

Productivity-Wage Gap and Surplus Appropriation in Nepalese Agriculture

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INTRODUCTION

The three pronged aims of economic development in Nepal during 1980-2000 are as follows:

- i. to increase the growth in production,
- ii. to increase gainful employment and
- iii. to fulfil basic needs of all people by the turn of century.

These aims have got their concerted quantitative expressions in the recently published Basic Needs Programme (BNP), (NPC 1985 and 1987).

Against such developmental orientation and macro-economic setting, here our concern is with inter-sectoral rates of growth in output and with the income of the rural poor. The BNP has envisaged following annual rates of growth in output during 1985-2000 period: agriculture 3.5 percent and non-agriculture 8.4 percent such that the GDP would increase at the rate of 5.7 percent. As far as redistribution of this income is concerned, there appears to be implicit reliance on the classical macro-economic postulate that supply would create its own demand.

However, it needs to be seen that whether or not sufficient marketed surplus would come from agriculture to support the rate of growth of industry and allied sectors well above twice its own growth rate, whether this would leave back in agriculture output and income needed to fulfil the basic needs of all the people there. And more particularly whether the increase in agriculture production would also increase the farm wages, given the choice of technology as earlier and leaving the institutions and structures of economy intact.

METHODOLOGY

The issues outlined above has been analyzed in the following four stages:

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- i. inter-sectoral income terms of trade,
- ii. Wage-productivity relation in agriculture,
- iii. land ownership and its tenure and
- iv. inter-sectoral wage relations.

Terms of Trade

The forward linkage of agriculture namely the supply of raw materials for manufacturing industry and for export has been well emphasized in the Nepalese development planning. In this regard, this paper shall frequently make use of two concepts viz. the marketed surplus (M) and the traded surplus (T) of agriculture.

The arithmetics involved in these two concepts are as follows:

$$M = Q - C \quad \dots \quad \dots \quad \dots \quad \dots \quad (1)$$

$$T = X - M \quad \dots \quad \dots \quad \dots \quad \dots \quad (2)$$

where

Q = Output of agricultural sector

C = Consumption of agricultural sector out of its own output

X = Exports of agricultural sector

M = Imports of agricultural sector.

Various statistical relations lying behind these two apparently simple identities have been dealt separately. This paper only tries to explain the trends in agricultural surplus in relation to changes in labour productivity of agriculture and farm wage rates.

Productivity-Wage Gap

Firstly, one would expect some positive relation between wage and productivity. This means that if output increases wage income also may be expected to increase, most of which, in turn, is allocated for subsistence consumption. On the other hand, the strategy to siphon-off more surplus from agriculture might have to rely on increasing the gap due to excess of production over consumption.

As labour is the fundamental productive resource, the agriculture output is some 'q' function of labour. That is

$$Q = q(L) \quad \dots \quad \dots \quad \dots \quad \dots \quad (3)$$

Likewise, the subsistence consumption of agriculture product (C) is some 'C' function of wage-income (W). That is

$$C = c(W) \dots \dots \dots (4)$$

The difference $Q - C$ is the agricultural product surplus available for reinvestment, use in industry or for export as noted above.

Here the use of labour input as common denominator of aggregate production provides a single most comprehensive indicator of agricultural productivity of labour (P_1). For the present purpose, the labour productivity has only been approximated as follows:

$$P_1 = \frac{\sum Q_i}{\sum L_i} \dots \dots \dots (5)$$

where,

$\sum Q_i$ = Sum of all crop outputs (i) in kg.

$\sum L_i$ = Sum of all labour employed in days in order to produce the output.

Thus the changes in productivity of labour (P_1) and wage rates (W) over time can be compared.

This situation is represented in Figure 1. Here it is assumed that all the wage income goes to consumption. The total product curve is given by OP and its corresponding marginal product (MP) and average product (AP) curves are presented just below that. The total wage line (subsistence wages) is given by OW which is equal to the average wage (AW) times employment (OL). The product surplus available for reinvestment, or for whatever use, is given by the difference between OP and OW. This can be maximized at the employment level = OB, where MP = AW. To begin with in the graph, there is no production and, hence no surplus. On the other end, average productivity is equal to average wage none of which, by assumption, could be saved. Here surplus can be increased by shifting up productivity (MP or OQP) and by pushing down wages (AW or OW).

In the present study, the direction of change in productivity and wages has been worked-out from the reports on National Farm Management Study of 1968/69 and 1983/85.

