July 1973
U.S. ISSN 0084-0793

LTC No. 91
THE LAND TENURE CENTER
310 King Hall
University of Wisconsin
Madison, Wisconsin 53706

THE DEMAND INDUCED IMPACT OF LAND REDISTRIBUTION

by

H. Van de Wetering*

*Associate Professor of Economics, Iowa State University, and former advisor to the Agricultural Sector Planning Office, Lima, Peru, as a member of the Iowa State Universities Mission to Peru.

THE DEMAND INDUCED IMPACT OF LAND REDISTRIBUTION

by

H. Van de Wetering*

I. Introduction

A land redistribution program involves expectations as to the amount of land available for redistribution, as to the speed at which such lands can be redistributed, as to the amount of income which can be redistributed, and as to the impact of the property and income redistribution on the production response of the new and as yet unaffected landowners. In the following pages we develop the thesis that such expectations may have to be adjusted downward. The compound probability of land redistribution having a noticeable impact on agricultural production is thereby lowered.

This involves two parts. In a preceding paper we developed the income and expenditure accounts of a small predominantly rural area.[1] We demonstrated how the income transfer associated with land redistribution could have a multiplier effect on agricultural and nonagricultural income. The signs and sizes of these multipliers were shown to depend on the differences in the expenditure propensities on locally produced goods and services as between the expropriated owners and the beneficiaries of land redistribution. Both the signs and the sizes of such multipliers were

---

*Associate Professor of Economics, Iowa State University, and former advisor to the Agricultural Sector Planning Office, Lima, Peru, as a member of the Iowa State Universities Mission to Peru.

[1] H. Van de Wetering, "The Potential Impact of Land Redistribution on Agricultural and Nonagricultural Production in Rural Areas," submitted for journal publication, February 1972.

indeterminate, unless one made the strong assumption that the expropriated landowners spent virtually none of their income on locally produced goods and services.

In practice one could not exclude the possibility of a landed gentry spending most of its income on locally produced goods and services. Similarly, the consumption pattern of the beneficiaries of land redistribution exhibited some heterogeneity depending on, among other things, the variety of goods and services the pertinent rural area could offer. Furthermore, agricultural production could not always be increased through an increase in demand with the result that the redistribution of agricultural income would lead to a decrease in farm output sold to urban areas. The heterogeneity as to observable situations reduced, on the average, the probability of very successful or very disappointing experiences with land redistribution.

II. The Size and Speed of the Income Transfer

But, the above is not the only element which ought to condition one's expectations as to the impact of land redistribution. The second consideration concerns the calculation of the size and the speed of the income transfer. Land redistribution is a major political issue, since it is symptomatic of the waning power of a landed aristocracy and a changing perception as to the proper role of the state as a guarantor of the economic system. In this climate of dominant urban and industrial interests, agricultural development policies, such as exist, will be preferably aimed at benefiting small agriculture, the agricultural labor force, or more frequently the consumer in the larger cities. Large-scale agriculture, when commercial and producing for domestic or international markets, can

therefore be easily subjected to a price-cost squeeze, with a consequent decline in the size of the income transfer.[2] Land redistribution would still eliminate socially unacceptable inequalities in land ownership, but it could not generate an immediate increased demand for agricultural and nonagricultural production.

Land redistribution legislation is designed so as to solve several problems associated with private and public ownership of rural areas. Some of these do not involve an income transfer as with the certification of titles of squatters and similar forms of uncertain occupancy of agriculturally active and idle lands. The elimination of undesirable tenancies such as share cropping may lead to a relatively small income transfer because of the loss of secondary advantageous arrangements between landlords and share croppers, and the limited economic differentiation between owners and operators of the smaller holdings. Given this, a redistribution of income will have no immediate impact on the local demand for agricultural and nonagricultural goods and services.

The orderly expropriation and redistribution of owner-operated estates is a lengthy, time-consuming process involving a large number of administrative-legal steps.[3]

---

[2] H. Van de Wetering, "Agricultural Planning: The Peruvian Experience," in Erik Thorbecke, ed., The Role of Agriculture in Economic Development, Universities-National Bureau Conference Series, vol. 21 (Columbia University Press, 1969), pp. 387-450.

[3] The recent Peruvian Agrarian Reform Law involves 39 distinct administrative-legal steps in the expropriation phase and 16 different steps in the subsequent allotment phase, with many additional internal consultations and delays not foreseen by the law, see Aspectos sociales y financieros de un programa de reforma agraria para el período 1968-1975 (Convenio para Estudios Económicos Básicos, Ministerio de Agricultura, Lima, Perú, September 1970), pp. 19-27.

