CHAPTER - V

FERTILIZER PRICING, PROMOTION AND ADOPTION

5.1. Evolution of Fertilizer Pricing Policy:

5.1.1. Role of Government

The price of fertilizer in Nepalese markets is currently determined by the Cabinet of Ministers of His Majesty's Government (HMG) of Nepal. The General Manager of the AIC can propose a price change to the AIC Board of Directors, and if the Board approves, the suggestion is forwarded to the Ministry of Agriculture. If the Ministry approves, the proposal goes to the full cabinet for a final decision.

5.1.2. History of Fertilizer Pricing Policy:

From a review of fertilizer pricing systems of Nepal over the years three different scenarios emerge.

Until 1972, the selling price of fertilizer was based on AIC's import costs plus internal transportation costs. Consequently the Hill and the Tarai


farmers faced different prices. Price was higher in the Hills than in the Tarai, in proportion to the transportation cost. This pricing policy discouraged the use of the expensive fertilizers in the Hills.

The first Government intervention in fertilizer pricing came in 1972, when it fixed uniform price for fertilizer throughout the country regardless of transportation costs. The subsidy policy for fertilizers was thereby introduced in Nepal for the first time. However, fertilizer was sold below cost price in the Hills and above cost price in the Tarai. The rapid increase in fertilizer off-take in the Hills is largely attributed to this lowering of prices in that region. The losses on sales in the Hills was partly financed by the profits from the sale of fertilizers in Tarai and partly from the profits derived from fertilizers donated by foreign Government. Any way, in effect, Tarai farmers were subsidising the Hill farmers to a certain extent. This policy was necessary at that time because it was imperative to encourage Hills farmers to use fertilizers and also maintain higher price for fertilizers in the Tarai in order to check fertilizers from being smuggled out into India, where price was attractive.
With the rise in the import cost, increasing difficulty was faced by the Government in passing the entire cost including Hill subsidy element to the Tarai farmers. It was apprehended that continuation of such a policy could have significant adverse effects on production. Consequently, both the Hills and Tarai prices were subsidised in the recent years, though the subsidy rate was different for the two regions. But this policy has placed tremendous demand on the Government exchequer.

These three policies have different implications on production, equity, government exchequer, and AIC finances. In the first scenario, where production considerations outweighed equity, the pricing policy is expected to boost production under 'Ceteris Paribus' condition. In the second policy scenario that made trade-off between production and equity, it is expected to secure improved equity with net social gain. Similarly, the third policy scenario which attempted to achieve both production and equity objectives simultaneously, should have increased production without affecting equity but at the cost of the treasury. These are however only conceptual reasonings. The actual impact of the policies are however not known.
5.2. Current Fertilizer Pricing Policy

The current fertilizer policy—which includes both import price subsidy and transport cost subsidy—is designed to address both production efficiency and distribution equity goals. The low price achieved through import price subsidy, provides an incentive for farmers to use more fertilizers, thus increasing crop production. This policy is efficient if the total real cost of the additional fertilizer used is less than the value of the increased output. The uniform national price achieved through transport cost subsidy, is an attempt to provide benefits to Hills farmers who are relatively dis-advantaged, and perhaps more importantly, to benefit the politically powerful Kathmandu Valley farmers. This policy could be considered equitable if under it, the Hills farmers actually received benefits comparable to farmers in other areas. However, in reality, people who purchase fertilizers in Kathmandu are the principal beneficiaries of the uniform national policy as now implemented, because they buy bulk of the total national supply of fertilizers. Hill farmers benefit little because very small quantity of the total supply of fertilizers is transported to them.

5.2.1. **Policy Goals**

The policy objectives with respect to fertilizer pricing are:

(a) To increase crop output by lowering the price of an important input (fertilizer) and hence lowering the cost of production.

(b) To benefit farmers living in remote parts of the country by offering transport subsidy.

(c) To discourage the outflow of precious imported fertilizers from Nepal to India across the Tarai.

(d) To maintain a stable price level for fertilizers.

5.2.2. **Policy Options**

There are in general four policy options or alternatives which the government may pursue with respect to fertilizer price:

(a) Import price and transport cost subsidy (current policy).

(b) Import price subsidy only.

(c) Transport cost subsidy only.

(d) No subsidy.

The implication of these policy alternatives are brought out in para 5.3 later in this Chapter.

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5.2.3. Economic Rationale of Pricing Policy:

The price policy assumes,

(i) The government of Nepal through the Agriculture Inputs Corporation, will continue to be the main source of fertilizer supply for Nepalese farmers,

(ii) Farmers are rational i.e. they maximise profits,

(iii) All farmers have the same production functions,

(iv) Demand for fertilizers is elastic i.e. that farmers respond to fertilizer price change.

