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AN EVALUATION OF THE IMPACT OF ALTERNATIVE TAX
POLICIES ON THE PROFITABILITY OF INVESTMENTS IN WHEAT
CORN & SOYBEAN PRODUCTION: AN INTERNATIONAL COMPARISON

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CHAPTER 1

INTRODUCTION AND OVERVIEW OF STUDY

The objective of this study is to analyze the relative impact that the tax policies of several important agriculture producing countries have on the profitability of investment in this sector. Agricultural products constitute some of the most widely traded commodities in existence today and compete internationally in organized competitive markets. At the same time, the agriculture sector in most countries is subject to a wide range of taxes, subsidies and regulations that influence both production costs and the prices producers need to receive before they are willing to sell abroad. In this study we will consider three of the most important agricultural commodities produced by the U.S., wheat, corn and soybean. For each commodity we will compare the taxation of this sector and the subsidies it receives in the U.S. with its treatment in a number of the principal countries producing agriculture goods, namely, Argentina, Australia, Brazil and Canada.

For the evaluation of the tax and subsidy impacts on agriculture we will determine their effect on the incentive to carry out investments in productive capacity in the sector. To do this we will develop a typical gross of tax and subsidy cash flow profile for an investment project that will produce one of the above commodities. Initially this investment profile will be based on that of the U.S.; hence, our research

question is to determine how the incentive to invest in the production of each of these commodities in the U.S. would be altered if the tax systems of the other competing countries were substituted for the U.S. system.

Although corporations have become important in U.S. agriculture, the production of wheat and soybean is at the present time not dominated by the corporate form of organization. In the analysis that follows, we consider the investment if undertaken by an individual as well as by a corporation in each of the cases.

To simulate out the effects of the alternative measures, we have employed a computerized tax calculator model initially developed by Robert Conrad (1980). This model has in turn been modified to account for the effects of inflation as it interacts with the tax system of the country in question. It also enables us to examine the cash flow impacts of alternative policies. One of the key problems facing most producers in the agriculture sector is the high degree of variability over time in the cash flow from these activities. While our analysis does not attempt to build in a systematic or random cycle in production due to climatic or market conditions, it does allow us to compare the effects of the alternative tax systems on the net cash flow of investments made in these agricultural areas in the absence of the other sector specific shocks.

The principal criterion used for the assessment of the relative effect of the different tax systems is the change in the net present value of the investment brought about by the

substitution of the alternative tax policies. This net present value is estimated from the point of view of the owner-operator of the farm or in the case of corporations from the perspective of the equity holders of the firm. This approach is superior to the conventional methods of evaluating tax systems that calculate annual effective tax rates by establishment or industry (Jenkins, 1978) or compare tax provisions on an item by item basis. By integrating all the tax provisions as they would actually apply to an operating facility, we are able to model the interactive effects of the various provisions in any given year, as well as over time. This model is not fully dynamic, as it does not attempt to predict how the factor mix would change as a result of the different incentives that the various taxes and subsidies provide to the factors of productions. The analysis will stop at the point of quantifying how the profitability of given production processes would be altered if the factor mix remained constant. As establishments will always be better off if they do respond to differential incentives, our analysis will tend to provide an underestimate of the increase in profitability that a more favorable tax system will provide and will overestimate the decrease in profitability that a more severe system would inflict.

The remainder of this report is organized into four chapters. Chapter 2 contains a brief overview of the production and general policies that apply to wheat, corn and soybean production in each of the countries examined in this study. Chapter 3 will outline the tax and subsidy provisions applicable to the

agricultural sector in some detail for each of the countries. Chapter 4 describes the construction of the cash flow profiles of the agricultural investments evaluated in the study and outlines how the various tax provisions are integrated into the tax/investment simulation model employed in the evaluation. Finally, Chapter 5 contains the results of the analysis and review of the implications that the tax policies have for the agriculture sector in the various countries and for international trade in these important agricultural commodities.

CHAPTER 2

AGRICULTURE POLICIES IN ARGENTINA, AUSTRALIA, BRAZIL, CANADA
AND THE UNITED STATESI. ARGENTINA

Agriculture is an important sector in Argentina's economy, accounting for 10-15% of its annual GDP and up to 80% of its export revenues.¹ Wheat and soybeans are both important contributors to agricultural earnings. Wheat production, generally of between five and ten million metric tons per year, ranks third, both in land use and in value of exports, to beef and corn. The soybean is the most important oilseed in terms of production (3-4 million metric tons) and exports (2-3 million metric tons). Although the area devoted to sunflower seeds surpasses that devoted to soybeans, in recent years Argentina has become the third largest exporter of soybeans, (after the U.S. and Brazil, and has become a major competitor in traditional U.S. markets such as the E.C.

Agricultural policy in Argentina has seen major changes in the last decade. Before 1976 the government controlled pricing, marketing, credit, and foreign trade. All domestic and foreign trading in wheat was monopolized by the National Grain Board which set prices at times as low as one-third of international prices. Minimum prices were set as well for other nonmonopolized commodities including soybeans, although they were generally too low to be binding. Exports of all commodities were discouraged and domestic prices kept artificially low with the

use of high export taxes and differentials of up to 50% between exchange rates applicable to exports and imports. Imports of fertilizer were virtually prohibited in order to protect the domestic fertilizer industry, resulting in low fertilizer usage and low yields. Interest rates were kept low, generally below the rate of inflation, leading to inefficient credit allocation and a flourishing black market in loans. Minimum wage legislation was enacted, although how binding it was outside the urban areas was unclear.

These policies resulted in stagnating agricultural production and exports. However, these policies were changed dramatically after the military's assumption of power in 1976.

The new government's free market orientation led to the elimination of price controls and state marketing monopolies, although official minimum prices (below market prices) are still offered to farmers. The government's desire to reduce inflation, which had soared to 440% in 1976, led to reductions in import tariffs and the deregulation of interest rates. The desire to increase international competitiveness led to the removal of most export taxes, the establishment of an export subsidy scheme, and intermittent devaluations of the peso.

The devaluation of 30% on April 1, 1981 was accompanied by temporary export taxes of 7-12% and/or the removal of export subsidies in order to minimize the windfall to farmers resulting from the immediate increase in domestic prices accompanying the devaluation. Aside from these temporary export taxes and the recent provision of limited long-term low-interest credit,

with 40-50% available in U.S. dollars but a minimum loan size of \$25,000, the agricultural sector in Argentina operates presently without significant government intervention or subsidization. The elimination of the many tax, pricing, and exchange rate policies discriminating against the agricultural sector has resulted in a significant upswing in production, particularly of export crops such as wheat and soybeans, the latter showing a particularly dramatic increase in the last five years.

II. AUSTRALIA

Wheat is Australia's most important crop, accounting over the last five years for about two-thirds of all area sown to annual crops and two-fifths of the gross value of total crop production in the country. Although total production falls short of that of many larger countries, the domestic population consumes only about one-fourth of total production, and the remaining three-fourths is exported. Australia ranks presently as the second largest wheat exporter after the U.S., with its major trading partners being China, Egypt, Japan, and the U.S.S.R.²

Due to unreliable weather and often poor soil fertility, Australian wheat output fluctuates widely from year to year, and yields are low compared to other major producers. In response to this uncertainty, the Australian government's wheat policy has been characterized for over forty years by a thorough system of marketing controls and guaranteed prices, accompanied at times by production quotas.

The Australian Wheat Board (AWB) has control over pricing and marketing of wheat, being the sole marketing authority for all domestically consumed (off-farm) and exported wheat. The AWB was established in 1939 and has followed a series of similar policies since that time. During World War II guaranteed minimum prices were established to assist farmers, but limits were placed on production because export shipping was blocked. In 1948, as European production recovered and world prices fell, the first of five five-year wheat plans was adopted, each setting price generalities, based on costs of production, for specified quantities and qualities of wheat. The AWB controlled domestic prices separately, not linked to export prices. Changes were made in 1974 as price supports were replaced with a new five-year Wheat Stabilization Plan. Under this plan, the government agreed to support prices at a minimum level, but farmers had to contribute to the stabilization pool a portion of any excess income earned in years when world prices exceeded the minimum price, subject to a maximum contribution per ton and a total pool ceiling of \$A80 million. Quantity restrictions were lifted in 1974 as well. During the five years of this plan world prices were consistently above the minimum price and the pool grew to its ceiling.

A significant change in policy was instituted on December 1, 1979, with the adoption of a new five-year plan in force until November 30, 1984. The major thrust of the change was a rise in the initial payment to farmers from an average of

85% in the 1970's to 95% under the new plan. Since final payments are sometimes delayed up to five years, the increase in the initial payment is expected to stimulate significantly increased production. The calculation of initial payments is now based on the average of net pool earnings over the preceding two years and the estimated pool return for the current year. Annual movement in the guaranteed price is limited to 15%, even though production and yields can vary by much more. The guaranteed price for 1979/1980 was \$A114.71 per metric ton, although growers were expected to receive about \$25 less due to deductions for freight, handling, and storage costs, the wheat research tax and a financing levy.

In addition to the higher initial payment, under the new plan the calculation of domestic prices is linked to export prices (the latter about 15% higher than the former in 1980) as well as previous domestic prices, with a limit of 20% on yearly fluctuations. Marketing has been considerably loosened, with growers now being able, with AWB permission, to sell directly to millers, although they still must together pay the fixed costs of the local handling authorities. Changes have been made as well in pricing formulas for wheat used as animal feed or in industry.

Australia is not a significant producer of soybeans.

III. BRAZIL

Brazil is traditionally a wheat-importing country, the largest in South America.³ Since wheat imports have been a drain on scarce foreign exchange reserves, however, policies have been designed in the last decade to encourage wheat production, with an aim toward self-sufficiency by the early 1980's. The Bank of Brazil, in charge of wheat policies, establishes a high minimum domestic producer price each year and acts as the official buyer of domestic wheat. Since 1962 the Bank has also controlled all imports of wheat, which it typically buys at world prices and resells to domestic mills at higher prices, using its resulting margin to pay domestic producers prices above the world market price. Its purchases of domestic wheat are then resold to domestic mills at somewhat lower prices to insure their marketability. The Bank also controls domestic retail prices, typically holding them low and thus causing a growth in wheat consumption, particularly in urban areas.

Despite high guaranteed prices, the drive toward wheat self-sufficiency has been hampered by poor soil conditions and humid climatic conditions in which rusts and mildews are prevalent. Wheat is a risky crop for farmers, and thus it is often double-cropped with soybeans, a safer crop with desirable cross-fertilization properties and an alternate growing season. Double-cropping has recently been declining in favor of monoculture of soybeans, however, because the late wheat harvest

delays soybean planting by at least one month, causing reductions in soybean yields as great as 30%.

Soybean production has grown tremendously in Brazil over the last twenty years, from 152,000 metric tons in 1959 to one million metric tons in 1960 and a forecasted 15 million metric tons in 1980. Although this is still less than one-third of U.S. production, Brazilian exports of soybean meal have at recent times surpassed those of the U.S. The extremely rapid growth has been spurred by liberal government incentives, research and extension policies, themselves a product of the more favorable attitude toward the agricultural sector since the decline in 1963 of import substitution in favor of export promotion policies.

Economic incentives for soybean production include guaranteed prices and subsidized credit. Soybeans are one of 45 or so commodities covered by the minimum price program of the Production Finance Commission (CFP) in the Ministry of Agriculture.⁴ Each year before planting season the CFP announces minimum prices for each product, determined with regard to such factors as costs of production, anticipated world prices and domestic requirements. The CFP has two basic policy tools to support these requirements. The first is the Federal Government Loan Program (EGF), which permits farmers to hold their product off the market during periods of peak supply by providing storage loans and government storage facilities. If the product is placed in a government facility the storage loan equals 100% of the guaranteed price; if kept on-farm, the

maximum loan is 80% of the guaranteed price. The second tool is the Federal Government Acquisition Program (AGF), pursuant to which the government will purchase crops at the minimum price. If government storage facilities have been utilized and a farmer's loan is not repaid (with storage costs and interest), the government automatically assumes ownership of the product under the AFG.

Aside from guaranteed prices, subsidized production loans are provided to farmers, equal to 100% of the estimated value of the farmers' crops and calculated using cultivated area and average yield data. The interest rate charged on these loans is well below the inflation rate; for example, interest rates on loans made in 1978 ranged from 13% to 22% while inflation in that year reached 40.8%. Other subsidized lines of credit are provided by regional and sectoral development programs.

In addition to minimum prices and subsidized credit, the government supports research through the Brazilian Agricultural Research Enterprise (EMBRAPA), and it provides technical assistance through the recently established Brazilian Enterprise for Technical Assistance and Rural Extension (EMBRATER). Soybean exports, particularly those of processed soybean products, are given a number of incentives including low rates or exemption from the state value-added taxes (ICM),⁵ zero-rating on exports⁶ under the national value-added tax (IPI), and exemptions from income tax of profits from the export of soybean oil.

IV CANADA

Canada produces between fifteen and twenty million metric tons of wheat per year. Of this about 70 to 75 percent is exported annually, accounting for approximately 12-15 percent of world trade in wheat.⁷ Thus, although in total production it is not among the world's leaders, in net exports it competes with Australia for second place behind the United States. Canada is not a major producer of soybeans, although production has recently been increasing in Central Canada, particularly Ontario.

The public sector is heavily involved in the Canadian wheat sector, its purpose being primarily regulation of all aspects of trade in wheat rather than income support for farmers. The Canadian Wheat Board, established in 1935, is the sole marketing authority for prairie grown wheat (and barley and oats) entering into interprovincial or international trade. The Board is strictly a producers' organization, and its mandate is to maximize total revenues from grain marketing, to provide prairie grain producers with price stability, and to assure each producer with equitable access to available markets.⁸ It seeks to accomplish these goals through a variety of mechanisms. First, it operates a pooled pricing system pursuant to which it pays farmers an initial payment upon delivery of grain to the primary elevator and a later final payment determined by the difference between the initial payment and final net proceeds of sale after marketing and Board expenses have been deducted. The initial price acts as a guaranteed price and, except for differences in internal transportation costs, all farmers delivering wheat of a certain type for sale at any

time in a given year receive the same initial and final payments per ton. This equality of price increases price stability and promotes equity objectives but it removes the rewards available in the U.S. to entrepreneurial price and futures market forecasting efforts.