It may be necessary, nevertheless, to present the redistribution data in their most favorable light, but considering only the data on the initial phase of expropriation proceedings, or by assuming that illegal tenant-operator arrangements have been resolved through the existence of legislation towards that end. In general, it is not easy to define as to when exactly a property is expropriated or redistributed, with a substantial amount of property to be redistributed remaining in the administrative-legal pipeline for a number of years, or even indefinitely.

The political pressure on land redistribution agencies is subject to rapid change. Initial strong political support expresses itself in a large budget and staffing. However, only rarely will all the resources of the agency be used with maximum effectiveness. Such will be the case when the agency is under close scrutiny from above and is expected to show dramatic results on short order. With the relapse of such pressures, there is no automatic internal mechanism pressing for effectiveness and performance may decline disastrously.

The foregoing emphasizes the necessity for careful interpretation of enabling legislation, land use and tenancy statistics, cost of production data, and agency performance. All of these are subject to change because of feedback generated by the ongoing redistribution program. Feedback effects are difficult to measure, but, disregarding revolutionary circumstances, landowners usually have sufficient time for preemptive action so as to reduce the area that can be taken under land redistribution legislation. A continued instability of property rights will eventually reflect itself in reduced rates of accumulation and income in agriculture, in spite of a positive response by the beneficiaries of land redistribution.

In order to determine the maximum possible demand induced impact of land redistribution, it is, therefore, convenient to start with a historical benchmark as to the legislation passed, the current situation as to land use and incidence of various tenancy arrangements, the current income situation in agriculture, and the current projected performance levels of the redistribution agency. This approach eliminates the consequences of probable subsequent negative modifications in legislation and agency performance. It also excludes from consideration those effects associated with uncertainty as to scope, compensation, and time of expropriation.

III. Peruvian Agrarian Reform Law No. 17716

In the following pages we substantiate the above proposition by analyzing the potential impact of Peruvian Agrarian Reform Law No. 17716.[4] Several reasons led to this choice. Barraclough and Domike found that no other country studied offered a similar concentration of landownership.[5] This stereotype of latifundia and minifundia should offer substantial opportunities for land redistribution.

In the past two decades the rate of growth in national income was twice as large as the corresponding rate for the agricultural sector.[6] The extreme inequality of the distribution of landownership is held to

---

[4] "Ley de Reforma Agraria del Perú," Decreto Ley No. 17716, El Trimestre Económico, 37 (January 1970): 170-211.

[5] Solon L. Barraclough and Arthur L. Domike, "Agrarian Structure in Seven Latin American Countries," Land Economics, 42 (November 1966): 391-424.

[6] "Cuentas Nacionales del Perú, 1950-1969" (Banco Central de Reserva del Perú, 1970), p. 16.

be the principal cause for the lagging growth in agriculture.[7] Comprehensive legislation was passed in 1964 and 1969. Both laws have been oriented towards a nonconfiscatory expropriation of rural lands. Valuable experience was gained with the implementation of the first agrarian reform law.[8] The necessary political commitment came with the recent law. The law and its rapid, but orderly, manner of implementation was considered to be a model for much of the rest of Latin America.[9] In what follows, we evaluate the increase in agricultural and nonagricultural production possible through the implementation of the second agrarian reform law.[10]

This evaluation involves three steps. In the first step we analyze the legal constraints on landownership and land use. We then apply these constraints against the existing benchmark of landownership and land use in 1967, and obtain the areas of land that can be distributed under the

---

[7]Comité Interamericano de Desarrollo Agrícola, "Tenencia de la Tierra y Desarrollo Socio-Económico del Sector Agrícola--Perú" (Secretaria General de la Organización de los Estados Americanos, Washington, D. C., 1966), pp. XXVII-XXXII.

[8]"Ley de Reforma Agraria No. 15037" (Lima, Peru, May 1964).

[9]Edmundo Flores and Solomon Eckstein, "Informe sobre la reforma agraria en el Perú," El Trimestre Económico 37 (Fall 1970): 635-47; Thomas F. Carroll, "Land Reform in Peru," Spring Review of Land Reform (Agency for International Development, Washington, June 1970).

