent (under PAITA) to 7.25 percent (under ITO 2001). We have not adjusted for fragmentation of landholdings for FY2011–2014. Under Muslim inheritance laws, property, including land, is distributed among progeny and other property claimants on the death of the owner. Therefore, landholdings for all farm sizes tend to become fragmented, altering the frequency of the farms within each size category. There may be some offsetting tendency as economically unviable small farms are sold to and purchased by larger farms, but the tendency towards greater fragmentation is likely to dominate. Nasim (2013) estimated AIT for FY2010 under tax mode 4 using Pakistan Agriculture Census 2000. By allowing 20 percent of the farms in every farm size category (except the smallest) to fragment into an average farm size of the next lowest farm category, and adjusting the farm area, he calculated the tax potential for owner-farmers. The impact on tax revenue potential for owner-farmers over a ten year period because of fragmentation was a decline of 6 percent (from Rs39.4 billion to Rs37 billion). Thus, the estimated revenue potential given in Table 6 is not likely to change by much even if allowance is made for land fragmentation.
agricultural income tax based on federal tax rates, the variation is even greater because federal income tax rates have undergone major changes during this period. As PAITA rates have remained unchanged, the gap in revenue potential from income-based tax at PAITA rates and at federal income tax rates widens from only 3.6 percent of PAITA potential in FY2010 to 53 percent in FY2014.

3 Political Economy Issues

The analysis in Section 2 shows that substantially higher revenue could potentially be generated in Punjab if PAITA 1997 was implemented effectively and if agricultural income tax rates were brought at par with tax rates applicable to comparable incomes in other sectors of the economy. Even a pure land-based tax could yield substantial revenue with appropriate revision of the rate structure (see Section 4.1) but there are important obstacles in implementing an effective land tax, let alone an income tax. This is one of the reasons many developing countries have opted for output and commodity taxation, such as export tax on agricultural goods, instead of levying a land tax or an agricultural income tax. In this section we provide a historical overview of agricultural taxation in Pakistan, including past attempts and missed opportunities to impose AIT, outline some results and insights from Skinner (1991a, 1991b) on why some countries successfully managed the transition from commodity taxation to land taxation and why others failed, and the arguments for why some countries may select commodity tax over land tax, despite the presumed efficiency of a land tax over commodity tax.

One of the conclusions reached by Skinner (1991a) is that the administrative and evasion costs of implementing a land tax are substantial, which explain the preference for commodity taxation over land taxation. Therefore, the next topic we take up is the administrative capacity of the Punjab Board of Revenue (BOR) and the scope for coordinating between the federal and provincial revenue for the design and implementation of agricultural taxes.

This section also discusses the issue of tax incidence of a land or AIT, i.e., who bears the

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19 During FY2010–FY2012, as taxable income increased from one tax bracket to the next, higher tax rates became applicable to all income rather than marginal income. FY2013 onwards, the income tax schedule resembles a step function with higher tax rates applicable only to marginal incomes.

20 As a very small number of farms pay income-based tax, the provincial Board of Revenue has not attempted to change the rules for income-based tax since 2001, despite drastic revisions in federal income tax rates. The structure of land-based tax was changed by an amendment, in 2003, in PAITA 1997, mainly for the benefit of taxpayers.
burden of an agricultural tax. If individuals and businesses on whom the tax is levied cannot shift the tax to consumers or workers in the form of higher output prices or lower wages, then there will be greater resistance on their part to any new taxes.

3.1 A Brief History of Agricultural Taxation

Some form of taxation of agricultural land and output has been in place in the Indian subcontinent since the pre-Mughal period.\(^21\) Land revenue—a tax on the rental value of land that was inherited by Pakistan from the British colonial period—was influenced by the Ricardian view on rent. In Punjab, land revenue continued to be collected with occasional changes in the rate structure and exemptions until it was abolished in 1997.\(^22\)

Income tax was first introduced in British India in 1860 but withdrawn after only five years. It was reintroduced in 1869 but again withdrawn after three years. The tax was reimposed in 1886 and continued throughout the remaining period of British rule.\(^23\)

Agricultural income was initially subject to income taxation, but when the tax was reimposed in 1886, farmers were exempted, on the grounds that they were already sufficiently taxed by the land revenue and by the cesses on land levied in the early 1880s.\(^24\)

The Indian Income Tax Act 1922, adopted by Pakistan at independence, also reflected the exemption provided to agricultural incomes.\(^25\) The 1973 Constitution of Pakistan excluded agricultural incomes from the Federal Legislative List, whereby the exemption of agricultural incomes from federal income taxation became constitutionally enshrined. In 1977, the government of the Pakistan People’s Party (PPP), under Zulfikar Ali Bhutto, attempted to replace land revenue with a presumptive AIT based on produce index unit (PIU)\(^26\) (see Khan...

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\(^{21}\) See, for example, Khan (1981) and Raychaudhuri and Habib (1982).

\(^{22}\) Land revenue was a tax on economic rent or the landowner’s unearned income. It was collected as a levy on “net assets,” which could be calculated in one of two ways: “(1) as value of annual gross output of owner operated holdings less the normal charges of production, or (2) as value of land rent received by landlord less charges borne by him in collecting the rent” (Khan 1981, chap. 8). Once determined, the net asset value (known as land settlement) was fixed for several decades at a time (The duration was 30–40 years at the time of independence in 1947, and was reduced to 25 years in 1967). See Khan (1981, chap. 8).

\(^{23}\) Kumar (1983, chap. 7).

\(^{24}\) Kumar (1983, pp. 924–926).

\(^{25}\) The title of the act was altered in 1949, omitting the word “Indian,” to “Income Tax Act 1922.” This act, with periodic amendments, was the operative income tax law until it was replaced by the Income Tax Ordinance 1979.

\(^{26}\) A PIU is a measure of land quality, based on land settlements (see footnote 22). These settlements were conducted before 1947 (see Khan 1981, p. 166).
and Khan 1998). The new tax was to be effective from July 1977, but before it could be implemented, General Zia ul Haq’s military regime, which took power through a coup d’état in July 1977, restored the tax exemption to agricultural incomes and revived the land revenue system, exempting holdings of up to 25 acres of irrigated land (and 50 acres of unirrigated land) from payment of land revenue, but setting higher rates for larger landholdings.27

In 1980, the Zia regime introduced the Zakat and Ushr Ordinance 1980 as part of its Islamization drive. The ordinance replaced land revenue with ushr, an earmarked tax for social protection, levied at the rate of 5 percent of the value of agricultural output on Muslim landowners, lessees and leaseholders with exemptions for some sects. It was assessed, levied, collected, and disbursed by Zakat and Ushr Committees. The land revenue department did not have any role in the assessment and collection of ushr in the original ordinance but its role was revived in the Finance Act 1990.

Ushr was an earmarked tax and not a part of the government budget.28 At its peak, in FY1984, the collection of ushr amounted to Rs267 million for the country as a whole, but it declined to Rs134 million by FY1989 and continued to slide thereafter, with occasional spurts. In FY1999, the figure was Rs100 million and in the last decade it has been negligible. In Punjab, ushr collection has been insignificant since FY1997.29

Another attempt to introduce AIT (at the provincial level) was made in 1993 by the caretaker government under Prime Minister Moeenuddin Qureshi. The tax was also a PIU-based presumptive income tax. When the caretaker government was replaced by an elected government, PIU-based presumptive income taxes were introduced in three of the four provinces, Punjab being the notable exception.30 In 1996, another caretaker government introduced agricultural income/land taxes in the four provinces.31 Soon afterwards, the elected provincial assemblies in all four provinces adopted agricultural income and/or land tax bills. The provincial government of Punjab adopted the Punjab Agricultural Income Tax Act 1997, which has been amended from time to time.

At the same time that the Punjab Agricultural Income Tax Act 1997 was introduced, land

31 “However, the proposed tax was not on agricultural income, but on either land or crop area under different conditions of irrigation and adjusted for the size of land holding” (Khan and Khan, 1998, p. 13).
revenue was abolished through the Punjab Land Revenue (Abolition) Ordinance 1997. Under the Zakat and Ushr Ordinance 1980, land revenue was not payable on land on which *ushr* had been charged compulsorily, but the 1997 ordinance abolished land revenue altogether. Provincial government documents continue to show land revenue as a budgetary head, with land revenue receipts in Punjab amounting to Rs5.75 billion in FY2010. However, the bulk of this revenue consists of mutation fees, rent on government agricultural land, and other minor fees, fines and charges.