In addition to the pooled pricing system, the Board operates a quota system that controls the type quantity and quality of grain a farmer can deliver to primary grain elevators. Although designed to insure equitable access to markets for all farmers, the fact that the calculation of quotas is based on area can arguably lead to inefficient land-intensive farming practices.⁹

Finally, pursuant to the Canada Grain Act the Board has the authority to control rail transport of wheat through allocation of boxcars. Since almost all Canadian wheat is transported by rail, due largely to the concentration of growing areas and port facilities, the Board's authority in this area is an important aspect of its power.

It is important to stress that the Board has broad regulatory power but relies on the private sector to provide the storage, transport, and international marketing services under contract. The marketing services are supplied largely by U.S. multinational firms.

A second public agency heavily involved in the wheat sector is the Canadian Grain Commission. The Commission, a Crown corporation independent from the Wheat Board, sets maximum handling fees for grain, licenses grain elevators, and inspects and grades all grain supplies. The Commission

was established in 1912 to guarantee high quality, and it has been very successful in this regard, but it has been suggested that the Commission's nonallowance of lower quality and lower priced blends could inhibit exports.¹⁰ Aside from the Wheat Board and the Grain Commission, the Saskatchewan, Alberta and Manitoba wheat pools (producers' organizations) assert great influence over wheat farmers with their near monopolies in handling grain elevators and fertilizer and other chemical inputs.

The largest subsidy to Canadian wheat farmers is the government's regulation of freight rates, set since the Crows Nest Pass Agreement of 1897 at about .5 Canadian cent per ton-mile or an average of \$4.36 per ton from producer to port (1/6 to 1/4 of comparable freight charges for U.S. farmers). This compares to a total average cost of \$11.39 per ton from producer to port, and the remaining \$7.03 comes from the government and the railroads, the former paying 24% and the latter 38% of total costs. The quality of freight service has declined considerably as a result of the negative return to railroad companies, and although farmers resist higher rates, it is becoming clear that the railroads need to be more fully compensated, by government subsidy if not by higher charges to farmers.

The major policy initiatives described above are used primarily to regulate grain production and marketing so as to stabilize prices and insure access and quality. Unlike many

U.S. policies, they are not meant to increase incomes to farmers. One other initiative, the 1976 Western Grain Stabilization Act (WGSA), aims to stabilize annual fluctuations in income by allowing farmers who so desire to contribute up to two percent of gross sales proceeds into a stabilization fund, to be matched by federal government contributions of four percent of analogous sales proceeds. When a participant's net cash flow falls below the average of the previous five years, the difference adjusted by the individual's participation ratio will be compensated from the fund. The actual payout in the 1976-79 period was three times as great as producer contributions,¹¹ indicating that the initiative acts as an income support as well as an income stabilizer.

Another significant income support mechanism is the crop insurance program, supported 60% by producer contributions, with the balance provided by the federal and provincial governments. Farmer participation in both this program and the WGSA is voluntary.

A major item of public support for the agricultural sector in general are the subsidized loans provided by the Farm Credit Corporation. These loans of usually a long-term nature have typically tended to be approximately two percent below the prime interest rates. However, during 1981 the interest rate differential has risen up to as much as 5 percentage points. The latest innovation by the Federal Government in its effort to provide credit to farmers has been to make "after tax financing" available through the banks to farmers in financial difficulty.

This measure allows all interest receipts from these loans to be non taxable in the hands of the lender, effectively lowering interest rates on these loans by approximately 8 percentage points when nominal interest rates are in the range of 18 percent.¹²

V UNITED STATES

The United States is the largest producer and exporter in the world of wheat, corn and soybeans. Unlike in Canada, agricultural production, transport, processing and marketing in the U.S. are all handled almost exclusively by the private sector. There is, however, a large degree of government intervention in the agricultural sector, designed primarily to provide price and income stabilization and support for farmers and price stabilization for consumers.

The agricultural policies in effect today, pursuant to the 1977 U.S. Food and Agriculture Act vary little from policies initiated by the Agricultural Adjustment Act of 1933. They consist primarily of acreage controls and income and price supports in the case of wheat and corn and price supports in the case of soybeans.¹³

Price supports are maintained through the Commodity Loan Program, pursuant to which farmers can commit any quantity of their crops to the Commodity Credit Corporation (CCC) in return for a non recourse loan equal to such quantity times a base price called the loan rate. If market prices rise above the loan rate, farmers can remove the crop from storage, sell it, and pay off the loan with a fixed rate of interest. If prices do not rise above the loan rate during the life of the

loan (generally nine months), the farmer can forfeit the crop to the CCC and keep the loan proceeds. This system, similar in concept to the Brazil's Minimum Price Program, effectively sets a floor market price equal to the loan rate, although the floor price has always been well below the market price in the case of soybeans and has only rarely in recent years been binding for wheat and corn.

A second price stabilization program, the Farm Reserve Program, permits grain farmers voluntarily to extend their CCC loans for three to five years by storing their crops on farm or in commercial facilities. Normal storage fees are reimbursed, but farmers may remove the grain from storage only when the market price equals a "release trigger" price (between 125% and 150% of the loan rate) set by USDA by crop. To set an effective ceiling price for consumers, farmers are required to remove the grain from storage when the market price reaches the crop's "call trigger" price (between 140% and 185% of the loan rate).

While the loan programs act as price supports, two other programs act as income supports. First, pursuant to the Target Price Program, participating farmers (those who have agreed to acreage set aside as discussed below) are guaranteed partial or full reimbursement for the difference between a preset target price and (if lower) the national weighted average price received by farmers during the first five months of the crop year. Target prices are based on production costs, excluding land costs. The extent of reimbursement varies

between 80% and 100% of the deficiency below target price depending on each farmer's participation in a voluntary acreage reduction program (see below). Second, a disaster payment program for wheat and corn (among other crops) provides farmers unable to plant due to circumstances out of their control with payments per acre equal to 75% of yield times one-third of the target price. If fields are planted but yields fall below 60% of normal, payments equal 50% of the target price times the production deficit below the 60% level.

Acreage controls are designed to control aggregate supply and thus ease the budgetary burden of the price and income supports for these crops.

Acreage controls consist of two programs, the acreage set-aside program and the paid acreage diversion program. Under the former, farmers who want to be eligible for protection under the other programs described above must remove without payment, a certain percentage of their farmland from production. The required percentage to be set aside is determined annually by USDA based on expected domestic, export and stock requirements; no requirement is in effect in years (such as 1980-81) in which no oversupply is predicted. Under the paid acreage diversion program, farmers are encouraged to remove additional acreage from production voluntarily with a promise of a diversion payment from the government approximating the net revenues foregone by such diversion.

The total amount of set aside and acreage planted to designated crops is in any case limited for purposes of all government programs to the "normal crop acreage" (NCA) per farm determined by county USDA officials on the basis of

1977 plantings. Through the NCA calculation and the two set aside programs the government can effectively control total acreage devoted to a designated crop.

In contrast to the comprehensive output controls and price and income supports described above, the U.S. unlike Canada interferes relatively little with crop handling, transport and marketing. Only in quality control and grain grading is the U.S. government dominant, and this role began only in 1976 with the passage of the Grain Standards Act and the establishment of the Federal Grain Inspection Service.

In practice, farmers have tended not to use the CCC program to a significant extent over the past few years.¹²

Credit to the farmer generally comes from seven major sources: (1) the Farm Credit System, which is made up of federal banks and federally-chartered local banks; (2) all operating banks - various commercial banks; (3) individuals and others - merchants, dealers, and so on; (4) life insurance companies; (5) the Farmer's Home Administration; (6) the Commodity Credit Corporation; and (7) the Small Business Administration. Since most farm assets, such as buildings, land, and machinery, are illiquid and, correspondingly, U.S. farmers have high fixed costs relative to total costs, it is vital that the U.S. farmer has credit available to be able to convert capital gains to loans in hardship periods when the farmer faces a net negative cash flow.

Many of these avenues of credit are subsidized to the farmer, through such mechanisms as direct federal loans, federal loan guarantees, and the elimination of intermediaries between the capital markets and the farmer. This helps to lower the interest costs to the farmer and to improve his income from his farm investments.

FOOTNOTES TO CHAPTER 2

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3. R. Fox, Brazil's Minimum Price Policy and the Agricultural Sector of Northeast Brazil, IFPRI Research Report No. 9, June 1979; U.S. GAO, Grain Marketing Systems in Argentina, Australia, Canada, and the European Community; Soybean Marketing in Brazil, May 28, 1976; U.S.D.A. Foreign Agricultural Service, Foreign Agriculture, various issues.
4. Wheat is not one of the 45 commodities covered by the CFP's price policy but is instead covered by a special program for wheat run by the Bank of Brazil and described above.
5. Soybeans: 13% ICM tax on export, and varied state rates up to 14% on domestic use.
Soymeal: 5% ICM tax on export, exception from ICM tax on domestic use.
Soybean oil: Exemption from ICM on export, and varied state rates up to 14% on domestic use.
6. As a raw material, soybeans are not subject to the IPI. Zero rating is available only for sales of meal and bulk sales of oil. Zero rating is preferable to exemption since it allows exporters to claim a refund for tax credits from IPI paid at earlier stages of production and processing.
7. L.A. Fischer, "Impact of Income Stabilization on Canadian Wheat Exports," Economic Planning, Vol. 16, No. 5, Sept-Oct 1980, pg. 6.
8. A.F. McCalla and S. Schmitz, "Grain Marketing Systems: The Case of the United States versus Canada," Am. Jul. Agr. Econ., Vol. 61, No. 2, May 1979, pg. 204.

9. Ibid., pg. 207
10. U.S. GAO, Grain Marketing Systems in Argentina, Australia, Canada and the European Community; Soybean Marketing in Brazil, 1976.
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12. Government of Canada, Budget Papers Ottawa: Department of Finance, Government of Canada, November 12, 1981, pg. 36.
13. Much of the description to follow is from C.V. Fulton, "U.S. Farm Programs for Wheat and Feed Grains," Canadian Farm Economics, Vol. 16 No. 1 and from B.L. Gardner, "The Farmer's Risk and Financial Environment Under the Food and Agriculture Act of 1977", , 1979.
14. National Economics Division Staff Report, National Agricultural Credit Study, Economics and Statistics Service USAD, April 1981 pg. 13.

CHAPTER 3

AN EXAMINATION OF TAX AND SUBSIDY PROVISIONS BY COUNTRY

I. AN OVERVIEW

This chapter provides a more complete outline of the different tax laws and accounting procedures currently in effect that will have a direct impact on the rate of return to investment in wheat and soybean production in the countries examined. Overall we find that agriculture tends to receive preferential treatment by the tax system. Usually this comes about through greater investment tax credits or preferential tax rates. Other incentives often take the form of subsidized interest rates on credit used both for investment purposes as well as to finance inventories of produce.

For countries such as Brazil the implicit subsidy given through preferential interest rates can be very substantial when the rate of inflation is very high. Although the rest of the tax system is fairly well indexed to account for the effects of inflation, the absence of indexation of credit rates creates a major distortion.

As most of agriculture production tends to be carried out by individuals instead of corporations, and hence cannot as easily offset temporary losses against income from other activities, most countries have instituted procedures that enable farmers to spread their income and losses over a greater number of years than is usually the case for other activities. In addition, most countries allow individual producers

to account for operating revenue and costs on either a cash or an accrual basis; hence, the impact of inflation on the estimation of cost of goods sold because of the way inventories are accounted for is greatly reduced if a cash basis for determination of income is used.

Personal income tax rates applicable to agriculture income vary widely. Brazil's personal income tax rate on farmers is only 6 percent while in Australia it is possible to reach marginal tax rates of 60 percent at an income of U.S. \$60,000.00 per year. Although Argentina has a mildly progressive income tax rate structure (graduated from 7 percent to 45 percent on income over U.S. \$104,000.00), its actual rates of tax on agriculture are substantially lower due to a high degree of tax avoidance and evasion.

In the remainder of the chapter the tax systems of Argentina, Australia, Brazil, Canada and the United States are in turn outlined with a summary of the tax system presented for each country.

II. TAXATION OF AGRICULTURE BY COUNTRY

A. Argentina

Argentina's profits tax on individuals is assessed at graduated rates from 7% to 45% on "net taxable income." For purposes of the agricultural sector, net taxable income can be simplified to gross receipts from the sale of agricultural commodities less operating expenses and capital cost deductions. Each individual in a farming family is taxed separately

under Argentinian law, although under normal circumstances farm profits will be attributed to the male head of the household.

A unique aspect of Argentina's tax system is its comprehensive indexation for inflation.¹ Not only are capital costs, inventory values and carryover losses updated every fiscal year by changes in the wholesale price index, but tax rate brackets and personal allowances are updated monthly as well. Indexation of depreciation deductions mitigates the relatively small size of Argentina's depreciation allowances, limited to straight-line amounts spread over long asset lives (such as 50 years for buildings and 20 years for machinery). As is typical in most countries, land is not a depreciable asset.

Of the profits tax provisions, only one is designed to encourage investment in the agricultural sector. This provision, designed in realization of the limited amount of prime farm land in the country, provides for the deduction of 100% of all expenditure incurred to bring unsuitable land into productive use. Depending on the nature of the land, preparing it for agricultural use might require clearing, leveling, draining and/or irrigating activities. In addition to this full write-off provision, any such expenditure of a capital nature may be amortized over the useful life of the asset according to normal profits tax rules.