[10]The evaluation draws upon a series of studies undertaken by the Convenio para Estudios Económicos Básicos between the Ministry of Agriculture, the National Planning Institute, the Central Reserve Bank, the Agricultural University at La Molina, and the Iowa Universities Mission to Peru. The author was technical director of this agreement, and wants to acknowledge the contribution made by the graduate students in economics from the Agricultural University, and in particular the contribution made by Ing. Carlos Amat y León, Ing. Julio Echevarria Rojas, professors of economics at the Agricultural University, and Ing. Enrique Valdivia Benavides of the Central Reserve Bank, all of whom shared with the author the day-to-day responsibilities of the studies undertaken by the Convenio.

recent law. We subsequently calculate the redistribution of agricultural income between the previous landowners and the beneficiaries of land redistribution.

The income redistribution is not instantaneous, but determined by the projected rate of progress of the program, and must be adjusted for the cash flows linked to the compensation for expropriated lands and the repayment obligations on distributed lands. In the final step we link the projected income transfer and associated cash flows to a multiplier analysis. From this we obtain upper limit estimates as to the possible induced acceleration of agricultural and nonagricultural production in the next five years.

We find that the projected land redistribution program potentially increases the annual rate of growth in agricultural production by 1.7 percent between 1970 and 1976. Redistribution could be an important short-run propulsive factor in agricultural production, but it nevertheless accounts for only 27 percent of the expected increase in agricultural production between 1970 and 1976. This calculation is based upon the fundamental assumption that the supply curves of agricultural and nonagricultural goods and services in the rural reform areas are infinitely elastic.

The heterogeneity as to observable situations in this respect would caution us to expect a participation substantially less than the calculated upper limit of 27 percent. Furthermore, adding the impact of the redistribution program to the projected autonomous increase in agricultural production prior to the activation of the current redistribution program assumes that the latter has no growth depressing effects upon the former. Such an interaction would presumably be negative and cause a downward adjustment in the projected rates of production.

The foregoing calculations are based upon a six-year program that would eliminate all farms in excess of 150 hectares of cropland in the coast (or its lesser limit in the highlands), and all livestock farms with more than 1,500 head of sheep each in the coast or highlands. It does not include the redistribution of lands with preferential rights.[11] This phase of the program is closely identified with the solution of the minifundio problem in the Peruvian highlands, and will probably have to be postponed until the end of this decade. The income transfer associated with such a program cannot be expected to impart a similar demand shift upon agricultural production as achieved in the first phase of the program. The bulk of the demand induced effects of land redistribution will, therefore, be felt in the next few years.

IV. Land Available for Redistribution

Agrarian reform law No. 17716 is a remarkable document, containing much more than the regulations of and limitations on rights related to private ownership of rural lands.[12] The law forbids the holding or exploitation of farmland by corporations or limited partnerships. Many of these farms were subdivided between owners and relatives prior to notification of expropriation. The exact measurement of this process has been impossible in the absence of a comprehensive centralized title registration office, but both the 1961 census and later benchmarks substantially

---

[11] Lands worked by peasants who receive from the landowner a plot of land in exchange for labor or other services, payment in kind, or money.

[12] Dr. Fred Mann, et al., "A Preliminary Analysis of Agrarian Reform Law No. 17716" (Iowa Universities Mission to Peru, Lima, Peru, October 1969).

overestimate the area available for redistribution. Since farmlands vary considerably in productivity, we considered arable lands separately from natural pastures. Our benchmark for the former was 1967. Land use statistics for that year reflect the systematic improvements made since the 1964 sample survey.[13] No such progress was possible in relation to ownership and tenure data, and for the latter we used the 1964 benchmark.

The expropriated area of farms taken for redistribution is substantially larger than the actually cultivated area. One could assume this residual unplowed area to be a recurring characteristic of the latifundia. Upon land redistribution, part of this residual area would be available for additional family allotments beyond the originally cultivated area. In the absence of a national cadastre and the corresponding soil maps, it is impossible to obtain a detailed estimate as to the extent to which large farms underexploit the arable potential of their lands. Its importance in the highlands could be substantial, whereas more efficient water use along the coast might have a similar effect. Land and water redistribution are, therefore, potentially important substitutes for colonization and irrigation projects in widening the natural resource base effectively available to the agricultural labor force. We took this possibility into account through the assumption of an equal ratio of arable land to total land for all farm size strata.

