Agricultural Income Taxation

Estimation of the Revenue Potential in Punjab

Anjum Nasim

10/14/2012

Abstract: According to the Constitution of Pakistan, taxation of agricultural crop incomes is a provincial subject. Although legislation for taxation of agricultural incomes has been in place in the provinces since 1996-97, actual collection is insignificant. In 2009-10, the provincial governments collected Rs1.2 billion under the budget headings of 'taxes from agriculture' and 'agricultural income tax', of which the share of Punjab was Rs1 billion. These agricultural taxes constituted 2.2 percent of the tax revenues of the provincial governments and 0.22 percent of the total direct tax revenue in the country. However, in actual implementation the 'tax on agriculture' is a land tax and not an income tax. An amendment to the Constitution, recently proposed in the Senate, to bring agricultural incomes under the purview of the federal government, mentions a figure of Rs200 billion as the potential tax revenue from agricultural incomes. This paper attempts to quantify the potential tax revenue from crop farming in the province of Punjab. Our estimates suggest that if we use the income tax rates applicable under the Finance Bill 2012, the potential tax revenue for Punjab from crop farming in 2009-10 would be of the order of Rs16-20 billion, assuming no difference in average yield per acre among small and large farmers. If the yield of large farmers (with farm sizes of 25 acres and above) is 50 percent more than that of small farmers, then the tax potential is estimated to be of the order of Rs24-29 billion. Had the tax been in place in the tax year 2010, the tax revenues would have been between Rs55-75 billion if small and large farmers were equally productive and between Rs63-79 billion if large farmers were 50 percent more productive than small farmers. Using these estimates for Punjab, the potential tax revenue from agricultural crop incomes for the country as a whole would have been in the region of Rs80 billion to Rs115 billion in 2009-10 compared with Rs529 billion collected as federal direct taxes (mostly income taxes) from the non-agricultural sector in 2009-10. Since

crop farming accounts for 43 percent of the value added in agriculture while livestock accounts for another 54 percent, our tax estimates, based on crop farming, underestimate the full potential. The paper concludes broadly that under the current income tax rates the perception about the agricultural income tax potential is exaggerated, but the revenue potential is still very large relative to the actual tax collection by the provinces. Taxing this source of income at rates applicable to similar incomes in other sectors of the economy will not only supplement the finances of the provincial governments, but will also have an important symbolic value in terms of fairness and equity.

Agricultural Income Taxation: Estimation of the Revenue Potential in Punjab

Anjum Nasim[*]

In May 2011 a senator moved a private member's constitutional amendment bill to remove the exemption provided to agricultural incomes from federal income taxation. The proposed amendment mentioned a potential revenue of Rs200 billion from Agricultural Income Tax (AIT).[1] This figure, however, differs widely from some other reported estimates of potential agricultural income tax.[2] The issue of AIT is likely to echo again in the parliament and outside as Pakistan grapples with the issue of its low tax revenues. It is, therefore, important to carefully analyze the potential revenue from AIT to allow more informed discussion and policy decisions on tax options at the federal and provincial levels.

The 1973 Constitution of Pakistan gives provincial assemblies the exclusive power to make laws pertaining to taxes on agricultural income.[3] Agricultural income could be interpreted narrowly to include crop farming and rental income from land, or more broadly to include income from livestock and animal husbandry. There is no ambiguity that income from the narrower interpretation falls within the domain of provincial taxation though there may be

---

[1] Specifically, the amendment proposes that in the Federal Legislative List (Schedule IV of the 1973 Constitution), in Part I, entry 47 – 'taxes on income other than agricultural income' – be substituted by 'taxes on all income'. The bill was moved by Senator Tahir Hussain Mashadi (see http://www.senate.gov.pk/Legis%20Br/bill/Private%20Bills/consti2011.pdf).

[2] A World Bank report (World Bank et al. 2009) estimates agricultural income tax to be Rs2.9 billion for Punjab and Rs0.28 billion for NWFP (Khyber Pakhtoonkhwa). These estimates are obtained by using net income of Rs4,000 to Rs8,000 per acre, a threshold income level of Rs100,000 and tax rate ranging from 5 to 15 percent. In an earlier study, Malik (2004) estimated agricultural income tax and/or land tax for NWFP (Khyber Pakhtoonkhwa) under three different alternatives. The tax revenue estimates ranged between Rs249 million (under alternative 1), Rs86 million to Rs808 million (under alternative 2 – with the lower estimate corresponding to per acre income of about Rs4,264 and the higher figures corresponding to per acre income figure of Rs14,227) and Rs745 million (under alternative 3).

[3] The 1973 Constitution gives the Parliament (consisting of the President, the National Assembly and the Senate) the exclusive power to make laws with respect to matters that are in the Federal Legislative List (Fourth Schedule of the Constitution), and gives the provincial assemblies the *exclusive* power to make laws in all other matters except in the matter of criminal law, criminal procedure and evidence (the power to make laws in these cases rests with the Parliament and a Provincial Assembly). The Federal Legislative List includes various forms of duties and taxes and explicitly excludes others. One of the taxes that is explicitly excluded from the list is agricultural income.

room for debate whether the provincial jurisdiction extends to the broader definition of agricultural income or not (see Box 1).

Box 1: Definition of Agricultural Income

Agricultural income is defined in the 1973 constitution (Article 260 (1)) as follows:

> "agricultural income" means agricultural income as defined for the purpose of the law relating to income tax.

At the time the 1973 Constitution was approved, the Income Tax Act 1922 was the relevant income tax law. This act, with some amendments and modifications, was a continuation of the Indian Income Tax Act 1922. The Income Tax Act 1922 was replaced by the Income Tax Ordinance 1979, which in turn was replaced by the Income Tax Ordinance 2001. The definition of "agricultural income" as given in the Income Tax Act 1922 was changed in 1977 by The Finance (Supplementary) Act 1977 under Prime Minister Z. A. Bhutto as part of his effort to bring agricultural incomes under the federal jurisdiction. This attempt was stopped in its tracks by the military coup of General Zia ul Haq in July 2007 (see section 2) but the revised definition of "agricultural income" (which was probably broader in scope than the previous definition) was not changed and was retained in the 1979 Ordinance as well as in the 2001 Ordinance (see Haq and Bokhari (2011)).

In the Income Tax Ordinance 2001 "agricultural income" is defined as:

(a) Any rent or revenue derived by a person from land which is situated in Pakistan and is used for agricultural purposes;
(b) Any income derived by a person from land situated in Pakistan from:
>   (i) agriculture;
>   (ii) the performance by a cultivator or receiver of rent-in-kind of any process ordinarily employed by such person to render the produce raised or received by the person fit to be taken to market; or
>   (iii) the sale by a cultivator or receiver of rent-in-kind of the produce raised or received by such person, in respect of which no process has been performed other than a process of the nature described in sub-clause (ii); or
(c) Any income derived by a person from:
>   (i) any building owned and occupied by the receiver of the rent or revenue of any land described in clause (a) or (b);
>   (ii) any building occupied by the cultivator, or the receiver of rent-in-kind, of any land in respect of which, or the produce of which, any operation specified in sub-clauses (ii) or (iii) of clause (b) is carried on, but only where the building is on, or in the immediate vicinity of the land and is a building which the receiver of the rent or revenue, or the cultivator, or the receiver of the rent-in-kind by reason of the person's connection with the land, requires as a dwelling-house, a store-house, or other out-building.

The Indian Income Tax Act 1922 was also adopted by India after independence. The Indian courts have interpreted agricultural incomes in the sense of income from cultivation of land and ruled that breeding and rearing of livestock, dairy farming, butter and cheese making, poultry farming, etc., are not included in agriculture. (Arshad 2010, pp. 198-200). We are not aware of a similar interpretation based on case law for Pakistan. 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 (the time-bound exemptions pertain to incomes from poultry farming, fish farming, dairy farming,

cattle breeding, sheep breeding and poultry processing (see Salam (1982, p. 10 and pp. 270-71)), 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 rental of land.

Since 1996-97 all four provinces have instituted some form of tax on agriculture land or incomes. In its implementation this tax is largely a land tax (based on acreage) rather than a tax on agricultural income. In Punjab the tax is levied under The Punjab Agricultural Income Tax Act 1997. The 1997 Act was amended in 2001 to include a provision for the tax to be levied on agricultural incomes, but the tax is effectively collected as a land tax.[4] The land tax can be interpreted as a presumptive income tax.[5]

The share of agriculture in the GDP in 2009-10 was 21 percent. Agricultural Income Tax (AIT) collection in all four provinces amounted to Rs1.2 billion in 2009-10.[6] In contrast, the federal direct tax revenue in the same year was Rs529 billion of which income tax revenue comprised an overwhelming share. In Punjab, the revenue from AIT was Rs1 billion as compared with the total provincial own-tax revenue of Rs37 billion and total revenue receipts (including federal transfers) of Rs436 billion.

The issue of agriculture income tax has important political economy dimensions. The two main political parties, the PPP and PML-N, have a strong support base in rural Pakistan while the MQM largely represents urban Sindh, whose capital Karachi is both an industrial hub and an MQM stronghold. During 2010 and 2011, when the federal government tried to introduce the Federal Value Added Tax Bill 2010 and then the Reformed General Sales Tax bill 2010 to increase tax revenues, the opposition and some of the political allies of the government stymied these efforts. The MQM took the position that the exemption provided to agricultural incomes protects the incomes of large landowners and forces the government to concentrate its tax measures on the common man.

Neither the PPP, the MQM's coalition partner in the government, nor the other major political parties have shown any interest in supporting the proposed constitutional amendment in the Senate. The provincial governments have also been lackluster in levying buoyant forms of agricultural income and land taxes at the provincial level. The weak land revenue administration and pressure from the strong farm lobby are possible explanations, but the growing provincial share in the federal divisible pool of taxes under the National Finance Commission (NFC) awards also creates a disincentive for the provinces to tap own-source

---

[4] According to a senior official of the Punjab Board of Revenue, a handful of individuals voluntarily submit their agricultural income tax returns and are taxed accordingly, but for all intents and purposes the tax is collected as a per-acre tax as in the original 1997 Act.

[5] Haq and Bokhari (2011) have questioned the constitutional validity of provincial governments imposing land tax in the guise of agricultural income tax. The 18th amendment of the constitution (effective from April 19, 2010) makes taxation of immovable property a provincial subject. Thus land taxation, whether acreage-based or value-based, has also been devolved to the provinces, and the acreage-based presumptive income taxation is constitutionally protected after the 18th amendment even if its constitutional validity was previously questionable.

[6] In addition to AIT, the provincial governments also impose other direct taxes (of about Rs6 billion in Punjab in 2009-10) on agriculture which are recorded under the general heading of land revenue. A large part of this revenue (over 90 percent in Punjab) is mutation fee, which is a tax on transfer of property in rural areas.

revenues.[7] The seventh NFC award has reinforced this disincentive. The award has increased the provincial share in the divisible pool of tax revenue to 56 - 57.5 percent compared with 46.25 percent in the sixth NFC award.[8] A reduction in collection charges of the federal government from 5 percent to 1 percent has further eroded revenue proceeds for the federal government. However, these additional revenues have to be seen in the context of the 18th amendment, which was passed within a few months after the agreement on the NFC award. This award abolished the concurrent list and transferred functional responsibilities in several areas to the provincial governments. Comparison of estimates of the outlay on devolved responsibilities (under the 18th amendment) with the devolved resources (under the NFC award) suggests a considerable net transfer of resources from the federal government to the provinces.[9]

With one of the lowest tax-to-GDP ratios in the world (10.1 percent in 2009-10) even a larger resource transfer would be insufficient to enable the provinces to adequately discharge their responsibilities, particularly in the areas of education, health and law and order. For this the provincial governments will have to tap into their own revenue sources. Finances of local governments also need to be strengthened to improve basic or municipal services. AIT and Urban Immovable Property Tax (UIPT) could potentially be important sources of own revenue for the provinces/local governments.[10] These sources generated revenues of Rs1 billion and Rs7 billion respectively in 2009-10. Is there a large revenue potential going untapped?