As mentioned earlier, one of the arguments against an AIT that is at par with taxation of other incomes is that agricultural incomes are taxed implicitly, and that in the presence of such taxation, farmers would be taxed disproportionately. This argument had considerable validity until the 1980s. At the time, farmers were subjected to fairly heavy taxation through government pricing policies in the form of the compulsory procurement of agricultural goods at prices below world prices; restrictions on agricultural exports or taxes on the export of agricultural goods (which would force domestic prices below world prices); and overvaluation of the exchange rate, which acted as a tax on exports, particularly agricultural exports. Estimates by Dorosh and Valdes (1990) suggest that, because of government pricing policies, the average implicit taxation for the five major crops in Pakistan constituted 36 percent of agricultural value-added during 1978–87. 32 However, the 1980s saw the initiation of a price reform process that continued through the following decades. As a result, the implicit taxation of agricultural incomes has been phased out largely, if not entirely (see World Bank et al., 2009).

The 1990s were also marked by other reforms in the economy, in particular, the liberalization of the financial sector and trade and foreign exchange regimes. The attempt in 1993 to replace the reduced burden of taxation on farmers, resulting from a reduction in export taxes and price-related taxes and transfers, with an agricultural income tax proved abortive. Later attempts have merely succeeded in putting the AIT on the statutes book without any effort by political or military regimes to seriously implement the tax on agricultural incomes, or to make it comparable with taxation of incomes in other sectors of the economy. Thus an important opportunity to substitute an implicit form of taxation of agricultural incomes with a more transparent but equivalent tax—in terms of tax burden on farmers—has been missed.

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The strength of farmers in influencing taxation policy in agriculture is a possible explanation for why agricultural land/income tax collection is so low in Pakistan, and not just in Punjab. It is difficult to evaluate the strength of this argument without a closer look at the rural-urban balance of political power and the direct and indirect ways in which the representatives of farmers wield their influence. There is little question that with greater urbanization, the rural representation in the legislative assemblies has declined but it is still substantial and probably influential enough to deter any radical departure from the status quo in the area of AIT. Surprisingly, farmers were subject to far greater taxation in the 1960s, 1970s and 1980s when the economy was far more agriculture-based and farmers more powerful economically than they are now. One explanation for this is that military governments dominated those three decades, and the electoral politics was less important. The other explanation is that the major form of agriculture taxation and transfers was in the form of pricing, trade and exchange rate policies which were implicit and hidden forms of taxation and not fully understood by those who were subject to this heavy taxation (Skinner 1991a, p. 131).

3.2 Land Tax versus Commodity Tax: International Experience

Pakistan is not unique among developing countries in relying so little on land or agricultural income taxation. In a paper titled “If agricultural land taxation is so efficient, why is it so rarely used?” Skinner (1991a) observes that the use of land tax as a source of government revenue has declined steadily over the years in almost all developing countries. He considers the following explanations for the declining importance of land taxation, and for why governments choose export or commodity taxes over land tax:

1. The current generation resists an increase in land taxation because land taxation not only lowers its after-tax income in the current period, it also results in capital loss in the form of depressed land prices as prospects of future net returns from land decline;

2. Land taxation, compared with commodity taxation, increases the riskiness of net farm income in the presence of imperfect insurance markets (because “the land tax must be paid each year regardless of the success or price of the crop, while commodity taxes pool risk by taxing only the value of marketed output”); and

3. The administration of land tax entails costly informational requirements.

On the first of these explanations, Skinner concludes that land tax, by increasing expectations
of future tax payments, depresses current land prices by more than the tax, but an export tax depresses land prices even more, and replacing an export tax with an equal-revenue land tax could in fact increase land prices. The capitalization effect of a land tax is therefore not a good explanation for the decline in the use of land tax and its replacement with commodity taxes.  

To evaluate the second argument about the greater riskiness of farm income associated with land tax, Skinner, working with an exact form of a one-period utility function, calculates the welfare effect of replacing an export tax with a land tax to “show that a land tax generally dominates an output tax when the output tax rate is high, even in the presence of substantial consumption uncertainty.”

To assess the importance of administrative factors in explaining the decline in land taxation and ascendance of commodity taxation, Skinner works with a model in which land quality for taxation purposes is incorrectly assessed but export tax is administered without error. Using illustrative parameters (to reflect aversion to inequality), Skinner finds that “accounting for the overall cost of the tax system inclusive of administrative and evasion costs, rather than just the distortions under particular tax rates, alters the traditional comparison of the land tax versus the export or commodity tax.”

The main insight from Skinner’s analysis is that high administrative cost of implementing a

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33 Skinner (1991a) shows that in a life-cycle model “land taxation is never ‘lump sum’ in that revenue collection is equal to the equivalent monetary loss of the individual. Current generations bear more than the burden of the tax ... and future generations bear no burden. Only when individuals live forever and never sell their land (or when they have strong Ricardian bequest functions) is the tax lump-sum in the sense of reducing lifetime wealth by the present value of the tax revenue.” Skinner also shows that even in a life-cycle model, land taxation is more efficient than commodity taxation. He shows that the ratio of the loss in social welfare to revenue collected across all generations is 1.0 for the land tax, and, abstracting from redistributional issue, this same ratio always exceeds one for the export tax.

The conventional wisdom that a tax on pure rental income (or a tax on the rental value of the unimproved value of land) will fall on the landowner and that land prices will fall by the capitalized value of this tax was also shown by Feldstein (1977) to be questionable. He shows that the analysis on which this result is based must assume that landowners are pure landowners and do not provide labour or capital, and also that the government does not use its tax proceeds to change anyone’s wellbeing. Feldstein then shows that, even when the above assumptions are incorporated, the conventional analysis is still flawed: “The essential oversight of the classical analysis is to ignore the fact that land and produced capital are alternative components of individual life-cycle wealth. Each generation wishes to accumulate a certain level of wealth with which to finance retirement in old age. If the tax on pure land rent reduces the value of land, a larger amount of the desired wealth must be accumulated in the form of produced capital. The tax on rental income thus induces an increase in the equilibrium capital stock and, therefore, in the equilibrium ratio of capital to land. This raises the marginal productivity of land and reduces the rate of interest at which net land rents are capitalized. Part of the tax on pure rent is thus shifted in the form of a lower net yield on capital and a higher wage rate. Moreover, the price of land does not fall by as much as the traditional theory predicts.” (pp. 350–351).
land tax explains why countries may opt for an export tax over a land tax. Export tax is one form of commodity taxation. There may be similar rationalization for preferring other commodity taxes over land taxes, e.g., an output tax along the lines of ushr or a sales tax on agricultural goods. The limitations of the administration of land tax/AIT in Punjab are discussed in the following subsection. There are, however, other factors that may constrain the governments from implementing a tax that may be justified on grounds of efficiency and equity. Skinner (1991b) reviews the experience of agriculture land taxation in Bangladesh, Argentina and Uruguay. One of his main conclusions is that “political support for the land tax is a necessary precondition for its success.” Elaborating on this, he writes: “This may appear to be a tautology, but its fundamental truth is often overlooked. The contrast between the success of the land tax in Uruguay and its failure in Argentina is instructive. The land tax in Uruguay at least partially replaced export taxes in response to political pressure from the ranchers themselves, whereas Argentine farmers viewed the land tax as yet another attempt by urban political powers to extract resources from the agricultural sector. The 1986 Argentine tax reform might have enjoyed more success had farmers believed that the increase in land taxes would be accompanied by a reduction in export taxes.” In the Pakistan context, the task of income or land taxation is far more onerous now than it was in the early 1990s when the opportunity for such politically acceptable reform presented itself.