Given the foregoing, the law could lead to the redistribution of 45 percent of arable lands and 69 percent of natural pastures (see Table 1). The law could benefit 314,000 families, either through group allotments such as production cooperatives or through individual allotments. The law specifies that the farm family unit should be of sufficient size to provide

---

[13] Primer Muestreo Agropecuario Nacional (Convenio para Cooperación Tecnica y Estadística, Ministerio de Agricultura--Universidad Agraria de la Molina, Lima, Peru, 1964).

Table 1. Land Available for Redistribution Under Law No. 17716 in Hectares and in Family Unit Equivalents by Type of Land and by Natural Regions, 1967

Land available for redistribution under Agrarian Reform Law No. 17716	Coast		Highlands	
	Has. 1,000	Family Allotments 1,000	Has. 1,000	Family Allotments 1,000
1. Existing arable land	730.3	124.5	1,689.7	243.9
1.1 Arable land available for redistribution under Law No. 17716	481.3	77.2	605.7	237.0
1.1.1 because of excessive size of owner-operated farm units	187.2	33.4	203.3	27.0
1.1.2 because of absence of owner-operatorship of farm units	294.1	43.9	402.4	210.0
1.1.2.1 with existing preferential rights	187.5	26.6	378.3	207.0
1.1.2.2 without existing preferential rights	106.7	17.2	24.1	3.1
2. Existing natural pastures	2,675.0	3.5	24,050.0	48.2
2.1 Natural pastures available for redistribution under Law No. 17716	2,302.0	3.0	16,301.9	32.7
2.1.1 because of excessive size of owner-operated farm units	1,621.3	1.9	12,515.5	25.1
2.1.2 because of absence of owner-operatorship of farm units	680.7	1.1	3,786.4	7.6
2.1.2.1 with existing preferential rights	184.2	.2	1,595.7	3.0
2.1.2.2 without existing preferential rights	496.6	.9	2,190.7	4.6
Number of persons eligible to be allotted a family farm unit		153.9		632.9

Source: Aspectos Sociales y Financieros de un Programa de Reforma Agraria para el Período 1968-75, Convenio para Estudios Económicos Básicos (Ministerio de Agriculture, Lima, September 1970), pp. 9, 11.

adequate employment or income for the beneficiary's family. Neither objective will be possible for all of the 234,000 farm units with preferential rights.

It is tempting to consider a large majority of such operators with preferential rights to be immediate beneficiaries of the recent law. If so, the law would promote the continuation of subfamily farm units, especially in the highlands. However, in the next five years little can be done to resolve the minifundio problem in the highlands because of the large cost involved. The resulting lag in implementation of the law favors both the continuation of what are now illegal tenant-operator arrangements, and a gradual shift towards owner-operated farm units. A redistribution program that excludes farm family units with preferential rights as possible beneficiaries reduces the potential number of family allotments to 111,000.

The law can satisfy only 1 out of 5 persons eligible to receive a family farm unit. This average tends to hide the desperate situation in the highlands where only 1 out of 11 of those eligible may entertain a reasonable expectation of receiving an adequate amount of land. A successful redistribution program creates substantial employment opportunities in nonagricultural and agricultural activities in rural areas. The former will tend to diminish the number of persons eligible to receive lands since they are no longer active in agriculture.

The increased employment opportunities in agriculture will tend to increase agricultural wages. In that case, the objective of the land redistribution program to give each agricultural worker his own plot of land could gradually give way to the objective of creating equal income opportunities among rural people. Land redistribution can contribute

substantially towards this objective along the coast, but it cannot be a sufficient solution in the highlands. In fact, the very success of land redistribution along the coast may set off innovations in farming systems and crop combinations which will disadvantage the traditional agriculture of the highlands.

V. The Size of the Income Transfer

Land redistribution causes a redistribution of factor earnings in agriculture. The redistribution of factor earnings has important subsequent effects upon agricultural income and production. We are partial to the hypothesis by which the increasing effective demand in rural areas will translate itself into increased production without noticeable changes in the existing activity mix or the technical and price efficiency of agricultural producers. If size of land holdings were to be an important variable influencing above aspects, it could be adequately compensated through the use of group allotments. A number of studies related to the latter confirm the hypothesis that group allotments tend to consolidate conventional choice and efficiency.[14]

However, land redistribution could contribute much more to increased production and employment if it would foster new systems of farming, particularly mixed farming which allows a more intensive use of land and

---

[14] Ing. Luis Rodriguez y Ing. Carlos Baanante, Un análisis económico de algunas empresas comunales (Misión Agrícola de la Universidad de Carolina del Norte, Lima, 1971); Ing. Mario Revilla, Cooperativas agrarias de producción: Un análisis de casos (Misión Agrícola de la Universidad de Carolina del Norte, Lima, 1971); Ing. Renan Ochoa, "Planificación agrícola de cooperativas de producción" (Tesis para el grado de Magister en Economía Agrícola, Universidad Agraria, La Molina, Lima, 1971).

labor.[15] Discounting both output increasing and output decreasing effects, we assumed that the value per hectare of harvested land would not subsequently change because of land redistribution.