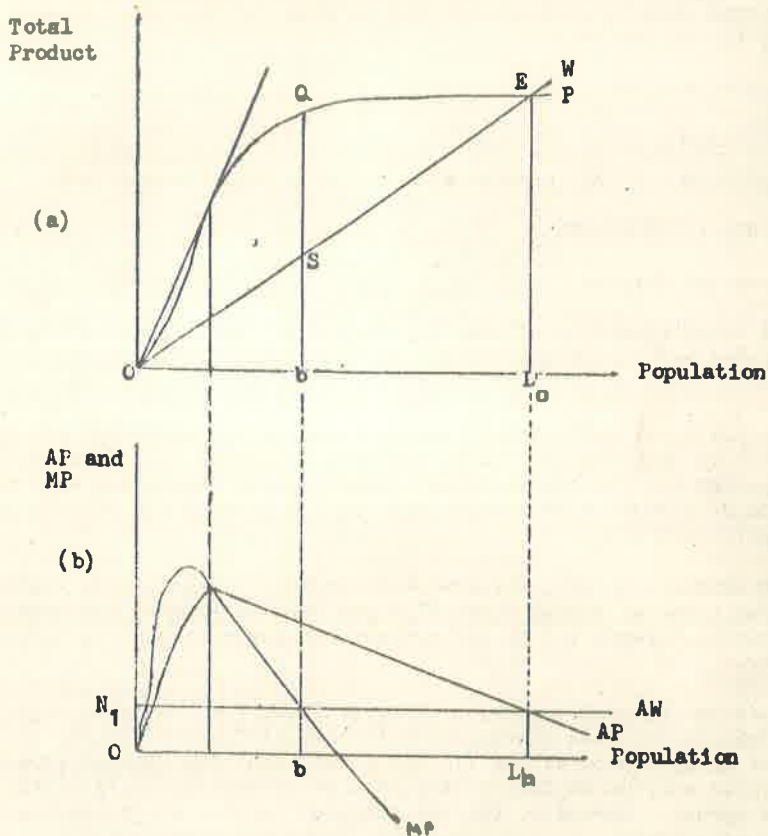
Land Distribution and Wages

If an increase in productivity does not push wages up, one may search for the causes of latter's decline, partly in the abundant supply of labour and in the increase in the concentration of land owned.

Some changes in agrarian structures during 1961 to 1981 has been examined by reviewing land concentration and incidence of tenancy.

The Gini-index of inequality of area of holding has been calculated by using the following trapezoidal formula

Figure 1 : The Emergence of Agricultural Surplus through Changes in Productivity and Wages.



$$G = 1 - \sum (x_i) (z_{i-1} + z_i)$$

where x_i is the proportion of i th class of households and z_i is the corresponding cumulative proportion of area reached at the i th class of holdings.

The point being underlined here is that the income terms of trade and the Ginni-index of inequality of wealth move in the same direction, that is their covariability over time and space is positive.

Inter-sectoral Wage Relation

Agriculture provides not only surplus product but also surplus labour for use in, say, industry and allied sectors. Thus if wages in industry are higher, more of labour will be pulled out of agriculture and eventually the employers of labour in agriculture would have to bid up wages there. That is wage rate in agriculture (W_a) is some 'w' function of wage rate in industry (W_i) as follows:

$$W_a = w(W_i) \quad \dots \quad \dots \quad \dots \quad \dots \quad (7)$$

This relationship has been estimated from the data on sectoral wage rates (1978/79 - 83/84) made available by the Nepal Rastra Bank.

RESULTS AND DISCUSSIONS

Production and Surplus

The trend behaviour of some parameters of terms of trade between agricultural and industrial-and-allied sectors have been presented in Table 1.

The parity of agricultural prices relative to industrial prices, called the barter terms of trade, has been declining by 0.9 percent. And more importantly, the agricultural production per capita has been falling down from an already subsistence level at the rate of 0.8 percent per annum, more regularly.

But on the contrary, the marketed surplus of agriculture (called the net income terms of trade) shows high and secular growth: its rate of growth varies between 2.3 to 3.2 percent per annum with 90 to 95 percent stability.

Likewise the traded surplus of agriculture i.e. sectoral exports net of imports has been growing both in absolute amount (23.5%) and as a percent of agricultural GDP (14.3%). Note that the rate of growth of agricultural surplus is faster than that of production (1.7%) even in absolute amount. Secondly, the agricultural surplus is increasing even on per capita basis.

Wage-Productivity Gap and Emergence of Surplus

It will be seen below that in Nepalese agriculture at the aggregate level (i) wages have not increased even when the labour productivity has gone up, and (ii) the increase in agricultural surplus as noted above might have emerged from the phenomena of rise in productivity but fall in wages.