3.3 Administrative Issues and Intergovernmental Relations

In Pakistan, agricultural land tax/AIT collection is the responsibility of the provincial boards of revenue (BOR), which historically collected land revenue and maintained records of land ownership and transfers. As an institution, the BOR has atrophied, even for the purposes of performing its traditional role, and it is hardly suited for collection of an income tax. The limitations of the revenue collection system and institutions, including the BOR, in Punjab are described in Annex II. Reform of the revenue system and strengthening of collection agencies is essential for effective and buoyant revenue collection from agriculture. The resistance to taxation from interest groups and lobbies may be an important hindrance to taxation but resisting such pressure can be more feasible if institutions are in place to carry out the government’s edict. The investment in capacity building and reform of the agricultural land/income tax system also makes economic sense: as this paper shows, such investment promises potential revenue of about Rs50 billion or more annually at 2013–14 prices for many years to come, though there may be year to year fluctuations because of weather-related
output shocks and volatility of commodity prices. Over time, fragmentation of holdings may tend to reduce the revenue potential but there may be counter-tendency because of higher yield, output and income.

The Federal Board of Revenue (FBR), the revenue collection arm of the Ministry of Finance, has in the past collected some taxes on behalf of the provincial governments, notably sales tax on services. The provincial governments have set up their revenue authorities and taken ownership of revenue collection of sales tax on services, starting with Sindh in 2011. The institutional weakness of the tax collecting agencies at the provincial level would suggest a need to farm out AIT to FBR. This, however, may not be feasible for a number of reasons. While the FBR’s own record with income tax enforcement and compliance is not the most illustrious, the federal government may also not have the incentive to collect revenue for BORs. On the other hand, the provinces may not want to admit their administrative limitations and invite an overbearing federal government into their revenue affairs. However, with certain incentives, the FBR could agree to send out lists to the BORs of all tax filers who have declared agricultural income in their tax returns, with an estimate of potential revenue collection.

As we have shown, potential revenue from AIT in Punjab was around Rs50 billion in fiscal years 2010, 2012 and 2014 but it was considerably greater (Rs78 billion) in FY2011 and considerably less (Rs34 billion) in FY2013. These fluctuations are partly explained by fluctuations in agricultural income over this period. An income tax typically has the flexibility to adjust the tax burden counter-cyclically but an AIT along the lines discussed in Section 2 is unlikely to be implemented for a long time. Until a political constituency takes root that allows a non-discriminatory AIT to be legislated, and institutions are developed that can translate policy into practice, alternative forms of agricultural taxation will have to be considered that are simpler and politically less toxic. As mentioned earlier, land taxation is one such option but it is inflexible to changes in farm income. However, as shown by Skinner (1991a), even in the presence of substantial consumption uncertainties, a land tax may still dominate an export tax in terms of welfare effect. Hoff (1991) has shown that in the presence of an imperfect insurance market, an optimum tax is a combination of a land tax and an output tax. In Pakistan, where export and output taxes fall within the federal domain and agricultural land/income tax falls in the provincial domain, it is highly unlikely that the federal and provincial governments can work together to jointly design and implement an optimum land
and output tax.

As mentioned earlier, the NFC, as part of its award in 2010, called on provinces to “initiate steps to effectively tax the agriculture and real estate sectors.” However, there was nothing in the award to incentivize such an undertaking by provinces. No target was set, nor any timeline provided. The federal government agreed to a major shift in the distribution of tax revenue from a 50 percent federal share before the 7th NFC award to 42.5 percent in the 7th NFC Award, without linking such transfers to greater revenue effort by the provinces. The 7th NFC Award was another opportunity lost for making the provincial governments ramp up their AIT and real estate taxation. Under the 18th constitutional amendment, the revenue share of the provinces agreed in the 7th NFC Award will be the lower bound in future NFC awards.

3.4 Incidence of Agricultural Taxation

A lesson from tax incidence analysis is that the statutory incidence of a tax is not necessarily the same as its economic incidence. Those that the law requires to pay the tax do not necessarily bear the ultimate burden of the tax. For example, an excise tax levied on a good is collected from the manufacturers of the good but the burden of the tax can be shifted to the consumers of the good in the form of higher prices. The extent to which the tax can be shifted depends on the price elasticity of a good’s demand and supply (or the responsiveness of the demand and supply to price changes). A land tax of the per-acre variety, along the lines of PAITA 1997, cannot be avoided even if the landowner withdraws the land from production.

In an atemporal framework, the full burden of the tax is borne by the landowner. (For implications of the tax in a lifecycle framework, see Feldstein [1977] and Skinner [1991a]).

The other form of tax we have considered in this paper is AIT. The tax is, in effect, a tax on the return to land, own-capital, own-labour, and profit. Profit under competitive conditions will be bid down to zero and the AIT is then a tax on return to a farmer’s land, his capital, and labour. If the supply of all three were inelastic, the tax burden would fall on the farmer.

34 The key result of tax shifting is that “taxes will be shifted by those agents and factors that are more elastic in supply and demand” (Kotlikoff and Summers 1987). It follows that the tax will be borne entirely by farmers if the market supply curves of the taxed goods are completely inelastic.

35 If the land tax is designed in a way that the tax rate is higher on large landholdings and lower on small landholdings, then large landowners may have an incentive to parcel their landholdings into smaller units and distribute them among family members to reduce their tax burden.Parceling land into smaller units for ownership records would reduce tax revenue but if the landowner continues to operate the land as a single unit, output may remain unaffected.
Unlike unimproved land, supply of improved land is not inelastic. Similarly, the supply of own-capital and own-labour is also not inelastic, at least in the long run. Thus, some shifting of the AIT to consumers, hired workers and suppliers of capital is likely in the long run if not in the short run.

The short-term prospects of implementing a full-fledged AIT, however, are very limited in Punjab. The form of AIT that is likely to be implemented will be a presumptive tax (see Section 4.2) based on estimates of revenue and cost that are representative for an area and based on objective measures. The presumptive AIT will be akin to a lump sum tax that farmers will not be able to avoid by altering their input choices. Therefore, the incidence of such presumptive AIT will be on the farmers.

We calculated the incidence of AIT under PAITA 1997 and Finance Act 2010 for the FY2010 (see Annex III). The overall incidence of AIT levied under PAITA is fairly small (amounting to only 7.3 percent of agricultural income of an average farm). Due to their relatively large size, the overall incidence is the highest for owner-cum-tenant farms (8.2 percent) as compared to owner-operated (7.35 percent) and tenant (5 percent) farms. As for incidence across farm size, the built-in progressivity of AIT under PAITA ensures that larger farms pay progressively higher proportion of their income in tax. Our calculations indicate that the smallest farms (i.e., of less than 1 acre and 1–2.5 acres) would remain exempt from payment of AIT, whereas farms of 2.5–5 acres would pay less than 5 percent of their income in tax. On the other hand, the largest farms (more than 150 acres) would have to pay 14.5 percent of their income in tax. If the tax is imposed under the Finance Act 2010, farms under 2.5 acres would be exempt from AIT, farms under 12.5 acre would pay less than 5 percent of their income as tax; and farms with 100 acres and above would pay 25% of their income as tax.

4 Options for Agricultural Taxation

While income-based agricultural taxation has substantially greater revenue potential in Punjab than the current land-based regime, the challenges discussed in Section 3 imply that a shift to income-based taxation along the lines of personal and corporate income tax may not be possible in the near future. However, interim options can be explored. In this section, we

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36 The incidence is calculated under the assumption that these taxes are borne by farmers on whom the tax is levied, and not shifted to hired factors of production or to consumers of agricultural goods.
discuss some forms of taxes that may be administratively feasible in Punjab in the short or medium term. We also discuss the option of a withholding AIT, which has been discussed recently in policy circles in Punjab, and address whether a tax on farm output at the point of sale can substitute for an income tax.\(^\text{37}\)

### 4.1 Land Tax

A per-acre tax is perhaps the simplest form of land taxation. Its simplicity derives from the fact that it invokes no ownership characteristics (see World Bank 1999); much of the simplicity is retained if the tax varies by irrigation status, i.e., irrigated or unirrigated. However, the tax can be regressive if no allowance is made for the quality of land and for the possibility that poor farmers own less productive land (Skinner 1991b, p. 499). These features make the tax less attractive, and imply that some owner and quality characteristics ought to be considered.

The current land tax regime in Punjab invokes land and ownership characteristics and therefore loses the simplicity associated with a per-acre tax. The tax is levied on cultivated rather than cropped area, which compromises the progressivity of the tax. However, the tax is not likely be regressive either because of the generous threshold limit allowed in PAITA 1997.