It would be instructive to obtain estimates of potential revenue from taxing agricultural incomes by applying the same tax rates to agricultural incomes as are applied to similar incomes under the Income Tax Ordinance 2001. This paper attempts to provide estimates of revenues from taxing agricultural incomes from cultivation of land and from renting out of land for the province of Punjab for the financial year 2009-10 using tax rates applicable under the Income Tax Ordinance 2001 (incorporating the amendments from the Finance Bill 2012).[11] We obtained three different sets of estimates with some variations on data and methodology. Our estimates suggest that if we use the income tax rates applicable under the Finance Bill 2012, the potential tax revenue for Punjab from crop farming in 2009-10 would be of the order of Rs16-20 billion, assuming no difference in average yield per acre among

---

[7] Bahal, Wallace and Cyan (2008, p. 23) make the same point when they argue that one of the constraints that inhibit provincial revenue generation is that "politicians have felt pressure from strong interest groups (agriculture property owners) to hold off on increasing taxes, and in a sense they have been "protected" by increased allotments under the NFC." Pasha, Pasha and Imran (2010) show that the increase in fiscal transfers has only a small disincentive on provincial revenues. A one-rupee increase in transfers results in a five-paisa fall in provincial tax revenues.

[8] The provincial share was 56 percent in 2010-11 and will be 57.5 percent from 2011 till 2015.

[9] Based on a paper by Ghaus-Pasha, an IMF report (IMF 2012, pp. 48-49) gives estimates of the amount of additional devolved resources to be Rs200 billion and the amount of devolved spending to be Rs67-Rs91 billion.

[10] Ahmad and Stern (1991) have suggested that AIT should be transferred to local governments.

[11] We focus only on one province to keep the estimation manageable. Punjab accounts for a very large part of the total agricultural crop output in the country (in 2009-10 it accounted for 77 percent of wheat output, 54 percent of rice output, 68 percent of sugarcane output and 66 percent of cotton output). Based on the tax revenue estimates for Punjab, reasonable projection can be made for aggregate agricultural income tax revenue for Pakistan. However, more precise estimates can be obtained by extending the methodology adopted in this paper to the data on other provinces.

small and large farmers. If the yield of large farmers (with farm sizes of 25 acres and above) is 50 percent more than that of small farmers, then the tax potential is estimated to be of the order of Rs24-29 billion. [12] Had the tax been in place in the tax year 2010, the tax revenues would have been between Rs55-75 billion if small and large farmers were equally productive and between Rs63-79 billion if large farmers were 50 percent more productive than small farmers. We should stress that crop output accounted for 43 percent of the value added in agriculture in 2009-10, and livestock accounted for 54 percent of the value added. The available data, however, does not allow us to extend our analysis to include agricultural incomes other than crop incomes.

The estimates presented in this paper should be seen as a continuation of earlier work in this area.[13] We start with a brief history of agricultural taxation in Pakistan (section 1), then consider some issues related to tax incidence (section 2). This is followed by a brief look at proposals for taxation of agriculture (section 3), estimates of revenue potential from AIT (section 4), and concluding remarks (section 5).

1. A Brief History of Taxation of Agricultural Land, Output and Income in Punjab

Some form of taxation of agricultural land, output and incomes in the subcontinent dates back to the pre-Mughal period.[14] *Land revenue* – a tax on rental value of land, inherited by Pakistan from the British period, was influenced by the Ricardian view on rent. In Punjab, land revenue continued to be collected with occasional changes in either the rate structure and/or exemptions till it was abolished in 1997.[15]

Income tax was first introduced in British India in 1860 but it was withdrawn after only five years. It was reintroduced in 1869 but was again withdrawn after three years. The tax was reimposed in 1886 and existed throughout the remaining period of the British rule.[16]

---

[12] We treated farm size of 25 acres and less as small and farm size of 25 acres or more as large. Difference in yield between small farmers and large farmers arises because the latter are better placed to purchase high cost farm inputs such as high yielding seed varieties, fertilizers, pesticides, water, etc. We do not have recent empirical evidence to support this hypothesis. Evidence from some earlier literature on farm size and productivity relationship is mixed (see e.g., Khan (1979), Mahmood and Haque (1981) and Mukhtar and Mukhtar (1988)).

[13] Some of the work in the area of agricultural taxation and agriculture transfers in Pakistan include Ahmad and Stern (1991), Chaudhry (1973, 1999, 2001), Chaudhry and Kayani (1991), Hamid (1970, 1973), Hamid, Nabi and Nasim (1991), Kazi (1984), Khan (1978, 1981), Khan and Khan (1998), Malik (2004), Mohammad (1987), Mukhtar and Nasim (1999), Nasim (1993), Nasim and Akhlaque (1992), Qureshi (1973, 1987), World Bank (1999) and World Bank et al. (2009).

[14] See, e.g., Bird (1974, chapter 6), Khan (1981), Habib (1982) and Kumar (1983).

[15] Land revenue was a tax on economic rent or unearned income of the landlord. 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, chapter 8). The net asset value, once determined, (known as land settlement) was fixed for several decades at a time (30-40 years at the time of independence in 1947 and reduced to 25 years in 1967). See Khan (1981, chapter 8).

[16] Kumar (1983).

Agricultural incomes were initially subject to income taxation, but when the tax was reimposed in 1886, agricultural incomes were exempted from taxation "on the ground that they were already sufficiently taxed by the land revenue and by the cesses on land levied in the early 1880s."[17] The Indian Income Tax Act 1922, adopted by Pakistan at independence, also reflected the exemption provided to agricultural incomes.[18] The 1973 Constitution of Pakistan excluded agricultural incomes from the Federal Legislative List, and the exemption from federal income taxation provided to agricultural incomes became constitutionally enshrined. In 1977 the PPP government under Zulfiqar Ali Bhutto replaced land revenue with a presumptive agricultural income tax, based on Produce Index Unit (PIU).[19,20, 21] The new tax was to be effective from July 1977, but before it could be implemented, the military regime of General Zia ul Haq, which took power through *a coup d'etat* in July 1977, restored the tax exemption to agricultural incomes, revived the land revenue system, exempted holdings of up to 25 acres of irrigated land (and 50 acres of unirrigated land) from payment of land revenue but with higher rates for larger land holdings.[22]

In 1980 the Zia regime introduced the Zakat and Ushr Ordinance 1980 as part of its Islamization drive. The ordinance replaced the land revenue by *Ushr* on Muslim landowners, lessees and lease holders with exemption for certain *fiqhs* (sects). It was levied at the rate of five percent of the value of output, to be assessed, 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 for social protection and not a part of the government budget.[23] At its peak, in 1983-84, the collection of *Ushr* was Rs267 million in the country as a whole, but it declined to Rs134 million by 1988-89 and continued to slide (with occasional spurts). In 1998-1999, the figure was Rs100 million and in the last decade it has been negligible. In Punjab, the collection has been insignificant since 1996-97.[24]

Another attempt to introduce agricultural income tax (at the provincial level) was made in 1993 by the caretaker government of Prime Minister Moeen Qureshi. The tax was also a PIU-based presumptive income tax. The caretaker government was replaced by elected government, and in three of the four provinces PIU-based presumptive income taxes were introduced with Punjab as the notable exception.[25] In 1996 another caretaker government

---

[17] Kumar (1983, pp. 924 - 926).
[18] The word 'Indian' was omitted from the Act in 1949 and it was titled 'Income Tax Act, 1922'. The Act, with periodic amendments, was the operative income tax law till it was replaced by the Income Tax Ordinance 1979. Also see Box 1.
[19] See Khan and Khan (1998).
[20] A Produce Index Unit (PIU) is a measure of land quality, based on land settlements (see footnote 15). These settlements were conducted before 1947 (see Khan 1981, p. 166).
[21] The tax on agricultural incomes was introduced through the Finance (Supplementary) Act 1977 (see Khan and Khan 1998, p. 9). The constitutional propriety of this process of bringing agricultural incomes within the purview of federal income tax is questionable. See also Haq and Bukhari (2011).
[22] See Khan (1981, p. 285) and Khan and Khan (1998).
[23] Khan and Khan (1998).
[24] See Government of Pakistan (2011a).
[25] Khan and Khan (1998, p. 13).

introduced agricultural income/land taxes in the four provinces.[26] 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. The Act has been amended from time to time.

Under the Punjab Agricultural Income Tax Act 1997, agricultural income tax is assessed in one of two ways: (1) as a charge on cultivated land,[27] and (2) as a tax on agricultural incomes net of deductions and allowances.[28] The taxpayer is liable to pay one tax, the amount of which is the greater of the two. In its actual implementation the agricultural income tax is collected as a tax on land area (or per acre tax) and not as a tax on agricultural or farm incomes.

At the same time that the Punjab Agricultural Income Tax Act 1997 was introduced, land 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 on a compulsory basis 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 2009-10. However, the bulk of this revenue consists of mutation fee, rent on government agricultural land and other minor fees, fines and charges.

In sum, land revenue, as a form of tax on land or farm output or income from agriculture, had been in place from the British and Mughal periods and even earlier. During the British period it was a tax on one component of income from agriculture, namely land rent. The system of land revenue, inherited from the British, continued till 1980 with occasional changes. In the early 1980s *Ushr* replaced land revenue for most Muslims landowners (with exemptions for some *fiqhs*) but collections were not very large and they declined with the demise of the Zia-ul-Haq regime. Despite attempts at introducing agricultural income tax by caretaker governments, the Punjab Assembly passed it into law only in 1997. The agricultural income tax in Punjab, in its implementation, is effectively a land tax. The collection under this head was Rs1 billion in 2009-10, which constitutes less than 3 percent of the provincial governments own-tax revenues of Rs37 billion.

---

[26]"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).

[27] The tax on irrigated 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.

[28] The tax payable is 5 percent of total income where total income does not exceed Rs100,000; Rs5,000 + 7.5% of the income exceeding Rs100,000 but less than Rs200,000; Rs12,500 + 10% of the income exceeding Rs200,000 but not exceeding Rs300,000; Rs22,500 + 15% for income exceeding Rs300,000. Tax is charged on income after deducting admissible allowances.

2.   Who Bears the Burden of Taxes

The lesson from tax incidence analysis is that those that are legally required to pay a particular tax do not necessarily bear the ultimate burden of the tax. In competitive markets, the extent to which the tax is borne by the seller or the buyer depends on how responsive supply and demand are to price changes (or the price elasticities of demand and supply of a good or factor of production). The key result on 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).

The case for treating farm incomes as business incomes for tax purposes is made on the ground that the differential treatment of agricultural incomes violates the principle of horizontal equity – equal incomes should be treated equally, and on the ground that by excluding agricultural incomes from taxation, a very large segment of the earning households are excluded from the application of the principle of vertical equity (those with greater ability to pay, should pay more). The latter principle is embodied in a progressive income tax rate structure.