A number of other taxes affect the agricultural sector in Argentina. Each province imposes a property tax on agricultural land, generally between 0.1% and 1.5%. Each province

has a turnover tax as well, with rates varying among provinces and among products and averaging about 1.8%. The national government collects both export taxes on agricultural commodities and livestock leaving the country (with rates varying over time) and capital taxes, with rates varying from 0.5% to 1.5%, on the net wealth of individuals and corporations at the end of each taxable year. Although most gains from sales of capital assets are taxed as ordinary profit, gains from the sale of real property (agricultural or grazing property in the case of corporations or limited partnerships) are taxed only under a 15% capital tax on real capital gains, and the first \$a 6,409,000 (U.S. \$3600 in April 1980 pesos) is exempt from taxation. The cost basis of the land, determined by either purchase price or property tax valuation, is subject to an adjustment for inflation.

TAXATION SUMMARY

Argentina^a

Exchange rate, April 30, 1980
US \$ = \$a 1,782

Income Tax ("Profits Tax")

I. Rates

A. Personal Income

National: Graduated from 7% on \$a 1,853,343 to 45% on income in excess of \$a 185,334,300 (adjusted monthly for inflation, rates on April 30, 1980).

State or Local: None.

Parties: Spouses taxed individually.

Jurisdiction: Source.

B. Corporate income tax rate: 33% of taxable income for domestic corporations.

II. Tax Accounting Practices:

A. Inflation: Indexation of assets, inventories, liabilities, tax losses,^b rate brackets, personal allowances, by a factor representing increase in wholesale prices.

B. Inventory valuation: Typically lower of cost or market price, FIFO or average cost for year or part of year acceptable, LIFO not acceptable, value of inventories indexed for inflation.

C. Income computed on cash basis for agricultural operations.

III. Deductions: In general, all losses and expenses incurred in obtaining and preserving assessable profit as well as personal allowances.

A. Depreciation: Straight-line, with installments indexed for inflation in official wholesale price index.

Tax Lives: ^c	Buildings:	50 years
	Machinery:	20 years
	Furniture:	10 years
	Vehicles:	5 years
	Land:	Not depreciable

B. Net Losses: Ten year carryforward (indexed for inflation in official wholesale price index);
Zero year carryback.

C. Interest: Most interest payments are deductible for tax purposes, but interest paid on the capital investment of an individual proprietor is not deductible.^d

D. Taxes: Non-deductible taxes include profits, estate, valorization, and capital gains taxes. Turnover taxes, customs duties, stamp and excise taxes, and any other taxes paid in the ordinary course of business are deductible.

E. Personal Allowances (in force April 1980; adjusted monthly for inflation):

Basic allowance	\$a 11,120,064
Spouse	\$a 2,594,688
Earned income	\$a 9,266,724

IV. General Investment Incentives Applicable to the Agricultural Sector: none.

V. Agricultural Tax Incentives:

A. 100% of deduction of expenditure (including clearing, leveling, draining, and irrigating) incurred in bringing arid, swampy or otherwise unsuitable land into productive use. In addition to such allowance, such capital expenditure may be amortized under normal tax rules over the useful life of the item.

Land Tax - Provincial, all provinces, varying rates.

Example: Buenos Aires, graduated rates from 0.1% to 1.3%.

Turnover Tax - Provincial, all provinces, varying rates averaging 1.8%. Applied on gross sales or gross revenue of any lucrative activity carried on in the province.

Export Taxes - Sporadically imposed on a number of agricultural products at rates ranging from 5% to 25%. New, temporary (to be phased out over 8 months) export taxes imposed on April 1, 1981 include:

Grains (except rice) - 12%

Oilseeds (except peanuts for human consumption) - 12%

Sugar - 12%

Oilseed meals (except soybean meal) - 10%

Wealth Tax - Annual tax of 0.5% to 1.5% on net value of assets in Argentina.

Capital Gains Tax - For individuals, 15% of real gains obtained from sale or exchange of real property (not sold during normal course of business), with exemption of the first \$a 6,409,000 or \$3600 (in April 1980 \$a); for companies, 15% of gains obtained from sale of land devoted to agriculture and/or cattle raising; capital losses deductible only from capital gains, with 10 year carry-forward; most other capital gains includable in ordinary income for purposes of profits tax.

Sales Tax - 16% VAT (national income type), agricultural commodities and exports^e exempt.

Estate and Gift Taxes - None.

^aInformation from Price Waterhouse, Doing Business in Argentina, September 1980, and Deloitte, Haskins and Sells, International Tax and Business Service, May 1979.

^bEffective for financial years ending after January 1, 1979.

^cNo mandatory depreciation rates exist, depreciation being based on the "estimated useful life" of the asset. Rates listed are frequently used.

^dDeloitte, Haskins and Sells, op.cit., p. 27, but deductions are allowed for interest paid on "loans obtained for the purpose of earning or maintaining taxable income."

^eInformation obtained through conversations with Mr. Alan Maurer, U.S. Department of Agriculture.

B. Australia

Australia assesses individual income tax on a three-step scale of graduated rates on taxable income, "assessable income" minus "allowable deductions." As in Argentina, each individual is taxed separately, there being no provision for joint returns.

Unlike the Argentinian system, the Australian tax system does not provide for comprehensive indexation to preserve real values in computing tax liabilities. In recent years of higher inflation, however, Australia has taken initial steps in that direction, providing in 1980 both for 50% indexation of the individual rate scale and for indexation of concessional tax rebates provided for those with dependents.² With regard to the method of accounting, Australia differs from both Argentina and the U.S. in requiring all business income, including that from farming, to be computed on an accrual basis.

Capital cost deduction provisions are quite restrictive under Australian tax law, but a number of special provisions for primary production are included. For example, although buildings or structural improvements are generally not depreciable, certain structural improvements to land used for primary production (including fences, new on-farm storage silos and irrigation facilities) can be depreciated over periods determined by tax authorities. In addition to being deemed depreciable, any such structural improvements costing over \$1000 are eligible for the 18% allowance provided for investment in "eligible" property, i.e., most newly

purchased depreciable assets. (If the cost is between \$500 and \$1000, the allowance is reduced proportionately.) Items of plant and machinery are depreciable as generally provided for in the tax law. Certain non-plant non-structural expenditures of a capital nature (enhancing land values) incurred in the process of primary production, including costs of pest eradication, water conservation and drainage, and land clearance, weeding, preparation and ploughing, can be depreciated on a straight-line basis over 10 years.

In addition to the more liberal capital cost deductions provided for farmers, three other tax incentives favor primary production. First, although loss carryforwards are usually limited to seven years, their duration is unlimited in the case of primary production. Second, individuals earning income from primary production are allowed to apply an average tax rate calculated over five years ending with the year of income.³ Third, taxpayers engaged in primary production are eligible to participate in an Income Equalization Deposits Scheme. Under this Scheme, each taxpayer can deposit with tax authorities up to 60% of his "gross receipts from primary production" to a maximum holding at any one time of \$A 250,000. Any such deposits are deductible from assessable income at the time of deposit. They will earn for the taxpayer a taxable interest payment of 5% of the amount on deposit per year, and

the principle will be included in income only when withdrawn (at least 12 months after the deposit is made except in cases of severe financial difficulty).

Farmers in Australia are only lightly affected by taxes other than the income tax. Although property taxes are imposed by both states (land taxes) and municipalities ("rates"), land used for primary production is generally exempt. Sales taxes are incurred by wholesalers on many goods, but again most agricultural inputs and outputs are not taxed. Australia has no capital gains or wealth taxes.⁴ Finally, federal estate and gift duties were abolished for persons dying after July 1, 1979, and although progressive state duties are still widely in force, most states have expressed the desire to abolish them over the next few years.⁵

TAXATION SUMMARY

Australia^a

Income Tax

I. Personal Income Tax Rates:

National: Three-step scale:

Total Taxable Income (1980-1981)

<u>Over</u>	<u>Not Over</u>	<u>Tax on Column 1</u>	<u>% on Excess</u>
0	4,041	-----	--
4,041	17,239	-----	32
17,239	34,478	4,223	46
34,478	-----	12,153	60

(rate scale indexed 50% as of July 1, 1980)

- Income averaging over five years available for individuals engaged in primary production.

State or Local - None.

Parties - Spouses taxed individually.

Jurisdiction - Residence and source.

- B. Corporation Income Tax Rates: 46% of taxable income.

II. Tax Accounting Practices:

- A. Inflation - 50% indexation of individual rate scale and concessional rebates to individuals; otherwise no indexation for inflation.
- B. Inventory Valuation - Lower of cost (FIFO or average cost), market value or replacement value; method can be changed annually; LIFO not permitted.
- C. All business income must be computed on an accrual basis.

III. Deductions: In general, all losses and expenses incurred in producing assessable income as well as personal allowances.

- A. Depreciation - On the historic cost of specifically enumerated categories of assets used to produce assessable income.

Buildings and land generally not depreciable, with the exception of certain structural improvements made on land used for primary production.^b For plant, machinery and vehicles, either straight line or 150% declining balance method allowed, based on effective life of property.^c

Representative lives:

Basic machinery - 10 years

Vehicles - 5-7 years

Engines - 20 years

- B. Net Losses - Seven-year carryforward (indefinite carryforward for primary producers);
Zero year carryback.
- C. Interest - Deductible if principle used to produce assessable income, spread over lesser of period of loan or five years.
- D. Taxes - Property and sales taxes deductible. Income taxes not deductible.
- E. Personal Allowances - Inflation-indexed tax rebates for care of certain dependents, including rebate of A\$800 for spouse (1980). Special additional rebates for living in hardship zone.

IV. General Investment Incentives Applicable to the Agricultural Sector:

- A. Investment allowance deducted from taxable income of 18 percent of "eligible property"^d a term generally including all newly purchased depreciable assets and thus excluding building

and structural improvements to land other than those enumerated relating to primary production.^c

V. Agricultural Tax Incentives

- A. 10 year depreciable life (straight line) for expenditures other than plant (but of a capital nature) incurred by a farmer for pest eradication, land clearing and weeding, land preparation and ploughing, water conservation or drainage, flood control, control of cattle diseases, and certain structural improvements (see B below).
- B. Investment allowances for some structural improvements to land used for agricultural production including fencing, water conservation and conveyance structures, and crop storage facilities.
- C. Indefinite loss carryforward for primary purchasers.
- D. Income Equalization Deposits Scheme - deposits deductible from assessable income, and withdrawals taxable. 5% annual interest paid or credited to taxpayer during holding period also taxable.^f

Land Tax - State: All states, typically graduated rates from 0.3% to 4% on unimproved land value, primary production land generally exempt.

Local: "Rates" imposed as flat percentage of property value.

Sales Tax - Federal wholesale tax on sales of goods only; 15% rate for most items, 2½% for household goods and 27½% for luxuries; agricultural machinery, building materials, irrigation equipment, and food and other agricultural products exempt.

Export Taxes - No export taxes on wheat, soybean, corn.

Wealth Tax - None.

Capital Gains Tax - None, although taxable income includes profits and losses from sales of properties acquired for purpose of sale, and gains from sales of property within 12 months of acquisition.

Estate and Gift Taxes - Federal duties abolished as of July 1, 1979. State duties at varying rates, also being phased out.

^aInternational Bureau of Fiscal Documentation, Taxes and Investment in Asia and the Pacific, Volume 1; CCH, Income Taxes World Wide, Vol. 5; Deloitte, Haskins and Sells, International Tax and Business Service, Vol. 1; Price Waterhouse, Doing Business in Australia, June 1978.

^bStructural improvements eligible for depreciation include fences, pipes and irrigation facilities, and grain, hay or fodder storage facilities. (See outline V A)

^cRates published in Schedule to Income Tax Order 1217.

^dFor complete list of eligible property see Section 82AF of the Income Assessment Act. The expenditure on the item must exceed \$A500; if between \$A500 and \$A975, the allowance is reduced proportionately.

^eStructural improvements eligible for depreciation include fences, pipes and irrigation facilities, and grain, hay or fodder storage facilities.

^fDeduction cannot exceed 60% of "gross receipts from primary production" and is limited to income other than income from property (income not derived from personal exertion) and therefore cannot create a loss for tax purposes. Maximum holding at any one time may not exceed \$A250,000.

C. Brazil

Brazil's tax system treats the agricultural sector very leniently by imposing a flat 6% rate on all agricultural enterprises producing only unprocessed products. With such a low rate, other aspects of the income tax have relatively little impact on agricultural investment decisions. A variety of incentives are provided through the income tax for investment in under-developed areas or export activities, but the effect of such incentives is experienced primarily by manufacturing or processing industries.

Most of the federal and state governments' revenues are raised through sales taxes, namely the federal "Impôsto sobre Produtos Industrializados" (IPI) and the State "Impôste sobre a Circulação de Mercadorias" (ICM). Both the IPI and the ICM are value-added taxes, the first applying only to the various stages of the production process and the second applying to both producers and consumers. Agricultural exports and their components are exempt from the IPI, as are most canned and packaged food products.

An interesting element of the Brazilian tax system is the federal rural land tax, a tax utilized primarily to encourage agrarian reform rather than to collect revenues. The basic tax rate is 0.2%, but this rate is adjusted by a multiplier increasing up to 4.5 with the size of the holding, thereby encouraging the breakup of large holdings. After this first adjustment, the rate is again raised or lowered

depending on the land's quality, its distance from market, the participation of its owner in production and management, and the existence and nature of housing, educational, and sanitary facilities located on it for use by laborers.

TAXATION SUMMARY

Brazil^a

Income Tax

I. Rates:

National - General corporate rate of 35% of profits up to 30 million cruzeiros and 40% on excess.

- Agricultural enterprises (corporate or non-corporate): 6%, provided they do not process their products or subproducts.^b

- Individuals: Normal rate graduated from 4% on Cr \$55,101 to 50% on amounts over 675,000.00 (1977 rates). The tax rate on individuals engaged in agriculture is 6%.

State or provincial - None.

Parties - Only "legal entities" are taxed; individuals are deemed to be "legal entities" if they engage habitually and professionally in profitmaking activity.

