The Economic Journal of Nepal
Vol. 1 No. 4, Oct. 1978 EEC-TU

The Estimation Of National Economic Parameters For Shadow Pricing Of Projects In Nepal

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General Summary Of National Parameters For Shadow Pricing

The following summary tables show estimates of the derivation of shadow prices, some of which are fully explained in appendices 1 and 2. In the first table are parameters and weights directly applicable to shadow pricing of project cash flows. In the second table are secondary parameters which are required when the analyst himself has to calculate a shadow price parameter. In the first table the parameters are divided into (a) Efficiency prices (b) Social prices. The analyst should use either (a) or (b), (b) represents the fully elaborated price, and is recommended as superior to (a).

The parameters listed here are a full set of the most important estimates required. A number of others are also required however for the system to become operational; in particular conversion factors for certain categories of traded goods (e. g. capital equipment) and non-traded goods and services (e. g electricity, transport, construction) are required. In the absence of such data the analyst has to make his own estimates. For many traded goods, this is in fact preferable, and involves as a general rule simply using C. I. F. prices (+internal transport and distribution costs) or FOB prices (-transport and distribution costs) for importables and exportables respectively.[1] However, there are cases where a conversion factor is useful (especially for nontradeables) and CF's will be estimated in due course.

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* David A. Phillips, Economic Advisor, Industrial Services Centre, acknowledges the help provided by J. Rayamajhi and D. Gurung of ISC., BP Risal and BB Pradhan of Nepal Rastra Bank, and Nepal Food Corporation in preparing this report.

1 This is for a situation in which the country's exports and imports are not large enough to influence the level of world prices. For Nepal this is realistic in all case.

The guideline manual for use of these parameters is under preparation. This will contain a set of CF's and revised estimates of CF's estimated in this report.

Table 1 National Parameter Estimates

1.	Standard Conversion Factor[1] (SCF)	0.8
	SCF for Indian Currency Trade	0.87
	SCF for Convertible Currency Trade	0.68

2.	Shadow wage; unskilled labour[2]	Kathmandu/Terai.	Hills.
	General efficiency wage	0.48	0.55
	General Social wage	0.76	0.78

3.	Shadow wage;	skilled labour	(Tentative).	Efficiency	Social
	Shadow wage;	permanent agricultural paid labour	(Tentative).	0.8 0.61	0 8 0.85
	Seasonal agricultural	paid labour	(Tentative).	1.23	1.23
	Casual urban labour, other wise wholly unemployed.		(Tentative).	0.	0.23

4.	Accounting rate of interest; discount rate	9%	6.5%

Table 2 National Parameter estimates

1.	Shadow price of savings, investment and public income (v)	1.67

1 In principle SCF's should be estimated in efficiency[1] and 'social' terms This would be practical with nontradeables, but considerable difficulty would occur with traded goods. It is anyway unlikely that the modification would be significant.

2 For more detailed estimates see appendix 2.

2.	Consumption weights (d) (indicative)		Kathmandu, Terai	Hills
	Skilled workers		0.58	0.64
	Workers (permanent)		0.89	0.97
	Low income Tenant farmers, casual labour		1.33	1.47
3.	Consumption Coversion factor	(B)		
	Weltheir comsumer.	(Rs. 1500 per Worker per month) Bw		0.95
	Average consumers	(Rs. 600–750). B		0.99
	Poorer consumers	(Rs. 150–300) Bp		1.01
	Very poor	(Rs. 150- or less)		1.03
4.	Agricultural production conversion factor	a		1.23
5.	Non-agricultural production CF. use SCF			0.8
6.	Individual CF's (tentative)[a]	price		1.15
		paddy		1.38
		wheat		1.05
		maize		0.96
		pulses		1.04
		potato		0.96
		milk		0.97
		meat		1.0
		oil		1.025
		ghee		1.0
		synthetic textiles		0.4

Note:

2 These CF's should only be used where the commodities involved are not major inputs or outputs for a project. If they are, then they should be estimated directly using world prices.
(See above this section)

Economic Parameters for Project Social Cost Benefit Analysis

Introduction

1. The Rationale of Social Cost Benefit Analysis (SCBA)

The general rationale for SCBA is to provide an estimate of the impact of a project on the national economy. Because of the structural underdevelopment of poorer countries, the impact is unlikely to be reflected in market price profitability, based on the market price of inputs and output. Distortions in market prices are introduced by tax subsidy and tariff measures, monopolies, fixed exchange rates, imperfect or non-existent capital markets, dual markets for labour, capital etc. over capitalisation in the modern sector due to internotional investment, and a host of other factors. Distortions also apply in industrialised economies, but as a general rule relatively competitive markets exist and market prices are a more realistic reflection of real costs and benefits.

In SCBA price adjustments are made for primary factors of production, labour, capital, and foreign exchange, which enter into the production of all foods and services. The adjustments are based on estimates of real cost to the economy, sometimes known as opportunity costs or efficiency values. In addition adjustments may be made according to the potential for the project to generate savings, or income to different groups of consumers (rich and poor).

In effect the procedure is supposed to trade off a number of development objectives, such as employment generation, increase in local value-added, savings generation, and redistribution of income towards the poor. These are common objectives in developing countries. Some of them may be conflicting; SCBA ideally permits a quantitative trade-off between conflicting objectives.

While elaborate methodogies as for project analysis may not be generally welcomed to planners, in principle it appears to be quite justifiable that a procedure incorporating objectives beyond private profit should be adopted by planning agencies, At the same time it should be accepted that investment decisions in the public interest often require political judgements which cannot be sensibly quantified and which are better left to the political bargaining process,

Up to now, no systematic attempt has been made to introduce economic parameters for shadow pricing in Nepal. A number of previous attempts which have

been made, have been normally relatively crude, and adhoc. That is they have been carried out for specific project studies in isolation from each other at different times. Neither the parameters used nor the approach adopted have been standardised, with the result that investment decisions would not necessarily be improved. Among the previous attempts were the following: (1) ISC paper mill (2) ISC dry cell battery project (3) Public Enterprise study; methodology (4) Road construction project (5) Khumbu Valley Tourism Project (6) Western Rapti Zone multi-purpose project. Of the above attempts (5) & (6) used crude adjustments based on cursory analysis of possible economic efficiency factors. Both for example suggested that the official exchange rate should be applicable. The paper mill study (1) used generally the same procedure as (5). For (4) a rather more elaborate analysis based on the UNIDO approach was tried, particularly for the shadow wage rate; however other parameters were estimated in a more rough and ready manner, and the discount rate was not subjected to any analysis. In the case of (3) an attempt was made to calculate parameters using the UNIDO approach, but again in a fairly superficial fashion. In the case of (2), the dry cell bettery project, a detailed attempt was made, also using the UNIDO approach.