The case for taxation of agricultural incomes on grounds of horizontal and vertical equity presumes that a tax levied on farm incomes will be borne largely if not entirely by farm households, and that the burden of other forms of taxation is not being shifted disproportionately on farmers so that even if farmers do not pay taxes on incomes, their burden of taxes is no less than that on others with similar incomes.

If farmers' own labour, capital and land are in fixed supply, a proportional tax on farmers' profits will leave their input and output decisions unchanged, there will be no tax shifting and the tax will be borne by farmers. This result will not hold, in general, under a progressive income tax regime or if farmers' own supply of labour, capital or land were not fixed.

In the long run competition will force economic profits to zero (see footnote 29 for a caveat)[29] and the profit tax will be a tax on the implicit returns to farmers' own labour, capital and land. Under a tax on farmers' incomes, a farmer, who does not provide his own labour, capital or land but hires these instead, will not pay any taxes in the long run because competition would have driven profits to zero, but the farmer who employs some or all of the factors of production that he owns, will be taxed on the implicit returns to the own factors of production that he employs.

---

[29] Economic profit is the difference between a firm's revenue and its input costs. The input costs incorporate the costs of raw materials and hired factors of production and also the opportunity cost of inputs that are owned by the firm and employed in the production process. In the case of owner-farmer, economic profits would incorporate the opportunity cost of farmer's own land, labour and capital. A farmer's productivity on his own farm may be greater than his productivity as hired worker on another farm. If the farmer is paid his marginal product as a hired worker, the opportunity cost of his labour may be less than the return to his labour when working on his own farm. The difference between the two returns will not be driven to zero by competition and therefore economic profits may not be zero even in the long run.

The factors of production that farmers own and employ in their production processes are not fixed in the long run. Differential treatment by tax authorities of debt and equity, of own labour and hired labour and of own land and rented land for calculating taxable income can result in farmers substituting hired factors of production for own factors of production, thus offsetting some of the impact of the tax on farm incomes.[30] Tax of farm incomes can also create incentives for labour and capital to move to other sectors of the economy where the after-tax returns may be higher. With capital and labour no longer immobile, some shifting of the tax is inevitable. However, we can conjecture that because of the presence of a fixed factor (unimproved land) and the relatively inelastic labour supply,[31] considerable part of an agricultural income tax will be borne by farmers even in the long run.

We next consider the question of whether there are forms of taxes on agriculture which compensate or over-compensate for the absence of income tax. Till the 1980s, farmers were subjected to quite heavy taxation through government pricing policies which took the form of compulsory procurement of agricultural goods at prices below world prices, ban or restrictions on exports or taxes on exports of agricultural goods (which forced domestic prices below world prices), and overvaluation of the exchange rate which acted as a tax on exports, particularly agricultural exports. The government did not earn revenues directly from all of these policies but met its other objectives of lowering food prices in urban areas and reducing wages and raw material prices for industrial producers. 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, a price reform process was started in the 1980s which continued through the 1990s and later. As a result, implicit taxation of agricultural incomes has been phased out largely, if not entirely (See World Bank et al (2009).

3.   Options for Agricultural Taxation

Taxation of agriculture incomes can takes place in a number of ways, and several authors have discussed these in the context of developing countries and specifically Pakistan.[33] One of the earliest papers on agricultural taxation in Pakistan is by Hamid (1970). Many later contributions have been influenced by this pioneering work. We briefly review some forms of taxes proposed in the literature on agricultural taxation in Pakistan.

Taxation Based on Land Area

As discussed earlier, land taxes have a particular appeal because of their simplicity and presumed efficiency. Land taxes can be levied either with or without reference to the

---

[30] To offset some of these tax-reducing substitution, appropriate taxes on rental incomes, in particular rental income from land, will have to be imposed.

[31] See Wahid and Wallace (2008) for a brief review of the literature of labour supply elasticities.

[32] Hamid et al (1991) also find evidence of substantial implicit taxation of agricultural incomes between 1960 and 1987.

[33] See, e.g., Bird (1974), Newbery (1987), Skinner (1991) and the references in footnote 13.

ownership characteristics. [34] A tax based on land area is administratively the simplest form of land taxation. It retains much of the simplicity if the tax varies by land characteristics such as irrigation status – irrigated or unirrigated. The tax can be regressive if no allowance is made for quality of land and for the possibility that poor farmers own less productive land (Skinner 1991). These features make the tax less attractive and some owner and quality characteristics ought to be considered. The land tax in Punjab distinguishes between cultivated and uncultivated land, irrigated and unirrigated land, farms with crops and farms with orchards and farms of different size categories.

The PIU-based tax that the PPP government under Zulfiqar Ali Bhutto in 1977 and the caretaker government of Moeen Qureshi in 1993 tried to introduce (see section 2), takes into account the productivity differences of land. Most farm lands in Pakistan have an assigned PIU but these have not been updated for several decades. The changes in absolute and relative productivities of land make the existing PIUs unreliable as a basis for land taxation. By periodic upgrading, the PIU-based tax on agricultural incomes could be made a buoyant source of provincial revenues. [35]

Annual Rental Value and Site Value Taxes

The theoretical concept of land rent is defined as the excess yield of a plot of land over 'marginal land' (land which produces just enough to cover production costs including wages of the cultivator).[36] The capitalized value of the rental value of land is the site value of land. Taxes on pure rental income and site value are efficient taxes because they only take away some, and in the extreme case all, of the landowners' rental income without affecting the supply of land or the level of output.

A tax based on annual rental value (ARV) targets only one component of the farmers' income, i.e., the income that is attributable to unimproved land. A farmer's income includes the return to his own labour, return to capital invested in land, return to entrepreneurship, and pure rent on land.

ARV as opposed to PIU based indices also reflects contribution of factors other than productivity of land, such as location (access to markets) and infrastructure (roads and transport).[37]

In theory, a tax on site value should have the same economic implications as a tax on rental value since the site value is the capitalized rental value of land.[38] This tax could be used in lieu of a tax on ARV if land markets are well developed. ARV may be the appropriate basis for taxation if land markets are not well developed but rental markets are.[39]

---

[34] See World Bank (1999).
[35] A method for updating PIUs has been suggested by Khan and Khan (1998).
[36] See Bird (1974, p. 150).
[37] See, e.g., Hamid (1970) and World Bank (1999).
[38] See Hamid (1970) and Bird (1974, chapter 7).
[39] See Khan and Khan (1998) for the problems in implementing taxes based on ARV and market-value of land.

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 limitation of farmers to maintain records and accounts and of the tax administration to assess, audit and collect, make it very unlikely that a modern income tax will be extended to the agricultural sector anytime soon. For the near future the tax will be some form of presumptive income tax. One such tax that focuses only on crop income is based on PIUs. A presumptive income tax would involve estimating Gross Value of Output (GVO), subtracting an estimate of cost of production (COP) and then applying a tax according to a tax schedule that is applicable to businesses in other sectors of the economy. International experience suggests that some countries try to obtain actual values of both revenues and costs and others work with estimates of either one or the other or both. [40]

Value Added Tax

A comprehensive value added tax (VAT) can be designed in a way that the tax is effectively a tax on all consumption.[41] Since income (Y) equals consumption (C) plus saving (S), a comprehensive uniform consumption VAT, if combined with a tax on savings (or a tax on assets), would amount to a form of tax on all incomes irrespective of the source of income.[42] Consumption accounts for a very large part of national income (87 percent of the GNP in Pakistan in 2009-10). The Government of Pakistan is trying to implement a VAT, but is still a long way from instituting a broad-based consumption tax.[43] The taxes on savings are also limited to savings that are channeled through formal financial institutions. Even if the government implements a comprehensive VAT together with a savings or asset tax, the issue of differential treatment of agricultural income and non-agricultural incomes would still remain if the federal and provincial income tax laws are retained in their present form.

Taxing Agricultural Output and Inputs

The efficiency of land taxes may not hold in the presence of imperfect insurance markets so output taxes or a combination of output and land taxes may be preferred to pure land taxes.[44] Distortionary taxation of outputs and inputs may also be desirable because of administrative difficulties in implementing efficient taxes such as land-based taxes.

---

[40] See World Bank (1999, chapter 2) for details.

[41] See, e.g., Ebrill et al. (2001, chapter 2).

[42] A tax on return to savings (interest and dividends) translates into a tax on savings. Thus, if the rate of return on savings was 'r' and a tax, at the rate of γ, was imposed on the rupee return to savings (rS), then the tax revenue (T) would be: $T = \gamma(rS) = \gamma r(S) = t_S S$, where $t_S \equiv \gamma r$ and is the implicit tax rate on savings. A tax on the value of assets can also be shown to be a tax on savings (see, e.g., Hyman (2005, chapter 17)). A comprehensive consumption tax combined with a tax on return to savings, taxes all incomes irrespective of the source of income and although it does not necessarily mean that equal incomes are taxed equally, it does not discriminate on the basis of source of income but on the basis of how income is distributed between consumption and saving. This form of taxation is also likely to violate the principle of vertical equity at least for the current rates of VAT, and current tax rates on returns on savings in Pakistan.

[43] The C-efficiency ratio (the ratio of VAT revenue relative to the full potential at the standard VAT rate), which can be theoretically 100 percent (and averages 50 percent for advanced and emerging economies), is 26 percent for Pakistan.

[44] Hoff (1991).

A proportional tax on agricultural outputs and inputs can be levied at the point of sale and purchase. It may also be equitable because less well off farmers have less marketed output and use fewer inputs. [45]

4. Estimates of Potential Agricultural Income Tax

In this section we estimate the potential revenue that can be raised from taxing income from crop farming in Punjab by applying the same rates of taxes as those applicable on similar incomes under the Income Tax Ordinance 2001. The design of an appropriate agricultural income or land tax is not our objective. For tax purposes, we treat farm income as business income of an *individual*.[46] Where we can distinguish between farm incomes and rental income, the tax rates used for rental incomes are those relevant to *income from property*.[47]

To derive estimates of the tax potential, we rely principally on the following data sources: (1) Pakistan Agricultural Census 2000 (Government of Pakistan 2003), (2) Agricultural Statistics of Pakistan 2009-10 (Government of Pakistan 2011a) and (3) Pakistan Economic Survey, 2010-11 (Government of Pakistan 2011c).

We first report tax revenue estimates for the year 2009-10 but by applying the tax rates applicable under the Finance Bill 2012 (as given in appendix III). We also report, in section 4.8, the tax revenue estimates based on tax rates that were applicable to the incomes in 2009-10 and as given in the Finance Bill 2010.

We derive three sets of estimates of tax potential using broadly the same methodology, relying on different sets of tables in the Pakistan Agricultural Census 2000 and, in one case, combining the information from the Agricultural Census with the value added figures from the Pakistan Economic Survey. We discuss three sets of estimates under the headings: (1) estimates based on value added, (2) estimates based on tenure status of farmers and (3) estimates based on irrigation status of farms.

Table 1 summarizes the estimates of tax potential from all three approaches. The three approaches to estimation of potential tax revenue are described briefly in this paper but for

---

[45] See World Bank (1999).

[46] The rates of tax used are those that apply to *individuals and association of person other than salaried individuals* as given in the First Schedule, Part I, Division I of the Income Tax Ordinance 2001 (Government of Pakistan 2011b) taking into account the amendments under the Finance Bill 2012 (Government of Pakistan 2012a). The tax rate ranges from 0% (for income less than Rs400,000) to 25% for incomes exceeding Rs2.5 million. (See table A-5).