The Agricultural Development Bank compiles a continuous and comprehensive series of costs of production data of its borrowers. Using the 1967 data we calculated the value added corresponding to the portfolio of crops harvested in each province.[16] Similar data for sheep ranches in 1969 were obtained from Vergara,[17] supplemented by employment and wage data from the 1969 annual survey of the Oficina Nacional de Estadística y Censos.[18] This information was used to compute the distribution of value added in agriculture and livestock production between wages, social benefits, and a residual category of "gross profits." The latter includes the salaries of employees in administrative and supervisory activities whenever allotments are expected to be made in group form, as with livestock farms.

---

[15] Ing. Eduardo Watson Cisneros, "Granjas mixta como sistema de agricultura en la costa del Perú" (Lima, 1970).

[16] Gerardo Prado Apaza, "Una primera estimación de los alcances del Decreto Ley No. 17716 de reforma agraria en la transferencia del ingreso agrícola" (Documento de Trabajo No. 342, Convenio para Estudios Económicos Básicos, Ministerio de Agricultura, Lima, 1971).

[17] Carlos Vergara, "Análisis de operación de una empresa ovejera" (Instituto de Investigaciones Socio-Económicas, Universidad Agraria La Molina, Lima, 1971).

[18] Datos para la estadística del empleo, salarios y sueldos año 1969 (División de Estadística Sociales y del Trabajo, Oficina Nacional de Estadística y Censos, Lima, 1969).

We computed wages and social benefits initially on the basis of prevailing labor requirements and existing labor legislation.[19] Medium- and large-size farms must submit each year a certified copy of the farm's employment record in the second week of June to the Ministry of Labor. We analyzed the June 1969 payrolls of 498 crop farms and 181 livestock farms.[20] We compared the estimated minimum labor costs in compliance with agricultural labor laws with the actual labor payments. The difference between these payments is retained by the farm operator, usually also its owner. The total annual amount unlawfully retained in 1969 equalled $2.3 million, or 2 percent of the estimated expropriation value of arable lands and natural pastures.[21] If owners were to retain unlawfully a substantial amount of wages and benefits, one might argue that the farm labor force should not be made to pay for expropriated lands. Nor should landowners receive compensation. The above figure indicates that landowners could claim partial compensation for expropriated lands.

Individual allotments do not permit the retention of on-site management and technical personnel. Most of the crop farms must be allotted in

---

[19] Sueldos y salarios mínimos vitales, vigentes en la republica segun niveles económicos y de productividad fijados en las resoluciones supremas respectivas (Dirección General de la Oficina de Asesoria Juridica, Ministerio de Trabajo, Lima, 1968); Requerimientos mensuales de mano de obra para la agricultura por hectárea, por cultivo, por provincias, y para la actividad pecuaria, año base 1967 (Convenio para Estudios Económicos Básicos, Ministerio de Agricultura, Lima, 1970).

[20] Raul Suarez Medina, "Resultados de una encuesta acerca del cumplimiento de la legislación agrícola en el mes de junio de 1968 y 1969" (Documento de Trabajo, Convenio para Estudios Económicos Básicos, Ministerio de Agricultura, Lima, 1970).

[21] Aspectos sociales y financieros de un programa de reforma agraria para el período 1968-1975, p. 43.

the form of individual plots because the possible number of beneficiaries out of an average expropriated crop farm is too small to form a viable cooperative.[22] For purposes of calculation, we have assumed that the beneficiaries of crop farms will individually assume their management responsibilities, but that they will be aided by an extension program that will adequately compensate for the dispersion of the management and technical personnel on redistributed farms.