Table 1
Growth in the Terms of Trade and Surplus 1964/65-1981/82

Particulars	Annual Growth Rate %	Coeff. of Stabi- lity of trend $0 < R^2 < 1$
1. Population in Agriculture ¹	2.14 to 2.79	
2. Agricultural production	1.70	0.87
3. Agricultural production per caput	-0.80	0.59
4. Gross income terms of trade	0.80	0.28
5. Barter terms of trade	-0.90	0.33
6. Net income terms of trade		
Under constant APC assumption ²	3.20	0.89
Under variable APC assumption ³	2.30	0.95
7. Inflow in agriculture under the assumption of variable APC		
Domestic and imported indus- trial commodities	-1.07	0.16
Imported Agricultural Commo- dities	0.01	0.06
8. Agricultural sector 'traded surplus under the assumption of variable APC		
Agricultural surpluses in absolute amounts	23.51	0.82
Agricultural surpluses as percent of agricultural GDP	14.27	0.59

Notes: 1. The population growth rate has been represented by convex quadratic function which means that the growth in labour force has been accelerating. For the population growth rates during the past three decades (1952 - 1981) have been 2.04, 2.29 and 2.67 percent per annum respectively.

2. The average propensity to consume agricultural product by a person in agriculture is 0.70; his APC to consume industrial products is 0.30. The APC of agricultural commodity by a person in industrial and allied sectors is 0.60.

3. The average propensity to consume agricultural product by a person in agriculture is allowed to vary between 0.65 to 0.86 depending on fluctuations in production. And his APC to consume industrial products get adjusted accordingly. Likewise the APC of agricultural commodity by a person in industrial and allied sectors is allowed to vary between 0.50 to 0.65.

Source: Thapa and Aryal - "Inter-Sectoral Terms of Trade in Nepal" Forthcoming, CNAS.

The panel data from the two National Farm Management Studies (1968-69 and 1983/84) have been assimilated here in Tables 2 and 3 to obtain a comparative static picture of productivity and wages. Its gist is that productivity has increased by something like 23 percent from 11 kg to 14 kg of foodgrains per labour day used while, on the contrary, wage rate in terms of paddy equivalent has fallen down by nearly 27 percent from 3 to 2 kg.

Coming to the relationship between the marginal productivity and wage rate, it may be noted from the diagram above (Figure 1) that in the first zone of production, the marginal productivity is not only more than the average productivity as long as the latter is rising but also that it goes on rising, except at a very latter stage in that zone. Its straight forward implication is that the wage rates too should have gone up. But the evidences suggest that despite upward shift in the frontiers of production curve (OP), the line of wage level (OW) has been pushed down, thus paving the way to increased surplus appropriation over the years which, in this case, is more near to the generic concept of appropriation or realisation of the surplus value.

Concentration of Land and Appropriation of Surplus

Increase in the inequality of land has probably contributed to two things; decrease in the farm wage rates and increase in agricultural surplus even when production per caput has fallen down.

As the wages have not picked up with the increase of productivity it seems plausible to hypothesize that wages have fallen down because of increasing concentration of land holding vis-a-vis the accelerated growth of labour force.

Changes in the agrarian structure during 1961-81 has been summed-up in Table 4. It shows increasing articulation of bimodal agrarian structure over the years. That is the distribution of labour and of land fall widely apart. The large farmers grow cash/industrial crops and superior food grains; this is almost in contrast to the land use pattern of the small farms.

Even though the average size of holding has increased marginally, the incidence of land renting has declined from one quarter to just twentieth and the Gini-coefficient of inequality of area of holding has gone up from 0.639 to 0.692.

Finally, Rudra has rightly remarked that increase in the inequality of surface area of land is only a physical aspect. Because the use of focus strategy of agricultural development, as distinguished from the dispersal strategies, increases the productivity of land belonging to the landlords much faster than that of the peasants; in the latter case, the productivity of land may even decline as is the case in most of the Hills and rainfed Tarai.

Table 2
Changes in Labour Productivity of Agriculture

Particulars	Unit	Time Span		Change %
		1968/69	1983/84	
1. Foodgrains:	Kg/labour day employed			
Mountain		-	10.15(11.10)	
Hill		10.44	11.69(13.58)	
Tarai		<u>12.91</u>	<u>17.34(18.26)</u>	
		11.31	12.56(13.80)	+11.05(22.72)
2. Milk:	Litre/labour day employed			
Hill		-	0.99	
Tarai		-	1.41	
3. Egg:	Nos./fowl/year			
Mountain		-	72	
Hill		56	81	
Tarai		<u>50</u>	<u>84</u>	
Country		52	81	+ 55.77

Note:

- (1) Crops included for 1968/69 are paddy, maize and wheat only.
- (2) Crops included for 1983/84 are paddy, maize, wheat, millet, upland paddy, buck wheat, naked barley, barley, lentil, black gram, pigeon pea, gram, grass-pea, mustard and linseed.
- (3) The figures within parentheses includes only three cereals and make it comparable with that of 1968/69.