The simplicity of a per-acre tax can be retained without compromising the tax revenue potential obtained from treating farm income as business income. To see this, we derive in Table 7 the per acre tax, for each income group, that would yield the same tax revenue that we obtained in Table 5 by applying the income tax rates applicable to business incomes for FY2010. The per-acre tax ranges from Rs0 for farms smaller than 2.5 acres to Rs6,705 per acre for farms of 100-150 acres (see Table 7, column 6). Under PAITA 1997, the tax rate for farmers with cultivated irrigated area of 12.5 acres and above ranges between Rs150 per acre and Rs250 per acre. This also implies that in order to make the structure of land-based tax comparable to the structure of tax on non-agricultural income (in the sense that farm income is taxed at the same rate as similar income in the non-agricultural sector), the exemption limit of the land-based tax needs to be lowered from 12.5 acres to 2.5 acres and the tax rates require a substantial increase.

Table 7: Revenue-Equivalent Land Tax on Owner Farmers in Punjab, FY2010

<table>
<thead>
<tr>
<th>Column 1 (Farm Size (acres))</th>
<th>Column 2 (No. of Farms)</th>
<th>Column 3 (Farm Area (acres))</th>
<th>Column 4 (Tax Liability per Farm (Rs))</th>
<th>Column 5 (Tax Revenue (Rs billions))</th>
<th>Column 6 (Tax per Acre (Rs))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 1.0</td>
<td>678,045</td>
<td>283,079</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1.0 to under 2.5</td>
<td>1,298,804</td>
<td>2,015,299</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2.5 to under 5.0</td>
<td>938,029</td>
<td>3,184,204</td>
<td>504</td>
<td>0.5</td>
<td>149</td>
</tr>
<tr>
<td>5.0 to under 7.5</td>
<td>618,656</td>
<td>3,537,966</td>
<td>4,899</td>
<td>3</td>
<td>857</td>
</tr>
<tr>
<td>7.5 to under 12.5</td>
<td>444,018</td>
<td>4,238,015</td>
<td>13,628</td>
<td>6.1</td>
<td>1,428</td>
</tr>
<tr>
<td>12.5 to under 25.0</td>
<td>238,419</td>
<td>3,840,693</td>
<td>45,545</td>
<td>10.9</td>
<td>2,827</td>
</tr>
<tr>
<td>25.0 to under 50.0</td>
<td>58,656</td>
<td>1,787,529</td>
<td>149,944</td>
<td>8.8</td>
<td>4,920</td>
</tr>
<tr>
<td>50.0 to under 100.0</td>
<td>13,864</td>
<td>843,717</td>
<td>402,216</td>
<td>5.6</td>
<td>6,609</td>
</tr>
<tr>
<td>100.0 to under 150.0</td>
<td>2,857</td>
<td>321,436</td>
<td>754,326</td>
<td>2.2</td>
<td>6,705</td>
</tr>
<tr>
<td>150.0 and above</td>
<td>2,024</td>
<td>476,532</td>
<td>1,466,341</td>
<td>3</td>
<td>6,228</td>
</tr>
</tbody>
</table>


Notes:
1. Data in Columns 2 and 3 are from Government of Pakistan (2012).
2. Calculations for Column 4 and 5 are explained in Section 2.2
3. Column 6 = (Column 5)/(Column 3).

Land-based tax thus remains one easy choice for imposing presumptive tax on agricultural income. The tax rates presented in Table 7 present one option. Variations on the existing land tax with lower threshold limit and higher tax rates are other options. Presently, tax from land-based agricultural tax is only a fraction of the tax that is collected from businesses in the non-agricultural sectors that generate similar levels of income. The revision of tax rates and threshold levels can bring some parity between taxation of income from different sources, which is one of the tenets of a good taxation system.
4.2 Presumptive Income Taxes

An income tax in agriculture along the lines of personal and corporate income tax may not be possible for quite some time. The limited ability of farmers to maintain records and accounts and of the provincial tax administration to assess, audit and collect taxes, makes it very unlikely that a modern income tax will be extended to the agriculture sector anytime soon. For the near future, the tax will be some form of presumptive income tax, which would involve estimating the GVO, subtracting from it an estimate of the COP, and then applying an appropriate tax rate. International experience suggests that some countries try to obtain actual values of both revenues and costs while others work with estimates of either or both.\textsuperscript{38}

The PIU-based land tax, which the PPP government tried to introduce in 1977, and which caretaker governments also attempted in 1993 and 1996, is a form of presumptive income tax that takes into account the productivity differences of land. Most farmlands in Pakistan have an assigned PIU but these have not been updated for several decades. The changes in absolute and relative land productivities make the existing PIUs unreliable as a basis for land taxation. However, if periodically upgraded, the PIU-based tax on agricultural incomes could be made a buoyant source of provincial revenues. Khan and Khan (1998) suggest how PIU can be used to determine taxable income, and also propose a method for updating these units, which have not been revised since the late 1940s.

Skinner (1991a, p. 130), takes the view that “When markets for land are thin or incomplete, the difficulty of assigning market value or net income to each parcel is likely to ensure that such land taxes are rarely used.” He goes on to say: “But there are alternative methods of collecting land tax which avoid the necessity of tax assessors’ placing a market value on each parcel with periodic updating. For example, a crude index of land quality depending on the soil type, distance from major roads, and irrigation facilities can be determined for each plot of land. The tax assessment could then be calculated by multiplying the year-specific tax rate by the permanent index, thereby avoiding the necessity for yearly reassessment.” This optimism is tempered, however, with the caution that “it is unlikely that the tax rate could be set at a high level, since net income from land may vary widely even within these crude assessments of quality, leading to horizontal inequities.” The tax can still be an important source of revenue for local governments, which have few tax instruments available to them and whose modest revenue requirements “imply a low land tax rate, reducing evasion and

\textsuperscript{38} See World Bank (1999, chap. 2) for details.
allowing for a simpler tax structure” (Skinner 19991a, p. 130). The earmarking of land tax for use where it is collected is also recommended by Ahmad and Stern (1991, chap. 8).

Once taxable income and tax liability is determined using PIUs or other simpler indices, revenue authorities still have to collect revenue from the taxpayers. The Punjab Land Revenue Act 1967 gave wide ranging powers to the revenue officers for recovery of land-revenue arrears, including arrest and detention of the person, sale of movable property, and attachment or sale of the holding in respect of which the arrears is due. Unlike the land revenue act, no provision is included in PAITA 1997 for attachment or confiscation of a defaulter’s land or property, or his or her detention (see Annex III). The lack of such penalties makes it difficult to enforce revenue collection. This applies to any tax, be it the tax under PAITA 1997 or the per acre tax discussed in the previous section or the presumptive tax discussed in this section. Collection issues also arise in the context of output taxes discussed in the following subsection.

Litigation is an inevitable consequence of tax assessments but such litigation will not be unique to agricultural income or land taxation. Provincial BORs could benefit from the experience of FBR and that of tax-collection authorities in other countries. To avoid the choking of the legal system with appeals, tax laws could be strengthened, e.g., by requiring minimum tax payment (as a percentage of tax liability) before an appeal is entertained and building in a tax mark-up if the decision goes against the litigant. This has to be balanced by compensating litigants for their opportunity cost and expenses if the decision goes against the revenue authority.

4.3 Taxing Agricultural Outputs

As discussed earlier, historically many countries, including Pakistan, have opted for some form of output taxes over agricultural land tax or AIT. The relatively high administrative costs for effective implementation of land/income taxes probably explain the preference over these taxes for, say, an export tax on agricultural goods (see Section 3.2).

Unlike land tax and AIT, the taxation of goods (such as the taxation of agricultural output or marketable surplus) falls exclusively within the federal legislative domain in Pakistan.\textsuperscript{39} We argued that this constitutional tax assignment between the center and the provinces limits the

\textsuperscript{39} The Federal Legislative List under the Constitution includes: “Taxes on the sales and purchases of goods imported, exported, produced, manufactured or consumed, except sales tax on services.”
scope of an optimum tax, which is a combination of an output tax and a land tax. We should point out that, from an economic standpoint, this legal separation between federal and provincial jurisdiction is problematic because certain taxes that appear different may in fact be equivalent. For instance, given that value-added in an industry equals the income earned by factors engaged in its production process, a value-added tax on an industry would be equivalent to a proportional income tax on the returns to factors of production in the industry. If the federal government, invoking its constitutional powers, were to impose a value-added tax on the agricultural crop sector, it would be equivalent to an imposition of a proportional tax on income earned by factors of production in crop farming, which would be trespassing provincial jurisdiction over agricultural income taxation.