Jurisdiction - Residence and Source.

II. Tax Accounting Practices:

A. Inflation - Asset values must be restated annually and depreciation deductions adjusted monthly; individual tax rate brackets as well as maximum allowable deductions for certain salaries, bonuses, and personal allowances adjusted annually; other

monetary corrections are made (such as interest, wages, salaries, rents), but such corrections are taxable to recipient and deductible by payor.

III. Deductions:

- A. Depreciation: Usually^c straight-line over useful life of asset.

Typical asset lives: Machinery, equipment - 10 years

Vehicles - 5 years

Buildings - 25 years

Land - Not depreciable

- B. Net losses: Four years carryforward

Zero year carryback.

- C. Interest: Deductible; should be amortized if incurred to finance property, plant and equipment in pre-operational stages of business venture.

- D. Taxes: All taxes other than income tax deductible.

- E. Personal Allowances: Exemption per taxpayer of first Cr \$65,000 (1979), and Cr \$14,400 (1979) deduction allowed for each dependent, determined separately each year on the basis of monetary correction.

- F. Reserves for Employee Liability: 8% of monthly payroll, deductible for income tax purposes, must be deposited in a special account at a government bank.

- G. Export Earnings: Profits arising from the exportation of certain manufactured goods whose export is promoted by the government are exempt from taxation.^d

IV. General Investment Incentives Applicable to the Agricultural Sector:

A. Incentives for investment in the Northeast and/or Amazon region:

- Deductions from income tax liabilities of individuals of certain percentages of some eligible investments, including 42% deduction of approved agricultural investments in the Northeast.
- Customs duty and/or income tax reduction or exemption for enterprises operating in Northeast.
- Use of up to 50% of any individual's income tax liability for approved investments in the Northeast (through the Northeast Investment Fund--Finor) or the Amazon (through the Amazon Investment Fund--Finam).

B. Export Incentives:

- Exemption of manufactured exports from income and sales taxes.
- Exemption of all exports and components of exports from IPI (see above).

V. Agricultural Tax Incentives: In lieu of 6% tax rate, option to deduct farm investments of up to 80% of net income (depending on the type of investment) and, for farm entities, option to exempt 100%, 100%, 50% and 25% of net income from farming in the first four years of operation, respectively or, for individual farmers, option to be taxable on only

50% of net income or 5% of gross receipts, whichever is less agricultural undertaking allowed to depreciate machinery and equipment over one-half its useful life. In practice most farmers opt for the last 6 percent income tax treatment.

Land Tax - Rural lands tax collected by federal government^e and distributed to municipalities; base rate of 0.2% of appraised value of land, adjusted by multiplier index (ranging from 1.0 to 4.5) depending on the ratio of the area of the taxable land to a "standard unit" of area for that unit of the country as established by the IBRA; further adjusted by a factor reflecting quality of land, the distance from market, owner participation and employee services.

Sales Tax - Federal VAT: IPI, value added tax of varying rate, applied on goods at every stage of production, certain processed food products exempt,^f exports and components of exports exempt, services not taxed under IPI.

State VAT - ICM, 14% (South, Southeast) to 15% (other) value added tax^g on producers and consumers; industrial exports exempt, agricultural raw material exports subject to maximum rate (13% in 1977).

Municipality Tax on Services: Maximum rate of 5%.

Export Tax - Federal levy applied at varying rates (not to exceed 40%) on the excess of actual export price over "basic export price;"^h primarily a price stabilization measure.

Capital Gains Tax - Capital gains generally taxed as ordinary income, after cost basis of assets indexed for inflation.

Transport Tax - 5% federal tax (ISTR) on transport cost of persons and goods across municipality, state or federal district lines.

Wealth Tax - None

Real Property Transfer Tax - State tax with maximum rates of 2% on transfers by gift or inheritance, 1% on most sales, including sales of agricultural land.

^aInternational Bureau of Fiscal Documentation, Corporate Taxation in Latin America, Deloitte Haskins & Sells, International Tax and Business Service, Vol. 1

^bBut they are not eligible for rebates granted as fiscal incentives.

^cAnnual deductions may be increased by 50% or 100% for machinery and equipment working 2 or 3 eight-hour shifts respectively. An asset life may be shortened if the user can prove the asset has a shorter life. Accelerated depreciation is available for certain projects approved by the Industrial Development Council (CDI).

^dSee Decree-Law No. 1158/71, No. 1291/73, and No. 1423/75 for the list of products. See IBFD, Brazil, pp. 39-40.

^eCollected by Brazilian Agrarian Reform Institute (IBRA): Decree No. 56,792/65; considered an instrument of agrarian reform rather than a revenue raiser.

^fDecree No. 70,435/72; including flour, sugar, and most other canned and packaged food products.

^gOther rates possible for products transferred between states, the maximum chargeable rate set by federal law (state rate reduced by 21-27%).

^hDefined as the average export price of Brazilian products as determined from time to time by the Central Bank.

D. Canada

In Canada the federal government and all provinces impose taxes on income. The rate of federal tax on individuals is graduated up to 34% (lowered from 43% as of November 12, 1981), and in all provinces except Quebec the provincial income tax is figures as a percentage (from 37.5% in Alberta to 58% in Newfoundland) of federal tax.

As in Argentina and the United States, farmers may use a cash basis of accounting, thereby including the value of crops in gross income only when disposed of. Although capital asset values and depreciation deduction are not indexed for inflation as in Argentina and Brazil, personal exemptions are indexed and a deduction of 3% of the cost of opening inventory is allowed as a correction for inflation. Depreciation is generally calculated on the declining balance method, with accelerated depreciation allowed only for manufacturing, processing, or extractive industries.

Investment incentives for the agricultural sector include a general 15.7% investment tax credit that is deducted from depreciable asset base and the ability to write off in the year incurred all expenses of clearing and levelling land and laying tile drainage. As in most other countries, five-year block income averaging is also available to farmers to smooth out income fluctuations and thus lower the effective marginal tax rates in years of high income.

Real estate taxes impose a significant burden on the agricultural sector.⁶ Several provinces levy real estate taxes on unincorporated land, while municipalities finance local services with taxes on real and personal property with their borders.

With regard to other taxes, both the provinces and the federal government levy sales taxes, but foodstuffs are generally exempt. One-half of capital gains are included in the income tax base, and such gains are deemed realized when transferred as a gift or bequest, thus mitigating the absence of federal gift and estate taxes. For farmers, agriculture enterprises can be sold to family members without incurring any capital gains tax. Of the provinces, only Quebec federal gift and estate taxes. Of the provinces, only Quebec still levies a succession duty, and it exempts the first \$75,000 of any receipts as well as all property passing to a spouse.

TAXATION SUMMARY

Canada^a

Income Tax

Ia. Personal Income Tax Rates

Federal: Graduated rates from 6% on \$761 to 43% on amounts over \$53,376 (indexed as of 1982).⁶

Provincial: Rates from 38.5% (Alberta) to 58% (Newfoundland) of the basic federal tax. Separate tax system in Quebec, with graduated rates from 13% to 33%.

Individual farmers may block average income over 5 years.

Also unlimited forward averaging allowed for lumpy income flows providing 50% withholding tax is paid.

Parties: Spouses taxes individually.

Jurisdiction: Residence and source.

Ib. Corporation tax rate:

25% on first \$200,000 of profits for a small business corporation but where dividends are paid from a small business there is a 12.5% dividend dispersement tax.

46% on taxable income greater than \$200,000 per year.

The 46% tax rate is made up of 36 percentage points of federal tax and the remainder provincial taxes.

II. Tax Accounting Practices

- A. Inflation: Inventory allowance of 3% of the cost of opening inventory deductible as a correction for inflation; under the individual income tax personal exemptions, rate brackets and certain credits indexed annually.
- B. Inventory Valuation: Lower of cost or fair market value; LIFO not permitted.
- C. Farmers may use cash basis of accounting.

III. Deductions - Generally expenses paid or incurred for the purpose of gaining or producing income from business or property as well as personal allowance.

A. Depreciation ("capital cost allowances")

- Generally declining balance
- Some examples of depreciation rates:
 - Farm buildings - 10%
 - Other buildings - 5%
 - Vehicles - 30%
 - Fences - 10%
 - Water Tanks - 10%
 - Water Pipelines - 6%
 - Land - Not depreciable
- Depreciation subject to recapture unless asset replaced within one tax year after disposal.
- After 1981 only $\frac{1}{2}$ rate of normal depreciation may be claimed in first year of acquisition of asset.

B. Net Losses: ^d Five year carryforward
One year carryback.

C. Interest: Deductible if paid on loans acquired to produce income from business or property.

D. Taxes: Income taxes not deductible; sales and excise taxes on capital equipment, depreciable as part of asset; other taxes deductible if considered expenses of doing business.

E. Personal Allowances: Basic exemption of \$2,890 (1980) plus \$2,530 for spouse earning less than \$430, and additional amounts for children, other dependents, and age (over 65); exemptions indexed for inflation.

IV. General Investment Incentives Applicable to the Agricultural Sector: Investment tax credit of 15.7% (10% or 20% higher for investments in designated areas is given, but deducted from depreciable asset base, for investments in certain new buildings, machinery and equipment.^e

V. Agricultural Tax Incentives:

- Five year income averaging for individuals
- Expensing of costs of clearing and levelling land and laying tile drainage.

VI. Special tax provisions: Dividends are "grossed up" by 50% for personal income tax purposes and a tax credit allowed equal to 34% of the grossed up dividends.

Land Taxes - Provincial and municipal real estate taxes with varying fixed percentage rates on assessed real and (in some provinces) personal property value.

- Ontario Land Transfer tax of 0.3% on value of consideration up to \$35,000 and 0.6% on excess; rate increased to 20% in sales of undeveloped rural land to nonresidents of Canada.
- Ontario Land Speculation tax of 20% on profits^f realized on "dispositions" of/land in the state.
designated
- Quebec Land Transfer tax of 33% on transfers of vacant land in the province to nonresidents.

Sales Tax - Federal: 9% tax^g on manufacturers's selling price of Canadian manufactured goods and on duty-paid value of imported goods; foodstuffs exempt.

- Provincial: Retail sales taxes of 5-11% in all provinces except Alberta; foodstuffs commonly exempt.

Export Taxes - None.

Wealth Tax - None on individuals.

Capital Gains - One half of capital gains and losses included in income tax base, with no holding period requirement; net capital losses up to \$2000 deductible from other income, with the excess to be carried back one year or forward indefinitely. For farmers selling land to members of immediate family there is no capital gains on sale of property.

Estate and Gift Taxes - Federal: None, but capital gains
deemed realized when transferred as
gift or bequest.

- Province: Levied in Quebec.

^aCCH, Income Taxes Worldwide, Vol. 2; Robert Couzin,
"Business Operations in Canada," Tax Management Foreign Income
Portfolios, 1978; Deloitte, Haskins and Sells, International
Tax and Business Service, Canada, February 1980.

^bGovernment of Canada, Budget Papers, Ottawa: Department
of Finance, Government of Canada, November 12, 1981, p.13

^cGovernment of Canada, Op. Cit., p.31

^d"Hobby" farm losses limited to 100% of first \$2,500 plus
50% of next \$5000 of loss.

^eThe investment tax credit is deductible in full against
the first \$15,000 of federal income tax payable and one-half
of the remaining tax payable, with 5-year carryforward for any
unabsorbed credit.

^fOnly profits accruing after April 9, 1974.

^g5% to 11% for building materials.

E. United States

The United States has perhaps the most complicated tax system of those considered in this study because of the many refinements made during the last twenty years to achieve certain social goals or to close perceived loopholes in the tax law. As an example of the law's complexity, an individual's tax rates differ according to whether or not he or she is married and, if so, whether he or she files separate or joint tax returns. ^{Before mid-1981,} /rates differed also according to the source of the income, i.e., whether it is "personal service" income or not.⁷

Income averaging over five years is available only if one's taxable income exceeds the average of his taxable incomes of the four previous years by more than 120% plus \$300,000.

No indexation for inflation was present in the tax law before 1981, but the Economic Recovery Tax Act (ERTA) of 1981 provided for indexation of personal exemptions, individual tax brackets, and the "zero bracket amount" beginning in 1985. Before 1982 depreciation deductions could be calculated in at least three different ways (straight line, double-declining balance, and sum of the years-digits methods) and asset lives for equipment and personal property could vary from guideline lives by 20%. The ERTA of 1981 cut all asset lives to 3, 5, 10 or 15 years and provided for prescribed schedules of accelerated depreciation. Deduction of losses on all but real property are subject to "at

risk" rules. With regard to accounting practices, inventories can be valued at cost or the lower of cost or market price; farmers can also choose the "farm-price" method (market price less direct cost of disposal). Individual farmers, small farm corporations, or family farm corporations may compute income on a cash basis, but large corporate farmers must use accrual accounting.

Incentive provisions are subject to numerous qualifications as well. An investment tax credit of 10% is given for "qualified investment," including most tangible depreciable property other than structures, but the annual credit is limited to \$25,000 plus 70% (80% in 1981, 90% after 1981) of the remaining tax liability. Furthermore, assets with tax lives less than three years are not eligible for the credit and those with asset lives of three years are only partially eligible. Finally, the credit is subject to recapture (as are accelerated depreciation and other tax benefits) if the asset is sold before the end of its useful life.

Several provisions of the tax law grant specific benefits to farmers. Under sections 182 and 175 of the Internal Revenue Code, farmers can deduct 100% of the costs of both land clearance (up to the lesser of \$5000 or 25% of the year's taxable income) and soil and water conservation (up to 25% of the year's taxable income with unlimited carryforward). Under sections 268 and 1231, unharvested crops sold together with

land are entitled to capital gains treatment; this can bestow significant tax advantages since current deductions are given for the costs of growing crops.⁸ Finally, the 10% investment tax credit, although not applicable to investment in all other buildings and structures, is available to investors in certain agricultural structures.