To illustrate the diverse results of these, we may sumarise the parameter estimated, as follows:

Table 1

Study	Estimated Exchange rates		Estimated Shadow wage ratio	Estimated Discount rates
	Indian Rs. Convertible		(unskilled)	
1.	1.0		0.5	NA
2.	1.043	1.318	0 51 0.42	10%, or 20%
3.	1.145	1.455	0.652	10%
4.	1.2		various	10%
5.	1.0		0.75	5%, or 10%
6.	1.0		0.0	10%

Clearly, SCBA will be of little use unless a uniform approach and estimates can be introduced. It is hoped that this paper will provide the basis for such an approach for ISC, and conceivably forout side organisations.

2. The Methodology

The methodology used in this paper is that of the World Bank, originally proposed in 1975. (see Bibliography). This is an extension of the OECD approach (otherwise known as Little-Mirlees method). It is distinct from the UNIDO method in that it uses as the basis unit of account what is known as 'government income, (or savings), at world prices', rather than the UNIDO unit of account 'aggregate consumption in domestic prices.'

These are a number of reasons why this method is proposed. They are as follows:

1. This method is the latest and has a full elaborated methodology for incorporating income distribution weights into the account of the project, if this is thought necessary.

2. Since it is in principle an extension of Little-Mirlees mothod, it will be understood relatively easily by those already acquainted with the latter.

3. It appears that this approach is likely to become more widespread than UNIDO system, and is used already by a number of aid agencies with whom Nepal is dealing-in particular: World Bank and IDA. The British, West German and Indian government also appear to favor this approach (currently in the Little-Mirlees version).

4. The UNIDO system has certain practical difficulties in estimation for example of output values in domestic prices, and in calculation of savings rates for project income earners. The World Bank system seems to be practically easier, once the possibly more difficult conceptual framework is understood.

5. Theoritically the proposed method is more flexible in that it uses what in effect are multiple exchange rates through valuation of each input and world prices. In Nepal, given the divergent behaviour of Indian and convertible currency trade, and the scarcity of reliable aggregate trade data, a case-by-case approach to exchange values appears to be required; the method proposed allows this if necessary. The UNIDO approach uses a single 'shadow exchange rate.'

6. The use of world prices in on open economy is relatively simple. Since industrialization in Nepal is likely to be export and import-oriented this approach is practicatly convenient. It should be noted however that this valuation system does not necessarily imply that an open economic structure is favoured.

3. Updating and Additional Research

The parameter estimates are preliminary, but it is hoped that they are realistic, and it is probable that given the data availability they are "best estimates" for the time being.

At the same time it is no doubt likely that, with more detailed research, modification and improvements will be made. The appendices of this paper set out the data and analysis used in making the calculations. It is important that any weaknesses of either data or analysis, or econamic logic, are aired and put right and it is hoped that all interested individuals or organisations will help in improving the estimates, if necessary.

Annual updating of estimates is necessary. Whereas the parameters may not change from year to year, it seems likely that changes in trade policy, and economic policy in general, plus evolution of the economy, will have effects on the parameters over time.

The full range of parameters has yet to be estimated. Work is continuing on the estimation of specific conversion factors for non-tradeable commodities, where analysis will have difficulty, in establishing world prices. Certain important traded goods may also have separate analysis carried out. The object of this work is to make the system operational. The parameters so far estimated do however, constitute the full set of basic parameters required for SCBA.

Further research is likely to be fruitful particularly in the micro-economic sphere, for example in estimation of discount rates and savings shadow price, and in the calculation of individual and group conversion factors.

4. The Uses of the Parameters

The parameters are presented in two forms, (1) Efficiency prices (2) Social prices.

Ths latter include adjustments for savings and distributional impact of projects It is possible that efficiency prices alone could be employed in SCBA. This would be justified if it was decided that HMG should handle savings and distribution problems directly, through the tax system, monetary policy, land reform etc, and such objective should not be taken into account in project appraisal, It is also possible that savings and distribution objectives could be incorporated separately (either savings or distribution) by setting the relevant parameter equal to 1.0. This type of decision, and indeed the whole decision on when use of shadow prices inappropriate, and which organisation should supervise their use, requires central coordination.

5. Manual of Guidelines for SCBA

This paper constitutes one part of a wider manual for SCBA. The practical use of these parameters within a cost benefit analysis will be the subject of the second part, to be prepared as soon as possible. The report will also contain a complete list of commodity and service conversion factors.

6. Government Coordination

From the above points it is clear that contral coordination of project analysis is necessary, to ensure uniformity of approach, assumptions, and data utilisation. Such a coordinator would presumably be best located in an agency such as the National Planning Commission. ISC's current contribution should ideally be regarded as a pilot project leading to full adoption of a system in due course.

7. The use of SCBA is not intended to constitute a complete answer to the question about whether or no to go ahead with a project. There are certainly conceptual difficulties and unquantifiable impacts. However the use of the methodology can lead towards the systematic planning and analysis of project within specified development objectives.

8. Bibliography

1. Nepal Studies

The following studies have included, in summary form, or in detail, attempts at estimating national parameters for Nepal.

"Micro study of public enterprises in Nepal" Draft report 1976. CCC/ISC

Western Rapti Multipurpose Project; prefeasibility study, Vol 1. June 1976 Lahmeyer International.

"Comparative evaluation of road construction techniques in Nepal" CEDA/ILO 1974-H. Rieger, B. Bhadra.

"Khumbu Region Tourism Study" ISC/World Bank, June 1976.

Feasibility Study on Dry Cell Battery manufacture – ISC 1977 (B. B. Thapa)

Feasibility Study for paper mill – ISC 1977 (A. R. Pandey)

Trail Suspension Bridge feasibility study – UNDP

2. General Studies (Published)

The following sources constitute a representative selection of literature, mostly of a theoretical nature. To this writers knowledge, no general text book of guidelines have yet been produced which sets cut fully and clearly either methodology or procedure in non-technical terms. "A guide to project appraisal in Developing Countries" Overseas Development Administration, London (1977).

"Project appraisal and Planning for Developing Countries" I. Little and J, Mirlees (1974).

"Economic Analysis of Projects" L. Squire and H. Van Der Tak (World Bank 1975).

"Guidelines for project evaluation" (UNIDO 1972)

"A practical guide to project analysis" M. Roemer and J. Stern.

"Project appraisal in practice" M. Scott, J. Macarthur and D. Newbery. (Heinemann 1976).

"Using Shadow prices" M. Scott (ed) (Heinemann 1976).

In addition, the World Bank have produced a mimeographed paper on "economic analysis in DFC subprojects" which is a supperficial but simple account of the procedure. A further manual is also available, but its' title is unknown to me.

Appendix – 1

Standard Conversion Factor

In this section 3 SCF's will be computed; (1) general SCF (2) overseas trade SCF (3) Indian trade SCF.