The withholding tax on agricultural income proposed in Punjab in the run-up to the provincial budget for FY2014 is a form of output tax, and therefore subject to possible legal challenge on constitutional grounds. The proposal entailed a tax, as a percentage of sales, on a few major crops at the point of sale. As a withholding tax on income, it would have to be adjusted against income tax liability. However, the province does not have an income tax administration in place: agricultural tax is collected largely as a land tax and not as an income tax. In the absence of a tax administration machinery that is able to assess farmers’ income taxes and promptly process claims for tax refunds, the withholding tax would act as a final discharge of income tax liability and would, in effect, be a tax on marketed surplus of farmers rather than an income tax.

In the absence of home consumption, an output tax that adjusts for the cost of intermediate inputs would be a tax on value added and can be regarded as an income tax because of the identity between the value added and the returns to factors of production. As the documentation requirement for a proper value-added tax are very demanding, an output tax at the point of sale can be levied which adjusts for the cost of intermediate goods and retains the property of being an income tax, provided intermediate input cost for a crop is a constant proportion (\(\lambda\)) of its GVO for all level of output. For this special case, if there was no home consumption, then an output tax \(t\) per unit of output at the point of sale would be equivalent to a proportional tax of \(t/(1-\lambda)\) on the value-added of the crop and therefore equivalent to a

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41 The value added of a crop is defined as: \(VA = PQ - COI\) where \(COI\) stands for the cost of intermediate inputs. If \(COI = \lambda(PQ)\), then \(VA = PQ - \lambda(PQ)\) or \(PQ = VA/(1-\lambda)\). A tax on \(t\) on \(Q\) is equivalent to a tax of \(t/(1-\lambda)\) on \(VA\).
The production of the crop.

The intermediate input cost as a ratio of GVO will be different for different crops and therefore the output tax would have to be calibrated so that the tax is uniform across crops; otherwise, incomes earned from one crop will be taxed at a different rate from incomes earned from another, and this would create an incentive for farmers to shift production from one set of crops to another. The same will be the case if some crops are taxed and others are not.42 There is also the issue of effectively administering such output taxes when these are levied by one province and not by others, or when tax rates are different across provinces. The issue may be particularly relevant in areas that border neighbouring provinces.43

In the presence of home consumption, a ‘presumptive’ value-added tax of the type described above will not be the same as a proportional income tax. However, under the assumption of the constancy of the ratio of intermediate-input cost to GVO, a tax \( t \) on marketable surplus of a crop can be shown to be a progressive tax (in the sense that richer farmers pay a higher proportion of their crop income as tax), if the following conditions hold: (i) farm households use only own land, labour and capital, and (ii) the ratio of home consumption to total output decreases as output increases.44

We note that a value-added tax would be a tax not only on the income of factors owned by the

\[\text{MS} = Q - Q^H.\]  
A tax \( t \) on \( Q^\text{MS} \) is equivalent to a tax \( t \) on \( Q - Q^H \), i.e., a tax \( t \) on marketable surplus is equivalent to a tax \( t \) on output with a tax rebate of \( tQ^H \) due to home consumption. Under the assumption that cost of intermediate inputs are a constant proportion \( \lambda \) of \( Q \), a tax \( t \) on \( Q^\text{MS} \) as a ratio of value added (or factor incomes) will be:

\[
\frac{tQ^\text{MS}}{VA} = \left[\frac{t(1 - \lambda)}{t(1 - \lambda) - t(PQ^H/VA)}\right] = \left[\frac{t(1 - \lambda) - t(PQ^H)/(1 - \lambda)Q}{t(1 - \lambda)(1 - Q^H/Q)}\right].
\]

If all factor incomes from the crop accrue to the same household, i.e., the farm household uses its own land, labour and capital in the production of the crop, then the tax will be progressive in the sense that tax payments increase more than proportionately with household income (\( tQ^\text{MS}/VA \) increases as \( VA \) increases) if \( Q^H/Q \) decreases as \( Q \) increases.

---

42To see that differential and selective taxation will create an opportunity for substitution between taxed and non-taxed goods, consider two categories of farmers: one that grows cotton in the kharif season and wheat in the rabi season, and the other that grows sugarcane, which is a year-long crop. If the tax is levied on cotton and sugarcane but not on wheat, it will create an incentive for farmers to shift from sugarcane production to the production of wheat and cotton. It follows that farmers’ supply curve for sugarcane, even if perfectly inelastic in the short run, will be less inelastic in the long run. This implies that, in the long run, sugarcane output will decline, the tax burden will be shifted partially to the buyers, and tax revenue from sugarcane production will decline.

43 In considering output tax as an option for agricultural taxation in Pakistan, the World Bank (1999) takes the view that: “The VAT is clearly a demanding requirement given the current level of documentation in the agriculture sector. However a basis for the VAT could be built through an output tax. This could be collected fairly simply through withholding at the point of sale of output. Output can [be] a good measure of actual income, and those farmers with very little marketable output would pay very little in taxation. For acceptance by farmers, the output tax should replace one or more of the current output taxes, such as the ushr or district export tax. It is administratively difficult to ensure that output taxes are collected from all outputs and all market transactions. Given the chances that the collection in practice would be selective, the output tax would be highly distortionary.”

44 If we denote the output of a crop by \( Q \) and its home consumption by \( Q^H \), then marketable surplus equals: \( Q^\text{MS} = Q - Q^H \). A tax \( t \) on \( Q^\text{MS} \) is equivalent to a tax \( t \) on \( Q - Q^H \), i.e., a tax \( t \) on marketable surplus is equivalent to a tax \( t \) on output with a tax rebate of \( tQ^H \) due to home consumption. Under the assumption that cost of intermediate inputs are a constant proportion \( \lambda \) of \( Q \), a tax \( t \) on \( Q^\text{MS} \) as a ratio of value added (or factor incomes) will be:
farmer but also on the return to workers who work on land and owners of capital and land who rent capital and land for crop farming. Thus, while a presumptive value-added tax is a simple way of levying an income tax, it not only taxes incomes of farmers but also, implicitly, taxes farm-workers and rentiers of capital and land. The income of some of these farmers, farm workers and rentiers may fall below the tax threshold if these incomes were to be treated at par with comparable income in the non-agricultural sector for tax purposes. It is also not clear if incomes of hired workers or capital rental firms are subject to provincial or federal income tax (See footnote 2 for the definition of agricultural income).

5 Conclusion

PAITA 1997 allows for the taxation of agricultural incomes but it also allows for tax to be collected as a land tax (unless income tax exceeds land tax). However, the tax is effectively collected as a land tax. The tax rates have not been revised for many years and tax collection is highly inadequate. We have estimated potential tax revenue under four different modes. The first three tax modes are based on PAITA 1997 and consist of a pure land tax, a combination of land and income tax, and a pure income tax. The fourth mode is based on ITO 2001 and shows the tax that farmers would have paid if agricultural incomes were taxed at rates comparable with incomes in non-agricultural sectors. We estimate that in FY2014, the tax yield under the four modes would have been Rs2 billion, Rs15 billion, Rs114 billion and Rs54 billion, respectively.

We considered political economy factors that would constrain collection of agricultural taxes to their full potential. Until the 1980s, governments relied on implicit taxation of agriculture such as compulsory procurement of agricultural goods at prices below world prices; restrictions on agricultural exports or taxes on the export of agricultural goods (which would force domestic prices below world prices); and overvaluation of the exchange rate. The 1980s saw the initiation of a price reform process that continued through the following decades. As a result, the implicit taxation of agricultural incomes has been largely phased out. In the late 1990s a land and income tax was instituted, but there has been little effort, to date, to seriously implement the tax; revenue collection from this tax was less than Rs1 billion in 2014. In the 1990s, when the government was reforming the price and exchange rate policies, it could have substituted the implicit form of taxation with an equivalent land or income tax but the opportunity was missed. Farmers were subject to far greater taxation in the 1960s, 1970s and
1980s when the economy was far more agriculture-based and farmers more powerful economically than they are now but military governments dominated those three decades, and the electoral politics was less important. Also the major form of agriculture taxation and transfers was in the form of pricing, trade and exchange rate policies which were implicit and hidden forms of taxation and not fully understood by those who were subject to this heavy taxation.