TAXATION SUMMARY

United States^a

Income Tax

I. Personal Income Tax Rates:

Federal -

-
- Individuals - Married, filing jointly - 1981 graduated from 14% on \$3,400 to 70% on amounts over \$215,400; 1982: graduated from 12% on \$3,400 to 50% on amounts over \$85,600.
- Single - 1981: graduated from 14% on \$2300 to 70% on amounts over \$108,300; 1982: graduated from 12% on \$2300 to 50% on amounts over \$41,500.
- 1981: maximum rate of 50% on earned (or "personal service") income.^b

Income averaging over five years available to all citizens or residents living in the country for at least five years, whose income for the taxable year exceeds 120% of the average taxable income over the immediately preceding four taxable years^c and whose excess amount is greater than \$3,000; the maximum 50% rate on earned income is not applicable if income is so averaged.

State - Several states, with top rates ranging up to 17%; deductible from federal income tax if deductions itemized; other states levy analogous "franchise" taxes.

Cities - 1% taxes in some cities.

Parties: Spouses can file joint or separate returns, with different rate structures apply to cash.

Jurisdiction: Residence and source.

Ia. Corporate Income Taxes: Basic federal income tax rates of:

16% - taxable income less than \$25,000

19% - \$25,000 - \$50,000

30% - \$50,000 - \$75,000

40% - \$75,000 - \$100,000

46% - over \$100,000

State income taxes ranging from 0 to 12 percent.

II. Tax Accounting Practices:

A. Inflation: Adjustments to individual income tax

brackets, personal exemptions, and zero bracket amount starting in 1985.

B. Inventory Valuation: Cost or lower of cost or market, LIFO acceptable if goods are valued at cost; farmers can value inventories according to "farm-price" method, i.e., market price less direct cost of disposal (I.R.C. 471).

C. Farm income of individuals or small or family corporations may be computed on a cash basis; for a few crops with longer maturity (including sugarcane), the "crop method" of accounting is also available.

III. Deductions

A. Depreciation: Allowed for all tangible property used in a trade or business or for the production of income; to be spread over a period of 3, 5, 10 or 15 years depending on the nature of the asset. Annual rate of depreciation depends on schedules

published in the "The Economic Recovery Tax Act of 1981. Asset lives include

Livestock or horticultural structures - 5 years

(by special amendment)

Vehicles - 3 years

Heavy Equipment - 5 years

Buildings - 15 years

Land not depreciable.

In lieu of the prescribed accelerated method, taxpayers may use a straight-line method over the regular recovery period (or certain prescribed longer periods if so desired).

Investments not greater than \$5,000 (1982 and 1983)^d can be expensed in the year of purchase.

B. Net Losses (incurred in trade or business): 15 year carryforward (from 1982 on); 3 year carryback

(elective). (Subject to "at risk" limitations.^e)

C. Interest: Generally deductible,^f but prepaid interest not fully deductible for cash basis taxpayers.

D. Taxes: Property and sales taxes deductible. Income taxes not deductible.

E. Personal Exemptions: \$1000 exemption with respect to taxpayer, spouse, and each dependent; additional exemptions if blind or over 65; personal exemptions indexed to inflation rate starting in 1985.

IV. General Investment Incentives Applicable to the Agricultural Sector:

- A. Investment tax credit of 10% of the cost of "qualified investment" in property constructed or acquired. Credit limited to \$25,000 plus 70%^g of the tax liability in excess of \$25,000. Credit generally allowed the year the property is put in service. Qualified property includes most tangible depreciable property other than buildings and certain agricultural structures with asset lives of at least 7 years.^h Unused credits can be carried back 3 years and then forward 15 years; the credit is subject to recapture if the property is disposed of before the end of its useful life.

V. Agricultural Tax Incentives

- A. Expensing of costs (not including otherwise depreciable assets) of land clearance and soil and water conservation, the former limited to lesser of \$5000 or 25% of the year's taxable income and the latter limited to 25% of the year's taxable income with unlimited carryforward. (I.R.C. 175,182).
- B. Capital gains treatment for sales of unharvested crops sold with land (I.R.C. 268,1231).
- C. Investment tax credit for certain agricultural structures.

Land Tax - Municipalities' property taxes: fixed rates of varying amount on assessed value of property.

Sales Tax - Federal: None.

tax
- State: Retail sales/of varying rates, generally 3-7%.

- Municipalities: Sales taxes in some larger cities.

Export Taxes: None.

Wealth Tax: None.

Capital Gains: Only 40% of net long-term (holding period over one year) capital gains included in income; only \$3000 of net capital losses deductible against taxable income, with unlimited carryforward for individuals.

Estate and Gift Taxes: Graduated rates on amounts over \$225,000 (1982)^j with maximum rate of 70%, falling to 50% by 1985; certain agricultural property can be valued on the basis of current use rather than "highest and best use". (I.R.C. 2032A)

^aCCH, Income Taxes Worldwide, Vol. 2; Price Waterhouse, Doing Business in the United States, August 1980; U.S. Congress, Economic Recovery Tax Act of 1981, H.R. 4242.

^bFor maximum rate purposes, the graduated tax rates are applied on earned income first.

^cThe tax on "averageable income" (the excess over 120% of the previous four years' average) equals five times the normal tax on 20% of such income, in effect expanding by five times the width of the marginal bracket above the 120% income figure.

^d\$7,500 in 1984 and 1985 and \$10,000 for years after 1985.

^dAdopted in Treasury Decision 7128 of June 21, 1971.

^eAn individual's business losses are limited to the amount the individual has "at risk;" not applicable to losses from holdings of real property.

^fWith a limit of \$10,000 plus any investment income on the deductions allowed to individuals for interest paid on borrowings used for investment.

^g80% in 1981, 90% in 1982 and thereafter.

^hOnly sixth percent of the cost of assets with lives of 3 years can be credited. Buildings and structures do not qualify, with the exception of certain livestock and horticultural structures.

ⁱ\$275,000 in 1983, \$350,000 in 1984, \$450,000 in 1985, and \$600,000 thereafter.

FOOTNOTES TO CHAPTER 3

1. Law No. 21,894 of October 27, 1978.
2. Before the 1979-80 income year there was 50% indexation (based on the goods component of the consumer price index) of inventory values to correct partially for inflation. See IBFD, Australia, C.2.1.4.7.
3. Deloitte, Haskins and Sells, p. 11.
4. Although taxable income includes profits from sales of property within 12 months of acquisition and gains or losses from sales of properties acquired for resale.
5. Deloitte, Haskins and Sells, p. 66.
6. Marvin Anderson, in "Taxation of Canadian Agriculture," states that property taxes are the most burdensome direct tax in Canadian agriculture.
7. In certain cases where the U.S. taxpayer has received numerous "tax benefits" (i.e., accelerated depreciation, capital gains exclusion, etc.), he may be subject to the "minimum tax" or the "alternative minimum tax."
8. If the sale is nontaxable because it follows adoption of a plan of liquidation under §337, one court has held that section 268 operated to disallow the deduction of the costs of growing the crops. Beauchamps & Brown Groves Co. v. Commissioner, 371 F. 2d 942 (9th Cir. 1967).

CHAPTER 4

DEVELOPMENT OF THE AGRICULTURE INVESTMENT CASH FLOW PROFILE AND THE MODEL FOR EVALUATION OF THE IMPACT OF TAXES AND SUBSIDIES

I. DEVELOPMENT OF INVESTMENT CASH FLOW PROFILES

The quantity and type of inputs used in an agricultural enterprise will vary significantly between countries according to their price, value and availability. This variation ideally could be modeled as a cost-minimization problem for each firm in each country, given different prices for inputs and constraints on their availability. This discussion will try to examine, in some detail, how these varying factors affect agricultural enterprises in some of the countries involved in this report.

On a per-acre basis, given similar input items some inputs are not likely to vary much as the yield of the land varies. For example, seed used per acre may vary less than the overall yield per acre. Similarly, amounts of chemicals, such as herbicides and pesticides, would also be used primarily on a per-acre basis, provided their marginal effects were about equal.

Other inputs will tend to vary both with the amount of acreage and the yield of the land. A certain amount of machinery-hours would be required to maintain and tend a crop-acre, but greater amounts of machine-hours would be required, to some extent, to harvest the crops as the yield increases. Similarly, labor might vary both with the quantity of the land and the yield.

Overall, though, most of the variable inputs would seem to be based more on per-acre costs rather than per unit of production costs. Thus, given a similar set of prices for inputs, the variable cost of producing, say, a bushel of wheat in different countries will depend on the per-acre yield. Since the countries we are examining are participants in the international market for agricultural goods, the price that farmers receive for their crops will ultimately reflect world prices after netting out the impact of transportation, freight, insurance, marketing costs, taxes and subsidies. Hence, for a given country, the farmers with higher yields will have greater margins over their variable costs. At the same time, across countries, after accounting for differences in costs, higher yields will result in greater margins over variable costs.

In a market such as this, the equilibrating concept of market rents become important. The theory of rents says that the differences in such profit margins will accrue to the fixed input factors, e.g., land, in the form of an economic rent. For a typical farm, the margin over variable costs--less the costs of management, which are basically constant with acreage but inversely proportional to yield--will be absorbed by the ownership costs of the land. Thus, the theory of rents, in its pure form, would predict that the cost of land acreage, if the land is not in competition with non-agricultural users, will depend on the yield of the land.

This discussion is all in abstraction, however, because there are likely to be significant variances in the relative

prices of farm inputs among countries. In lesser-developed countries, for example, it is likely that labor would be supplied at lower prices than in more industrial countries, and that the imported price of farm machinery would be significantly higher. Thus these countries would tend to rely more on labor and less on machinery relative to, say, the United States. Similarly, one would expect the price of fertilizer and like inputs would be somewhat higher for these countries. Nevertheless, we may still try to examine the changing rents to land, realizing that the variable costs of production may differ also because of differences in input prices.

Below are listed the average yields by major crop in the United States and Argentina for 1979-1980:

<u>Country</u>	<u>Crop</u>	<u>Yield (Metric Tons/ Hectare)</u>
United States	Corn	6.88
	Wheat	2.30
	Soybeans	2.16
Argentina	Corn	3.10
	Wheat	1.69
	Soybeans	2.14

Sources: "Oilseeds and Products," Foreign Agriculture Circular, U.S.D.A. Foreign Agricultural Service, Washington, D.C., March 1981; "Gross Reference Tables on Wheat, Corn and Total Coarse Grains Supply Distribution for Individual Countries," Foreign Agriculture Circular, U.S.D.A. Foreign Agricultural Service, Washington, D.C., Jan. 28, 1981.

As can be seen, the United States has significantly higher yields. This would lead to the hypothesis that the economic rents to land are far higher in the United States than in Argentina, or similarly, that land is a more significant input into U.S. production costs relative to others.

Using available data,¹ we may compare the proportion of costs per bushel of production accruing to land for major crops in these two countries:

Proportion of Land Costs to Total Costs of Production

<u>Country</u>	<u>Crop</u>	<u>Percentage</u>
United States	Corn	29.3%
	Wheat	30.3
	Soybeans	35.1
Argentina	Corn	20.9
	Wheat	N/A
	Soybeans	16.9

These data provide general support for this proposition of rents to land by comparing the United States with Argentina, which shows a definitely lower land rental in Argentina than in the United States, which is consistent with Argentina's lower yield.

The question arises, then: Can we control for differences in input prices and, more importantly, differences in factor productivity, such as yield? To do this, we would have to adapt each country's model farm investment to account for such factors as differences in wages, land productivity and

fertilizer costs. The immediate drawback of this approach is that we now would face the problem of trying to determine which part of the difference between the value of a farm investment in each country is due to tax factors, and which part is due to the variances in economic factors.

This problem can be alleviated, but some lack of comparability will remain. It would be necessary to examine the value of an investment in each country before the imposition of the tax scheme, and then afterwards, and to compare the percent change in net present value resulting from the imposition of taxes in each country. While this method would provide some basis for comparison, it would not allow for detailed analysis of the cash flow of each agricultural investment, since the flows in each country would not be directly comparable.

An alternative approach, then, is to ask the question: What would be the effect of imposing different tax and subsidy regimes on the same agricultural investment, say, in the United States? This would allow for a detailed analysis of when and where different tax systems would exact their due and for a concurrent investigation of the pattern of cash flow and how the tax system may change it. It is this approach that we will follow in this report.

To develop the operating profile for a typical agricultural enterprise producing each crop, it was necessary to examine production cost data from the U.S. Department of Agriculture.² The most detailed data were developed for the costs of producing corn, and it was therefore these data

that were used as a base to develop all other cash flows.

Capital expenditures were developed as follows. The average cost of land in the United States for corn is \$1220 per acre. While this average may vary slightly for each crop, depending on where the major producing areas are located, it is also true that the cost of a particular piece of land will generally be the same, regardless of the type of crop growing on it. Thus the figure of \$1220 is used as a per acre cost. This land is financed at a 75% mortgage over a 30-year period. In the U.S., this mortgage carried an interest rate of 9.25% in 1979--as opposed to the 10.6% market rate on farm vehicles. This lower rate is assumed to reflect the various avenues of subsidized credit available to the farmer. If we assume that the assumed inflation rate in 1979 was approximately 8%, then the real interest rate of the mortgage is estimated to be 1.25%, i.e., $0.0925 \sim (1.08)(1.0125) - 1$.

The loans for farm vehicles finance 80% of the cost of the machinery, and are paid back over a four-year period. The machinery itself is replaced every 8 years, which represents the usual turnover in the U.S. The vehicles cost an average of \$455 per acre in corn production. Comparing this figure with corn depreciation figures provided in detail in USDA reports, we are able to deduce the corresponding costs for farm machinery in soy and wheat production.