The recent law has brought no benefits to those members of the agricultural labor force who are employed on a temporary or seasonal basis. The only direct beneficiaries of land redistribution are the permanent agricultural workers. We assume that the former will continue to employ the same amount of temporary labor at the same wage rates which existed prior to land redistribution. The income of the permanent labor force after redistribution therefore equals all of value added minus the labor cost of temporary agricultural workers.

The beneficiaries have a repayment obligation on the lands and livestock received. The annual discretionary income of the beneficiaries of land redistribution then equals income as previously defined minus the annual repayment obligation. The latter may increase in subsequent years because of an initial grace period on amortizations, but the projected continuous currency depreciation will eventually lower the real burden of the repayment obligation below its initial level.[23]

The redistribution program affects $86 million of income earned in agriculture. Prior to the redistribution program, landowners earned

---

[22] Ibid., p. 38.

[23] Ibid., pp. 53-62.

$33 million in gross profits with the residual accruing to the permanent and temporary labor force (see Table 2). After redistribution, the permanent labor force on the expropriated farms will almost double their income from $39 million to $73 million. This amount should be increased by a $16 million income transfer accruing to the permanent agricultural and industrial labor force of the eleven coastal sugar complexes.[24]

The total income transfer, therefore, equals $50 million, or 9.4 percent of total value added in crop and livestock production and 1.7 percent of national income in 1967.[25] This apparently small percentage is all of the income redistributive effect associated with a redistribution of 22 percent of arable lands and 63 percent of natural pastures.

Thirty percent of the income transfer must be set aside for allotment repayments. Almost two-thirds of the remaining discretionary income goes towards the permanent farm workers in the coastal area. Comparatively little will be done to alleviate the rural poverty in the highlands, indicating the regionally regressive nature of the program. Land redistribution, although effective in rural areas, can contribute but little to a redistribution of national income. The immediate effect is diluted further because of the projected six-year execution span of the program.

---

[24] The quoted amount equals profits minus taxes as calculated from the 1970 balance sheets submitted to the Ministry of Economy and Finance. The repayment obligation in 1970 equalled $9.2 million according to data provided by the Dirección General de Reforma Agraria.

[25] Cuentas nacionales del Perú, 1960-69 (Banco Central de Reserva del Perú, Lima, 1970), p. 16.

Table 2. The Projected Increase in the Annual Income of the Permanent and Seasonal Labor Force, Before and After Land Redistribution, on the Crop and Livestock Farms to be Taken for Redistribution in the Coast and Highlands[a]

Factor earnings	Crop farms to be taken for redistribution				Livestock farms to be taken for redistribution			
	Coast		Highlands		Coast[b]		Highlands	
	Before allotment	After allotment	Before allotment	After allotment	Before allotment	After allotment	Before allotment	After allotment
	million $	million $	million $	million $	million $	million $	million $	million $
Wages paid	16.5	5.6	9.3	3.8	2.0	.3	13.6	1.4
Benefits paid	3.6	.9	1.9	.6	.6	.1	5.0	.5
Gross profits	17.7	31.3	5.9	12.7	.3	2.5	9.3	26.0
Value added	37.8	37.8	17.1	17.1	2.9	2.9	27.9	27.9
Income of permanent labor force	13.6	31.3	6.8	12.7	2.2	2.5	16.7	26.0
Repayment obligation[c]	--	4.5	--	.4	--	.1	--	.6
Discretionary income of permanent labor force	13.6	26.8	6.8	12.3	2.2	2.4	16.7	25.4
Income of temporary labor force	6.5	6.5	4.4	4.4	.4	.4	1.9	1.9

[a]Excludes agro-industrial complexes.

[b]Excludes dairy, hog, poultry and cattle-fattening farms.

[c]Average annual for the period 1969-1976.

VI. The Impact of the Income Transfer

The income transfer in favor of the beneficiaries of land redistribution could be considered to have an instantaneous multiplicative effect on income and production in the two sectors of the rural economy analyzed here if there were no lags in the spending, production, and earning cycle. But agricultural production is a biological process with a marked seasonality. Double cropping is only exceptionally possible in Peru. Consequently, current expenditure is substantially based upon the proceeds of last year's harvest.

For the same reason, an increase in demand cannot call forth an immediate increase in production. Beneficiaries on allotted livestock farms might proceed to an immediate realization of their purchase plans through the slaughter of existing livestock or through the purchase of livestock from outside sources. If the impatience of the recipients cannot be realized in this manner, it may reflect itself through a reduction in area exports. Possibly the prices of agricultural products would increase. Local merchants might succeed in capturing a substantial part of the income transfer whenever they exercise sufficient price control over nonagricultural products and services.