Pakistan has moved away from commodity taxation, but some forms of commodity taxes are administratively simpler and less costly. Although land taxes may be preferred to output/commodity taxes on purely efficiency grounds, Skinner (1991a) shows that when administrative and compliance costs are taken into account, the traditional case for preferring land taxes over commodity taxes no longer holds. Hoff (1991) shows that when institutions for insuring landowners against production risks are imperfect, an optimum tax is a combination of a land tax and an output tax. This result does not take into account the administrative costs of the two forms of taxes and empirical evidence on administrative costs may still favour a commodity tax over a combination of land and commodity tax. In Pakistan, where export and output taxes fall within the federal domain and agricultural land/income tax fall in the provincial domain, it is highly unlikely that the federal and provincial governments can work together to jointly design and implement an optimum land and output tax.

The tax implementation capacity of the provincial BOR, which is responsible for collecting agricultural land/income tax, has deteriorated over time. Some degree of tax coordination and information sharing between the FBR and BOR can raise revenue yield but the scope of tax farming is fairly limited. Given the revenue potential from AIT, investment in skills and capacity development of BOR would be well worth the cost. The development of a well-functioning income tax machinery could take many years but in the interim the provincial government can consider alternative forms of agricultural taxes that are easier to implement.

In the choice of agricultural tax instruments, the tax incidence issue is always important. The tax burden of an AIT in the short term will very likely be borne by farmers, but in the long term some shifting to consumers and factors of production is also possible. If the alternative forms of taxes that the government opts for in the interim are per-acre land tax or a PIU-based presumptive income tax, then their incidence is likely to be on the farmers.

The recent proposal to collect AIT as a withholding tax presupposes a functional income tax
administration. In the absence of such administrative machinery in Punjab, the tax will be a final discharge of income tax liability and will, in effect, be a tax on farmers’ marketable surplus rather than on income.

Changing the current form of tax collection from a land tax to an income tax will require building a modern income tax machinery. Until such time as this is achieved, land tax rates could be revised in a way that the tax collection from land (as a proxy for income tax) is comparable with income tax collection in other sectors of the economy. Alternatively, presumptive income based on revised PIU can be considered as an option. The equivalence between value-added and factor incomes also suggests a presumptive value-added tax as a form of income taxation. These tax measures will not only hold an important symbolic value in terms of fairness and equity but will also substantially supplement provincial government finances.
References


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Annex I: Cost of Production

We report the cost of production (COP) estimates based on three different approaches. The first of these is based on COP data for 2007-08 provided by the Agriculture Policy Institute (API) and our projections based on their data for 2009-10, which are combined with estimates of depreciation allowance and cost of rented land. The second approach uses the national income accounts, and combines these with an estimate of GVO, cost of hired labour, depreciation cost, and interest payment on investment loans to derive COP. The third approach is to use the detailed cost estimates data for four major crops prepared by API and netting out from these the imputed cost of family labour and (rental cost) of family owned machinery and equipment to arrive at an estimate of COP.

COP Based on API Data

The Agriculture Policy Institute reports data on the cost of purchased inputs as a ratio of GVO.\(^{45}\) For six crops (wheat, Basmati rice, Irri rice, cotton, sunflower and sugarcane) in Punjab, the average ratio was 33 percent in FY2008.\(^{46}\) Assuming the ratio was unchanged for 2009/10, we adjusted this for depreciation allowance of self-owned capital (as outlined at the end of this annex) and for the cost of rented land.

Two important implications of the above methodology need to be pointed out. First, the average cost of rented land varies for owner farms (where this cost is zero), owner-cum-tenant farms (where the cost factor applies only to the rented portion of cultivated land), and tenant farms (where the cost factor applies to the entire cultivated land). This implies that taxable income, and therefore the revenue potential, has to be calculated separately for the three types of farm. Second, as the proportion of rented land varies across farm sizes (for owner-cum-tenant and tenant farms), the overall production cost will vary across farm sizes.

For tax mode 4, the depreciation allowance was estimated to be Rs107 billion. Our estimated GVO from crop farming (including value of by-products) is about Rs1,525 billion. Thus depreciation is about 7 percent of GVO. When the depreciation allowance is taken together with the 33 percent ratio of purchased inputs to GVO, the cost of production for owner-

\(^{45}\) API costs are summarized as “cost of purchased inputs” and “imputed cost.” We have assumed that cost of hired labour, capital and interest cost on investment loans are part of the cost of purchased inputs.

\(^{46}\) It may be pointed out that API data on production cost provide information on purchased inputs and only some cursory estimates of imputed cost of family labour and self-owned capital. For the purpose of the present study, costs of family labour and self-owned capital need not be netted out of GVO because they are part of taxable income as defined by PAITA 1997 and ITO 2001.
farmers, under tax mode 4, comes to about 40 percent on average. For tax modes 2 and 3, the depreciation allowance is Rs84 billion and the production cost for owner farmers is about 5.6 percent of GVO.

COP for owner-cum-tenants and tenants also includes cost of rented land, which is assumed to be 50 percent of GVO net of purchased inputs, hired labour, and depreciation cost.

**COP Based on National Accounts**

The second approach to estimating cost of production starts with the value added in agriculture taken from the national accounts, and combines it with an estimate of GVO and cost of hired labour, depreciation cost, and interest cost of investment loans.

Our estimate of GVO of cropped agriculture was Rs1,525 billion for Punjab in FY2009/10. In the same year the value added in ‘important crops’ and ‘other crops’ was Rs1482 billion for Pakistan\(^{47}\) From the Pakistan Agricultural Census 2010, the cropped area in Punjab (excluding Islamabad district) was 66.2% of the total cropped area in Pakistan. We apply this ratio to value added figure of Rs1482 billion to calculate the value added in cropped agriculture in Punjab (excluding Islamabad district) (VA): This gives:

\[
VA = 0.662 \times \text{Rs1482 billion} = \text{Rs981 billion}
\]  

\(^{(1)}\)

Cost of intermediate inputs\(^{48}\) = GVO – VA

= Rs1525 billion – Rs981 billion

= Rs544 billion

Assuming all capital is self-owned by farmers and no capital is rented, the COP can be expressed as:\(^{49}\)

\(^{47}\) As given in Government of Pakistan (2014b).

\(^{48}\) This includes the cost of seeds, fertilizer, pesticides, water, and plowing and planking.

\(^{49}\) The same result is obtained if we assume that there are two sets of farmers, one owning capital and the other renting capital from owners of capital. The cost of renting capital for the latter is the income of the former and the two offset each other. We are assuming that this offset takes place within each farm size category, which is unrealistic. More likely it is the large farmers who own capital and the small farmers who rent capital. If so, this increases the taxable income of large farmers and reduces that of small farmers. The taxable income would therefore be greater if the cost of capital rental and income from capital rental are factored in calculating taxable income.
COP = cost of intermediate inputs + cost of hired labour + depreciation cost + markup on investment loans

(2)

We take cost of hired labour to be 5 percent of value added of cropped agriculture in 2001-02 as given in *Pakistan Rural Household Survey (PRHS) 2001-02* (see Dorosh, Niazi, and Nazli 2006, p.19), which comes to Rs22.5 billion in 2001-02. This figure is then adjusted for the increase in daily wage rate of unskilled labour between 2002 and 2010 (as reported in *Pakistan Economic Survey 2012/13*) by multiplying it by (375/145). The depreciation cost is taken as Rs107 billion (based on the methodology explained in the subsection below on cost of depreciation). The interest cost on investment loan is taken to be 13.5 percent of cost of advances to cropped sector (Rs85 billion). These cost estimates are substituted in (2) above:

\[
COP = \text{Rs}544 \text{ billion} + [(375/145) \times \text{Rs}22.5 \text{ billion}] + \text{Rs}107 \text{ billion} + [0.135 \times 85 \text{ billion}]
\]

or

\[
COP = \text{Rs}544 \text{ billion} + \text{Rs}58 \text{ billion} + \text{Rs}107 \text{ billion} + 11.5 \text{ billion} = \text{Rs720.5 billion}
\]

Thus,

\[
\frac{COP}{GVO} = \frac{720.5 \text{ billion}}{1525 \text{ billion}} = 47.246 \text{ percent}
\]

\[
\frac{COP \text{ (excluding depreciation)}}{GVO} = \frac{\text{Rs}(544 + 58 + 11.5) \text{ billion}}{\text{Rs1525 billion}}
\]

\[= 40.22 \text{ percent}\]

COP for owner-cum-tenants and tenants also includes cost of rented land, which is assumed to be 50 percent of net GVO or GVO net of purchased inputs, hired labour, depreciation cost, and interest on investment loans.