Because land, a capital asset, is such a major input into agricultural production, the cost of financing this land, i.e. the cost of capital, will have a major effect on the

value of the investment. It is first important to distinguish between the real and nominal costs of this capital. The interest rate the farmer pays on a land mortgage (and that he implicitly imputes to himself in terms of the cost of capital) includes a component which compensates for changes in the price level, and the other component, which provides a real (after inflation) return on the money. To an economist, the compensation for the change in prices is not a true cost of holding onto the land, since, on average, the prices a farmer receives for his crops will also increase with inflation. Thus, the true cost to the farmer is the real component of these costs, though the effect of nominal rates of interest on the cash-flow profile of an investment may have an impact upon the timing of investment decisions.

Finding a real interest rate for loans can be easily accomplished by observing nominal interest rates and inflation rates. In the agricultural sector this has already been assumed at 2.6%.

The real cost of equity capital, however, is not easily ascertainable. In similar studies of the mineral and steel industries, the real cost of equity capital was assumed to be 10%. There are reasons to believe the agriculture sector requires a far lower rate of return on its equity.

In the 1979 study of rates of return to investments in Canada, Jenkins found the real return to equity in the agricultural sector to be about 4%, gross of personal income

taxes.³ While this seems anomalous in light of the real rates of return faced by other sectors of the economy, it is likely that this discrepancy can be explained through the use of economic reasoning. Land is a physical, non-depreciable asset, not subject to obsolescence due to technical change and, as such, has a more stable value than most other assets. Land is therefore probably a much less risky investment than financial assets. Therefore, the equity cost of holding this capital, in real terms, will be significantly lower, because of the lower risks. Thus the 4% real rate of return, gross of personal tax, to the agricultural land can be seen in this light as a reasonable assumption for agricultural enterprises.

For individual farmers, the net of personal tax real return to equity will therefore be assumed at 3%. In the United States, the analysis will be made with a 4% and 6% real rate of equity to a firm, to estimate the sensitivity of the investment to changes in the real (gross of personal taxes) cost of equity capital. A 4% rate will be assumed in the other countries. On the individual level, the analysis will assume that the enterprise is a "new" firm, and is thus forced to carry-forward all tax credits and net losses in excess of what will cover the tax liability in the early period. The corporations will be assumed to be "established," i.e., they may immediately expense all tax credits and net losses when they are incurred.

The analysis will be done both under a reasonable appropriation of current inflationary circumstances (with an 8% inflation rate in Australia, Canada and the U.S. and a 40% rate in Argentina and Brazil) and under

a 0% inflation scenario. The intent here is to provide both an estimate of the way in which taxes currently affect investment under inflationary circumstances, and also how they affect the investment in idealized circumstances.

Interest rates on loans will be held constant in real terms at 2.6% except in Brazil, where subsidized credit at 18% will be available when the inflation rate is 40%. In the United States, the real interest rate of 1.25% will be assumed on land mortgages.

Revenue per acre is based on the average yield per acre times the average real price per bushel (constant 1980 dollars) over the past five years. From these revenues are subtracted the costs of getting the grain to the market, estimated at \$26/ton.⁴

Operating costs include the normal costs for seed, fertilizer, chemicals, overhead and labor, and additionally include the costs of management inputs (usually from the owner). Thus all the real variable costs of producing grains and soybeans from a farm by an agricultural corporation are included. In our evaluation of these production units, if they are operated by an individual, the returns to management are considered an expense (as they are the farmers' opportunity cost of time) and are not part of the farmers' return to his investment in productive capacity.

Interest payments are calculated and net depreciation charges are added, producing net income for the farm. In year 25, the land is resold at a price reflecting real capital gains of 2

TABLE 4.1
INVESTMENT AND OPERATING CASH FLOW FOR ACRE OF CORN IN THE U.S.
(U.S. \$, 1979 PRICES)

	1	2	3	4	5	6	7	8	9	10	11	12	13
	YEAR												
<u>CAPITAL EXPENDITURES</u>									455				
Land													
Machinery													
<u>OPERATING INCOME</u>													
Revenue ¹	236.47	236.47	236.47	236.47	236.47	236.47	236.47	236.47	236.47	236.47	236.47	236.47	236.47
Operating Costs *	138.86	138.86	138.86	138.86	138.86	138.86	138.86	138.86	138.86	138.86	138.86	138.86	138.86
Interest Payments	20.90	20.90	18.15	15.41	12.66	9.91	9.53	9.15	18.23	17.85	15.10	12.36	9.61
Net Income	76.71	76.71	79.46	82.20	84.95	87.70	88.08	88.46	79.38	79.76	82.51	85.25	88.00
<u>DEBTS (REPAYMENTS)</u>													
Land	915	(30.5)	(30.5)	(30.5)	(30.5)	(30.5)	(30.5)	(30.5)	(30.5)	(30.5)	(30.5)	(30.5)	(30.5)
Vehicles	364	(91)	(91)	(91)	(91)				364	(91)	(91)	(91)	(91)
NET CASH FLOW	-319.29	-44.79	-42.04	-39.30	-36.55	57.20	57.58	57.96	-42.12	-41.74	-38.99	-36.25	-33.50
	14	15	16	17	18	19	20	21	22	23	24	24	
	YEAR												
<u>CAPITAL EXPENDITURES</u>													(1931.50)
Land													
Machinery													
<u>OPERATING INCOME</u>													
Revenue ¹	236.47	236.47	236.47	236.47	236.47	236.47	236.47	236.47	236.47	236.47	236.47	236.47	236.47
Operating Costs *	138.86	138.86	138.86	138.86	138.86	138.86	138.86	138.86	138.86	138.86	138.86	138.86	138.86
Interest Payments	6.86	6.48	6.10	15.18	14.80	12.05	9.31	6.56	3.81	3.43	3.05	2.67	2.67
Net Income	90.75	91.13	91.51	82.43	82.81	85.56	88.30	91.05	93.80	94.18	94.56	95.94	95.94
<u>DEBTS (REPAYMENTS)</u>													
Land	(30.5)	(30.5)	(30.5)	(30.5)	(30.5)	(30.5)	(30.5)	(30.5)	(30.5)	(30.5)	(30.5)	(30.5)	(183)
Vehicles				364	(91)	(91)	(91)	(91)					
NET CASH FLOW	60.25	60.63	61.01	-39.07	-38.69	-35.94	-33.20	-30.45	63.30	63.68	64.06	1844.44	

¹ Revenues are derived from the 1978-80 average real price of corn received by the farmer (\$2.36/bu) times the 1978-80 average yield (100.2 bu/acre).

* Operating Costs Include: VARIABLE COSTS: \$111.89 (including Seed @ \$12.41, Fertilizer @ 37.95, Lime @ \$1.18, and Chemicals @ \$13.67); TAXES AND INSURANCE ON VEHICLES: \$3.28; OVERHEAD: \$7.92; and MANAGEMENT: \$15.77.

TABLE 4.2

INVESTMENT AND OPERATING CASH FLOW FOR ACRE OF WHEAT IN THE U.S.
(U.S. \$, 1979 PRICES)

	1	2	3	4	5	6	7	8	9	10	11	12	13
	YEAR												
<u>CAPITAL EXPENDITURES</u>													
Land	1220								348				
Machinery	348												
<u>OPERATING INCOME</u>													
Revenue ¹	138.12	138.12	138.12	138.12	138.12	138.12	138.12	138.12	138.12	138.12	138.12	138.12	138.12
Operating Costs *	62.99	62.99	62.99	62.99	62.99	62.99	62.99	62.99	62.99	62.99	62.99	62.99	62.99
Interest Payments	18.67	18.67	16.48	14.29	12.10	9.91	9.53	9.15	16.00	15.62	13.43	11.24	9.05
Net Income	56.47	56.47	58.66	60.85	63.03	65.22	65.60	65.98	59.14	59.52	61.71	63.90	66.08
<u>DEBTS (REPAYMENTS)</u>													
Land	915	(30.5)	(30.5)	(30.5)	(30.5)	(30.5)	(30.5)	(30.5)	(30.5)	(30.5)	(30.5)	(30.5)	(30.5)
Vehicles	278	(69.5)	(69.5)	(69.5)	(69.5)	(69.5)			278	(69.5)	(69.5)	(69.5)	(69.5)
NET CASH FLOW	-318.53	-43.53	-41.34	-39.15	-36.97	34.72	35.10	35.48	-41.36	-40.48	-38.29	-36.10	-33.92

64

	14	15	16	17	18	19	20	21	22	23	24	25
	YEAR											
<u>CAPITAL EXPENDITURES</u>												
Land												
Machinery												
				348								(1932.51)
<u>OPERATING INCOME</u>												
Revenue ¹	138.12	138.12	138.12	138.12	138.12	138.12	138.12	138.12	138.12	138.12	138.12	138.12
Operating Costs *	62.99	62.99	62.99	62.99	62.99	62.99	62.99	62.99	62.99	62.99	62.99	62.99
Interest Payments	6.86	6.48	6.10	12.95	12.57	10.38	8.19	6.00	3.81	3.43	3.05	2.67
Net Income	68.27	68.65	69.03	62.18	62.57	64.76	66.95	69.13	71.32	71.70	72.08	72.46
<u>DEBTS (REPAYMENTS)</u>												
Land	(30.5)	(30.5)	(30.5)	(30.5)	(30.5)	(30.5)	(30.5)	(30.5)	(30.5)	(30.5)	(30.5)	(183)
Vehicles				278	(69.5)	(69.5)	(69.5)	(69.5)				
NET CASH FLOW	37.77	38.15	38.53	-38.31	-37.43	-35.24	-33.05	-30.87	40.82	41.20	41.58	1821.97

¹ Revenues are based on the 1978-80 average real price of wheat at the market (\$4.25) times the 1978-80 average yield (30.5 bu/acre).

* Operating Costs Include: VARIABLE COSTS: \$52.63 (which includes, among others, Seed @ \$5.02, Fertilizer @ \$9.95, Lime @ \$.16, Chemicals @ \$2.08, and Overhead \$8.63); TAXES AND INSURANCE ON VEHICLES: \$2.28; MANAGEMENT \$8.08.

percent a year (which is inflated to reflect changes in the price level) and capital gains taxes are applied where it exists and where it does not differentiate between nominal and real gains.

Loans are repaid and depreciation charges are added back to develop the net of tax cash flow. Additionally, taxes may have been applied to capital and/or land, and these will have been subtracted from net income if deductible.

The cash flow is run over 25 years, deflated to a real cash flow, and discounted at the appropriate cost of equity capital to develop the Net Present Value, which is used as the basis for comparison of the effect of differing tax structures on farm income over time.

In Tables 4-1, 4-2 and 4-3, the cash flows associated with each of these crops are presented. The real value of land is included as a capital expenditure in year 1 and is also included as a cash inflow in the final year.

The negative cash flows associated with these profiles are not as important as it at first glance seems. This negative cash flow reflects the current income/or loss accuracy to the farmer from his investment in the farm. However, the farmer has already been assumed to have extracted a (taxable) management fee, as well as his hourly costs of labor. In addition, he is likely to receive significant off-farm income, especially in the United States. Thus, this negative cash flow represents merely a current . From all earnings, and not a negative

cash flow from all the farming activities. The implicit income accruing to the farmer from the appreciating real value of his farmland is realized (and appropriately taxed) in year 25 of his investment, giving the farmer a greater return than would be expected merely by looking at the cash flow, which exclude the implicit income from the land price increase.

II. A COMPUTERIZED INVESTMENT APPRAISAL MODEL FOR TAX ANALYSIS

The basic computerized tax analysis model used in this study was initially developed by Professor Robert Conrad for the evaluation of the tax incentives for foreign investment in the non-fuel mineral industries.⁵ However, it has been modified to better reflect an agricultural investment decision.

It is the derivation of the net cash flow to equity from an investment project that is the principal focus of the model. To carry this out there is a need to estimate operating receipts, operating expenditures for goods and services, tax payments, and the cash flows related to the financing of capital expenditures and operations. Here receipts are estimated as,

$$(1) \quad R_t = S_t + AR_t - AR_{t-1},$$

where R_t denotes cash receipts from operations in year t , S_t is sales in year t , and AR_t and AR_{t-1} refer to accounts receivable in years t and $t-1$, respectively.

Operating expenditures in turn are estimated as:

$$(2) \quad E_t = P_t + AP_t - AP_{t-1},$$

where E_t is operating cash expenditure in year t , P_t refers to purchases made in year t and AP_t and AP_{t-1} refer to accounts payable in years t and $t-1$, respectively.

It is the estimation of profile of tax payments that is most complex and is the major function of the model. First, we define taxable income as:

$$(3) \quad Y_t = S_t - OC_t - D_t - i_t B_t - T_t^S,$$

where Y_t is taxable income in year t ; S_t is sales in year t ; OC_t is total direct and indirect operating costs in year t evaluated at replacement cost prices; D_t is the amount of depreciation expense (capital cost allowance) claimed for tax purposes

in year t ; i_t is the nominal interest rate paid on the debt (B_t) in year t ; q and T_t^S are the state income taxes paid in year t and allowed as a deduction from taxable income.

There are separate subroutines in the program to estimate each of the variables in equation 3. For depreciation each asset is iterated through its tax life according to the particular depreciation rule allowed by the taxation authorities. When allowed it will switch from one depreciation rate to another when it is financially advantageous for the firm to do so. Available depreciation rules are straight line, declining balance, sum-of-years, unit of production, or immediate write-off. Also depreciation expenses, operating costs, or any of the other variables in equation 3 can be estimated at the various levels of activity of a company, i.e., local, state, national, international (parent).

To estimate the corporation income tax at the national level when there are also state income taxes, we have

$$(4) \quad T_t^N = t_n(Y_t) - aC_t$$

where T_t^N is the amount of national level corporation income taxes paid in year t ; t_n is the rate of corporation income tax; C_t is the value of new investment eligible for the investment tax credit, and "a" is the rate of investment tax credits.

Investment and financing of capital expenditures also generate nontaxable cash flows that need to be integrated into

the analysis. The net cash flow effect of investment, new loans, loan repayments, and interest payments can be expressed as follows:

$$(5) \quad F_t = N_t - A_t - i_t B_t - C_t,$$

where F_t is the effect on the net cash flow profile of the investment in year t ; N_t is the value of new loans taken in year t ; A_t is the value of loans repaid in year t ; $i_t B_t$ is the value of interest payments, and C_t is the value of expenditures made on new investments in year t .