In what follows, we assume that the prices of agricultural and nonagricultural goods and services are unaffected by the income transfer. We furthermore consider expenditure to be out of current income, and the expenditure propensities are assumed to be unaffected by the income transfer. We also assume a one-year lag between spending and production in both sectors. Possibly the time necessary to get demand for additional agricultural production translated into new output may be infinite. By not

considering such a distributed response delay, we strengthen the immediate impact of land redistribution on production.

The multiplier effects of land redistribution depend on the expenditure propensities of the individuals composing the agricultural and nonagricultural sector.[26] In order to evaluate the impact of land redistribution, we must have knowledge about these expenditure propensities. At this time we do not have such knowledge, apart from certain introspective considerations as to their probable values.

Since the expenditure propensities are independent of one another they do not have to obey a unique ordering. Usually, however, small landowners and farm labor will spend a very large share k_{11} of their income on the products they themselves produce. The proportion k_{12} of goods and services acquired from the nonagricultural sector will usually be smaller than the reciprocal proportion k_{21} which individuals not active in agriculture spend on locally produced agricultural products and services. The order $k_{21} > k_{22}$ will eventually be reversed with increasing incomes in the nonagricultural sector, but usually the expenditure propensity of food k_{21} by individuals in the nonagricultural sector will be larger than the expenditure propensity k_{22} on goods and services they themselves produce. Individuals in the nonagricultural sector allocate a larger proportion, k_{22}, on such goods and services than small landowners and farm labor. The expenditure propensities above obey a descending order such that:

$$[1 > k_{11} > k_{21} > k_{22} > k_{12} > 0].$$

---

[26] H. Van de Wetering, "The Potential Impact of Land Redistribution on Agricultural and Nonagricultural Production in Rural Areas," p. 11.

In the calculations below we assume [$k_{11} = .7$; $k_{12} = .2$; $k_{21} = .4$; $k_{22} = .3$], which satisfies the above ordering. The income multipliers are then uniquely determined as to sign and as to size, provided that the expropriated owners spend all of their income on investments or consumption outside the reform area.[27]

The spending behavior of the owners of the expropriated sugar estates may have approximated this stereotype, but it is not a reasonable assumption with respect to the spending behavior of the owners of other types of expropriated farms. We assumed that the owners of other expropriated farms on the coast would typically spend half of their income outside the reform area, with the remainder being spent locally on the purchase of nonagricultural goods and services. Expropriated owners of crop and livestock farms in the highlands have substantially smaller incomes than their counterparts on the coast. We therefore assumed the expenditure pattern of the former to be identical with that of the individuals residing in the nonagricultural sector or small rural towns.

These assumptions are sufficient to compute the numerical values of the income multipliers related to the redistribution of agricultural income. An income transfer of $1 is expected to increase agricultural income by $2.9, and nonagricultural income by $0.7 (see Table 3). The rural area product, therefore, is expected to increase by $3.6 for each $1 of income transferred between the expropriated landowners and the beneficiaries of agrarian reform.

If the beneficiaries of land redistribution, or their immediate neighbors, cannot respond to the increased demand for locally produced goods and

---

[27] Ibid., p. 13.

Table 3. Estimated Values of the Income Multipliers Related to the Income Transfer and Subsequent Expropriation and Allotment Payments, by Sectors, and by Type of Expropriated Farm[a]

	Income transfer multipliers		Expropriation payment multipliers		Allotment payment multipliers	
	agricultural production	nonagricultural production	agricultural production	nonagricultural production	agricultural production	nonagricultural production
Sugar complexes	4.38	1.54	0	0	-4.38	-1.54
Other coastal farms	2.85	.38	0	0	-4.38	-1.54
Highland farms	1.31	.23	0	0	-4.38	-1.54
Weighted average	2.88[b]	.72[b]	0	0	-4.38	-1.54

[a] For the algebraic expressions underlying the calculations of these coefficients see H. Van de Wetering, "The Potential Impact of Land Redistribution on Agricultural and Nonagricultural Production in Rural Areas."

[b] Weighted by the calculated increase in the income of the permanent labor force in Table 2.

services then prices must increase, or else less must be put up for sale outside of the area. Assuming the latter to take place, an income transfer of $1 is expected, on the average, to decrease agricultural exports by $0.53. The rural area product decreases by $0.04 because of the decrease in demand for locally produced nonagricultural goods and services.