[47] The tax rates used are as given in the First Schedule, Part I, Division VI of the Income Tax Ordinance 2001 (Government of Pakistan (2011b)) under item (a), taking into account the amendments in the Finance Bill 2012 (Government of Pakistan 2012a). The tax rates range from 0% for income less than Rs150,000 to 10% for income exceeding Rs1 million. (See table A-6).

economy of space, we discuss in detail only the estimates based on the tenure classification of farmers (see appendix I).[48]

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

4.1 Estimates Based on Value Added

Using data on total value added in agriculture (in major and minor crops), as given in Government of Pakistan (2011c), the value added for Punjab was estimated and allocated to the ten farm size categories in line with the classification given in the Pakistan Agricultural Census 2000.[49, 50] This allocation is done according to the distribution of cropped area by farm size.[51] We assume implicitly that value added in a particular farm size category is proportional to the cropping area in that farm size.[52] By dividing these values by the number of cultivated farms in each size category we obtain a distribution of average value added per cultivated farm. The average value added (by farm size) is the income that accrues to all the factors of production of a representative farm, and takes the form of wages, return to capital, rental income of land and profits. If all these incomes are clubbed together and taxed for each farmer as *individual income*,[53] then the potential revenue for Punjab is Rs29 billion.

The above estimates of tax revenue need to be adjusted for the depreciation cost of capital and expenses incurred on hiring of workers.[54] Value added is the gross return to factors of production and is calculated by subtracting the value of purchases of inputs from the value of output. The depreciation of capital in the process of production is not subtracted in the calculation of gross value added. For tax purposes, depreciation of capital is allowed as an expense and treated as part of *cost of goods sold*. In fact, an accelerated rate of depreciation is allowed with 50 percent depreciation in the first year and 15 percent in the future years, till

---

[48] All three sets of estimates are described in detail in an extended version of this paper (Nasim 2012).

[49] The value added calculation takes into account the cost of inputs (seed, fertilizer, pesticide and water), cost of ploughing and planking through tractors and animals and 'other' input costs (see Government of Pakistan 2012b).

[50] For details on the estimation of total value added in agriculture (in major and minor crops) for Punjab, see Nasim (2012).

[51] This is based on the distribution (by farm size) of cropped area given in the Pakistan Agricultural Census 2000 (Government of Pakistan 2003, table 6.2).

[52] This is a simplification because larger farmers have greater access to high cost inputs (including seeds, fertilizer and machinery) and this could mean greater output yield and value added per acre by large farmers compared with small farmers. In section 5.4 we allow for differences in yield between small and large farmers.

[53] For the applicable tax rates see footnote 46.

[54] The tax revenue should also be adjusted for bank charges on production and capital loans, which are also admissible business expenses. We have ignored these in our tax calculations, effectively assuming that all capital is owner capital.

the capital fully depreciates. We factor in this accelerated depreciation in our estimates of taxable income and potential tax revenue.[55]

The value added adjusted for depreciation has to be adjusted further for hired labour in order to arrive at potential taxable income. Value added includes income from labour (in addition to return to other factors of production) but if labour is not family labour but hired labour then this component of value added is not the income of farm household but the income of wage earners. Though wage income is also in principle taxable, this income would typically fall below the taxable threshold. In effect the average value added as a proxy of the income of a representative farmer has to be scaled down to the extent that the farmer employs wage labour.

If we adjust for depreciation of capital for all farm households and hired labour for operational holdings of 12.5 acres or more, the potential tax revenue for Punjab is about Rs19 billion.[56]

The value added approach to calculation of taxable incomes of farmers does not distinguish between incomes from owned land and rented land. For farmers who cultivate rented land, the rental payments to landowners are a cost of production and need to be subtracted from total farm income to obtain taxable income from crop farming. The rental payments, in turn, need to be taxed separately as property income of landowners. The clubbing of land rental with farm income can overestimate or underestimate farm income and the tax potential. In the following subsection we use data on farm households based on tenure status, which allows us to separate farm income from property or rental income, and to possibly correct any overestimation or underestimation.

4.2 Estimates Based on Distribution of Acreage by Tenure Status

Pakistan Agricultural Census 2000 (Government of Pakistan 2003) provides data on farm households according to their tenure status. It classifies farm households as tenant farmers, owner-cum-tenant farmers or owner farmers. We base our tax estimates in this subsection on taxation of incomes of *farmers* after subtracting any payments made on rented land, treating

---

[55] The following steps were followed to calculate capital depreciation: (1) Data for private Gross Fixed Capital Formation (GFCF) was obtained from Government of Pakistan (2011c) for the period from 2005-06 till 2009-10. (2) GFCF for each year was allocated to 'major and minor crops' by taking the ratio of the share of 'major and minor crops' in GDP to the share of agriculture in GDP, and multiplying this ratio with the GFCF in agriculture. (3) The estimated GFCF in the 'major and minor crop' sector for 2005-06 was multiplied by 0.05, for 2006-07 till 2008-09, the GFCF was multiplied by 0.15, and for 2009-10, the GFCF was multiplied by 0.50, and these products aggregated over five years. (4) The total accelerated depreciation calculated in the previous step was allocated to Punjab according to its share in total value added in agriculture.

[56] This adjustment for labour is obtained as follows: Dorosh et al. (2006) report that according to Pakistan Rural Household Survey (PRHS) 2001-02, agricultural wage labour accounted for 5 percent of total value added in crop agriculture. We assume that wage labour is hired exclusively by farmers with operational farm holdings of 12.5 acres and above. From the distribution of value added, about 48 percent of the value added is contributed by farmers with holdings of 12.5 acres and above. This implies that wage income accounts for about 10 percent (0.05/0.48) of the value added of farmers with holdings of 12.5 acres and above. The value added of farmers with holdings of 12.5 acres and above is then scaled downwards by 10 percent, after it has been adjusted for depreciation, and the appropriate tax rates applied.

their income as business income and combining these with tax estimates of rental income of *landowners.*[57]

To calculate the taxable income of farmers (classified by tenure status), gross value of farm output is calculated for each farm size and an estimate of cost of production is subtracted to obtain potential taxable income for each farm size. For owner-farmers, potential taxable income (PTI) is calculated by subtracting an estimate of the cost of production from gross value of output (GVO). The cost or production is taken to be 40 percent of GVO.[58] For tenant-farmers, another expense allowed in calculating PTI is the rental income payable to landowners. For owner-cum-tenants, the PTI on own land is calculated as the PTI for owner farmers and for the rented land the PTI is calculated as for tenant-farmers (see appendix I for details).

Ignoring rental income, the total potential tax revenue from crop farming in Punjab is Rs12 billion under the assumption that all farmers have the same yield per acre. The tax revenue estimates when we relax the assumption of uniform yield per acre across farms sizes are given in section 5.4 below.

To obtain tax on rental incomes, we rely on the estimates obtained from taxation of landowners on their rental incomes, and adjust these for some discrepancy in the reported area rented out and the area rented in (see appendix I). We estimate tax revenue from rental incomes to be about Rs4 billion.

We estimate tax potential from crop farming including rental income in 2009-10 to be about Rs16 billion for Punjab using tax rates given in the Finance Bill 2012.

The estimate of potential tax revenue based on tenure status of farmers is less than the estimate based on value added. As mentioned earlier, the value added approach could overestimate or underestimate the actual tax potential, with the tenure-based approach possibly correcting for the overestimation or underestimation. However, it would not be

---

[57] Farmer's incomes are taxed at the rates given in table A-5 and rental income of landowners is taxed at the rates given in table A-6.

[58] Khan and Khan (1998) mention that cost of production varies between 35 and 45 percent of GVO. We have taken the intermediate value in this range which an alternative method for calculating the cost of production also supports. The alternative method adopted was to solve for λ in the equation:

$$VA = (GVO - COP_{UnAdj}) = GVO - \lambda GVO = (1 - \lambda) \times GVO$$

where VA is the aggregate value added in agricultural crop sector (as given in the National Income Accounts), COP_{UnAdj} is the cost of production which is not adjusted for depreciation or hired labour, and GVO is the gross value of output as explained in the text, aggregated over all farm sizes and across all tenure classes. The solution of the equation gave: $\lambda = 0.26$. We then calculated, for each farm size, $VA_i = (1 - 0.26) \times GVO_i$. This value added was adjusted for the depreciation of capital and for the cost of hired labour to obtain potential taxable income for each farm size.

The tax estimates obtained from using this alternative approach gives tax estimates (using data on tenure status) within about 12.5 percent of the ones obtained by assuming COP to be 40 percent of GVO as we have done in reporting the estimates in this paper.

We should also mention that Dorosh et al. (2006, annex table 3) provide estimates of value of output and value of inputs for major crops. The ratios of value of inputs to value of outputs are mostly concentrated around 0.4 but the ratio for wheat is 0.49 and for 'other major crops' the ratio is 0.29. The overall ratio for wheat, Irri, Basmati, cotton, sugarcane and 'other major crops' is 0.39. This ratio needs to be adjusted further for depreciation and hired labour to arrive at potential taxable income.

correct to conclude that the estimate of Rs16 billion based on the tenure-based approach is the correct estimate and that the estimate of Rs19 billion based on the value-added approach overestimates potential tax revenue. The data sources for value added approach and the tenure-based approach differ, as do the underlying methodologies for arriving at potential taxable income. Therefore, we cannot strictly compare the tax estimates based on the two approaches.[59]

The calculation of net income using the tenure status of farmers does not distinguish between irrigated and unirrigated farms. In calculating average GVO for each farm size, we effectively assumed that the typical farmer, in the relevant farm size, had a mix of irrigated and unirrigated farm area that was in proportion to the irrigated and unirrigated cropped area in that size category. Information on irrigation status of farms, which distinguishes between irrigated and unirrigated farms, can help us improve on the above estimates. In the following subsection, we estimate tax potential based on information on irrigation status of farms but we do so at the cost of losing information on the tenure status of farmers.

4.3 Estimates based on Irrigation Status of Farms

We base the third set of estimates on the irrigation status of farmers. The Agricultural Statistics of Pakistan 2000 provides data on the number of irrigated and unirrigated farms under different size categories and the area cultivated by these farms. It also provides data on the area under different crops cultivated within each size category. We calculate GVO for farms classified as irrigated and unirrigated, and estimate tax potential for both types of farms separately. Stratification of irrigated and unirrigated farms by tenure status is not available. Consequently, we made no attempt to distinguish between incomes from owned and rented land. The two are clubbed together and taxed as farmer's *individual income*. This could lead to overestimation and underestimation as in the case of the approach based on value added.

We estimate the tax potential from irrigated farms to be about Rs20 billion and from unirrigated farms to be merely Rs0.06 billion. Therefore, the total potential tax revenue from crop farming in Punjab in 2009-10, using tax rates given in the Finance Bill 2012 (Government of Pakistan 2012a), is just over Rs20 billion.[60]

---

[59] To see the how the different data sources and underlying methodologies can impact overall tax revenue estimates, we calculate net income for each farm size (without subtracting rental income from total gross value of output) using the tenure-based approach and compare it with the net income calculated from the value added approach. The net income from the value added approach is greater than the net income calculated from the tenure-based approach for each farm size. For the farm sizes which fall in the taxable bracket (12.5 acres and above), net incomes from the former approach exceed those from the latter approach, ranging from less than 1 percent to as much as 17 percent with 5.4 percent as the average.