Combining equations 1 to 5 we estimate the net present value (NPV) of a project to a corporation as of year zero as:

$$NPV_r^0 = \sum_{t=0}^n \frac{R_t - E_t + F_t - T_t^n - T_t^s}{(1+r)^t},$$

where r is the opportunity cost of equity funds to the owners of the company.

To carry out the evaluation, the model requires as input a set of time profiles of variables including yields, prices, purchases, new investments, and final scrap values of assets, if any. Assumptions are made concerning how the assets are financed, i.e., by new additions of equity, with retained earnings, or through debt. There can be three types of loans to finance these assets, each with its own interest rate and repayment schedule. In addition, short-term loans can be introduced to provide liquidity.

Different prices of output are allowed for up to 4 separate markets for each time period with the costs of production similarly specified. The quantity of output produced and sold in each market is also given to the model. Inflation is incorporated by providing assumed rates of growth for input and output prices and by adding an appropriate value reflecting the compensation for expected inflation to the nominal interest rate paid on debt.

Tax rates of each kind, corporation income tax, ad valorem, capital, and property are specified for local, state, and national or foreign levels of government, with varying provisions for deductibility and tax credits.

The model also allows for the possibility of the transfer of intra-corporate overhead between taxing jurisdictions. Should income losses occur, the model will allow the firm to carry forward or backward these losses according to the specifications of the tax laws for each level of government.

The evaluation of the investment profile is carried out at the various levels of the firm and throughout the lifetime of the investment. Taxable income for each year is developed by calculating revenues for each market and aggregating them for each tax jurisdiction. Net income is calculated using the appropriate depreciation rules and deductions. Tax liabilities are then estimated prior to the application of tax credits. A subroutine estimates the available tax credits--both foreign tax credits and investment tax credits. The final taxes are

calculated and substituted back into the cash flows of the investment to give us the net cash flow accruing to the equity holders of the corporation.

FOOTNOTES TO CHAPTER 4

1. Sources include Costs of Producing Selected Crops in the United States - 1978, 1979, and Projections for 1980, prepared by the Economics, Statistics and Cooperative Service, U.S. Department of Agriculture for the Committee on Agriculture, Nutrition and Forestry, United States Senate, Washington, D.C., July 1980; Costo de Produccion Agricola en la Argentina y los Estados Unidos, Juan Amorin por el ingeniero agronomo, 1978.
2. Costs of Producing Selected Crops in the United States - 1978, 1979, and Projections for 1980, prepared by the Economics, Statistics and Cooperative Service, U.S. Department of Agriculture for the Committee on Agriculture, Nutrition, and Forestry, United States Senate, Washington, D.C., U.S. GPO, 1980.
3. Glenn P. Jenkins, Rates of Return to Capital in Canada, a study prepared for the Economic Council of Canada, 1979.
4. Farmer prices for soy in 1979-90 in the U.S. were \$253/ton, while export prices, including in-land freight, insurance, and other charges to port, were \$279/ton. U.S. Department of Agriculture, Foreign Agriculture Service, Oilseeds and Products, Foreign Agriculture Circular, Washington, D.C.: U.S. GPO, March 1981.
5. R. Conrad, Tax Incentives for Foreign Investment in Non-Fuel Mineral Industries, report submitted to the Office of International Tax Affairs, Office of Tax Analysis, United States Treasury, December 1980.

CHAPTER 5

EVALUATION OF IMPACT OF TAX POLICIES ON THE RETURN TO INVESTMENTS IN GRAIN PRODUCTION: A CROSS-COUNTRY COMPARISON

I. INTRODUCTION

The proliferation of taxes, subsidies and special provisions applicable to investments in agriculture make the incremental impact of any one of the provisions rather difficult to measure. However, in the analysis that follows some of the more important aspects are singled out to determine their independent effect on the profitability of investments in grain production.

Grain production tends to be relatively more land intensive than most other industrial activities and constitutes at least 75 percent of the total investment required to undertake a grain producing farm. As land is not depreciable, we find that the depreciation rules used for tax purposes are not as important as for other activities. However, the cost of capital in such a situation becomes critical.

Not only is the cost of funds important for farming activities but the value of the target rate of return used to discount the net cash flow profiles becomes critical. From a previous study of rates of return from capital in Canada (Jenkins, 1978), it was found that the real (net of inflation) return on total capital employed in the agricultural sector in Canada was approximately 4 percent before personal income taxes were paid. If the average rate of tax paid by grain farmers is approximately 25 percent, then the private net of tax and inflation discount rate would be approximately 3 percent a year.

Although this cost of capital for agriculture appears to be somewhat low as compared to other activities where the real rate has been approximately 6 percent (net of corporate tax but gross of personal income taxes) it might be explained by the fact that land tends to provide excellent security for loans; hence, the risk of losing from default of the loan is reduced. In the estimation of the net present values of the investments, a discount rate of 3 percent a year has been used for those net cash flow profiles that are analyzed from the point of view of individual farmers. For the estimation of the net present value of net cash flows accruing to corporations discount rates of 4 and 6 percent are used. The principal area where the discount rate interacts with tax policy is in the case where there is a substantial rate of inflation that gets built into the interest rate. This will cause the real value of the debt to be repaid faster than it would be in a zero inflation rate situation. If the discount rate is higher than the real interest rate on debt, this more rapid repayment schedule will lead to a fall in the net present value of the project.

The assessment of the impact of different tax schemes is carried out for both an owner/operator farmer as well as a corporation. This analysis is useful to point out two aspects of the tax system that tend to change when a firm engages in an agriculture activity. First, the rate of corporation income tax will typically differ from the average rate of tax of the "normal" large scale farmer. Second, in this evaluation it is assumed that the corporation would have income from other sources

when it undertakes this investment, enabling the firm to utilize any tax credits or operating losses immediately by employing them to offset either taxable income or tax liabilities from other sources of income. For the purpose of this study, the individual farmer setting up this grain-producing operation is assumed to have no other income, so he will have to carry forward any excess tax credits or tax losses and use them to reduce the future tax liabilities of the project.

In every country there is both an income tax and a land tax. For Australia, Canada and the United States, such property taxes tend to be about 1.5% per year. This tax is somewhat lower in Argentina and substantially lower in Brazil.

The two most important provisions in the tax systems of these countries are the rates of income taxation and the degree to which tax systems are indexed to account for the impact of inflation. In the United States, Canada and Australia, a rate of inflation of 8% will substantially reduce the present value of the grain producing project and produces a greater fall in NPV for the individual investor than for corporations. This arises from the fact that inflation reduces the real value of tax credit or loss carryforwards, hence leading to an increase in the real taxes paid by the project.

Agricultural credit at preferential rates can also have a powerful effect on an agricultural project if the interest rate is fixed in nominal terms and inflation occurs. Brazil is the prime example of this phenomenon, where the NPV of the project actually increases with the rate of inflation. Argentina has

come the closest of all countries to complete indexation of the tax system. As a result, our estimates show no effect to the real NPV of the project when the rate of inflation is increased. This analysis does not include, however, the negative input that high rates of inflation are likely to have on the efficient functioning of markets and hence the economic climate for the operation of an agricultural enterprise.

All net present values derived from this analysis are expressed in terms of the 1979 price level. The prices of the commodities produced are average world prices from 1978 to 1980 expressed in terms of the 1979 U.S. price level. The description of the analysis and the results by country are outlined below.

II. AN ANALYSIS BY COUNTRY

A. United States

The evaluation of the tax system's impact on an investment in grain production is carried out for both an individual owner and for a corporation at a zero and an 8 percent rate at general inflation. An average rate of personal income tax of 25% is used in the analysis to estimate the tax effects for an owner/operator project. In the case of corporations, a 46 percent tax rate on taxable income is applied. A zero rate of state income tax is assumed. This analysis assumes the farm is sold in the final year of the project (year 25) and the real capital gains on land (assumed to be 2 percent a year) plus any inflationary capital gains are subject to capital gains taxation of 18 per-

cent ($.4 \times .46$). A land tax of 1.5 percent of nominal value of the land is levied each year and is treated as a deduction from both the personal and corporate income tax.

The nominal interest rate paid on loans for machinery is set at 10.6 percent (rate used in calculation of production costs by USDA). This rate corresponds to an expected rate of inflation of approximately 8 percent and a real interest rate of 2.6 percent per year. Eighty percent of all machinery is financed by loans that are repaid over the following 4 year period. Twenty percent of all machinery costs and 25 percent of land costs are financed by equity. The remaining 75 percent of the land cost is assumed to be financed by a 30-year mortgage at a preferential interest rate of 9.25 percent per annum. When there is zero inflation this represents a real interest rate of approximately 1.25 percent per year.

An investment tax credit equal to 10 percent of investment in new machinery and equipment is deducted from the tax liabilities of the corporation in the year the investment is made because it is assumed that the corporation has income from other sources. However, an individual may have to carry forward tax credits to future years because it is assumed that the farmer has no outside income. Net losses and tax credits can be carried forward 15 years or carried back 3 years.

Depreciation on machinery and equipment is calculated on the basis of 200 percent of declining balance over 5 years, switching to straight line depreciation when it becomes advan-

tageous. The results of this analysis are presented in Table 5.1. For all grains the net present value of this investment is positive when the rate of inflation is zero and the discount rates are set at 3 percent for the individual and 4 percent for corporations.

At a zero rate of inflation the investment from the point of view of the individual farmer is superior to the same investment if undertaken by a corporation. The higher net present value for the corporation is due to the fact that it has both a higher tax rate and a larger discount rate. However, when the rate of inflation is increased to 8 percent, we find that for the case of corn not only does the net present value fall a great deal for both individuals (from 127.41 to -111.67) and corporations (from -12.92 to -23.40), but that the decrease is substantially greater for the case of individuals. The principal reason for this is due to the decline in the real value of the carry-forward of tax credits and losses to offset future income tax liabilities.

For both corn and wheat the net present value of investments in these sectors are negative whether they are undertaken by an individual or a corporation. In the case of individual farmer-owned facilities, there are many years where the net cash flow is negative. However, the farmers' opportunity costs of time as a farm manager and worker have been deducted from the cash flow before the net present value has been estimated. When these items are added back to the cash flow for the individual, the liquidity problems created by negative cash flows are greatly reduced.

TABLE 5.1

EVALUATION OF TAXATION OF
AGRICULTURAL INVESTMENTS IN THE UNITED STATES
(Net Present Value to Equity Per Acre, 1979 US \$)

<u>CASE</u>	<u>INDIVIDUAL (3% DISCOUNT RATE)</u>	<u>CORPORATION (4% DISCOUNT RATE)</u>
(1) Corn, 0% Inflation	127.41	-12.92
(2) Corn, 8% Inflation	-111.67	-23.40
(3) Corn, 8% Inflation and 6% Discount Rate for Corporations	-----	-239.14
(4) Wheat, 0% Inflation	-11.38	-107.13
(5) Wheat, 8% Inflation	-201.82	-107.13
(6) Soybean, 0% Inflation	537.01	217.96
(7) Soybean, 8% Inflation	530.44	314.91

NOTE: Individuals are taxed at 25% on income and must carry forward excess tax credits and net losses, while firms are taxed at 46% on income and immediately utilize all tax credits and net losses.

Grain production is very land intensive, and thus capital intensive. Hence, the private opportunity cost of capital plays a critical role in determining the magnitude of the net present value of an investment. When the discount rate for corporations is increased from 4 to 6 percent, with an 8 per cent inflation rate, the NPV falls from -23.40 to -239.14 for corn production. For both investment in wheat and soybean production the effect of inflation causes the NPV of the project to fall for individuals but to increase for the case of corporate investors. This arises because inflation causes the nominal rate of interest to increase, hence increasing the potential amount of deductions that can be taken against income before calculating tax liabilities. Due to the underlying assumptions of these examples, corporations are able to utilize all deductions at the time they occur. As a result they are able to use the increased interest rate payments to reduce their tax liabilities on other activities. On the other hand, individual farmers are assumed to have no other sources of income and therefore an increase in nominal interest payments results only in an increase in cash outflow in the early years of the investment's life without any reduction in taxes in these years as they have to carry these additional deductions forward.

Inflation also causes the real value of the capital cost allowances to fall. However, for corporations the effect of inflation to reduce tax liabilities because of the greater nominal interest rates more than offsets the effect of inflation on the real value of the capital cost allowances. For individuals the impact of inflation on the real value of the capital cost allowances is greater than for the case of corporations because they have to carry forward these allowances further into the

future even when there is no inflation. When the nominal interest rates increase the banks of unused deductions in the early years of the investment increase, hence causing inflation to erode the real value of the capital cost allowances even more.

To estimate the revenues for the examples reported in Table 5.1 average farm gate prices during the period 1978 to 1980 were used for each of the grains (expressed in terms of the real price level of 1979). Average yields were also used for the same years. These values result in soybean showing a much greater degree of profitability than wheat and corn.

B. Canada

In Canada, the corporations are taxed at a rate of 46 percent on income, while individual farmers are assumed to face an average tax rate on farm income of 25 percent. Depreciation, based on an asset life of 4 years, is done on a declining balance of each asset class, which is approximated by a straight-line method.

Net losses may be carried forward for 5 years, and back for 1. An investment tax credit of 15.7 percent is available on machinery and equipment; the value of this tax credit is removed from the depreciable base of the asset.

A land tax of 1.5% is assessed on the nominal value of the farm land. A capital gains tax rate of 23 percent ($.50 \times .46$) is paid by corporations and of 12.5 percent ($.50 \times .25$) is paid by individuals, because of the exclusion of 50 percent of capital gains.