The standard conversion factor is the inverse of the 'Shadow exchange rate'. It is a general estimate of the extent to which Nepal's domestic prices differ from Indian, or world prices of goods, the difference being caused by tariffs and taxes on trade, and by import quotas and controls, which cause domestic prices (net of internal transport and distribution costs) to diverge from import prices for goods.

These are two principal methods of calculating the tariff distortion effect. The quota and control effect are more difficult to calculate unless it can be established what consumers would be 'willing to pay' in a free market. This is in practice difficult because it requires a knowledge of demand conditions for each commodity, and specifically the elasticity of demand. The SCF would in principle be based on the following:

$$SCF = \frac{Ro}{1 + {}^{t}m - {}^{t}x + {}^{q}m} \quad (1)$$

Where Ro = official exchange rate (=1.0)

${}^{t}m$, ${}^{t}x$ = tariffs taxes and subsidies on imports and exports

${}^{q}m$ = rate of quantity restrictions on imports.

One approach to calculating tariff distortion which may or may not capture quantitative restriction is represented by the expression $\sum_{i} fi \frac{WP_i}{DP_i}$ for all i trad goods (2).

Where,

WP_i is world price of i^{th} good

DP_i is domestic price of i^{th} good (net of internal transport and distribution cost

f_i is a weight based on the share of i^{th} good in total trade.

Here data for a large number of individual commodities is required. In this formula quantitative controls would be to some extent taken into account if we asume that

the DP_i's reflect local consumers' willingness to pay. (This would be the case if inter-alia there was no price control, or price manipulation by traders government, or monoppsonistic consumer behaviour). The data required for most individual products traded has not as yet been collected. Consequently a second method, more approximate, is used firstly here to estimate tariff distortions. This is the 'weighted average of tariff' method. In addition some intuitive analysis is made of import control effects by analysis of the export bonus scheme, (scrapped in March 1978). One difficulty is that has been suggested that the tariff structure of the country is more a revenue raising instrument than a trade distorting instrument e. g. it to not designed to provide protection to local industry etc. The existence of the open border with India in a fact makes protection particularly difficult, and 100./· import bans may in some cases be necessary in order to facilitate control. However, it is clear that certain tariffs do reflect trade conditions and policies. The existence of import bans, restrictive import licensing, and the bonus rate premium which existed up until recently, suggest that trade distortions do exist. In addition the balance of payments has been supported by capital inflows at low interest rates and grants. The relatively strong balance of payments situation over 1975–77 with a 3-year surplus of Rs. 250 million, or 4./· of the 3 year total of imports, has also concealed a deteriorating visible trade situation, worsening during 1977–8, which is likely to lead to a zero surplus in 1977–8. Furthermore, future prospects for visible trade suggest possible movement into overall deficit as exportable grain surpluses drop and industrialisation proceeds, unless invisible earnings undergo significant expansion.

1) The general SCF

A analysis of tariffs is used here as a starting point for estimation of the general SCF.

The relevant expression is:

$$SCF = \frac{M + X}{M\ (1+t_m)+X(1-t_x)} \qquad (3)$$

Where M = imports

X = exports

t_m = import tax rate

t_x = export tax rate.

The following data are relevant to the this calculation[1] :

Table — 1

(Rs. million)

	1974/75	1975/76	1976/77
Total exports	890	1158	1169
Total imports	1814	1982	1987
Import Duty	182	205	220
Indian excise refund	108	112	116
Export Duty	31	38	50
Misc export tax[1]	8	4	5
Internal excise on exports	*	*	*

* Approximated by applying 5.5% estimated excise rate on industrial gross output to all non-primary exports.

Source: Rastra Bank Quarterly Economic Bulletin 1977.

In order to allow for the comflicting estimates of trade (from customs dept., Rastra Bank, and commerce department) which seem to conflict largely in time sequencing rather than overall estimates, it is necessary to average out the data over the 3 years. Indian excise refund is treated as an import tax by HMG. The tax is levied in India but refunded to HMG. Individual enterprises pay the tax within the CIF import price of materials from India. Internal excise rebate in Nepal is a subsidy to exports to be balanced against export tariffs. This was estimated roughly from trade and excise data and amouuts to 1.1/· of total exports in 1976/7. We substitute into the formula the following data.

X (over 3 years)	=3217
M (" " ")	=5783
T_m (duty rate)	=0.105+excise refund rate (0.058)=0.163
T (tariff rate)	=0.042—local excise rebate (0.011)=0 031

1. A complication arises in the case of the rice export levy, which in 1976/7 amounted to 24,200 tons (about 23./· of total rice export). This acts in effect as a small subsidy to domestic prices, and would reduce the ratio of domestic to world prices for rice. However it amounts to only about 2.5./· of tatal domestic milled rice production and will be ignored here.

Substituting into the formula gives: $\frac{3217+5783}{5783\ (1.163) + 3217\ (0.969)}$

$SCF = 0.914$

The next task is to try to evaluate the effect of import controls. One way of approaching this is to examine the effects of the export bonus voucher market. This was a privately arranged market where overseas exports who gained foreign exchange entitlement were officially permitted to 'sell' their entitlement to traders who were importing from overseas. The selling prices reflected the demand conditions for different categories of foreign imports. The market has been officially allowed to exist for about 3 years up to March 1978.

Table-2

	Time-period	Extimate	Source
1. Overseas imports / Total imports	1974/5–1976/7	30.4%	Rastra Bank
2. Bonus imports / Overseas imports	1974/5–1976/7	19.0%	Rastra Bank
		20.1%	Commerce Dept.
3. Bonus imports / Total imports	1974/5–1976/7	5.8%	Rastra Bank
		6.1%	Commerce Dept.
4. Overseas textile imports / Total overseas imports	1974/5–1976/7 average	16 7%	Customs, excise dept.
5. Synthetic Textile imports / Total overseas imports	" "	13 1%	" "
6. Bonus imports textiles / Total overseas imports	1974/5–1976/7 weighted average	50.4%	Rastra Bank
7. Bonus imports textiles / Total overseas imports	" "	9.6%	" "
8. Total foreign currency spent on textiles / Total foreign currency expenditure per annum	" "	15.6%	" "

From the above table 2 it can be seen first of all (3) that imports under the bonus scheme represented only 6% of total imports into Nepal. The bonus imports

supply was restricted under the scheme by foreign currency earning on exports; two categories existed; under category 1 (mainly raw materials) a 45% foreign exchange entitlement was allowed on CIF export value (at destination based on sea freight); under category 2 (mainly processed and manufactured goods), 60% was allowed. Consequently if entitlement were fully taken up, one would expect bonus import value to be between 45% and 60% of total overseas export value. The average for 1974/5 to 1976/7, based on Rastra Bank data, is in 50.4%. This suggests that ettitlements were fully taken up and that there was possibly a high elasticity of demand for foreign consumer goods.