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50 Bank advances to “agriculture, hunting, forestry and fishing” was Rs166 billion as of end-June 2010. Assuming advances to the crop sector to be in proportion to its share in agriculture sector (77 percent), we estimate the advances to the cropped sector be Rs128 billion. The share of Punjab (excluding Islamabad) is assumed to be in proportion to its share in the cropped area (66.13 percent) or Rs85 billion. The lending rate during 2010 was about 13.5 percent (see State Bank of Pakistan 2010). At this rate the cost of borrowing from scheduled banks was Rs11.5 billion.
COP Based on API Detailed Cost Data for Four Major Crops

API also publishes production cost data (by activity) for wheat, cotton, rice, and sugarcane. The cost is reported on a per acre and per 40 kg basis. Using the weighted average of per acre GVO, the average value of COP for the four major crops comes out to be 53 percent of GVO. However, these estimates include imputed costs of family labour and rental value of family owned machinery and equipment, which, for our purpose, need to be netted out of COP. We took 60 percent of the API cost estimates for all production activities requiring labour and capital (i.e., machinery and equipment) as the imputed cost of family labour and owned capital. This came out to be about 13 percent of GVO. As such, the cost of purchased inputs for the four crops was taken as 40 percent of GVO. Given that these four crops account for almost 60 percent of GVO, the same COP to GVO ratio is also applied to other crops.

Cost of Depreciation

To obtain an estimate of depreciation allowance, we used national accounts data to get national level data on value added and gross fixed capital formation (GFCF) in agriculture. We assumed that investment ratio (i.e., ratio of GFCF to value added) in cropped agriculture is the same as that of overall agriculture. This provides us with an estimate of GFCF in cropped agriculture.

We also assumed that the share of Punjab in GFCF of cropped agriculture is the same as the share of Punjab (excluding Islamabad) in total cropped area or 66.2 percent as given in Pakistan Agricultural Census 2010. This helps us arrive at an estimate of GFCF in cropped agriculture in Punjab.

Depreciation allowance is then calculated as allowed in PAITA 1997 (for tax modes 2 and 3) and ITO 2001 (for tax mode 4). These estimates are, respectively, Rs84 billion and Rs107 billion.

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51 The shares of gross GVO for each crop (in total of all four crops) were taken as the weights.
52 PAITA 1997 allows depreciation allowance at the rate of 15 percent of the “written down value.” ITO 2001 allows an accelerated depreciation allowance. For tax modes 2 and 3, the depreciation allowance is taken to be 15 percent of GFCF for years 1–6 and 10 percent for year 7. For tax mode 4, the depreciation allowance is taken to be 50 percent of GFCF for the first year, 15 percent for years 2–4, and 5 percent for year 5.
Annex II: Administration of Agricultural Income Tax

**Background:** The main objective of tax administration is to collect revenue for the government, primarily by ensuring compliance of taxpayers with tax laws. However, due to growing complexities of national and sub-national economies, this seemingly simple task has progressively become more intricate, and requires a variety of highly technical and managerial skills. Promoting compliance requires tax administration (and procedures) to be fair, efficient, simple, and “user-friendly.” Moreover, the administration has to have the ability to identify and address risks that lead to non-compliance. This requires the revenue authority to be aware of major developments and trends in the business and legislative environment; be able to ascertain the implications of these for various taxes and taxpayer categories; and have the capacity to devise strategies to deter tax avoidance and evasion. Use of information technology and third-party data and information are standard tools to formulate and implement such strategies. Modern tax administration, therefore, is a highly professional job, focused on providing a service to the taxpayers that helps them to discharge their legal obligation at minimum time and economic cost.

For this reason, there is a growing tendency around the world to establish a single national (not federal or central), integrated, autonomous, and highly professional tax authority to collect taxes for all levels of government. This not only protects tax administration from political influences, but also attracts state-of-the-art skills and integrates all tax-related information, including third-party information on major developments and trends in the economy and business, under a single roof. This enhances the efficiency of the authority.

**Fragmentation of Tax Administration in Punjab:** Contrary to the global trend, tax administration in Pakistan, and especially in the provinces (including Punjab), is getting increasingly fragmented. Like Sindh and Khyber Pakhtunkhwa, Punjab now has three separate tax agencies, each assigned with the task of collecting a different set of taxes. There is hardly any coordination among the three agencies, which prevents each agency from benefitting from the knowledge, databases, and skills available with the other two. At the same time, this increases the costs of the taxpayers as they have to deal with three entities separately to pay their taxes. These problems are compounded by the inefficient internal structure of the agencies, each of which is organized on the basis of taxes rather than functions.
**Punjab Board of Revenue:** Agricultural Income Tax (AIT) in Punjab is administered by the Punjab Board of Revenue (BOR), a successor to the Office of the Financial Commissioner, which had been established by the colonial government. While it was set up with the main purpose of collecting land revenue, BOR has, over time, been assigned additional functions. Presently, it is the controlling authority in all matters regarding administration of land, including land titling and preparation, updation and maintenance of land records. The Board also serves as the highest Revenue Court in the province. In addition, it is tasked with all the relief activities in the province. On the revenue side, BOR is responsible for collection of land revenue, mutation fee, most stamp duties, and AIT. Additional functions, especially land management and relief activities, require BOR’s presence at grassroot level, where the lower level BOR officers are in close and regular contact with clients, who are also the taxpayers. This proximity and contact between tax collectors and taxpayers opens up the possibility of their collusion, rent-seeking, and corruption.

**The Legal Framework:** The Punjab Agricultural Income Tax Act, 1997 has several weaknesses, some of which are highlighted in the main text of this paper. One important weakness that impacts tax collection is that the statutory punishment specified for non-compliance comprises only of fines. Unlike land revenue law, no provision is included for attachment or confiscation of a defaulter’s land or property, or his or her detention. The lack of such penalties makes it difficult to enforce the law.

**Institutional Capacity:** A high proportion of the staff employed in the BOR are in grades 1 to 5, which are the lowest grades in public service in Pakistan. Moreover, there are no incentive schemes available to staff and this, combined with low pay, leads to low motivation. In general, then on-merit based system of public employment creates a culture of dependency and increases the possibility of corruption. Job descriptions are inadequate and were last reviewed in 1982. There is no systematic system of appraisal and evaluation of staff performance.

The public officials responsible for tax administration have neither the skills nor the training to impose a modern tax like AIT. Conditioned by its history of collecting land revenue, BOR is perfectly at ease in collecting only the land tax. Assessing income from the same tract of

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53 The fine for non- (or late) furnishing of the tax statement or filing of the tax return is specified as Rs25 per day, with a maximum amount of Rs1,000. For concealment of tax information or under-declaring the tax liability, the fine is 100 percent of the difference between assessed and declared tax, while for non-payment of tax, it is 5 percent per year of the amount not paid, subject to a maximum of 50 percent.
land is far beyond the skill-set of BOR functionaries, from the lowest to the highest levels. Tax assessment, use of third-party information, and undertaking even the simplest of tax audits—let alone risk-based audits—are alien concepts in BOR.

BOR’s capacity is further eroded by the multiple tasks assigned to it in addition to tax collection, such as land record maintenance and execution of relief activities. The centering of most land-based government functions in BOR encourages rent-seeking and corruption. In addition, the staff are burdened with additional tasks on an ad hoc basis.54

There has been no move to computerize AIT administration, partly because most of the staff involved are not computer literate. The few computers available with the administration are used for routine office work, like word processing or data storage.

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54 For example, in order to keep consumer prices in check during Ramadan, the field staff of BOR are tasked with monitoring market prices in their respective jurisdictions.
Annex III: Incidence of (Potential) Agricultural Income Tax

Revenue mobilization is only one, albeit the most important, objective of tax policy. Other important objectives include improving equity in the economy through redistribution of income and assets, and enhancing efficiency by channeling economic factors and resources away from non-preferred economic activities towards preferred sectors.