TABLE 5.2

EVALUATION OF TAXATION OF
AGRICULTURAL INVESTMENTS IN CANADA

(Net Present Value to Equity Per Acre, 1979, US \$)

CASE	INDIVIDUALS (3% DISCOUNT RATE)	CORPORATIONS (4% DISCOUNT RATE)
(1) Corn, 0% Inflation	-180.05	-138.81
(2) Corn, 8% Inflation	-165.90	-76.77
(3) Corn, 8% Inflation and 6% Discount Rate for Corporations	-----	-277.01
(4) Wheat, 0% Inflation	-286.03	-229.38
(5) Wheat, 8% Inflation	-423.70	-169.65
(6) Wheat, Impact of Trans- port Subsidy if Infla- tion 8%	-199.66	24.23
(7) Soybean, 0% Inflation	424.37	169.95
(8) Soybean, 8% Inflation	408.26	217.15

NOTE: Individuals are taxed at 25% on income and must carry forward excess tax credits and net losses, while firms are taxed at 46 percent on income and immediately utilize all tax credits and net losses.

The same financing arrangements are assumed for Canada as in the United States, i.e., the cost of the machinery and equipment are financed 80 percent by loans and 20 percent by equity, while a 30 year mortgage equal to 70 percent of the value of the land is assumed. Until 1981 the interest rate charged agriculture in Canada has been close to market rates so an interest rate of 10.6 percent is assumed if there is 8 percent inflation, but a rate of 2.6 percent if no inflation. In 1981 subsidies of approximately 5 percentage points have been instituted because of abnormally high real interest rates. However the real rate of interest is still close to the 2.6 percent used in this study. A subsidy of \$16.00 per ton on freight is included in the analysis to estimate the impact of these subsidies if they were fully reflected by higher income of the farmers. Although it is unlikely that farmers will receive a substantial portion of this subsidy on a net basis, this appraisal will include it all in the analysis as a net benefit. The results of the evaluation of the investment in grain production are shown in Table 5.2.

The results for Canada indicate the net present value for corn and wheat production is negative for both individuals and corporations. On the other hand, soybean production is very profitable. However, Canada only produces small amounts of soybeans in Southwestern Ontario.

The higher interest rates charged Canadian farmers as compared to those in the U.S. appear to have a much greater impact on the individual farmer (127.41 in the U.S. to -180.05 in Canada for individuals) than on corporations (-12.92 in the U.S. to -138.81 in Canada). This result follows from the assumption that current losses can be offset against other income in the case of corporations but must be carried forward by individuals.

If the transportation subsidy provided by Canada of \$16 per ton to transport grain to the ports is not offset by poor service from the railroads but meant higher incomes by the full amount of the subsidy, it does have a powerful impact on the profitability of grain operations. Its effect is of such magnitude so as to transform wheat growing operation from a negative NPV of -423.70 for an individual and -169.65 for a corporation to -199.66 for an individual and a positive 24.23 for a corporation.

In summary, without the transportation subsidy the Canadian tax and subsidy provisions are less favorable than they are in the U.S. However, even if only part of the transportation subsidy ends up as a net benefit to the farmer, it has improved his situation greatly.

C. Australia

In Australia, the corporate income tax is also assessed at a 46 percent rate, and individuals pay a rate of 30 percent on income. Depreciation of machinery and equipment is based on a 150 percent declining balance over a six-year asset life.

Net losses may be carried forward indefinitely, and an investment tax credit of 18 percent is available for investments in machinery and equipment.

Land varies across regions, but is here assumed to be taxed at a rate of 1.5 percent of its nominal value each year but no capital gains taxes apply to the sale of the land.

As can be seen from Table 5.3, the overall private return from investments in agriculture in Australia is considerably higher in Australia than in Canada. For the case of wheat with an 8 percent inflation rate, the NPV is -190.50 while in Canada the NPV is -423.70. For a firm the NPV is -23.45 while for Canada the NPV is -169.65. As compared to the U.S., the Australian position is almost the same when comparing two individuals but is more profitable for a firm with an NPV of -23.45 as compared to the U.S. case of -84.90.

When comparing individuals we find that the higher income tax in Australia (30% versus 25% in the U.S. and Canada) is more than offset by the higher tax credit and the unlimited time for carryforward of losses. Again we find that inflation (8 percent) has a powerful negative impact on the profitability of agricultural investments. Its effect is primarily felt through the impact it has on reducing the real value of the tax credits and losses carried forward. As in the other cases, an increase in the discount rate of 2 percent has a powerful impact on the net present value of investment in agriculture.

D. Argentina

Argentina has perhaps the most fully indexed tax system in the world. Tax brackets are indexed, and book values, depreciation and carryforwards are all increased by the change in the price level. Corporate income is taxed at 33 percent, while individuals are assumed to have a rate of 15% on income.

Land is taxed at 1.3 percent of its nominal value, and depreciation is based on an (indexed) straight line over 5 years.

TABLE 5.3

EVALUATION OF TAXATION OF
AGRICULTURAL INVESTMENTS IN AUSTRALIA

(Net Present Value to Equity Per Acre, 1979 US \$)

<u>CASE</u>	<u>INDIVIDUAL (3% DISCOUNT RATE)</u>	<u>CORPORATION (4% DISCOUNT RATE)</u>
(1) Corn, 0% Inflation	73.25	3.94
(2) Corn, 8% Inflation	-22.67	60.29
(3) Corn, 8% Inflation and 6% Discount Rate for Corporations		-203.51
(4) Wheat, 0% Inflation	-57.96	-82.64
(5) Wheat, 8% Inflation	-190.50	-23.45
(6) Soybean, 0% Inflation	596.16	315.12
(7) Soybean, 8% Inflation	522.75	357.71

NOTE: Individuals are taxed at 30% on income and must carry forward excess tax credits and net losses, while firms are taxed at 46% and immediately utilize all tax credits and net losses.

Only real capital gains are taxed at a rate of 15 percent. There is no investment tax credit given to investments in agricultural machinery but any losses (indexed) can be carried forward for up to 10 years.

In Argentina the loan principal instead of the interest rate is indexed with the result that the tax system and the financial system become close to being completely neutral to inflation. As is indicated in Table 5.4, there is no net impact of inflation that can be detected by our analysis.

Overall agriculture investment is not as attractive in Argentina as it is in the U.S., when the U.S. has a zero inflation rate. Even though tax rates are substantially lower, the absence of preferential interest rates or accelerated depreciation more than offsets the advantages of the lower tax rates. However, when the U.S. inflation rate increases to 8 percent, the individual farmer in Argentina is better off even at inflation rates of 40 percent than his counterpart in the U.S.

Argentina's tax system has many admirable characteristics as it allows very few preferences, while at the same time prevents spurious changes in taxation because of changes in the rate of inflation.

E. Brazil

Brazil provides a low rate of 6 percent tax on agricultural income and provides generous indexing of depreciation and loss carryforward. In addition, the nominal cost of interest rate to agricultural enterprises, when there is inflation, is modeled here at 18 percent, but does not fully reflect the effect of the

TABLE 5.4

EVALUATION OF TAXATION OF
AGRICULTURAL INVESTMENTS IN ARGENTINA
(Net Present Value to Equity Per Acre, 1979, US\$)

<u>CASE</u>	<u>INDIVIDUALS (3% DISCOUNT RATE)</u>	<u>CORPORATIONS (4% DISCOUNT RATE)</u>
(1) Corn, 0% Inflation	52.97	- 90.10
(2) Corn, 40% Inflation	53.00	- 90.00
(3) Corn, 40% Inflation and 6% Discount Rate for Corporations	-----	-----
(4) Wheat, 0% Inflation	-74.54	-170.93
(5) Wheat, 40% Inflation	-74.54	-170.93
(6) Soybean, 0% Inflation	622.95	313.07
(7) Soybean, 40% Inflation	623.00	313.00

NOTE: Individuals are taxed at 15% on income and must carry forward excess tax credits and net losses, while firms are taxed at 33% on income and can immediately utilize all tax credits and net losses.

inflation rate on nominal interest rate which here is set at 40 percent to reflect recent experience. In the case where a zero rate of inflation is assumed, the cost of credit is set at 2.6 percent.

Depreciation of machinery and equipment (fully indexed) is based on an asset life of 5 years and estimated on a straight line basis. Land is taxed at a rate of 0.6 percent, indexed annually.

As is shown in Table 5.5, the effect of all the Brazilian preferences to agriculture from the low tax rate to the huge credit subsidy, when there is inflation has a dramatic impact on the net present value of agricultural investments. We must keep in mind, however, that U.S. prices and yields are assumed in this evaluation.

If there is no inflation in Brazil, the lower tax rates are largely offset by the fact that no investment tax credit is provided and there is no accelerated depreciation of fixed assets. Hence, the results for Brazil and the U.S. are quite close for the zero inflation cases. On the other hand, when inflation increases, the effective rate of tax increases in the U.S., while the cost of agricultural credit falls to large negative rates in Brazil, causing the NPV's of agricultural investments in the U.S. to greatly diverge. Given the current rates of inflation in Brazil and the U.S., it is the latter situation that is the most realistic.

TABLE 5.5

EVALUATION OF TAXATION OF
AGRICULTURAL INVESTMENTS IN BRAZIL
(Net Present Value to Equity Per Acre, 1979 US \$)

<u>CASE</u>	<u>INDIVIDUAL (3% DISCOUNT RATE)</u>	<u>CORPORATION (4% DISCOUNT RATE)</u>
(1) Corn, 0% Inflation	208.05	47.85
(2) Corn, 40% Inflation	1035.29	768.47
(3) Corn, 40% Inflation and 6% Discount Rate for Corporations	-----	344.19
(4) Wheat, 0% Inflation	78.15	-65.68
(5) Wheat, 40% Inflation	493.41	292.43
(6) Soybean, 0% Inflation	831.54	613.33
(7) Soybean, 40% Inflation	1277.33	1296.07

NOTE: Individuals and firms are taxed at 6% on income. Individuals must carry forward excess tax credits and net losses, but these are fully indexed. Firms immediately utilize all tax credits and net losses from grain production.

AN EVALUATION OF ALTERNATIVE TAX POLICIES FOR GRAIN PRODUCTION: SUMMARY AND CONCLUSIONS

This review of the application of the tax systems of five countries as they are applied to grain production has identified a number of important ways that the tax system interacts with particular characteristics of the investments involved, the credit policies of the government applicable to this sector and the rate of inflation in the country. In this section an effort will be made to outline some of these linkages and to point out the aspects of the analysis that are important for the design of tax policy.

By its nature, the production of wheat, corn and soybean tends to be land intensive relative to its use in other forms of capital investment. Hence, the tax provisions that are concerned with investment tax credits for machinery and equipment or the depreciation of these assets do not play as important a role in determining the profitability of this type of farming as they do in other industries. Because land does not depreciate under most circumstances and provides excellent collateral for loans, the credit policy of the government with respect to the purchase of land plays a central role in determining the overall profitability of the enterprise. In several of the countries examined here we find that subsidization of interest rates has been an important tool of agricultural policy. Often credit policy can play as important a role as tax policy in the determination of the private incentive available to undertake grain production.

Although land is not a depreciable asset in any of the countries covered by this study, the effect of inflation that

causes nominal interest rates to increase by approximately the expected rate of inflation, leads to a situation where much of the initial purchase price of the land (in real terms) is deducted from taxable income if the amount of loan financing used to purchase the land is substantial. In Canada, the United States and Australia the tax systems allow the full deduction of the nominal interest rate from taxable income, hence, in these countries an increase in the rate of inflation that is reflected in higher nominal interest rates will cause the net present value of a corporation's investment in grain production to increase. In Argentina, only the real rate of interest is allowed as a deduction from taxable income. As a result changes in the rate of inflation does not have direct tax consequences. The impact of inflation is only felt through other channels such as its distortion of relative prices at any point in time.

The degree to which tax deductions can be immediately utilized to reduce taxable income rather than be carried forward is shown to be very important in determining the profitability of such investments. Because corporations in this study are assumed to be able to fully utilize tax deductions in the year they occur, we find that although they pay higher tax rates than individuals these rates are substantially offset by the advantage of having immediate use of all tax deductions. In the event of an increase in the rate of inflation and nominal interest rates the NPV of the investment for a corporation rises while for individuals in countries, other than Argentina and Brazil, the NPV is always reduced.

The results of this study indicate that investments in wheat and corn production tend to be unprofitable in most countries with the exception of Brazil. This result occurs primarily as a result of the land costs that were used in the evaluations and growth rate in the relative price of land that was assumed. In the 1970's estimates have been made of the growth in the price of agricultural land and it would appear that it has been growing faster than the 2 percent annual rate used in this study. If this is the situation, then the land costs will tend to be inflated because people will want to hold land not just for its productive use but also in the expectation that its price will rise by more than the rate of inflation. If a higher real rate of appreciation had been assumed for the value of the agricultural land many of the negative NPV's for the wheat and corn cases would become positive. However, the relative values of the cases evaluated would not be significantly altered.

The Brazilian cases dramatically illustrate how faulty agricultural credit policies combined with high inflation rates can lead to the creation of major incentives to misallocate investment. The large increase in the profitability of investments in grain production when the rate of inflation increases to 40 percent is a result of the fixed nominal price of government credit to the sector and not a result of any increase in the real productivity of the investment.

Overall it would appear that the combined effects of tax and credit policies in Canada and the United States causes the incentives for investment in these activities in the two countries to tend toward equalization. When only considering the tax

measures, the United States system is more generous, however, when the Canadian transportation subsidies are also included in the estimates the relative incentives to produce grain in the two countries move much closer together.

Australia's tax policies are only slightly more generous than those of the United States. Argentina, in turn, with its "inflation proof" tax system provides marginally more incentive for investment in grain production than does Australia.

Brazilian agriculture enjoys by far the most liberal tax and credit policies of the countries examined in this study. In particular, it illustrates the importance of evaluating the combined effect of all government policies on a sector when undertaking such a comparative analysis of tax policies. While Brazil's tax policy is relatively generous, its impact is not nearly as important as the government's credit policy, particularly when the country is experiencing a high level of inflation.

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