[60] Pakistan Agricultural Census 2000 (Government of Pakistan 2003) provides data on unirrigated farms and cultivated area under unirrigated farms. The unirrigated farm area is converted into unirrigated cropped area and multiplied by the average GVO per cropped acre for unirrigated areas (see appendix I for calculation of average GVO per cropped acre for irrigated and unirrigated areas). From this estimate of GVO for unirrigated farms, potential taxable income per farm is obtained by subtracting cost of production (taken to be 40 percent of GVO) and dividing it by the number of unirrigated farms. Tax rates are applied to the taxable income per farm, and the tax liability per farm is multiplied by the number of unirrigated farms to obtain the total tax revenue from unirrigated farms.

4.4 Effect on Tax Revenue Due to Difference in Crop Yield between Small and Large Farmers

Implicit in the calculation of potential tax revenue is the assumption that all farmers in all farm size categories have the same yield per acre and face the same prices. While retaining the assumption of common prices for all farmers, we allowed for the possibility of higher yield among large farmers with operational holdings of 25 acres and above compared with small farmers with operational holdings of less than 25 acres. While holding the overall average yield per acre constant, we allowed yield of large farmers to be 50 percent above the yield of small farmers. The total tax revenue potential, based on tenure classification, goes up to about Rs24 billion for Punjab. The potential revenue using irrigation status of farms increases from Rs20 billion to Rs29 billion.

4.5 Tax as a Share of Income and Revenue Equivalent Land Tax on Owner Farmers

Of the total of over 3 million owner farmers, there are 0.36 million potential tax payers (see table 2). The number of owner farmers with operational holdings of 100 acres and above is less than 8,000. These farmers account for Rs3.4 billion of the total of about Rs9.7 billion potential tax revenue from owner farmers.

Working with the tax estimates of Rs9.7 billion for owner farmers, we note (see table 2, column 8) that tax as a share of net income would be zero for operational farm holdings of less than 12.5 acres, and would then increase from less than one percent for farmers with holdings of 12.5 – 25 acres to 18 percent for farmers with holdings of 150 acres and above.

From the estimates of potential tax revenue, one can also calculate the per acre tax on owner farmers that would yield the same revenue as obtained from treating farm income as business income. Working again with the same figure of Rs9.7 billion as the potential tax revenue, the per acre tax ranges from zero for farms below 12.5 acres to about Rs3300 for farms above 150 acres (see table 2, column 7).

Given the total area cultivated by owner farmers is about 19 million acres, a flat tax of Rs500 per acre on owner farmers would raise the same revenue as from a progressive income tax (Rs9.7 billion). If farms below 12.5 acres were to be exempted then the flat rate would be about Rs1,030 per acre.

Under the current AIT in Punjab, the tax is Rs150 per acre for farm size exceeding 12.5 acres of cultivated irrigated land but not exceeding 25 acres, and Rs250 per acre for farm size exceeding 25 acres of cultivated irrigated land. If for administrative reasons we consider only two farm size categories and the ratio of tax rates has to be the same as in AIT 1997, then the

---

From the data on the number of unirrigated farms together with data on the total number of farms we can calculate the number of irrigated farms which we interpret as the number of farms which cultivate *some* irrigated land. The area cropped by irrigated farms is calculated and is further subdivided into irrigated cropped area and unirrigated cropped area. Multiplying the former with the average GVO per cropped acre for irrigated areas and multiplying the latter by the average GVO for unirrigated areas and adding the two together gives aggregate GVO (by farm size) for irrigated farms. Potential taxable income, tax liability per farm and potential tax revenue for irrigated farms is then calculated in the same way as for unirrigated farms.

tax rates that would raise the target revenue of Rs9.7 billion from owner farmers would be Rs733 for farm size 12.5 to 25 acres and Rs1,222 for farm size exceeding 25 acres.

4.6 Representative Farmer Assumption

Our methodology relies on the level of disaggregation provided in the Pakistan Agricultural Census 2000. The aggregation of farm households into 10 farm-size categories limits the extent to which we can capture the full dispersion of farm incomes. The tax revenue estimates, based on the representative household assumption (which treats all farmers within each of the ten farm size categories as having the same income), can overestimate or underestimate the actual potential of tax revenue. We consider below the extent of overestimation or underestimation of potential tax revenue for owner-farmers.

The overall distribution of owner farms (the proportion of owner farms in each of the ten size categories) is highly skewed (see footnote 61).[61] The representative household assumption, which averages the income of all farmers within a given size category, overestimates the income of the relatively small farmers and underestimates the income of the relatively large farmers within a given size category. The overestimation of income of small farmers tends to inflate the estimated tax revenue and the underestimation of income of large farmers tends to deflate the estimated tax potential. The net effect depends on the number of small farmers whose incomes we overestimate relative to the large farmers whose incomes we underestimate, and on the tax rate structure. The distribution of owner farms is skewed to the right, so the averaging of incomes implies that the percentage of farm households evaluated at a taxable income higher than their actual income will be larger than the percentage of households evaluated at a taxable income lower than their actual income. This tends to overestimate the tax potential. However, averaging also implies that we evaluate small farmers at higher marginal tax rates and large farmers at a lower marginal tax rate than the rates actually applicable. If the increase in the marginal tax rate of small farmers is small relative to the decrease in the marginal tax rate of large farmers, then we might underestimate the potential tax revenue. The overall overestimation or underestimation will depend on which of the two tendencies dominate.

Wealth and income distributions of countries are often modeled as samples drawn from an underlying true population distribution such as Pareto distribution or lognormal distribution.[62] We could, in principle, experiment with alternative distribution functions to see which of these provide a better prediction of the observed frequencies of farm households by farm size categories (12.5 – 25 acres, 25 – 50 acres, etc.), and then calculate tax potential from the distribution that we find empirically robust. An exhaustive analysis along these lines is beyond the scope of this paper but we carried out some limited curve fitting experiments with Pareto distribution. As expected, we found the prediction of frequencies along the full range

---

[61] Among owner-farmers, 88 percent of the farm households own less than 12.5 acres with a share in total owner-farmed acreage of 51 percent, 8 percent own 12 – 25 acres with a share in acreage of 19 percent, 3 percent own 25-50 acres with a share in acreage of 15 percent, 0.8 percent own 50-100 acres with a share in acreage of 8 percent, 0.13 percent own 100-150 acres with a share in acreage of 2.4 percent and 0.12 percent own '150 acres and above' with a share in acreage of 4.4 percent (see Government of Pakistan 2003).
[62] The literature suggests several other possible distributions.

of land holdings to be unsatisfactory. The predictions improved when we fitted the Pareto distribution to farm sizes of 12.5 acres and above. Even then the Pareto distribution over-predicted frequencies in the 12.5 – 25 acre category by 12 percent and under-predicted in all other categories ranging from 9 percent to 23 percent. We then obtained tax estimates using the Pareto distribution and working with finer farm-size classification (cell width of one acre for farms ranging from 12.5 acres to 1,000 acres). The estimated revenue potential using the Pareto distribution is Rs10.4 billion for owner-farmers which compares with Rs9.7 billion we obtained using the representative farmer assumption. To address the issue of under-prediction and over-prediction we fitted Bounded Pareto distributions to the relevant farm size categories.[63] The revenue estimate from fitting Bounded Pareto distributions is Rs10.3 billion. These estimates of tax revenue need to be tempered by the consideration that fragmentation of landholdings over time reduces the tax potential.

4.7 Fragmentation of Land Holdings

We based our tax revenue estimates on Pakistan Agricultural Census 2000. It assumes that the number of farms in each of the ten farm-size categories remained unchanged over the ten-year period since the census was conducted. We would expect some changes in this distribution over time. Under Muslim inheritance laws, property, including land, gets distributed among progeny and other property claimants on the death of the owner. Therefore, landholdings at all farm sizes tend to get fragmented. This would alter the frequency of the farms within each size category. There may be some offsetting tendency as economically unviable small farms are sold, and purchased by larger farms, but the tendency towards greater fragmentation is likely to dominate. Allowing 20 percent of the farms in every farm size category (except the smallest) to fragment into average farm size of the next lowest farm category, and adjusting the farm area,[64] we calculated tax potential for owner-farmers.[65] The tax revenues decrease from Rs9.7 billion to Rs8.7 billion for owner-farmers. To relax the representative farmer assumption, we tried fitting Pareto distribution as in section 5.6. The estimated revenue potential from the Pareto distribution is Rs.9.4 billion or almost the same as under the representative farmer assumption. To address the over-prediction and under-prediction within each size category, we applied Bounded Pareto distributions as in section 5.6. This gives potential tax revenue of Rs9.3 billion for *owner-farmers* compared with Rs9.7 billion when we ignored fragmentation and assumed representative farmer within each farm size.

---

[63] The Bounded Pareto distribution was applied to the following farm size categories (in acres): (i) 12.5 to 25, (ii) 25 to 50, (iii) 50 to 100, and (iv) 100 to 150. For farm size, '150 acres and above', the standard Pareto distribution was used.

[64] If the average size of farms in the 50-100 acre category is 60 acres and the average farm size in 25-50 acre category is 30 acres then we assume that 20 percent of the farms in the 50-100 acres category with an average size of 60 acres fragment into farms with an average size of 30 acres. It is assumed that in all farm size categories, except the smallest farm size category, there is an inflow of farms from the size category just above and an outflow of farms into the size category just below. The area in a farm size category increases by: (20% of farms in the category above) × (average size of the farms in the category above) and decreases by: (20% of the number of farms within the size category) × (average size of farms within the size category). For the smallest farm size there is only an inflow of farms but no outflow.

[65] The GVO per cropped acre (by farm size) was assumed to be unchanged before and after land fragmentation.

Thus, for owner farmers, the estimate of tax revenue that takes into account fragmentation of land holdings and relaxes the representative farmer assumption is quite close to the estimate we obtained assuming representative farmers and no fragmentation of holdings between 2000 (the census year) and 2010. Our preferred estimate of potential tax revenue from crop farming and rental income from land for Punjab in 2009-10 is therefore unchanged. This estimate is Rs16 billion if small and large farmers have the same crop yield and Rs24 billion if large farmers have 50 percent greater yield per acre than small farmers.

4.8 Estimates using tax rates for the tax year 2010

We have reported estimates of tax revenues using the tax rates applicable under the Finance Bill 2012 (Government of Pakistan 2012a). The tax rates change over time and the impact on tax revenues can be considerable. Table 1 summarizes the potential tax estimates based on the three approaches discussed above and using tax rates applicable under the Finance Act 2012 (Government of Pakistan 2012a) and Finance Act 2009 (Government of Pakistan 2009).

Table 1: Summary of Estimates of Potential Tax Revenue from Agricultural Incomes in 2009-10

Column1	Column2	Column3
	Tax revenue potential with no yield difference between small and large farmers	Tax revenue potential if large farmers obtain 50 percent greater yield per acre than small farmers
	(Rs billion)	(Rs billion)
Estimates based on value added	19 (75)	
Estimates based on tenure status of farmers	16 (55)	24 (63)
Estimates based on irrigation status of farms	20 (69)	29 (79)

Source: Nasim (2012)

Notes: Figures in parentheses are obtained by using the tax rates that were applicable under the Finance Bill 2009 (i.e. using the tax rates that were applicable to taxable incomes in 2009-10). The other figures are based on tax rates applicable under the Finance Bill 2012. Tax potential under the value added approach is calculated only under the assumption of no yield difference between small and large farmers.