Source: Worked out from various tables in DFAMS (1986) & MOFA (1971).

Table 3
Changes in Agricultural Wage

Particulars	Unit	Time Span			Change in 15 yrs (%)
		1968/69	1976/77 ¹	1983/84	
Money wage: Rs/day					
Mountain ²		-	-	12.0	
Hill		3.21	4.17	11.78	
Tarai		4.07	5.07	11.67	
Country ³		3.70	-	11.74	
Real wage: Paddy equivalent kg/day ⁴					
Mountain		-	-	-	
Hill		3.04	2.15	2.09	(-) 31.25
Tarai		<u>3.39</u>	<u>3.24</u>	<u>2.94</u>	(-) 13.27
Country		3.27	2.76	2.40	(-) 26.60

Notes:

1. The wage rates for 1976/77 are from Islam (1984).
2. The money wage is the average of five districts (Bajura, Jumla, Rasuwa, Solukhumbu and Taplejung).
3. The country average of wage rate is for Hill and Tarai districts only: their number in 1968/69 and 1983/84 is 14 and 15 respectively.
4. Money wages are converted into real wages by using the retail prices. The retail prices of coarse rice during 1983/84 were Rs. 7.79, Rs. 5.47 and Rs. 6.75 per kg for the Hills, Tarai and country, respectively. Here the milling efficiency is assumed to be 62 percent. The average retail price of paddy in 1968/69 was Rs. 1.20 per kg; here it is assumed to be the price in Tarai. During that year the consumers, price index for the Hills, and Tarai with base 1961/62 = 100 was 136.8 and 156.0, respectively. Using these as adjustment factors, the retail price of paddy in hill and for the country as a whole has been worked out to be Rs. 0.88 and Rs. 1.13 respectively.

Source: Worked out from MOFA (1971), DFAMS (1986 & 1985), MOF (1986) and Islam (1984) for the wages in 1976/77.

Table 4
Changes in Land Tenure 1961-81

Particulars	1961	1971	1981
Holding size (ha.)	1.09	0.97	1.12
Land renting (%)	25.47	15.86	5.91
Gini coefficient of distribution of area of holdings	0.6389	0.6187 (0.688)	0.6918

Source: 1. Worked out from CBS (1965, 1975, 1985 and 1986) and Zaman (1972).

Note: The Gini-coefficient within the parenthesis for 1971 has been worked out from the data provided by Zaman (1972).

In this context, Johnston and Tomich observed that this large scale sub-sector tends to produce a large marketable surplus over family needs, and accounts for most of the commercial output. But since domestic commercial market is limited, the purchasing power constraint will be intensified for the overwhelming of farm households and they resort to the production of exportable cash crops. On the other hand, the focus strategy does to a considerable extent preempt the possibility of achieving significant and widespread modernisation of farming technique among the great majority of small farm units. Andrews and Janvry called it as the increasing articulation of Recardian Political Economic Structures.

The above discussion leads us to the far reaching conclusion drawn by Amartya Sen that, under the present system of entitlement and exchange, production and hence the supply of food may increase but owing to the alienation of labour from land and fall in the share of wages in income, effective demand of people does decline, the co-existence between the abundant supply and famines can recur and, thus, the agricultural surplus ought to rise because of fall in consumption as also due to increase in the concentration of wealth.

Farm Wages and Industrial Wages

It appears that the farm wages are determined partly by the local landlords (oligopsony) and partly by the industrial wages: the latter, in turn, are administered through the Labour Acts.

In Nepal, industrial wage levels are administered and regulated through a series of legislative acts. So the involvement of the government, and the classes who influence it most, in the determination of wages is direct.

There is no such act regarding agricultural wages. However, NPC (1983) shows that in agriculture 69 percent of labour is under-utilized, that is the supply of labour in agriculture is abundant. Hence the absence of acts on rural wages *ipso facto* mean that the landlords have been given a good deal of free hand to determine the wage rates from the demand side. The interlocked, phased and segmented nature of markets such as that of labour, money, food and inputs could further reinforce this situation.