On these assumptions, the production will increase if prices of fertilizers are reduced either through subsidisation of price or through subsidisation of transport cost. For a lower price of fertilizer will lead to lower cost of production and hence to higher profit, thus encouraging farmers to produce more. Thus fertilizer pricing policy becomes part of the government strategy of agricultural development.

The transport subsidy is primarily intended to benefit farmers living in remote areas. The consideration is not economic efficiency but equity in distribution of income.

The prevention of outflow of fertilizers to India is intended primarily to keep within bounds the burden of fertilizer subsidy on the Nepalese Government and the AIC.
The desire to maintain stability of price assumes that stable prices foster growth.

5.2.4. Consequences of Price Policy

While it is relatively easy to visualise conceptually the consequences of fertilizer price policy it is very difficult to establish the practical impact of these policies. Hence a survey of farmers was carried out to assess effectiveness of the fertilizer price policy.  

The main finding was that while there has been a dramatic rise in aggregate consumption of fertilizers in Nepal, the fertilizer price support and subsidisation policy had not been an important cause of this. In fact, the rise in the level of consumption is seen to be primarily a function of farmers awareness of fertilizer use and profitability and access to fertilizer supply. This emphasizes the importance of promotional activities and non price policies and development strategies for improving rates of fertilizer use in Nepal.

The data were obtained from 264 farmers using fertilizers on the 1983-1984 wheat crop. The finding of the study are:

5. Known as Hawaii Project, this field investigation was carried out by EWC/APROSAC in 1983-1984.
1. **Types of fertilizers used**: Farmers were using four kinds of fertilizers on wheat, namely, Urea (46:0:0), Complex (20:20:0), DAP (18:46:0), and Potash (0:0:60). Urea was used by four-fifths of the farmers, Complex and DAP by fewer than one-third, and potash by fewer than one-fifth.

2. **Non-availability of fertilizer supplies**: Farmers reported a variety of problems with obtaining and using fertilizers. But one stood out: *Fertilizer was not available on time.* (See Table 4.20 presented earlier). Over one-third of the farmers (93) indicated that they were unable to get fertilizer when they needed it. Just over one-tenth (28) reported that lack of water was a problem connected with fertilizer use. And just under one-tenth (25) reported both availability and water problems. Over one-fourth (70) indicated that they had no difficulties obtaining or using fertilizer. A surprisingly small number—fewer than one-sixteenth (16) indicated that fertilizer cost was a problem, and only eight farmers said that cost was their only fertilizer problem.

3. **Total demand for fertilizers does not change dramatically with changes in price**, that is, demand is relatively inelastic. The demand is most elastic in Kathmandu Valley and least elastic in Tarai. But differences in elasticity among areas are not statistically significant.
5.2.5. Effect of Price Policy on Fertilizer Consumption

The survey of 150 farmers carried out by the Author provides important insight into the effect of price policy. The survey results presented in Appendix 2 Tables 11 and 12 bring out two important facts viz.,

1. The increase in demand for fertilizers is due to increase in the number of farmers consuming fertilizer and not through increase in per capita consumption of fertilizer from farmers (Appendix 2, Table 11).

2. There was no significant change in per capita consumption of fertilizer from year to year (Appendix 2, Table 12).

These two facts together indicate that change in demand is not along the original demand curve but due to shift in demand curve. This fact establishes conclusively that the demand for fertilizer is price inelastic. This is very important conclusion and has serious implications for fertilizer price policy. Our own findings re-inforce Mr. Wallace's conclusion that fertilizer demand is relatively price inelastic.

5.3. Implications of Pricing Policy

The conceptual and empirical analyses both indicate that the farmers in the Tarai, Hills and Kathmandu Valley respond differently to an increase in the fertilizer price.

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(1) **Tarai farmers**: who use little fertilizer, obtain a high crop response ratio, have some experience and relatively easy access to information about fertilizers, and have an alternative source of fertilizer in India, will not decrease their use of fertilizers if the price of fertilizer is increased.

(ii) **Hill farmers**: who use little fertilizer, obtain a high crop response ratio, have little experience of fertilizer use, and difficult access to information, and have transport costs on top of the official price — may decrease their use if the fertilizer price is increased.

(iii) **Kathmandu farmers**: who use much fertilizer, obtain a lower crop-response ratio, have both experience and access to information, will respond normally, that is, like profit maximisers and decrease their use if the price is raised.

Consequently, an increase in the price of fertilizer will affect these three segments of the Nepalese fertilizer market differently.