Since the market for bonus vouchers was free, the premiums reflected the demand and limited supply condition for certain foreign goods. It is not possible to ascertain however the elasticity of demand, which reflected both Indian and local conditions, so that it is not known how equilibrium price of bonus vouchers would fall as supply increased. The bonus voucher rates for individual items may be regarded as upper limits on the convertible foreign exchange preminium applicable in Nepal.

Bonus voucher premia over recent month are reportedly as follows:

Table-3

Rates	Late 1976	Early 1977	Mid. 1977	Early 1978	Projection
General rate (weighted average)	42%	120%	90%	72%	65–80%
'Luxury goods'		120		35	
'Essential goods'		145		85	
'Development goods'		80		35	

Source: Overseas Trade Association (Interview)

Under the scheme imports had to include at least 10% development goods, and at most 70% essentials and 20% luxuries.

Under the essentials category was included synthetic textiles. From table 2 (6) it can be seen that the textile group alone accounted for over 50% of bonus imports over 3 years, a proportion which was growing. This was equivalent (7) to 9 6% of

total overseas imports. Customs data (4) show textiles overall as comprising 16.7% of total overseas imports, while foreign currency expenditure on textiles over (3) years (8.) is recorded at a comparable 15.6% of total overseas imports. It is clear that textile imports from overseas were disproportionately highly represented within the 'bonus' category. In fact over 70% of the foreign currency bonus entitlement for essentials was spent on textiles, a proportion which in 1976/7 reached 78%[1] Within total textile imports from overseas, over 3 years, synthetics accounted for 78%. It is generally considered that textile imports under bonus were almost entirely of synthetics. The bonus voucher premium for 'essentials' therefore largely reflects the premium price which consumer (in India and Nepal) are prepared to pay for synthetic textiles. The luxury category including domestic electrical equipment, sound equipment, cosmetics, photographic equipment and smokers accessories, also carried high premia, although not as high as for essentials (i. e. largely synthetic textiles).

The effective foreign exchange premium for exporters based on the general bonus rate (weighted average of premia) depends on whether their exports carried the 45·/. or 60·/. bonus entitlement. For different periods effective rates worked out as follows (official rate=1.0).

Table-4

Effective exporters exchange rates

	Late	Early	Mid	Early
Category 1	1976	1977	1977	1978
45·/. bonus	1.19	1.54	1·405	1.324
Category 2				
60·/. bonus	1.252	1.72	1.54	1.432

Note: Exchange rate = general bonus voucher rate x entitlement ·/..

By using these as guidelines to real exchange rates, it is possible that a more accurate idea can be derived than for the more 'extreme' bonus rate.

1. There is furthermore reason to believe that there was under-invoicing of imports of synthetic textiles.

In addition to the bonus premium prevailing, products such as synthetic textiles also faced customs duties. Blended fabrics and synthetics were charged total duty of 73.1./· and 74.2./· of import value in 1976/7; luxury goods faced similarly high tariffs, particularly alcoholic liquor (225./·), domestic appliances, radios, cosmetics and cigarettes (60./· to 100./·). The imported cost of synthetics after duty and premium payment was made up as follows (early 1978); CIF cost (1.0) + (74./· x CIF. cost) + (85./· x CIF cost) =2.59.

On top of this, domestic sales tax was levied on a high estimated base price. We will not consider this tax however because in principle it was applicable at equivalent weight to both domestic and imported products.

A critical question of the real exchange rate is the extent to which such inflated domestic prices reflect Indian rather than Nepalese trade distortion and protection. Protective tariffs up until recently have been severe in Indian, including a ban on synthetic fabric imports. The severity of the ban obliged the closure of a number of synthetic fabric plants is Nepal, which had been exporting to India, after 1969, when annual production had reached 3.5 million metres. Currently operating capacity is about 0.5 million metres. It is not known exactly what proportion of synthetics import 'found its way' to India. Assuming however that it was significant, it follows that the premia for foreign exchange to purchage synthetics significantly overstated the premium that would have been applicable if the Nepal market was alone accessible. The same applied to the luxury goods category. The fluctuation in the bonus rate can in fact be traced partly to recent political changes in India (e. g end of the the emergency when border trade became freer) as well as seasonal factors and domestic policy changes in Nepal. This suggests that the Indian market was of considerable importance.[1]

Interviews with the OTA shortly before the abolition of the scheme indicated and expected medium term general bonus rate of 65./· to 80./· (mean 72.5./·). It may be considered that this rate, plus the average tarriff rate on imports of 16 3./·. (=88.8./·) constitutes the lower bound for the general SCF, or upper bound for the

1 A current ISC study of the textile industry, using household budget data, however, estimates 1977-78 demand in Nepal for synthetics at 27 million metres. (out of 103 million total demand) Total synthetics imports in 1976-7 were at the most 15 million metres (Rs. 89 million C.I.F. according to T. P. C.) officially. But underinvoicing is thought to have occured.

foreign exchange premium, while the weighted average tarriff rate on all trade constitutes the opposite lower bound (9.4/.). A series of other possible estimates, based on either bonus premia or tarriff, rates is shown below.

Table — 5

Effective exchange rates (official rate=1.0)

Estimate		Source
A.	1.89	General bonus rate projection + average import tariff rate.
B.	1.725	General bonus rate.
C.	1.38	'Exporters exchange rate' based on mean on 45% and 60% entitlement × general bonus rate projection.
D_1	1.163	Average import tariff rate.
D_2	1.094	Weighted average trade tariff rate (=1/0.914).
E.	1.0435	Official rate (1.0) × 94% (import share at official rate) + Bonus rate (1.725) × 6% (bonus import share).

These estimates would be applicable at the old exchange rate of Rs. 12.5=$1.

Of these estimates it seems justified to eliminate the lowest and highest estimates, E. A. and B. E. would imply firstly that tariff distortion were not taken into account and secondly that quota effects were represented by the premium on only 6% of total imports. Since it is likely that elasticity of demand for foreign consumer goods, as substitutes for Indian goods, is high and would increase as the effective premium price is reduced towards the level of Indian CIF prices, a 4.35% weighted average premium on imports probably underestimates the overall quota premium. As for A and B, they would reflect the full weight of the premia paid, and to use these as weighted average import premium would imply infinite elasticity of demand for foreign goods at existing 1978 general bonus rate, an impossible situation since even with likely Indian demand the share of overseas consumer goods in total consumption would sooner or later hit an upper limit, e. g. the demand for synthetic textiles cannot exceed physically the level of

total textile consumption (about 7% of average urban consumption), while at the existing premium price of early 1978 household budgetary constraints would apply to ensure that before this level was attained further demand could only be attracted at reduced prices.