Table 2: Tax as a Ratio of Net Incomes for Owner Farmers in Punjab (2009 – 10)

Column1	Column2	Column3	Column4	Column5	Column6	Column7	Column8
	No of farms	Farm area (acres)	GVO (Rs billion)	Net income (Rs billion)	Tax revenue (Rs billion)	Tax per acre (Rs)	Tax as a ratio of net income
Private Farms							
Under 1.0	364,383	165,617	7.41	4.44	0.0	0.0	0.0
1.0 to under 2.5	822,892	1,268,446	63.79	38.28	0.0	0.0	0.0
2.5 to under 5.0	681,845	2,312,219	117.62	70.57	0.0	0.0	0.0
5.0 to under 7.5	443,956	2,563,966	127.87	76.72	0.0	0.0	0.0
7.5 to under 12.5	366,294	3,501,421	166.34	99.80	0.0	0.0	0.0
12.5 to under 25.0	230,696	3,732,199	161.27	96.76	0.4	120	0.00
25.0 to under 50.0	94,964	2,897,503	110.29	66.18	2.82	973	0.04
50.0 to under100.0	24,390	1,490,134	48.79	29.27	2.50	1,678	0.09
100.0 to under150.0	4,086	466,095	14.72	8.83	1.14	2,452	0.13
150.0 and above	3,651	851,013	25.38	15.23	2.8	3,282	0.18
Total		19,248,613		506.08	9.7		

Source: Government of Pakistan (2003) and the author's calculations.

Notes:
1. Column2 and Column3 are from Government of Pakistan (2003).
2. Calculations for Column4 are given in Nasim (2012).
3. Column5 = 0.6 x (Column4)
4. Column6 is obtained by dividing Column5 by Column2 and then applying the tax rates given in table A-5 (detailed calculations given in Nasim (2012)).
5. Column7 = (Column6)/(Column3)
6. Column8 = (Column6)/(Column5)

5.   Concluding Remarks

The share of land taxes in total tax revenues is miniscule in Pakistan. Farmers and agriculturists contribute towards some other direct taxes (e.g., some forms of withholding taxes on dividends and interest incomes and taxes on property transfer) and also bear the burden of indirect taxes in their capacity as consumers of taxed goods and as suppliers of raw materials to the taxed industries. Before the 1980s, there was considerable implicit taxation of agricultural incomes and agricultural pricing policies resulted in substantial transfers from the agricultural sector. Price-related transfers and taxation was brought down considerably in the 1980s and 1990s. The 1990s decade was also marked by other reforms in the economy, in particular liberalization of the financial sector and trade and foreign exchange regimes. The attempt to replace export taxes and price-related taxes and transfers with AIT in 1993 only succeeded in putting the AIT on the statute books – as late as 1997 in the case of Punjab – without any attempt by the political or military regimes to seriously implement the tax.

Our estimates suggest that if we use the income tax rates applicable under the Finance Bill 2012, the potential tax revenue for Punjab from crop farming in 2009-10 would be of the order of Rs16-20 billion, assuming no difference in average yield per acre among small and large farmers. If the yield of large farmers (with farm sizes of 25 acres and above) is 50 percent more than that of small farmers, then the tax potential is estimated to be of the order of Rs24-29 billion. Had the tax been in place in the tax year 2010, the tax revenues would have been between Rs55-75 billion if small and large farmers were equally productive and between Rs63-79 billion if large farmers were 50 percent more productive than small farmers. Using these estimates for Punjab, the potential tax revenue from agricultural crop incomes for the country as a whole would have been in the region of Rs80 billion to Rs115 billion in 2009-10 compared with Rs529 billion collected as federal direct taxes (mostly income taxes) from the non-agricultural sector in 2009-10.

The discussion of agricultural income tax normally relates to income from crop farming. Based on our estimates we can say that potential tax revenue from farm income (using tax rates applicable under the Finance Bill 2012) appears considerably smaller than the perception that the potential revenue is of the order of Rs200 billion. However, the potential revenue is sizeable, and for Punjab, if the tax had been in place in 2009-10, the tax revenue from this source would have added at least another 13 percent to the total provincial revenue receipts.

Why does actual agricultural tax collection fall so short of its potential? One reason is that the tax is effectively a tax on land and not on income, and the provincial governments have not revised the tax rates to reflect the changes in the income potential from land. Therefore, tax as a share of income falls as agricultural income increases. The land tax could be redesigned to reflect the changes in potential income from land and also distribute the burden of tax more heavily on large landowners.

The lack of effectiveness of the tax administration could be one of the constraints in the design and implementation of a modern income tax system in the agricultural sector. The administrative difficulties in collecting land tax and AIT are not limited to Pakistan (see e.g., Bird (1974) and Skinner (1991)). In Pakistan, provincial land tax and land administration system has been in place since the pre-independence period. These revenue departments may not be appropriate vehicles for collection of income taxes but they could be strengthened for collection of more buoyant forms of land taxes.

The growing provincial share in the federal divisible pool of taxes under the National Finance Commission (NFC) awards also creates a disincentive for the provinces to tap own-source revenues. The seventh NFC award has reinforced this disincentive. The award has increased the provincial share in the divisible pool of tax revenue to 56 - 57.5 percent compared with 46.25 percent in the sixth NFC award.

Strong political influence of large landowners also constrains the growth of revenue from agricultural incomes. Political governments can risk a revolt by their party members from rural constituencies if they attempt to institute an AIT. As we have seen, the urban constituency is also now opposing new tax measures unless landowners pay a fair share of their taxes.

Bringing the taxation of agricultural incomes at par with business incomes will plug an avenue for tax evasion in the system. This avenue arises because the differential tax treatment of agricultural incomes provides the opportunity to fraudulently declare non-agricultural incomes as agricultural incomes and thereby escape the rates of taxation applicable to non-agricultural incomes.

The AIT can substantially supplement provincial government finances and will also have a very important symbolic value in terms of equity and fairness. Instituting an AIT could also contribute to lowering opposition to new tax proposals and measures aimed at broadening the tax bases at the federal level. It is probably time for a national consensus through the Council of Common Interests to institute an agricultural income tax, which can raise substantially more revenue than it does presently, and which in due course could resemble the taxation of incomes in other sectors of the economy.

References

Ahmed, E. and N. Stern. 1991. *The Theory and Practice of Tax Reform in Developing Countries*. Cambridge: Cambridge University Press.

Arshad, M. 2010. *The Income Tax Ordinance with Case Law and Explanation*, 8th edition. Lahore: Pakistan Law Associates.

Azhar, B.A. 1991. "Taxation of Agricultural Income: A Holistic View." *Pakistan Development Review* 30:4, 1075-1072.

Bahl, R., S. Wallace and M. Cyan. 2008. "Pakistan: Provincial Government Taxation." International Studies Program, Working Paper 08-07, Andrew Young School of Policy Studies, Georgia State University.

Bird, R. M. 1974. *Taxing Agricultural Land in Developing Countries*. Cambridge, Mass.: Harvard University Press.

Chaudhry, M. G. 1973. "The Problem of Agricultural Taxation in West Pakistan and an Alternative Solution." *The Pakistan Development Review* 12:2, 93-122.

Chaudhry, M. G. 1999. "The Theory and Practice of Agricultural Income Tax in Pakistan and a Viable Solution." *The Pakistan Development Review* 38:4,757–768.

Chaudhry, M. G. 2001. "Theory of Optimal Taxation and Current Tax Policy in Pakistan's Agriculture." *The Pakistan Development Review* 40:4, 489-502.

Chaudhry, M. G. and N. N. Kayani. 1991. "Implicit Taxation of Pakistan's Agriculture: An Analysis of Commodity and Input Prices." *The Pakistan Development Review* 30:3 225-242.

Dorosh, P., and A. Valdes. 1990. "Effects of Exchange Rate and Trade Policies on Agriculture in Pakistan." Research Report 84, International Food Policy Research Institute.

Dorosh, P., M. K. Niazi and H. Nazli. 2006. "A Social Accounting Matrix for Pakistan, 2001-02: Methodology and Results." PIDE Working Papers 2006:9. Islamabad: Pakistan Institute of Development Economics.

Ebrill, L., M. Keen, J-P Bodin and V. Summers. 2001. *The Modern VAT*. Washington D.C.: International Monetary Fund.

Government of Pakistan. 2003. *Pakistan Agricultural Census 2000*. Lahore: Agricultural Census Organization.

Government of Pakistan. 2009. Income Tax Manual, Part I, Income Tax Ordinance, 2001 (Amended up to 28th October, 2009). Islamabad: Federal Board of Revenue (Revenue Division), Facilitation and Taxpayers Education Wing. Available from the Federal Board of Revenue (Government of Pakistan) site, http://www.fbr.gov.pk/Docs/201012279125232750ITaxOrdinance2001ut28-10-2009.pdf

Government of Pakistan. 2011a. *Agricultural Statistics of Pakistan 2009-10*. Islamabad: Ministry of Food and Agriculture (Economic Wing).

Government of Pakistan. 2011b. Income Tax Manual, Part I, Income Tax Ordinance, 2001 (Amended up to 30th June, 2011). Islamabad: Federal Board of Revenue (Revenue Division), Facilitation and Taxpayers Education Wing. Available from the Federal Board of Revenue (Government of Pakistan) site, http://n.fbr.gov.pk/Docs/201191210938447ITOrdinanceUpdated2011.pdf

Government of Pakistan. 2011c. *Pakistan Economic Survey 2010-11*. Islamabad: Economic Affair's Wing, Finance Division.

Government of Pakistan. 2012a. Finance Bill 2012. Islamabad: Federal Board of Revenue, (Revenue Division). Available from the Federal Board of Revenue (Government of Pakistan) site, http://www.fbr.gov.pk/budget/FinanceBill/FinanceBillFinal.pdf

Government of Pakistan. 2012b. Pakistan National Accounts. Islamabad: Pakistan Bureau of Statistics, Statistics Division, Available from the Pakistan Bureau of Statistics (Government of Pakistan) site, http://www.pbs.gov.pk/sites/default/files/national_accounts/methodology/methodology_new1.1.pdf

Habib, I. 1982. Chapter VIII in T. Chaudhuri and I. Habib, eds. *The Cambridge Economic History of India, Volume I: C. 1200 – C. 1750*. Cambridge: University of Cambridge.

Hamid, J. 1970. "Suggested Approach to Agricultural Taxation Policy in West Pakistan." *The Pakistan Development Review* 10:4, 422-447.

Hamid, J. 1973. "The Problem of Agricultural Taxation in West Pakistan and an Alternative Solution: A Comment." *The Pakistan Development Review* 12:3, 311-314.

Hamid N, I. Nabi and A. Nasim. 1991. In A. O. Krueger, M. Schieffe and A. Valdes, eds. *The Political Economy of Agricultural Pricing Policy, Volume 2, Asia: A World Bank Comparative Study*. Baltimore, Maryland: The Johns Hopkins University Press.

Haq, I and H. Bukhari. 2011. "Tax on Agriculture Income." Briefing Paper No. 43. Islamabad: Pakistan Institute of Legislative Development and Transparency (PILDAT).

Hyman, D. N. 2005. *Public Finance: A Contemporary Application of Theory to Policy.* Eighth edition. Mason/Ohio:Thomson/South-Western.

International Monetary Fund. 2012. "Pakistan: 2011 Article IV Consultation and Proposal for Post-Program Monitoring." Washington D.C.: IMF Country Report No. 12/35.

Kazi, S. 1984. "Intersectoral Tax Burden in Pakistan: A Critical Review of Existing Evidence and Some New Estimates." *The Pakistan Development Review*, 23:4, 553-573.

Khan, M. H. 1978. "A note on Estimates of Agricultural Income Tax." *The Pakistan Development Review*, 17:1, 89-98.