(a) An increase in fertilizer price will least affect Tarai where the most productive crop land is. This is because it has an alternative source of supply in the Indian market.

(b) An increase in fertilizer price will have adverse effect in the Hills where the poorest people live and where food is scarce and where there is urgent need to increase food production.
(c) A price increase will have maximum effect in the Kathmandu Valley where the most political power is.

Hence, there is an urgent need to treat these three regions - Tarai, Hill and Kathmandu Valley as separate and distinct segments of the fertilizer market and evolve and implement separate policies appropriate to the conditions in each segment. A uniform national policy will be disastrous in this context.

**Implications of Policy for Government Exchequer:**

With increase in the quantity of fertilizers distributed every year, the amount of subsidy will be increasing. ADB estimates that a total of NRs 1.2 Billion would be needed to subsidize the fertilizer targeted for the sixth plan at current subsidy rate. This amount would be equivalent to 50% of total government budget allocated to agriculture. It is very difficult, if not impossible, to sustain expenditure of this magnitude for long. Hence withdrawal of subsidy has become a national imperative.

**Implications of Subsidisation for AIC Finances:**

Since AIC has been asked to shoulder the losses resulting from subsidising the price of fertilizers
the AIC has been incurring massive losses. The accumulated losses of AIC stand at 157 million rupees and have seriously eroded the economic viability of AIC. Hence this too is a strong argument in favour of doing away or at least reducing the level of price subsidy on fertilizers.

5.4. **Fertilizer Pricing Policy as a Strategy of Agricultural Development and Modernisation**

The fertilizer strategy of Nepal is part of its overall strategy of agricultural development. The long range objectives of fertilizer strategy are:

1. Use fertilizer, in conjunction with other inputs, to increase agricultural production to feed an expanding population, to provide needed raw materials for agro-industry processing, and to provide increased employment.

This strategy presumes modernisation of agriculture and use of modern inputs.

From this it is clear that the fertilizer policy must therefore be co-ordinated and integrated with other agricultural development policies and that the

success of the fertilizer policy and strategy is predicated upon the effective implementation of such coordination and integration of policies. In the context of Nepal it may be noted that such coordination of policy and execution is lacking.

In particular, it is necessary to realise that the problems of farmers of Tarai, Hills and Kathmandu Valley are different and hence separate policies should be evolved for these three regions. This is not so at present.

The Nepalese data suggests that less than 7% of the area under major cereal crops is fertilized. Of the total arable area only 11% is fertilized. The proportion of farmers using fertilizers is also quite small. The application of fertilizers is at a rate substantially below the recommended rate. All these suggest the need for creating fertilizer awareness amongst farmers and providing them adequate access to information of fertilizer usage, dosages and agronomic practices.

The field studies have also shown that farmers respond well to High Yielding Varieties of seeds, and irrigation facilities and these contribute more to boost demand for fertilizers than the price incentives
provided through price subsidies and transport subsidies. The non-price factors seem to dominate farmer's demand for fertilizers.

The field studies have clearly established that the availability of right type of fertilizer in needed quantity at the needed time is a critical factor influencing off-take of fertilizers by the farmers.

All these facts should be taken into account and the policies should be suitably modified if the fertilizer policy is to succeed in its development objective.

5.5. **Open Border With India And Its Implications**

*For Fertilizer Pricing Policy of Nepal*\(^\text{11}\);

Any fertilizer price policy which Nepal pursues must take into account current fertilizer prices in India. The long open border means that significant price differences will result in fertilizers moving one way or the other across the border. This may be to Nepal's advantage if prices are higher in Nepal, but it may also lead to unsold stocks if the price differences are large. Lower prices in Nepal are a disadvantage, because fertilizers will move South across the border, and Nepal will effectively be subsidising

Indian agriculture. While there are no official statistics, informal estimates indicate that as much as 85% of some shipments of fertilizers intended for the Tarai have gone to India when fertilizer prices were higher there. A policy which keeps Indian prices as lower bounds on fertilizer prices in Nepal, and which responds quickly to changes in Indian prices, is probably necessary to insure that the benefits of Nepal's fertilizer policies are reaped by the farmers of Nepal.