It is possible to simulate the effects of different assumption about demand elasticity. The most likely assumption is that demand for overseas imports would have been above unit elasticity at the 1978 general bonus premium, and of rapidly increasing elasticity as the premia were reduced towards Indian price levels up to a point where elasticity would decline once more as physical consumption constraints were approached.

The following expression may be used to investigate the elasticities of demand implicit in different estimates of the overall weighted average import control premium.

$$1.0X + Z\ (1.0 - X) = Y$$

Where X = Share of non-premium imports

Z = General premium rate for 'bonus' imports

Y = Weighted average premium rate on overall import value,

Currently (early 1978) X = 94%, Z = 1.725.

Case (1) Y = 1.05 (5% premium)

X	X	1 – X	nd
1.725	94%	6%	
1.7	92.9	7.1	12.5
1.6	91.7	8.3	4·9
1.5	90%	10%	4.4
1.4	87.5%	12.5%	4.7

nd=elasticity of demand.

Case (2) Y = 1.07 (7% premium)

Z	X	1 - X	nd
1.725	94%	6%	
1.7	90	10	45
1 6	88.3	11.7	12.1
1.5	86	14	8 9
1.4	82.5	17 5	8.2

nd=elasticity of demand with respect to change in premium price from existing (early 1978) levels.

The above data show that very high elasticities of demand for foreign goods at premium rates would be required to increase Y, the overall weighted average import premium rate, from 4.35·/. to 5·/. or 7·/. (elasticities of 12 declining to 4 for the 5·/. overall premium, and 45 declining to 8 for the 7./· premium, over the relevant range of changes in premium). However the demand for foreign goods must be conceived of age largely a substitute for demand for Indian goods. As the effective mean exchange rate fell from 1 725 towards 1.0, this substitution effect would almost certainly result in very high cross-elasticities of Indian and overseas import demand, and possibly infinite elasticity over a limited range as the premium approached zero (1.0 exchange rate). The elasticity of demand derived in response to a change in the premium alone is somewhat lower in the above table, slightly above 2 over most of the range for a 5·/. overall premium, and around 4.5 for most of the range for a 7./· overall premium. Conclusions from the above analysis have to be largely subjective. However, given the probably very high elasticity of substitution between Indian and overseas consumer goods (and possibly capital goods), an overall premium of 7·/. to reflect import controls seems justifiable.

Estimate 'C' (1.38) in table 5, representing the average exchange premium (or rate) required from export goods in early 1978, may reflect more closely the real exchang rate, as it is a measure of the export competitiveness of Nepal's products. However, given the fact that supernormal profits seem to have been attainable at this rate, in addition to which the estimate still reflects Indian as well as Nepal demand for overseas imports, it is probably an overestimate.

Estimate 'D_2', the weighted overage trade tariff rate represents the value of both import and export taxes on trade (9 8·/.). Conceivably however export tariffs (net of the small internal excise rebates) should be regarded as revenue-raising instruments, not trade policy instruments, since the existence of export tariffs in the context of an overvalued currency would appear anomalous; except in special cases of specific items. If this is accepted then it is probable that the import tariff rate (D_1) 16 3%, is a more reliable indicator of trade distortions. In order to reduce the effect of export tariffs, it is suggested that the mean of D_1 and D_2 is used as an adjusted tariff r ate, which comes to 13%.

The final estimate, accepting the tentative nature of the analysis and data, appears to be justified as being the sum of (1) the adjusted tariff rate (13.0·/.) and (2) the potential exchange premium implied by trade controls and restriction (7·/.). This would result in an overall premium of 20·/., giving a shadow exchange rate of 1.20, or standard conversion factor of 0.83. This rate is applicable to the old base rate of U. S. $=Rs. 12.5. Adjusting for the new base rate of $ 1=Rs. 12/- would give 1.248 or 0.8. It is recommended therefore that the following general rates are applicable for industrial projects.

(1) Shadow exchange rate = 1.248 (1.25)

(2) Standard conversion factor = 0.8

This is equivalent to a current exchange rate of N. Rs. 15.4 U S. $ 1.0.

2) The SCFs for Indian and Foreign Currency

In order to compute these parameters, the data used for the general SCF can be applied. 'Bonus' imports over 1975-7 comprised on average 20% of total overseas imports (table 2) The quota and direct trade control element of the SCF may be regarded as applicable only to overseas and not to Indian goods, so that the full value of the bonus premium was a more accurate reflection of the exchange premium for overseas imports alone than for all imports in general. In addition to the premium, tariff rates on overseas imports have been higher than on Indian imports because of the higher concentration of luxury goods and special items incurring high tariff rates. For example estimates of overall import tariff rates for a selection of Indian AR-1 from and overseas 'B-form' imports were computed as follows for 1975-6.

Table – 6

(Rs. million)

	Estimated Value	Duty Paid	Average duty rate
B-form imports	264.7	81.2	30.0·/.
AR-1 imports	434.6	61.0	14.0·/.

Source: Customs and Excise Data (adjusted).

These two categories of imports accounted for approximately 32·/. of Indian and 45·/. of overseas imports[1] (on customs data basis for latter). With AR-1 excise (5 8·/.) counted as additional import tax, the AR-1 import tax rate would amount to 19.8·/..

Visible trade balance on Indian and overseas account recently was as follows:

Table – 7

(Rs. million)

		A India	B Overseas[1]	C Overseas[2]
1974-5	Imports	1476	339	558
	Exports	747	143	166
	Balance	-729	-196	-392
1975-6	Imports	1227	755	580
	Exports	894	292	266
	Balance	-333	-463	-314

1 Note that these are approximations because the customs and excise data supplied were incomplete, and some 'notional' figures were included.

1976-7	Imports	1343	664	597
	Exports	780	385	363
	Balance	-563	-279	-234
1977-8	Imports	723	320	
(1st 6 months)	Exports	283	191	NA
	Balance	-448	-129	

Sources: Rastra Bank (A. B) T. P. C. (C)

We now apply the weighted average of tariff on total trade to either case. (assuming that excise rebate rates on exports are the same for both destinations. Export tariffs are uniform). We assume that the tariff rate estimates previously computed for Indian and overseas imports (table 6), represent the weighted average differential between tariff rates for all imports from the two sources. If this is the case then we can compute the general import tariff rate applicable separately for Indian and overseas imports which would when summed result in a general import tariff of 16.3% which was computed previously (see table 5).