Khan, M. H. 1979. "Farm Size and Land Productivity Relationships in Pakistan." *The Pakistan Development Review*, 18:1, 69-77

Khan, M. H. 1981. *Underdevelopment and Agrarian Structure in Pakistan*. Boulder, Colo. : Westview Press.

Khan, M. H. and M. S. Khan. 1998. "Taxing Agriculture in Pakistan." Washington D. C.: Paper on Policy Analysis and Assessment of the International Monetary Fund.

Kotlikoff, L.J. and L.H. Summers. 1987. Tax Incidence. Chapter 16 in Handbook of Public Economics, vol. II, edited by A. J. Auerbach and M. Feldstein. Elsevier Science Publishers B. V. (North Holland).

Kumar, D. 1983. In D. Kumar, ed. *The Cambridge Economic History of India, Volume 2*. Cambridge: University of Cambridge.

Mahmood, M., and N. U. Haque. 1981. "Farm Size and Productivity Revisited." *The Pakistan Development Review*, 20:2, 151 – 190.

Malik, S. 2004. "Study on Tax Potential in NWFP (Revised Report)." Islamabad: Innovative Development Strategies (Pvt.) Limited.

Mohammad, F. 1987. "Agricultural Taxation in Pakistan Revisited." *The Pakistan Development Review*, 26:4, 419 – 432.

Mukhtar, E. M. and H. Mukhtar. 1988. "Input Use and Productivity Across Farm Sizes: A Comparison of the Two Punjabs." *The Pakistan Development Review*, 27:4, 595 – 604.

Mukhtar, H. and A. Nasim. 1999. "Resource Mobilization in the Punjab." Unpublished background paper for the Punjab Expenditure Review, 2000, undertaken jointly by the World Bank and the Government of Pakistan.

Nabi, I. 1986. *"Contracts, Resource Use and Productivity in Sharecropping." The Journal of Development Studies*, Volume 22, Issue 2, 429-442.

Nasim, A. 1994. "Revenue Estimates from Land Taxation in Pakistan." *Pakistan Journal of Applied Economics*, Volume X, Nos. 1 & 2, 77–97.

Nasim, A. 2012. "Agricultural Income Taxation: Estimates of Revenue Potential in Punjab: A Report." Unpublished. Lahore: Institute of Development and Economic Alternatives.

Nasim, A. and A. Akhalaque. 1992. In A. Nasim, ed. *Financing Pakistan's Development in the 1990s*. Lahore: Lahore University of Management Sciences and Oxford University Press.

Newbery, D. 1987. "Agricultural Taxation: The Main Issues." In David Newbery and Nicholas Stem, eds., *The Theory of Taxation for Developing Countries*. New York: Oxford University Press.

Pasha, H., A. G. Pasha and M. Imran. 2010. "Budgetary Consequences of the 7th NFC Award." Islamabad: Paper presented at the 26th Annual General Meeting and Conference of the Pakistan Society of Development Economists.

Qureshi, S. K. 1973. "The Problem of Agricultural Taxation in West Pakistan and an Alternative Solution: A Comment." *The Pakistan Development Review*, 12:4, 433-437.

Salam, S. A. 1982. *The Income Tax Ordinance, 1979*. 1982-83 edition. Lahore: Accountancy and Taxation Services Institute.

Skinner, J. 1991. "Prospects of Agricultural Land Taxation in Developing Countries." *The World Bank Economic Review* 5 (3), 493-511.

Wahid, U. and S. Wallace. 2008. "Incidence of Taxes in Pakistan: Primer and Estimates." Working Paper 08-13, International Studies Program, Andrew Young School of Policy Studies, Georgia State University.

World Bank. 1999. "Agricultural Taxation in Pakistan." Report Number 18935-PAK. Rural Development Sector, South Asia Region.

World Bank, Government of Pakistan, Federal Board of Revenue and Georgia State University. 2009. "Pakistan Tax Policy Report: Tapping Tax Bases for Development." Document of the World Bank.

Appendix I

Taxation of Income from Crop Farming: Distinguishing Farmers by Tenure Classification

These estimates of potential AIT revenues distinguish between owner farmers, owner-cum-tenants and tenant farmers. The tax we calculate is on income from crop farming, irrespective of whether the farm households have any title to land.

The estimates of potential taxable income are based on the distribution of farm size as given in the Agricultural Census 2000 (Government of Pakistan 2003). A farm of a particular size is the aggregate area of land operated by members of a farm household, with possible assistance from members of other households, but it does not necessarily mean that a single household has title or ownership of the land area. In fact the household may have full, partial or no ownership of the farm.[66]

Potential tax revenue is obtained from taxation of crop farming and rental incomes. We treat farm income and rental incomes separately, with farm incomes taxed as *individual incomes* of farmers and rental income taxed as *property income* of landowners.

Farm Incomes

To calculate Potential Taxable Income (PTI), the first step is to calculate the distribution of Gross Value of Output (GVO) – i.e., GVO for each of the ten farm-size categories. For irrigated area, the followings steps are followed to obtain the distribution of GVO: (1) A select number of crops, namely, Basmati rice, Irri rice, wheat (irrigated), cotton and sugarcane are chosen and GVO per crop (by farm size) is calculated by multiplying the area (by farm size) under each crop with the yield of the crop and the price per unit of output (see appendix II for data on yield and prices). (2) GVO per crop, for each farm size, is aggregated over the five crops and divided by the area under the five crops (by farm size), to obtain average GVO for the five crops.[67] (3) The average GVO for the five crops is increased by another 15 percent to account for the value of by products.[68] This average GVO, calculated over the five crops and augmented for by products, is treated as representative average GVO for all irrigated cropped acres.

---

[66] For the country as a whole, of the 6.62 million privately managed farms, 5.13 million (78%) are operated by owner cultivators, 0.56 million (8%) by owner-cum tenants and 0.93 million (14%) by tenants. The area under these three categories was 36.97 million acres (73%), 7.32 million acres (15%) and 6.13 million acres (12%), respectively. In Punjab the number of privately owned farms are 3.86 million of which 3.04 million (79%) are owner cultivated, 0.42 million (11%) are cultivated by owner-cum tenants and 0.4 million (10%) are cultivated by tenants. The area under these categories is 19.25 million acres (69%), 5.4 million acres (19%) and 3.11 million acres (11%) respectively (Government of Pakistan 2000, pp. xxxviii).

[67] Cropped area takes account of multiple crops on the same area in a given year – if two crops are grown on an acre of land in a given year then the cropped area will equal two acres. The area under the five crops (Basmati, Irri, wheat (irrigated), cotton and sugarcane) also equals cropped area under the five crops. Therefore, the average GVO per acre equals average GVO per cropped acre.

[68] This is in line with the value of by products for all major crops reported in the Agricultural Statistics of Pakistan 2009-10 (Government of Pakistan 2011a).

The average GVO per cropped acre for unirrigated areas was calculated similarly except for the choice of crops, which in this case were wheat (unirrigated) and pulses (unirrigated). [69] The average GVO per unirrigated cropped acre, calculated over the two crops and augmented for by products, is treated as representative for all unirrigated cropped acres.

Gross value of output per cropped acre, by farm size, is calculated as a weighted average of the GVO per irrigated cropped-acre and the GVO per unirrigated cropped-acre, where the weights are respectively the share of irrigated cropped-area in total cropped area and the share of unirrigated cropped-area in total cropped area.

The average GVO per cropped acre varies by the size of farm area operated. At times we will need to work with an average GVO per cropped acre taken over all farm sizes. This average value that is obtained by dividing the GVO (aggregated over all farm sizes) by the cropped area aggregated over all farm sizes is Rs 30,257.[70]

In all our estimates we assume the cost of production (COP) to be 40 percent of the gross value of output (GVO). [71] The net value of output (NVO) is calculated as the difference between GVO and COP: $NVO = GVO - COP = GVO - (0.4 \times GVO) = 0.6 \times GVO$. We also refer to NVO as Potential Taxable Income (PTI).

Tenancy arrangements fall broadly under two types: fixed-rent leasing and share cropping. The dominant form of tenancy arrangement in Punjab is sharecropping. We work with the assumption that inputs and outputs are shared equally by the landlord and tenant farmer.[72]

In our tax calculations we have made no distinction between the types of tenancy arrangements, and have treated all area under tenancy farming (whether involving owner-cum-tenants or tenant farmers) as if it was a 50-50 sharecropping arrangement, with landowners and tenants sharing both inputs and outputs equally.

In calculating tax liability on rental incomes of landowners, we do not have information on farm size of the tenants to whom the land has been rented out, and we, therefore, approximate the rental income of landowners as fifty percent of the net value of output per cropped acre, and since the latter equals $NVO = 0.6 \times GVO = 0.6 \times Rs30,257 = Rs18,154$, the rental share/income of landowners is taken to be Rs9,077 per cropped acre for all farm sizes.

The tax revenues from tenants, owner-cum-tenants and owner-farmers are respectively, Rs0.2 billion, Rs2.2 billion and Rs9.7 billion.[73]

---

[69] Wheat (irrigated) and wheat (unirrigated) stand for wheat grown in irrigated and unirrigated areas respectively. Pulses (unirrigated) stand pulses grown in unirrigated areas.

[70] See Nasim (2012).

[71] See footnote 58.

[72] For the data on leasing and sharecropping in 2000, see Government of Pakistan (2003). See Nabi (1986) for a discussion of sharecropping arrangements in Punjab.

[73] See Nasim (2012) for details.

Rental Incomes

Land that is rented by owner-cum-tenants and tenants farmers results in income for farmers as well as rental income for landowners. We need to incorporate the tax on income that accrues to landowners.

In Nasim (2012) we have calculated tax liability from rental income using the data on land ownership. We show that tax revenue obtained from landowners' share of rental income is about Rs3 billion. Thus, one may conclude that an additional Rs3 billion is the potential tax revenue when rental income of landowners is also included. However, there is a possible underestimation involved in this approach. From the data on operational status of ownership holdings,[74] the total landowners' share of rental income is about Rs74.8 billion. On the other hand, from the data on tenure status, the landowners' share of rental income is about Rs86.7 billion. How can this gap of about Rs11 billion be explained and how should the tax revenue estimates of rental incomes be adjusted?

The gap is probably explained, in large part, by the discrepancy in the reported figures on area rented-out on which the former set of estimates are based, and the area rented-in on which the latter set of estimates are based. There is, in fact, a gap of 0.84 million acres in the reported figures on rented-out land and rented-in land.

If we assume that the under-reporting is by landowners who rent-out land and that too by large landowners, then we can apply the highest tax rate of 10 percent on the unaccounted Rs11 billion. Thus, the total additional tax from landowners' share of rental incomes is estimated at Rs3 billion plus another Rs1 billion or a total of about Rs4 billion.

To summarize, the potential tax revenue from tenant-farmers, owner-cum-tenants and owner-farmers is Rs0.2 billion, Rs2.2 billion and Rs9.7 billion respectively, giving a total of about Rs12 billion as tax revenue from farm income. The potential tax revenue from rental income of landowners is about Rs4 billion. Thus the total potential income tax revenue for Punjab from crop farming in agriculture is of the order of Rs16 billion.

Potential Tax Calculations for Owner-cum-Tenants

Although we have calculated the tax liability for all three categories of farm households – tenant farmers, owner-cum-tenant farmers and owner farmers – for economy of space we only report tax calculations for owner-cum-tenants. This choice is not arbitrary. The tax calculations for tenant farmers and for owner farmers are special cases of this more general case. In Nasim (2012) we present tax calculations for the three categories of farmers.