**Levels of Prices**: Currently the official policy in Nepal is to peg Nepalese fertilizer prices at a level 6% higher than the Indian prices. Normally, this works out well for Nepal. This is because the transportation and transaction costs, including taxes and trade regulations and bribes to border customs and inspection officials is estimated to be around 6% of the price of fertilizer in India. Nepal's long, open border with India and the relative sizes of these countries markets have implications for Nepal's fertilizer price policy. Nepal is like the flea on the elephant's back - no matter which way the flea turns, it travels in the elephant's direction. Nepal cannot maintain a fertilizer policy completely independent of India.
In the Indian states bordering Nepal - West Bengal, Bihar and Uttar Pradesh - 3.8 million metric tons of fertilizers were sold in 1983-84, compared to less than 0.1 million metric tons in Nepal (Source: MAO GOI, 1984, FAI, 1985). Nepal can buy from or sell to the Indian market without affecting Indian prices. This usually insures that the Nepalese price of fertilizer is equal to the Indian border price plus or minus the transportation and transaction costs, including taxes, and trade regulations, and bribes to the border customs and inspection officials. As a result, Nepalese prices can be controlled with price policy instruments only within the upper and lower bounds defined by transportation and transaction costs (See Figure 5.1)12. As indicated earlier (Pu - PL) is estimated to be 6% of the price of fertilizer in India.

Above price Pu, fertilizer supply is elastic because villagers can bring as much fertilizers as they want across the border from India at price Pu. Below price PL, demand is elastic because Indian farmers and traders will buy all of Nepal’s fertilizer. It may however, be noted that Pu and PL are not the

FIG. 5.1 - FERTILIZER DEMAND AND SUPPLY

Pu = Indian price plus transport/transaction costs; import price
Pl = Indian price minus transport/transaction costs; export price
LS = Local supply (Nepal only)
TS = Total supply (Nepal plus India)
LD = Local demand (Nepal only)
TD = Total demand (Nepal plus India)
same for all regions. $P_u$ is highest in the Hill and Mountains and lowest in the Tarai, and in between these two in the Kathmandu Valley, while the opposite holds for $P_l$.

Thus, there are both upper ($P_u$) and lower ($P_l$) bounds on Nepal's fertilizer prices. Below $P_l$ demand from India swamps the market and above $P_u$ supply from India swamps the market. It is only for prices between $P_l$ and $P_u$, where fertilizer is not traded and will not move North or South across the Indian border, that Nepalese price policy can be effective. The larger the size of the range between $P_l$ and $P_u$, the greater is the scope for price policy in Nepal. This range varies from region to region. It is virtually zero for Tarai, moderate for the Kathmandu Valley, higher for the Hills and highest for the Mountains.

Any attempt to use price policy instruments to move Nepalese fertilizer prices outside the range defined by $P_l$ and $P_u$, will lead to income transfers from the policy implementing agencies to the individuals who receive fertilizer. Individual who receive subsidised fertilizer can sell it at the Indian price and capture the difference as money income or use it on owned farm and thus increase their real income.
Effect on Border Trade in Fertilizer:

Normally it is estimated that the volume of border trade is about 15% of the Nepalese national supplies. In years when the price differences are large and Nepalese prices move below the Indian level of prices, then the Nepalese fertilizers move South into India on a massive scale. This happened in 1973-74 and 1974-75. And more recently in 1980-81 and 1981-82.

In early 1981, the urea price in India was IC Rs. 2000 = NC Rs. 2900/mt, while the price in Nepal was NC Rs. 3100/mt. On July 11, 1981 the price of urea in India was raised to IC Rs. 2350 = NC Rs. 3408/mt, while the price in Nepal remained at NC Rs. 3100/mt until April 18, 1983. Thus for nearly two years the Nepalese urea price was lower than Indian urea price. Similarly, in the beginning of 1981, the complex price in India was IC Rs. 2050 = NC Rs. 2973, while the complex price in Nepal was NC Rs. 2800/mt. In July 1981, the Indian price was raised to IC Rs. 2400 = NC Rs. 3380/mt, while the Nepalese price remained at NC Rs. 2800/mt. Thus for almost two years nearly 10% profit could be made simply by moving urea fertilizer across the border to India and over 20% profit could
be made by simply moving complex fertilizer by moving it across the border to India. This situation changed in April, 1983 when fertilizer prices in Nepal were raised.

An examination of the official statistics of Nepal for the period 1981-82 shows that while 54,000 mt. of fertilizers were sold by AIC to the farmers, the actual recorded consumption of fertilizer in Nepal that year was only 15,000 mt. This illustrates the telling impact of the Indian market on the Nepalese market for fertilizers. For the difference viz., 39,000 mt. represents the volume of chemical fertilizers which moved from Nepal to India that year (1981-82).

Consequently, in formulating the fertilizer policy for Nepal, the reality of the Indian border must be taken into consideration.

5.6. **Fertilizer Subsidisation And Its Implications**

In the pursuit of keeping fertilizer price stable and at low levels for encouraging farmers to use more fertilizers, the Government has sold fertilizer below cost price through direct price subsidy and through transport cost subsidy.