We use the following formula, where A = Indian average import tariff rate and is unknown.

$$\frac{T_O}{T_I} Am_O + Am_I = 0.163$$

Where, t_o = overseas B - form tariff rate (0.3)

t_I = Indian AR-1 " " (0.198)

m_I, m_O = Indian and overseas import share (0.7, 0.3)

This calculation gives: A = 0.141

∴ The Indian average tariff rate = 14.1%.

$$\text{Overseas rate} = \frac{t_O}{t_I} \times 14.1 = 21.4\%$$

Using these rates were derive the following

For India: (1974/7)

$$\frac{X + M}{M(1+tm) + X(1-tx)} = \frac{6467}{4046(1.141) + 2421(0.969)} = 0.929$$

For overseas (1974/7)

$$\frac{X + M}{M(1+tm) + X(1-tx)} = \frac{2528}{1758(1\ 214) + 820(0.969)} = 0.863$$

The first aproximation to SCF yields for India 0.93, for overseas, 0.86, and exchange rates of respectively 1.075 and 1.160. As before (section 1), we take the mean of the import tariff and weighted average trade tariff, for either source. This yields for India an exchange rate of (1.141+1.075)/ 2=1.108. For overseas it yields (1.214+ 1.16)/2=1.187 (SCFs 0.9, 0 84).

We now assume that tariff distortions alone are applicable to Indian trade, while for overseas trade other controls also apply, Table 4 estimates of effective exporters exchange rate under the bonus scheme are used as the basis for the premium originating from overseas import controls. Table 5 shows mean exporters exchange rate x bonus rate projection giving a foreign exchange average price of 1.38. However, to apply the whole of this premium even on overseas imports alone would be excessive for reasons previously discussed. The 7% premium on all imports would imply a 23%. premium on overseas imports alone. (comprising 30%. of total imports). The final estimate here based on aggregating the adjusted import tariff rate and the bonus premium rates for overseas imports, and the adjusted tariff rate alone for Indian imports.

Summing[1] these two foreign exchange premia we obtain 1.0 (1.187-1.0)+ (1-23-1.0)=1.417 for overseas imports, and for India we use the adjusted tariff rate 1.108. This yields SCFs of 0.71 (overseas) and 0.9 (India).

The SCF's calculated are based on the old $ base rate of $ 1=Rs. 12.5. Adjustment (4·/.) for the change to $ 1=Rs. 12 have been taken into account in the following summary table.

Table-8

Summary of estimates of shadow exchange rate and SCFs (Indian and overseas)

Method	India		Overseas	
	SCF	SER	SCF	SER
A. Adjusted import tariff rate	0.87	1.152	0.81	1.236
B. Tariff plus control effect	–	–	0.68	1.475

Our final consideration must be the future prospects for trade in Indian and convertible currency. Recent currency realignments are likely to result in reduction of deficit and movement of Indian trade towards equilibrium, aided by tariff adjustments on all trade. The relatively small premium on Indian currency shown here (corresponding to SCF of 0.87) appears intuitively justfiable in these circumstances. The SCF on overseas trade is possibly an underestimate since, as pointed out before it includes to some extent the effects of Indian demand which has inflated the premium. However, there is no doubt that the real exchange rate for overseas goods would be considerably higher than for Indian goods taking into account consumer preferences in Nepal. Future liberalisation of overseas imports will not include many of the luxury

[1] Summation is correct because both premia are applicable to the same base, i. e. the CIF price.

goods, and speciality goods, which were fetching premium prices under the bonus scheme. Nevertheless there may be a tendency for the canvertible currency SCF to rise as a result of liberalisation, provided that tariff adjustments do not exactly compensate, or overcompensate, the fall in effective CIF import prices[1] .

Table–9

Final Summary SCFs

	India	Overseas	General
Standard conversion factors	0.87	0.68	0.8

[1] The actual $ exchage rate implied for overseas goods is Rs. 17.7 = US $ 1. Note that this includes both premium and tariff components. It should therefore be expected to be higher than the current official exports rate of Rs. 16 = US $ 1.

Appendix-2

Shadow price of labour; shadow wage [1]

The derivation of the shadow wage rate is based on two adjustments to the market rate, firstly for 'efficiency', and secondly for 'social' effects. This gives two parameters, the use of which will be explained below. There are a number of possible formulas that can be employed; the one which is used in this preliminary study is a generally applicable one, applied mainly to unskilled labour, but in principle applicable to any income earner.

$$W^* = ma + (w-m)\,B - (w-m)\,\frac{d}{v} + (w-m)\,\$e\,\frac{d}{v} \quad (1)$$

Where W^* = shadow wage

m = opportunity cost of labour

a = conversion factor for labour's alternative product at world prices. (Agricultural products CF or other)

w = wage rate paid for unskilled labour employed by project

B = conversion factor for value of increased consumption (w-m) at world prices. (consumption conversion factor).

d = distribution 'weight' applicable to average income of particular category of project labour.

V = Shadow price of savings or investment, or present social value of savings

[1] This section was written in advance of the final report of the NPC study. "Employment income distribution and consumption patterns in Nepal". Delays in production of the final report necessitated exclusion of some probably important information, and data.

relative to consumption.

e = wage earners valuation of cost of his increased effort as propertion of increased income.

ϕ = governments valuation of cost of increase effort relative to wage earners valuation.

This formula states the following:

Shadow wage = [efficiency wage] + [Net Social cost of increased consumption in terms of savings and distribution of income] − [Social cost of increased effort]

In order to simplify matters it will be assumed here that ϕ = o, i. e. that government does not regard increased effort by age-earners as a social cost. Consequently the whole of the third term, $(w-m)\,\phi e\,\frac{d}{v} = o$.

The formula can now be rewritten as follows:

$$W^* = ma + (w-m)\left(B - \frac{d}{v}\right) \qquad (2)$$

Before proceeding it is necessary to point out some assumptions within this formula; (w-m) is assumed to be equal to the increase in consumption for the wage earner in the new project.

This implies that the worker was previously paid close to 'm', his marginal

product. (See table 2). For unskilled labour this would in turn imply a reasonably free labour market in rural areas. But (w-m) would equal the increase in wage earners consumption, $\triangle C$, only if the savings out of (w-m) $\simeq$ o, or if the savings out of W and m were about equal, and the worker was paid about m previously. Below we check the validity of such assumptions.

First of all there is some evidence to suggest that rural wage rates are roughly equal to marginal product. A 1969-70 survey [1], which derived estimates of peak season marginal product by fitting production functions to farm data, suggested that over the country as a whole an additional rupee invested in agriculture would yield additional labour product of 1.19 rupees. (1.68 in the Terai; 0.70 in the hills). In the Terai this finding suggests that wage rates are greater or equal to 'm'. Intuitively, considering that at peak periods hired labour and child labour has to be used on the farms, it is reasonable to suppose that at such times the wage paid to hired labour is about equal to its marginal product. In the slack season, zero marginal product receives zero wages. Therefore annual wages would approximately equal marginal product per annum.

A recent planning commission report[2] gives the following estimate of fully employed labour days, by region.

---

[1] Rastra Bank Agricultural Credit Survey Vol. 1.

[2] "Employment, income distribution and consumption patterns in Nepal" NPC preliminary report 1978.