In this view, it is important not only to assess the potential revenue that could be mobilized from imposing Agricultural Income Tax in Punjab, but also to consider the categories of farmers from whom this tax will be collected, and to assess how much of the tax burden will be borne by each type.

In this paper, the potential revenue for AIT (separately under PAITA 1997 and Finance Act 2010) was estimated separately for owner-operated, owner-cum-tenant, and tenant-operated farms. At rates specified in PAITA 1997, the proportion of tax to be collected from each farm category and type is shown in Table A.1.

**Table A.1: Proportion of Potential Tax Collectable from Different Categories of Farmers and Farm Sizes under PAITA 1997 (%)**

<table>
<thead>
<tr>
<th>Farm Size (Acres)</th>
<th>Owners</th>
<th>Owner-cum-Tenants</th>
<th>Tenants</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>1–2.5</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>2.5–5</td>
<td>9.1</td>
<td>0.0</td>
<td>0.0</td>
<td>9.1</td>
</tr>
<tr>
<td>5–7.5</td>
<td>11.5</td>
<td>1.2</td>
<td>0.0</td>
<td>12.7</td>
</tr>
<tr>
<td>7.5–12.5</td>
<td>16.8</td>
<td>2.1</td>
<td>1.1</td>
<td>20.0</td>
</tr>
<tr>
<td>12.5–25</td>
<td>20.9</td>
<td>3.7</td>
<td>1.2</td>
<td>25.8</td>
</tr>
<tr>
<td>25–50</td>
<td>11.8</td>
<td>3.7</td>
<td>0.8</td>
<td>16.3</td>
</tr>
<tr>
<td>50–100</td>
<td>5.8</td>
<td>2.2</td>
<td>0.5</td>
<td>8.4</td>
</tr>
<tr>
<td>100–150</td>
<td>2.3</td>
<td>0.6</td>
<td>0.1</td>
<td>3.0</td>
</tr>
<tr>
<td>&gt;150</td>
<td>3.3</td>
<td>1.1</td>
<td>0.3</td>
<td>4.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>81.4</strong></td>
<td><strong>14.5</strong></td>
<td><strong>4.1</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

The table shows that 81 percent of potential revenue from PAITA is to be collected from
owner-operated farms. This is no surprise as, of the 5.2 million farms in Punjab, 82 percent are owner-operated. Almost 15 percent of potential revenue is to be collected from owner-cum-tenant farms. Although such farms constitute only 9 percent of farms, these are relatively larger farms, with an average farm size of 12 acres compared to the overall average of 6 acres. Therefore a larger proportion of tax revenue is to be expected compared to the proportion in terms of number of farms.

In numbers, tenant-operated farms also comprise 9 percent of total number of farms. On average, these farms are larger than owner-operated farms (7 acres, compared to 5.2 acres), but smaller than owner-cum-tenant farms. As such, these farms are expected to contribute 4 percent of AIT revenue.

Although farm size is considered to be quite an adequate indicator of farm income, farm income is also impacted by the cropping pattern, modes of irrigation, and level of use of modern inputs (e.g., fertilizers, pesticides, etc.) and technology. It is therefore important to determine the percentage of income that would be taxed by AIT for each type of farmer and farm-size category. This is shown in Table A.2.

**Table A.2: Potential Tax as a Proportion of Income of Different Types of Farmers and Farm Sizes under PAITA 1997 (%)**

<table>
<thead>
<tr>
<th>Farm Size (Acres)</th>
<th>Owners</th>
<th>Owner-cum-Tenants</th>
<th>Tenants</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1–2.5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2.5–5</td>
<td>5.09</td>
<td>0</td>
<td>0</td>
<td>4.5</td>
</tr>
<tr>
<td>5–7.5</td>
<td>6.01</td>
<td>5.54</td>
<td>0.32</td>
<td>5.64</td>
</tr>
<tr>
<td>7.5–12.5</td>
<td>7.32</td>
<td>6.16</td>
<td>5.73</td>
<td>7.07</td>
</tr>
<tr>
<td>12.5–25</td>
<td>10.19</td>
<td>8.08</td>
<td>6.67</td>
<td>9.6</td>
</tr>
<tr>
<td>25–50</td>
<td>12.45</td>
<td>11.51</td>
<td>9.71</td>
<td>12.06</td>
</tr>
<tr>
<td>50–100</td>
<td>13.64</td>
<td>12.95</td>
<td>11.92</td>
<td>13.35</td>
</tr>
<tr>
<td>100–150</td>
<td>14.27</td>
<td>13.58</td>
<td>13.29</td>
<td>14.1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>7.35</strong></td>
<td><strong>8.17</strong></td>
<td><strong>4.87</strong></td>
<td><strong>7.3</strong></td>
</tr>
</tbody>
</table>
Table A.2 shows that AIT, under PAITA, will tax 7.5 percent of income of owner-operated farms, 8.5 percent of income of owner-cum-tenant farms, and only 5 percent of income of tenant farmers. On the average, the tax shows significant progressivity across farm-size categories. While the two smallest categories are exempt from AIT, farms in the lowest taxable category pay less than 5 percent of their agricultural income as tax, whereas the largest farm-size category pays 15 percent of its average income.

Calculations similar to those in Tables A.1 and A.2 but for tax collected under Finance Act 2010 are given in Tables A.3 and A.4. These tables show only marginal differences in comparison to Tables A.1 and A.2.

**Table A.3: Proportion of Potential Tax Collectable from Different Types of Farmers and Farm Sizes under Finance Act 2010 (%)**

<table>
<thead>
<tr>
<th>Farm Size (Acres)</th>
<th>Owners</th>
<th>Owner-cum-Tenants</th>
<th>Tenants</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1–2.5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2.5–5</td>
<td>0.9</td>
<td>0</td>
<td>0</td>
<td>0.9</td>
</tr>
<tr>
<td>5–7.5</td>
<td>6</td>
<td>0.2</td>
<td>0</td>
<td>6.3</td>
</tr>
<tr>
<td>7.5–12.5</td>
<td>12</td>
<td>1.4</td>
<td>0.4</td>
<td>13.9</td>
</tr>
<tr>
<td>12.5–25</td>
<td>21.6</td>
<td>3.6</td>
<td>0.9</td>
<td>26.1</td>
</tr>
<tr>
<td>25–50</td>
<td>17.5</td>
<td>5</td>
<td>0.8</td>
<td>23.4</td>
</tr>
<tr>
<td>50–100</td>
<td>11.1</td>
<td>3.6</td>
<td>0.6</td>
<td>15.3</td>
</tr>
<tr>
<td>100–150</td>
<td>4.3</td>
<td>1.2</td>
<td>0.1</td>
<td>5.6</td>
</tr>
<tr>
<td>&gt;150</td>
<td>5.9</td>
<td>2</td>
<td>0.6</td>
<td>8.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>79.5</strong></td>
<td><strong>17.1</strong></td>
<td><strong>3.5</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>
Table A.4: Potential Tax as a Proportion of Income of Different Types of Farmers and Farm Sizes under Finance Act 2010 (%)

<table>
<thead>
<tr>
<th>Farm Size (Acres)</th>
<th>Owners</th>
<th>Owner-cum-Tenants</th>
<th>Tenants</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1–2.5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2.5–5</td>
<td>0.5</td>
<td>0</td>
<td>0</td>
<td>0.4</td>
</tr>
<tr>
<td>5–7.5</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>2.6</td>
</tr>
<tr>
<td>7.5–12.5</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>4.7</td>
</tr>
<tr>
<td>12.5–25</td>
<td>10</td>
<td>7.5</td>
<td>5</td>
<td>9.2</td>
</tr>
<tr>
<td>25–50</td>
<td>17.5</td>
<td>15</td>
<td>10</td>
<td>16.5</td>
</tr>
<tr>
<td>50–100</td>
<td>25</td>
<td>21</td>
<td>15</td>
<td>23.3</td>
</tr>
<tr>
<td>100–150</td>
<td>25</td>
<td>25</td>
<td>21</td>
<td>24.9</td>
</tr>
<tr>
<td>&gt;150</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Total</td>
<td><strong>6.8</strong></td>
<td><strong>9.2</strong></td>
<td><strong>4.1</strong></td>
<td><strong>7</strong></td>
</tr>
</tbody>
</table>