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Currently, assuming world prices of import for fertilizers, the total real cost of fertilizer in Nepal works out to be NRs 5130/mt. for urea and NRs 6830/mt. for complex fertilizer. That is the cost per Kg. of fertilizer is Rs. 5.13 for urea and Rs. 6.83 for complex fertilizer. On the other hand official selling price is Rs. 3.99 Kg. both for urea and complex. This implies that currently urea is being subsidised at the rate of Rs. 1.14 Kg. and complex at the rate of Rs. 2.84 Kg. These are however, the minimum estimates because Nepal receives considerable fertilizer under tied-source arrangements at higher than world market prices.

The subsidy from the farmers point of view is much less : prices in India are now equal to Rs. 3.78 Kg. for urea and Rs. 4.20 Kg. for complex. Since the Nepalese price is Rs. 3.99 both for urea and complex, for a farmer whose alternative source of supply for urea and complex is India, there is no effective subsidy for urea and only a subsidy of Rs. 0.21 for complex\(^{14}\).

In view of the growing volume of imports and consumption of fertilizer by Nepal, and the trend of rising unit prices of fertilizer in the international market, the burden of the fertilizer subsidy has steadily increased and it is no longer possible for either the

Government or the AIC to bear this burden indefinitely as their resources are being overstrained under the burden of the subsidy. The burden of subsidy is estimated to be Rs. 330 million per year in May, 1986. Hence, there is some re-thinking on the issue of subsidisation of fertilizers and a policy of withdrawal of fertilizer subsidy is being seriously debated.

In this context it is necessary to raise certain basic questions with regard to the policy of fertilizer subsidy. These are:

1. Is there really any need for subsidisation?
2. Who should be subsidised?
3. What should be the level or extend of subsidy?
4. Should subsidies be permanent or transitory?
5. Who should bear the cost of the subsidy?

1. **Need for subsidy**: At the farm level, the economics of fertilizer use are relatively simple. Fertilizer now costs NRs 4.00 per Kg. The most commonly utilised fertilizers, urea and complex, 46 and 40 percent nutrient content, respectively. Yield response ratios for improved varieties of paddy and wheat lie between 10 and 15. The value of these crops is NRs. 2.00 or more per Kg. Thus a farmer who spends NRs. 4.00 on one Kg. fertilizer can expect a return of at least \((0.40) \times (10) \times (NR 2.00) = NRs 8.00\), and often a return of as much as \((.46) \times (15)\)

(NRs. 3.00) = NRs 20.70, with an average return of about NRs. 14.00, a 3.5:1 benefit cost ratio. However, this is not a risk-free investment weather can change the yield response ratio and crop values cannot be known with certainty before harvest.

This simple calculation which has been verified many times on farmers fields, indicates that even if the fertilizer price subsidy were to be completely eliminated and fertilizer sold for as much as NRs 7.00 per Kg, farmers would still double their money on fertilizer investment. The fertilizer subsidy is not needed to make fertilizer use profitable. Indeed subsidising fertilizers may encourage unwise use, because farmers may use it when the return is more than subsidised price but less than the real cost of the fertilizer. The main point is worth repeating : A subsidy is not needed to make fertilizer use profitable.

2. Who needs subsidy ? : Production efficiency considerations suggest that those who are not using fertilizers optimally should be encouraged to do so through a policy of subsidisation. The equity consideration suggests that farmers in remote Hill areas who are handicapped by lack of physical infrastructure should receive transport subsidy.
However, from our analysis in (1) above it is clear that the first group need not be subsidised as the benefit cost ratio is 3.5 and fertilizer use is profitable. The second group however, needs to be subsidised in the transitory period till physical infrastructure is adequately developed.

3. What should be the extent of subsidy? This question loses its importance once it is shown that there is no need for a subsidy. Further once it is demonstrated that the demand elasticity for fertilizers is low and that fertilizer use is a function of availability of fertilizers and access to information about fertilizer use, it becomes clear that subsidy is not a significant factor in boosting use of fertilizers. Consequently, the size of the subsidy loses its significance, from the point of increasing productivity of agriculture.

None-the-less the question is relevant when subsidies are paid on considerations of equity. Thus in the case of transportation subsidy the size of the subsidy should, prima facie, be guided by the actual transportation costs, and the burden that the state is willing to bear.
4. Should subsidies be permanent or temporary?

By its very nature, the subsidies should be temporary and they should be phased out as soon as the objectives of subsidisation are achieved. For instance, if the object is to improve rate of fertilizer use, then the subsidy should be discontinued when the desired rate of fertilizer use is attained. Similarly transport subsidies should be eliminated once transport facilities are fully developed.