Table – 1

Labour days per annum

Region	Male	% of total available (300)	Female	% of total available (300)
East	131	0.44	93	0.31
Central	134	0.45	99	0.33
West	157	0.52	102	0.34
Far West	115	0.38	102	0.34
Overall	134	0.45	99	0 33

Equivalent data for hill and terai employment are not available.[1] The pattern of farm employment in the two areas is different because crop and livestock raising activities do not figure as importantly in hill farm output (about 55 man days per annum) as in terai farms (about 180 man days per annum[2]). It has been estimated that out of total farm income, non-agricultural income in the terai comprises about 30% while in the hills it is about 53% of the total[3]. Assuming that the regional difference in labour days in agriculture is compensated by output in non-agricultural activities, the lack of separate data for hill and terai may not affect estimates of marginal product for the two areas.

1 See note at start of this section.

2 Farm Management Study 1972 and ARTEP report op cit.

3 Rastra Bank Agricultural Credit Survey Vol – 2.

The marginal worker seeker in an urban area is likely to be male; this is the assumption made here. Relevant data for calculation of 'm' for unskilled urban labour is given in table 2, below.

Table – 2

Derivation of m for unskilled labour

Rural Income Agriculture etc.				Urban Income (Factory etc.)			
Region	(1) Average wage paid	(2) Days worked p. a.	(3) Total (1)x(2)	Town	(4) Average wage paid (Rs.)	(5) Days worked p. a.	(6) Total (4)x(5)
East	7.2	131	943	Pokhara/			
Central	7.2	134	965	Kathmandu	8	300	2400
West	7.2	157	1130	Biratnagar & Terai	8	300	2400
Far West	6.3	115	725	Other (hills)	7	300	2100
Overall	7.0	134	935	Overall	7.7	300	2300

Agricultural wages have been reported on average as about 73% of industrial wage over 1975-7, (83% in 1976-7), in the border areas. However the source of this data[1] also shows average industrial wages higher than currently prevailing (average Rs. 9 per day over 1975-7).

1 Rastra Bank "Main Economic Indicators" Jan-Feb. – 1977.

In the above table it is assumed that the mean agriculture paid wage is about 10% below industrial unskilled wage, set at rates based on feasibility studies (Rs. 8 per day) with a reduction for hill towns and Far West rural areas. These calculations are approximated. (It is advisable in cases of doubt to calculate separately for specific projects under analysis). The actual marginal product m is shown in column 3. The efficiency wage ratio at domestic prices (m/w) is based on ratio of rural to urban income. The results are as follows, based on all combinations of (3)/(6) in table 2.

Table - 3

Efficiency wage ratios at domestic prices

Source of rural labour / Location of urban project	Pokhara / Kathmandu	Biratnagar / Terai	Other (hill towns)	Average m (Rs. per annum) for all areas at domestic prices
East	0.39	0.39	0.45	943
Central	0.4	0.4	0.46	965
West	0 47	0.47	0.54	1130
Far West	0 3	0.3	0.35	725
Overall	0.39	0.39	0.45	935

Previous data presented showed the marginal product of peak season labour in the Terai as greater than the wage paid. For the hills it showed 70% of the wage paid. Taking into account the likely margin of error of such estimates, based they are on application of a production function to sample survey data, it seems justifiable, in view of the other comments made above, that the income received should be regarded as equal to the marginal product of labour in the Terai. To make the same assumption for the hills would however require that the available data was ignored. This seems unjustifiable. Howaver, results for the hills show a wide variation, with marginal products ranging from above 1.0 in Dhading district, with a maximum of 4 6

(small irrigated farms) to –7.0 for large irrigated farms in Nuwakot. There was no tendency for 'm' to rise with size of farm. In fact 'large' irrigated farms in both Terai and Hills (average size 8.9 ha and 1.74 ha respectively) showed in general lower 'm' than smaller farms. This is possibly explained by the lower intensity of use of other inputs per hectare in large farms, but otherwise tends to contradict normal assumptions.

The standard deviation ∂ of m's for 7 hill districts (various sizes of farm) was as follows:

$$\partial = \mp\sqrt{\frac{\Sigma\left(x_i - \bar{x}\right)^2}{n}} = \pm 2.14$$

Where x_i = m for farm category i

$\bar{x}$ = 0.7 (arithmetic mean of m)

n = 22 (number of individual estimates of m)

If the m's are normally distributed, this result implies a 68% probability that true m lies between – 1.44 and +2.84, or Pr $(-1.44 < m < 2.84) = 0.68$.

Further more Pr $(-4.32 < m < 8.52) = 0.99$.

The variability of the results is such that little confidence can be placed in the estimate of $\bar{x}$, which has been taken as average m. A considerable possibility exists that the real m for the hills is greater or equal to 1.0.

From the previous intuitive discussion, and the above empirical results, it will be assumed that annual labour wage paid or income received in both hill and terai areas is approximately equal to annual marginal product, as shown in table 2. The next question concerns the extent of savings out of m and w. The 1969–70 Rastra Bank survey estimated some surprisingly high income – expenditure surpluses for farm families, ranging from 14·/. for small hill farms to 28·/. for large Terai Farms, out of total income[1].

1 These calculations are based on cash income plus value of subsistence production (see survey report, Vol 2, p 148 ff and p 265 ff).

In the current NPC survey, preliminary indications are that savings rates are lower. Contribution to direct tax revenue by the farm sector has up to now been confined to land revenue. For the bulk of farms this is however a very small proportion of income, and the probable maximum (in large terai farms) was 4%, in 1969-70. (The effects of the new Panchayat development and land tax are as yet not known in detail).

Savings in urban areas can be estimated from household budget data. The surveys for Kathmandu, Biratnagar and Pokhara (1973-74) show zero or negative saving. The proviso is made that reported income may however be under-estimated.

A possibly more authoritative report [1] carried out in 1974 gave the following results:

Table-4

Rural households Savings rate		Urban households savings rate	
District		Town	
Dhankuta	2.52%	Kathmandu 1 (a)	6.59%
Morang	5 01	,, (b)	5.58
Kathmandu	5.15	Kathmandu 2	5.53
Myagdi	3.44	Biratnagar 1 (a)	6.63
Jumla	3.09	(b)	5.62
Kailali	3.41	(c)	6.19

The reliability of these results is supported by the study findings on savings rates at different income levels.

[1] "Report on the estimates of saving and investment in Nepal" 1974. Tribhuvan University.

Table-5

Rural household rates by income level (1974)

Household income per annum	No. of households	Total gross income (Rs. million)	Total gross savings (Rs million)	Savings rate
<2000/-	389	0.54	0.01	1.85%
2000-6000/-	635	2.17	0.075	3.45
>600/-	190	1.9	0.011	5.75

These findings support the generally accepted hypothesis of falling propensity to save, and lend credibility to the results as a whole. On the other hand they contradict previous indications that rural savings rates are higher than urban rates.