The law does not contain provisions as to where the indemnification payments must be spent or reinvested. What incentives do exist encourage expropriated landowners to invest in industrial enterprises. The latter are typically located in urban areas. The multipliers associated with the payments made to expropriated landowners will therefore be zero.

The beneficiaries of land redistribution must pay for their allotments with the state functioning as the collection agency. The multiplier effects associated with allotment payments are income depressing and numerically never less than the maximum possible value of the income transfer multiplier (see Table 3). Relatively moderate repayment levels can cancel most of the demand induced impact of land redistribution. Both the agricultural and the nonagricultural sector in the area would reap substantial benefits if the repayment obligation could be diverted into equity capital for the formation of rural cooperatives and area export promoting projects. The law currently does not contain such provisions and we assumed that all repayment obligations are transferred out of the area.

The projected redistribution of agricultural income equal to $50 million could increase agricultural production by $144 million.[28] If one assumes

---

[28] Obtained by multiplying the income transfer by the weighted income transfer multiplier in Table 3.

that the beneficiaries of land redistribution will comply with their repayment obligation this figure must be lowered to $78 million (see Table 4).

Table 4. The Potential Impact of Agrarian Reform Law No. 17716 on Agricultural Income and Nonagricultural Income by Regions, 1969-1976

	Coast million $	Highlands million $	Total million $
Potential increase in agricultural income	62.7	15.5	78.2
Potential increase in nonagricultural income	10.9	2.0	12.9
Total increase in rural area income	73.6	17.5	91.1

Almost 80 percent of the projected increase in agricultural income is projected to take place on the coast, implying that crop and livestock production in the highlands will not receive any substantial production propulsive effects related to the land redistribution program. Nonagricultural production could increase by $13 million. Virtually all of this increase is estimated to take place on the coast. Land redistribution will, therefore, do little to strengthen the market for nonagricultural activities in the highlands.

Agricultural income without land redistribution was projected to increase from $588 million in 1970 to $780 million in 1976.[29] The demand

[29] Based upon supply hypothesis II in "Peru--Proyecciones a largo plazo de la oferta y demanda de productos agropecuarios seleccionados, 1970-75-1980" (Convenio de Cooperación Técnica, Estadística y Cartografía, Universidad Agraria, Ministerio de Agricultura, Lima, 1969).

induced impact of land redistribution could account for one-third of the increase in agricultural production in the next five years. But this implies certain assumptions as to the characteristics of aggregate supply in agricultural and nonagricultural production, i.e., that additional production within the reform areas can be offered at constant prices because of a very elastic capacity to produce.

The production increase caused by a redistribution of agricultural income will be the maximum possible when the price elasticity of supply tends to infinity. Any constraints on the expansion and reorganization of the factor and product markets will limit this potential increase. Such constraints may be so severe that supply must be considered given. In that case, a redistribution of agricultural income would have no impact on agricultural production.

We have then two very different conceptions as to the development potential of the rural economy. The first hypothesis welcomes land redistribution, because a change in the state of the income distribution is expected to lead to an increased utilization of resources. The second hypothesis denies the existence of a readily tapped development potential in the rural economy, and implies that land redistribution may reduce the domestic food supply in urban areas.

Attaching equal probabilities to both hypotheses would lower the projected demand induced impact of land redistribution to $40 million,[30] and

---

[30] Obtained by halving the projected increase in agricultural income in Table 4.

reduce the domestic food supply to urban areas by $9 million.[31] The impact of both figures must be distributed over the six-year execution span of the program. It may, therefore, be difficult to prove at some future point as to whether the redistribution program caused either a significant increase in agricultural production, or a reduction in the supply of food available for consumption in urban areas. We conclude with others[32] that a redistribution of agricultural income can generate neither a rapid nor a self-sustained increase in agricultural production, unless it is accompanied by an equal effort to increase the capacity to produce.

---

[31] Obtained by multiplying the corresponding transfer and allotment payment multipliers in Table 2, Van de Wetering, "The Potential Impact of Land Redistribution," p. 11, by the corresponding income transfer of $50 million and annual allotment payments of $14.8 million.

[32] Edmundo Flores, "Issues of Land Reform," Journal of Political Economy, 78, no. 4 (Supplement to July/August 1970), pp. 890-905; Solon L. Barraclough, "Agricultural Policy and Land Reform," ibid., pp. 906-947.