5. Who should bear the cost of subsidy?

At present three parties, the foreign donor, HMG Nepal and AIC are sharing the burden of subsidies. There is need for a clear cut policy as to how the burden of subsidy should be shared between these three parties.

Finally there is one other aspect of fertilizer subsidy which needs serious consideration and that is that a fertilizer subsidy discourage the search for alternatives to chemical fertilizers organic manures and the research into methods of substitution e.g. alternative cropping pattern, rotations etc. under varying agro-climatic conditions.

5.7. Measures for Fertilizer Adoption And Promotion:

From the preceding discussion, it is clear that in the Nepalese conditions the demand for fertilizers
is not elastic with respect to price and that variations in use can be explained in terms of availability of fertilizer and access to information about fertilizer and its usage. The survey of farmers also confirmed this view.

Further, it was observed that introduction of high yielding varieties, development of irrigation and credit facilities and effective promotion influence fertilizer use more than price incentives and subsidies. Consequently there is an urgent need to review the promotional measures and assess their effectiveness.

Further it is now realised that under Nepalese conditions fertilizer use cannot be disassociated from a concerted package approach, particularly in the Hills region. This implies an integrated approach covering agricultural research, extension, irrigation, farm inputs supply and farm credit. None-the-less there is no such clear-cut policy towards an integrated approach in existence to-day.

5.7.1. Fertilizer Use Development Strategy

The farmer will not use fertilizers, and consequently, production will not increase, unless their use results in the value of additional yield being at

least twice as much as the cost of fertilizers used i.e., unless the value/cost ratio is equal to or greater than 2. Therefore, economically safe fertilizer recommendation should be evolved through field trials and then demonstrated to the farmers.

A trial design providing maximum output for the minimum of plots should be developed and demonstrate.

Conduct reconnaissance soil survey to select plots for fertilizer trials on farmer's fields under farmer's conditions.

Provide soil testing facilities and carry out soil survey and soil mapping.

Fertilizer trials programmes have demonstrated that the use of fertilizers in combination with improved varieties increases production considerably of the three major cereal crops - paddy, wheat and maize. Compared with average production under traditional farming, yield increases can be expected ranging from 110-150 % in the case of paddy, 100-110 % in the case of maize and 90-140 % in the case of wheat, while value/cost ratios are generally above 2 and may even go up to four.

Also demonstration programmes are carried out at the block levels. Also Fertilizer Related Inputs Programme (FRIP) and production programmes are carried
out to demonstrate to the farmers the beneficial effects of fertilizer use. In these programmes the necessary inputs are supplied in kind as short term credit and on a revolving basis through farmer's groups.

5.7.2. Extension Work:

It is the responsibility of the Department of Agriculture to provide extension services to carry out the fertilizer use development strategy. Unfortunately the AIC has no responsibility whatever for promotional activity which is the sole responsibility of the Department of Agriculture, (DOA). A major activity of the extension service should be inform farmers of the availability of fertilizers and related inputs and demonstrate methods of their efficient use.

In Nepal, the total plant nutrients removed by the crops like paddy, maize, wheat and the oil seeds per annum from the cropped area of 21,48,000 HA amounts to 73,000 tons of nitrogen (N), 35,000 tons of phosphate (P₂O₅) and 116,000 tons of potassium (K₂O) from the soil (See Table 5.1)¹⁷. The demand projections of chemical fertilizers for the F/Y 1983-84 (See Table 5.2)¹⁸


¹⁸ Ibid., p. 11.
<table>
<thead>
<tr>
<th>Crop</th>
<th>Cropped area (Kg/ha)</th>
<th>Approx. Plant Nutrient removal rate (Kg/ha)</th>
<th>Total plant nutrient removal</th>
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<tbody>
<tr>
<td>Paddy</td>
<td>125600</td>
<td>20</td>
<td>25120 75360</td>
</tr>
<tr>
<td>Wheat</td>
<td>329000</td>
<td>30</td>
<td>9870 19740</td>
</tr>
<tr>
<td>Maize</td>
<td>450000</td>
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<td>13500 18000</td>
</tr>
<tr>
<td>Oil seeds</td>
<td>113000</td>
<td>30</td>
<td>1130 3390</td>
</tr>
<tr>
<td>Total</td>
<td>2148000</td>
<td>-</td>
<td>73000 35000 116000</td>
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</tbody>
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Source: B. K. Thapa and R. Singh, Field level activities to promote fertilizer use in Nepal, p. 11.
<table>
<thead>
<tr>
<th>Fertilizer nutrient (M.T.)</th>
<th>1980-1981 Demand Consumed</th>
<th>1981-82 Demand Consumed</th>
<th>'82-83</th>
<th>'83-84</th>
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<td>Nitrogen</td>
<td>18504 16620</td>
<td>22022</td>
<td>17425</td>
<td>26128</td>
<td>28748</td>
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<tr>
<td>Phosphorus</td>
<td>7008  5094</td>
<td>8044</td>
<td>5050</td>
<td>9256</td>
<td>10996</td>
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<tr>
<td>Potash</td>
<td>6000  578</td>
<td>6600</td>
<td>825</td>
<td>7500</td>
<td>8410</td>
</tr>
</tbody>
</table>