In principle, for $\Delta C = (w-m)$, savings rate (s) out of m must exceed savings rate (s) out of w. For example, assuming $m/w = 0.4$ (see table 3), then for $\Delta C = (w-m)$, s out of m must equal 2.5 times s out of w. If urban s = 5%, then rural s must equal 12 5%. The most detailed empirical evidence suggests however that this is not the case. If the savings rate out of both m and w is 5%, the ΔC (change in consumption) will be 5% less than ΔY (change in income). It may be deduced from table 3, that a rural s of 3.45% or less is most likely to be applicable to those migrating from rural to urban areas. Given a rural s of 3%, and an urban s of 5%, with $m/w = 0.4$, $\Delta C = 0.94\ \Delta Y$. Consequently, in crrying out estimates of the social shadow wage for unskilled urban labour, it will be assumed that ΔC is 6% below (w-m).

Shadow wage for unskilled labour

1. Efficiency wage (ma.)

Given $a = 1.23$, the following results are obtained; (m derived from table 3).

Table-6

Efficiency wage (ratio to market wage) ma/w

Source of rural labour/ / Location of project	Kathmandu/ Pokhara	Terai	Other (Hill towns)	Average m at world prices (Rs. per annum)
East	0.48	0.48	0.55	1160
Central	0.49	0.49	0.57	1187
West	0.58	0.58	0.66	1390
Far West	0.37	0.37	0 43	892
Overall	0.48	0.48	0.55	1150

1. This implies that the findings of the household budget surveys, and agricultural credit survey, are ignored in favour of the estimates of the savings study (see previous note). Recall that w-m $=$ $\triangle Y$ bacause we have assumed rural wage or income received $=$ m. per annum.

2. Social Shadow wage

The general expression for this parameter is:

$$W^* = \left[ma + ((w-m) \left(\frac{B-d}{v} \right) \right] / w.$$

For explanation see above, this section, Note that (w-m) is deflated by 6% in the following table for reasons discussed. The parameter values are as follows:

B_p (for poorer consumer) $= 1.01$

V $= 1.67$

d = average per capita consumption/per capita consumption of unskilled labour, see table 7. below:

Table – 7

Social shadow wage (unskilled permanent labour)

Location of project	Kathmandu, Pokhara, Terai	Other Hill towns
Consumption weight d*	0.89	0.94
Labour source:		
East	0.76	0.78
Central	0.76	0 8
West	0.82	0.85
Far West	0.69	0.7
Overall	0.76	0.78

The above results show that for projects located in hilly areas shadow wage ratios are relatively high. This is because of the assumption that the going industrial wage rates are relatively low in these areas, while the marginal product of labour has not been assumed different in Terai as opposed to Hill areas. Shadow wage ratios are lower for labour from the far west region because of the assumption of lower rural wage rates (or incomes). The reason for the relatively high western region rate is that number of days worked per annum in rural areas was recorded as highest in this region (see table 2).

If the origin of labour employed cannot be determined, the overall wage ratios should be used. This is likely to be the case for most projects.

* Consumption weight = mid point of range.

The following is a summary of general rates for unskilled permanent labour, in 1978.

Project Location	Kathmandu, Terai, Pokhara	Other (hill towns
Efficiency wage	0.48	0.55
Social wage	0.76	0.78

Shadow wages for other occupational groups (Rural labour, urban casual labour, skilled labour)

In principle equation (2) is applicable to all groups of labour. That is:

$$W^* = ma + (w-m)\left(B-\frac{d}{v}\right)$$

It is however necessary to recalculate for different parameter values of m, a, w, m, B, d, v.

The second term of the expression could take a negative value in the case of skilled workers in short supply, where wages are below free market rates, or $w<m$. It is likely in the case of seasonal agricultural labour (in an agro-industrial project) that $w-m\simeq 0$, because the project wage may not increase consumption over and above consumption from other activities which be carried out if the project was not set up, However, for permanent agricultural paid labour, $w-m\nearrow 0$.

Possible diffieulties arise in the calculation of the efficiency wage. For certain categories of workers this will reflect nonagricultural production. Consequently parameter a is irrelevant. It is suggested that the general SCF is used. (0 8) as CF for alternative product. The category of workers affected would be those for which agricultural production is not their opportunity cost, e. g. urban skilled workers drawn from the existing urban labour market. For unskilled workers or casual workers in urban areas,

it is assumed that their opportunity cost is, directly or indirectly, reduced agricultural output. Therefore parameter a applies.

The estimation of m may be difficult for skilled labour. Some relevant data are as follows. According to the 5th plan, an expected defficiency in different categories of skilled labour is likely to occur by 1980, as follows:

Table-8

Supply and demand for technical manpower (5th Five year plan)

		Deficit	Deficit % of supply
High level		1478	50%
of which: Scientists	27		9
Engineers	891		90
Medical	254		47
Middle level		407	5
Asst. scientist			18
Paramedical			24
Basic level		2344	26
Jun. scientist	238		200
Jun. health wkr.	1885		60

In no case was a surplus expected. However, for the middle level category the dificit was in general small. The shortfall was especially acute for medical corps, but at the top level engineers were also expected to be in considerable shortage.

There is not however apparently expected to be a shortage or surplus of industrial and other supervisory or junior technician grades (surprisingly perhaps). These are the categories of particular concern for industrial project analysis, after unskilled workers. Consequently it is suggested that m for skilled workers is based on the going market wage in the private sector.

For previously wholly unemployed personnal, m=0.

In the following table some suggested shadow wages are computed for the other groups. The weights should be checked when modifications are required.

Table – 9

Shadow wage ratios (average) for other labour categories

Possible parameters:	Market W per annum m	CF or a	Efficiency wage ratio $\frac{ma}{w}$	B	d	v	Social W* per annum	Social wage ratio $\frac{W^*}{w}$
1. Casual labour (urban) otherwise unemployed	1500	0	N.A.	0	1.03	1.35	1.67	345	0.23
2. Agricultural labour (permanent)	2000	1000	1.23	0.62	1 01	0.9	1.67	1700	0.85
3. Skilled labour (urban in private sector)	8000	8000	0 8	0.8	N.A.	N.A.	N.A.	6400	0.8
4. Seasonal agricultural labour	1000	1000	1.23	1.23	N.A.	N.A.	N.A.	1230	1.23

N. A. = not applicable, d = mid-point of range.

Note: Even in the case of urban labous classified as unemployed, some productive activity usually takes place. This category is however not important in current conditions in Nepal, although it should be expected to be so later.

The above examples will be assumed to apply generally in project analysis. Their calculation can without difficulty be adjusted for different origins and project locations by consulting tables 6, 7 and 8 of this section. Because of the variety of possible circumstances for these categories it is not practical to compute results in detail, as was done for unskilled urban labour. It is important that such calculations are however made for specific projects, using the formula shown.