For owner-cum-tenants, we calculate gross value of output for total area cropped including their own land and rented land. Let GVO stand for the Gross Value of Output taken over both own land and rented land. Let GVO_{RL} stand for Gross Value of Output of rented land. The net value of output is: $NVO = 0.6 \times GVO$. The landowners' share is: $0.5 \times 0.6 \times GVO_{RL}$. The owner-cum-tenant's share (or Potential Taxable Income (PTI)) is then:

---

[74] As given in Government of Pakistan (2003, table 13.3).

PTI = (0.6 × GVO) - (0.5 × 0.6 × GVO$_{RL}$)

The share of income is divided by the number of owner-cum-tenant farms in each size category to obtain PTI per owner-cum-tenant farm. Tax liability of a representative tenant farmer in each farm size category is calculated and the tax liability per farm is multiplied by the number of owner-cum-tenant farms to obtain aggregate tax liability in each size category. The sum of these liabilities is the potential tax revenue from owner-cum-tenant farmers.

The potential tax revenue for owner-cum-tenants calculated in table A-1 to table A-3 is Rs2.2 billion.

Table A-1: Cropped Area of Owner-cum-Tenants and Cropped Area Rented by Owner-cum-Tenants

Col.1	Col.2	Col.3	Col.4	Col.5	Col.6	Col.7	Col.8
Size of farm (acres)	No of owner-cum-tenant farms	Total owner-cum-tenant area in 2000 (acres)	Total area rented by owner-cum-tenants (share-cropped, leased and other) (acres)	Percent cultivated	Cropping intensity	Total cropped area by owner-cum-tenants (in 2009-10) (acres)	Cropped area rented by owner-cum-tenants in 2009-10 (acres)
Private Farms							
Under 1.0	4,605	2,983	1,634	90	1.78	4,974	2,725
1.0 to under 2.5	27,633	49,243	28,830	97	1.74	86,511	50,649
2.5 to under 5.0	77,822	278,212	161,355	97	1.69	474,722	275,325
5.0 to under 7.5	78,863	472,783	273,059	97	1.64	782,857	452,144
7.5 to under 12.5	97,636	939,320	538,413	95	1.58	1,467,571	841,203
12.5 to under 25.0	88,165	1,495,904	865,906	93	1.53	2,215,557	1,282,478
25.0 to under50.0	37,859	1,229,754	734,258	91	1.51	1,758,901	1,050,200
50.0 to under100.0	8,831	559,747	341,500	92	1.48	793,316	484,000
100.0 to under150.0	1,169	135,363	79,994	95	1.36	182,040	107,578
150.0 and above	919	237,403	121,310	86	1.29	274,144	140,084

Source: Government of Pakistan (2003) and the author's calculations.
Notes:
1. Column2 to Column6 are from Government of Pakistan (2003).
2. Column7 = (Column3) x (Column5/100) x (Column6) x 1.04089; (the multiplication by 1.04089 is to adjust for the 4.089 percent growth in cropped area over the period 1999-2000 and 2009-10).
3. Column8 = (Column4) x (Column5/100) x (Column6) x 1.04089; (the multiplication by 1.04089 is to adjust for the 4.089 percent growth in cropped area over the period 1999-2000 and 2009-10).

Table A-2: Gross and Net Value of Output and Potential Taxable Income of Owner-cum-Tenants in 2009-10

Col.1	Col.2	Col.3	Col.4	Col.5	Col.6	Col.7	Col.8
Size of farm (acres)	Gross value of output per cropped acre (Rs)	GVO Rs billion)	Net value of output (Rs billion)	GVO from rented land (Rs billion)	Net value of output from rented land (Rs billion)	Landowners' share (= tenants' share) in net value of output from rented land (Rs billion)	PTI Rs billion)
Private Farms							
Under 1.0	26,838	0.13	0.08	0.07	0.04	0.02	0.06
1.0 to under 2.5	29,432	2.55	1.53	1.49	0.89	0.45	1.08
2.5 to under 5.0	30,666	14.56	8.73	8.44	5.07	2.53	6.20
5.0 to under 7.5	31,132	24.37	14.62	14.08	8.45	4.22	10.40
7.5 to under 12.5	31,258	45.87	27.52	26.29	15.78	7.89	19.64
12.5 to under 25.0	30,751	68.13	40.88	39.44	23.66	11.83	29.05
25.0 to under 50.0	29,190	51.34	30.81	30.66	18.39	9.20	21.61
50.0 to under 100.0	27,945	22.17	13.30	13.53	8.12	4.06	9.24
100.0 to under 150.0	28,684	5.22	3.13	3.09	1.85	0.93	2.21
150.0 and above	28,774	7.89	4.73	4.03	2.42	1.21	3.52
						Total	**42.3**

Source: Government of Pakistan (2003) and the author's calculations.

Notes:
1. The methodology for calculation of Column2 is given in appendix I. For details of calculations see Nasim (2012).
2. Column3 = (Column2) x (Column7, table A-1)
3. Column4 = 0.6 x (Column3)
4. Column5 = (Column2) x (Column8, table A-1)
5. Column6 = 0.6 x (Column5)
6. Column7 = 0.5 x (Column6)
7. Column8 = (Column4) – (Column7)

Table A-3: Tax Calculations for Owner-cum-Tenants in 2009-10

Col.1	Col.2	Col.3	Col.4
Size of farm (acres)	PTI per farm (Rs)	Tax liability per farm (Rs)	Aggregate tax revenue (Rs billion)
Private Farms			
Under 1.0	12,630	0	0.0
1.0 to under 2.5	39,102	0	0.0
2.5 to under 5.0	79,692	0	0.0
5.0 to under 7.5	131,877	0	0.0
7.5 to under 12.5	201,109	0	0.0
12.5 to under25.0	329,462	0	0.0
25.0 to under 50.0	570,778	17,077	0.6
50.0 to under 100.0	1,046,768	79,516	0.7
100.0 to under 150.0	1,888,174	225,135	0.3
150.0 and above	3,834,291	681,081	0.6
		Total	**2.2**

Source: Government of Pakistan (2003) and the author's calculations.
Notes:
1. Column2 = (Column8, table A-2)/(Column2, table A-1)
2. Column3 is obtained by applying the tax rates (given in table A-5) to Column2.
3. Column4 = (Column3) x (Column2,table A-1)

Appendix II

Yield and Prices for Crops Used in the Calculation of Gross Value of Output

Table A-4 provides values for yield per acre in kg and price per kg for Basmati, Irri, wheat (irrigated), cotton, sugarcane, wheat (unirrigated) and pulses (unirrigated). These yield and output figures are used in the calculation of gross value of output. The main source for yield and prices is the Agricultural Statistics of Pakistan 2009-10 (Government of Pakistan (2011a)).

Yield

Separate figures for yield by irrigation status are reported only for wheat. Cotton, Basmati, Irri (and other rice) and sugarcane are grown mostly, if not entirely, in irrigated areas. The reported yield figures for Basmati rice, Irri and other rice, wheat (irrigated), cotton and sugarcane were initially taken to be the representative yield figures for all farm sizes in irrigated areas. This assumption was later relaxed (see section 5.4).

According to the data on area under various crops in irrigated and unirrigated (by size of farm) as reported in Pakistan Agricultural Census 2000 (Government of Pakistan (2003)), 73 percent of the total acreage in Punjab under pulses is unirrigated. The reported yield figures for pulses and wheat (unirrigated) were initially taken to be representative of the yield figures for all farm sizes in unirrigated areas. This assumption was later relaxed (see section 5.4).

Prices

    a. The price of wheat is taken to be the procurement/support price of wheat, which is the same for wheat (irrigated) and wheat (unirrigated).

    b. The price of Basmati is the intervention price of Basmati 385.

    c. The price of Irri and other rice is taken to be the intervention price of Irri-6 (FAQ).

    d. The price of sugarcane is the support/indicative price of sugarcane.

    e. Government of Pakistan (2011a) reports intervention price for seed cotton (B-557, F-149 and Niab-78) for 2008-09 but does not provide price data for lint cotton. On the other hand the yield figures are reported only for lint cotton. To arrive at the price of lint cotton for 2009-10 we made two approximations: (a) based on the data reported for earlier years, we took lint prices to be 2.5 times the price of seed cotton, and (b) to convert the estimated lint price of cotton in 2008-09 to 2009-10 prices, we multiplied the 2008-9 prices with the ratio of wholesale price of cotton in 2009-10 to the wholesale price in 2008-09. Thus the price of seed cotton in 2008-09, which was Rs1,465 per 40 kg (or Rs36.625 per kg) was multiplied by 2.5 to convert to the price of lint cotton in 2008-9 and then multiplied by 1.327 to convert it to the price in 2009-10. The latter ratio was obtained from the data on wholesale prices in Economic Survey (Government of Pakistan (2011c)).

    f. The price of pulses (unirrigated) was the weighted average wholesale price of gram, Mung, Mash and Masoor, adjusted for the wholesale margin (10 percent) to arrive at

the price received by farmers. The weights used were the relative shares of these crops in the total production of these four crops. The wholesale prices for each of the four crops were the average of the wholesale prices of these crops in Lahore and Rawalpindi.

Table A-4: Yield per Acre and Price Per Kilogram for Major Crops in Punjab in 2009-10

	Yield per acre (kg)	Price (Rs/kg)
Wheat (irrigated)	1,112	23.75
Wheat (unirrigated)	318	23.75
Cotton (lint)	242	121.50
Basmati	708	50
Irri and other rice	968	30
Sugarcane	20,882	2.5
Pulses (unirrigated)	213	42.1

Source: (1) Government of Pakistan (2011a, 2011c) and the author's calculations.
Notes: Some of the yield and prices are taken directly from Government of Pakistan (2011a, 2011c) and others are calculated from the data given in these sources as explained in appendix II. For details see Nasim (2012).

Appendix III

Tax Rates on Individuals and on Income from Property

In this paper two kinds of incomes have been considered: (1) Income from crop farming treated as business income, (2) income from renting out agricultural land on sharecropping or fixed-rent lease arrangements. If incomes from agriculture were to be subject to the same tax law as all other incomes, then for the income from crop farming the appropriate tax rates would be the ones applicable to individuals and association of persons (other than salaried individuals), and for rental income the appropriate tax rates would be the ones applicable to income from property, as given in Government of Pakistan (2011b). These tax rates are given below in table A-5 and table A-6.

Table A-5: Tax Rate on Individuals and Association of Persons (Other than Salaried Individuals)

Taxable Income	Tax Rate
Rs0 to less than Rs400,000	0
Rs400,000 to less than Rs750,000	10% of the amount exceeding Rs400,000
Rs750,000 to less than Rs1.5 million	Rs35,000 + 15% of the amount exceeding Rs750,000
Rs1.5 million to less than Rs2.5 million	Rs147,500 + 20% of the amount exceeding Rs1.5 million
Rs2.5 million and above	Rs347,500 + 25% of the amount exceeding Rs2.5 million.

Source: Government of Pakistan (2012a)

Table A-6: Tax Rate on Income from Property

Gross Amount of Rent	Tax Rate
Rs0 to less than Rs150,000	0
Rs150,000 to less than Rs400,000	5% of the gross amount exceeding Rs150,000
Rs400,000 to less than Rs1 million	Rs12,500 + 7.5% of the gross amount exceeding Rs400,000
Rs1 million and above	Rs57,500 + 10% of the amount exceeding Rs1 million

Source: Government of Pakistan (2011b)