Source: B. K. Thapa and R. Shah, Field Level Activities to promote Fertilizer use in Nepal, p. 11.
covers only 40%, 30% and 7% of total N, P, K, respectively that would be removed by the above mentioned four crops only over looking the fertilizer requirements of other crops. This implies that soil is being progressively impoverished. Consequently there is an urgent necessity to use higher dosages of fertilizers even to maintain the nutrient status of the soil.

Farmers need to be educated on this aspect. And should be encouraged to make up the nutrient deficiency by using various sources of locally prepared compost/FYM organic manure.

Currently, the average fertilizer nutrient consumption per hectare of arable land is only 9 Kgs (7 Kgs of N and 2 Kgs. of P₂O₅) and 81% of fertilizers is used in the two peak periods June/July and October - December. The estimated total requirement of nutrients is 37% for paddy, 49% for wheat and 5% for vegetable and 9% for other crops. This shows that major amount of fertilizer is used by rice and wheat crops only. Also of the total use of fertilizers 33% is consumed in Kathmandu Valley with total cultivated land of 2.5% only. The average fertilizer consumption in Tarai and Hills is only 11 Kgs. and 3 Kgs of nutrient per hectare. With the meagre use of fertilizers it is almost impossible to expect any spectacular increase in yields. At the
moment prospects of replenishing the nutrients removed annually by the crops appear to be bleak and dim. Studies carried out at the cropping system sites indicate that only less than half of the total nitrogen (N) removed from soil by the crops in one year, is being replaced by the application of organic and inorganic chemicals. Hence there is need to evolve new cropping systems including in them leguminous crops for biological fixation of N in the soil.

A simple rule of thumb is that the grain/nutrient ratio is 10:1. Field trials have demonstrated that a mean response of 12-20 Kgs. of cereals per Kg of nitrogen can be easily obtained when 45 to 90 Kgs of nutrients (N) are applied per hectare.

The fertilizer use efficiency is normally linked up with several factors like soil, seed variety, season, time of planting and harvesting, water management, pest control, fertilizer sources and time and method of application. For efficient use of fertilizer it is necessary to manage all these variables. Hence there is need to ensure that this information is disseminated amongst the farmers.

The reasons farmers are not getting the proper response to fertilizers may be due to:
(i) Their unawareness of correct crop management practices,

(ii) Inadequacy and unavailability of other related inputs including meagre use of fertilizers,

(iii) Excessive moisture or moisture stress in the growth season and

(iv) lack of soil test and plant response information for monitoring the balanced use of fertilizers e.g. lack of use of phosphorus and potassium may reduce the efficiency of N.

All this emphasises the urgent need for effective extension work. There is no single approach to agricultural extension appropriate for all farming conditions in Nepal. In Tarai the Training and Visit (T and V) system has been adopted throughout whereas in the Hill "Contact" farmer strategy of extension is adopted. The variable conditions in the Hill provide an opportunity for several modified, new approaches to be tried along with the existing ones, all of which should be constantly monitored and evaluated.\(^{19}\)

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At present all extension services suffer from inadequate resources, few office and transport facilities, inadequately trained and poorly motivated staff. Incentives are required to make service in rural areas more attractive and remunerative. At the same time greater efforts should be made to involve farmers in the extension activity of dissemination, and diffusion of new technologies and practices.

5.7.3. Market Information System In Nepal

Market information while a much broader concept than price information has nevertheless been confined to the collection, analysis and dissemination of prices of 36 major agricultural commodities (See statement 5.1).

Statement 5.1

List of Agricultural Commodities which price information are collected by the DFAMS.