Here it may be specially noted that even as late as 1981, economically active labour force dependent on agriculture was as high as 91 percent. Had the migration of this labour from agriculture to industry been high, it could send back waves of positive changes in the agricultural wages. But if the wages in industry are relatively frozen by way of Acts, this could freeze the wages in agriculture too.

The real wage rates in agriculture and industry combined (Table 5) have been declining by 2.8 percent a year. Further the data shows that the real wage rate in industry for unskilled labour declined far rapidly by 6.31 percent per annum.

Table 5
Trends in Aggregate and Industrial Wages, 1978/79-1983/84

Wage and Price	Mean wages rate (Rs./day)	Growth rate % per annum	Coefficient of determination R ²
1. Industrial wages of unskilled labour (Nominal)	9.17	4.75	(0.73)
2. Aggregate wages rates including farm labour	9.29	8.29	(0.97)
3. Urban consumer price index (1972/73=100)	-	11.06	(1.00)
4. Aggregate wages in 1972/73 prices	4.60	(-)2.77	(0.81)
5. Industrial wages of unskilled labour (Real)	4.55	(-)6.31	(0.86)

Source: NRB (1984), Idem (unpublished) for wages.

The results of regression of agricultural wages (AW) against industrial wages (IW) for a period of 1978-84 are as follows:

$$W = 5.78 + 0.37 W_i$$

$$t = 3.66$$

$$R^2 = 0.76$$

It shows that when there is Rs. 1.00 increase in industrial wage rate, the wage rate in agriculture increases by Rs. 0.37. Both the t-statistics of significance (3.36) and the coefficient of determination (0.76) are impressive.

The decline in wages in the industrial sector at a rate faster than the decline in wages in agriculture discourages the labour migration from rural to urban areas. It has therefore successfully enforced decrease in wages.

CONCLUSION AND RECOMMENDATIONS

The main conclusions are as follows:

- i. It is instructive to minutely examine the contradictory relation between the fall in agricultural production per capita at the rate of 0.8 percent per year from an already subsistence level and the rise in the marketed surplus as well as the net traded (export minus import) surplus at the rate of 2.3 to 3.2 percent and 23 percent per year, respectively. The imperatives of examining the causes of this apparent antagonism take us a long way to examine how the basic agrarian structure is being remolded to increase the marketable surplus of agriculture, and for that matter how the mass consumption is being cut down.
- ii. Even though the rate of growth of labour force in agriculture, as approximated by population growth, has accelerated from 2.1 percent to 2.8 percent a year, most of the labour - the fundamental productive resource - has been alienated from land by reducing the incidence of tenancy from 25 percent to 6 percent of cultivated land and by increasing the Gini index of inequality of area of holding (owned + rented) from about 0.64 to 0.69. Obviously this leads to the under-employment of labour power.
- iii. The labour productivity of agriculture, measured fairly as the aggregate of grain production against the comprehensive denominator of labour use, has increased from 11.3 to 15.5 kg but the wage rate, measured as paddy equivalent kg per day, has fallen from 3.3 kg down to 2.4 kg. Likewise the aggregate wages, measured as the simple average of agricultural wages and industrial wages, have been decreasing at the rate of 2.8 percent a year. While the wage rate of industrial unskilled labour has been falling down by 6.31 percent a year. Thus the alienation of labour both from its product, the grain, and the means of work, the land, as seen above implies that

the level of mass consumption has been going down. But in face of it, the product surplus is rising up.

- iv. Thus summing up the basic themes from above features, the agricultural surplus (marketed or net of sector's exports minus imports or net of production minus consumption) has been rising, and it is principally because of the two trends: (i) growing enclaves of commercial farming by agro-industrial oligarchy amidst the broad continuum of subsistence farming and landless labourers and (ii) widening gap between the rise in labour productivity but fall in the wage income and mass consumption. These trends through-up a panorama such as increasing surplus, decreasing mass consumption and recurring famines.

Following from this, some of the policy alternatives could be as follows:

- i. A land reform programme designed to promote peasant farming and consolidation of uneconomic holdings through cooperatives, and application of wide spread dispersal technologies in lieu of pocket oriented focus strategies would raise land and labour productivity at a faster pace without a substantial investment outlay by the state. In fact, it may increase productivity of labour without incurring much of capital cost and also provide a built-in-mechanism for redistribution of consumption.
- ii. Growth of industries should be hastened to absorb the surplus labour and product of agriculture and the agro-industries should be organised on peasants' union or cooperative lines; and
- iii. Agricultural Wage Acts should be stipulated and the labourers should be encouraged to rally round an organisation of their own.

These measures can ensure increase in surplus production as well as increase in mass production.

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