1. Paddy
2. Paddy Midum
3. Paddy Fine
4. Raw Rice Coarse
5. Raw Rice medium
6. Raw Rice Fine
7. Parboiled Rice
8. Flaitened Rice
9. Wheat
10. Maize

<table>
<thead>
<tr>
<th></th>
<th>11. Millet</th>
<th>12. Wheat Flour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>17. Tobacco</td>
<td>18. Mustard Seed</td>
</tr>
<tr>
<td></td>
<td>23. Mustard Oil</td>
<td>24. Buff</td>
</tr>
<tr>
<td></td>
<td>25. Pork</td>
<td>26. Fish</td>
</tr>
<tr>
<td></td>
<td>27. Milk</td>
<td>28. Sugar</td>
</tr>
<tr>
<td></td>
<td>29. Potato</td>
<td>30. Dry Onion</td>
</tr>
<tr>
<td></td>
<td>31. Ginger</td>
<td>32. Tomato</td>
</tr>
<tr>
<td></td>
<td>33. Dry Chilli</td>
<td>34. Radish</td>
</tr>
<tr>
<td></td>
<td>35. Orange</td>
<td>36. Lemon</td>
</tr>
</tbody>
</table>

At present Department of Food and Agricultural Marketing Services (DFAMS) is responsible for collecting analysing and dissemination of market information. The various publications of DFAMS furnish the following information:

(a) weekly price situation targeted for policy makers.

(b) Display of price wall posters for general public in major market centres of 11 districts.
(c) Monthly Agricultural Market Bulletin for researchers, policy makers and the general public.

(d) Bi-monthly commodity price Bulletin for the policy makers.

(e) Technical recommendation regarding minimum support prices, regulation of various commodity prices, and prices fixation of various agroindustrial raw materials.

It is necessary to note that the users of currently available price information are limited to individual researchers and government officials. It is pertinent to note that the most relevant target groups producers and consumers, have a limited access to these information and they are served only marginally.

From the foregoing it is clear that while Nepal has come a long way it still has a very long way to cover in the field of extension and information. There is an urgent need to strengthen these services to make them more efficient and effective. The field studies carried out so far attest to the fact that these services are weak and ineffective.

5.8. **Need for Regional Differentiation and Identification of Market Segments to make Fertilizer Price Policy More Effective** ;
Experience indicates that adopting a single uniform price policy for the entire country is not desirable as this ignores important regional variation. In para 5.3 we have already suggested that the market should be divided into three segments as follows:

1. Tarai Farmers
2. Hills and Mountain farmers
3. Kathmandu Valley farmers

The segmentation has been done taking into consideration such factors as:

(i) Level of fertilizer use
(ii) Crop response ratio
(iii) Experience of fertilizer use
(iv) Access to information
(v) Availability of an alternative source of supply,
(vi) Farmer's elasticity of demand for fertilizer.

We have indicated earlier that fertilizer subsidy is not very effective in promoting crop production because of low elasticity of demand for fertilizers. However subsidy may be used in equity grounds to benefit farmers in all regions of Nepal. It is pertinent to repeat that the effective rate of subsidy for Nepalese farmers as measured against the opportunity cost of obtaining fertilizers from India, can never exceed internal transport costs in Nepal. The political power of Kathmandu resid-
ents, and Tarai farmers, combined with financial limits on the ability of the Nepalese government to subsidise internal transport costs, will probably insure that few benefits of the subsidy are obtained by Hill and Mountain farmers. This analysis is summarised (Transport costs include transaction costs of bringing fertilizer and food grain from India), in statements 5.2.

**Statement 5.2**

**Analysis of Price support and Fertilizer Subsidy by Regions**

<table>
<thead>
<tr>
<th>Region</th>
<th>Transport cost</th>
<th>Fertilizer subsidy</th>
<th>Price support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mountains</td>
<td>highest</td>
<td>subsidy possible;</td>
<td>steepest supply curve;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>lowest output</td>
<td>support possible but</td>
</tr>
<tr>
<td></td>
<td></td>
<td>response; equity</td>
<td>ineffective</td>
</tr>
<tr>
<td>Hills</td>
<td>high</td>
<td>subsidy possible;</td>
<td>steep supply curve;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>low output response; equity objective</td>
<td>support possible but ineffective</td>
</tr>
<tr>
<td>Kathmandu</td>
<td>moderate</td>
<td>small subsidy</td>
<td>steep supply curve;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>possible;</td>
<td>small support possible</td>
</tr>
<tr>
<td></td>
<td></td>
<td>moderate output</td>
<td>but little effect</td>
</tr>
<tr>
<td></td>
<td></td>
<td>response; political</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>objective</td>
<td></td>
</tr>
<tr>
<td>Tarai</td>
<td>nearly zero</td>
<td>subsidy not</td>
<td>support not</td>
</tr>
<tr>
<td></td>
<td></td>
<td>possible below</td>
<td>possible above</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Indian price</td>
<td>Indian price.</td>
</tr>
</tbody>
</table>

More meaningful and effective policies may be evolved and pursued if the different regions are treated as distinct market segments having divergent price response.