

The Role of Fertilizer in Transforming the Agricultural Economy of Nepal

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INTRODUCTION

Nepal is a landlocked country, surrounded by India and China with long borders. All merchandise trade, including fertilizer trade, is transited through India. Because of its geopolitical location and agro-ecological conditions, Nepal faces unique challenges in developing a well-functioning fertilizer market. The main objective of this policy brief is to highlight the difficulties a landlocked country faces in procuring fertilizers and the externalities it encounters from neighboring countries fertilizer policies in promoting efficient fertilizer use and supply.

Nepal is divided into three eco-regions: Mountain, Hill, and Terai. The Mountain Region is the northern area of the country and is the most sparsely populated region (7.3 percent), containing 15 percent of land area in Nepal. The Hill Region, located between the Mountain and Terai Regions, has been terraced to cultivate rice, wheat, maize, fruits, and vegetables. The region accounts for the 68 percent of the land area and 44.3 percent of the population. The Terai Region is an extension of the Indo-Gangetic plains, with a land area of 17 percent, yet it accounts for 48 percent of the population, 46 percent of the gross cultivated area, and 70 percent of the cereal production in the country. The tropical/subtropical climate, plain topography, and irrigation systems allow for a wide variety of crops to be grown, including rice, wheat, legumes, maize, vegetables, and sugarcane.

Low crop productivity is the main constraint for food security and growth rate has lagged far behind population growth; (Joshi et al 2012). Farm output is generally far less than research farms; one of the primary reasons for the yield gap is low fertilizer use and depletion of soil fertility. Research suggests that by adopting fertilizer management, irrigation, and using quality seed farmers in Nepal can increase their yields and increase cereal productivity.

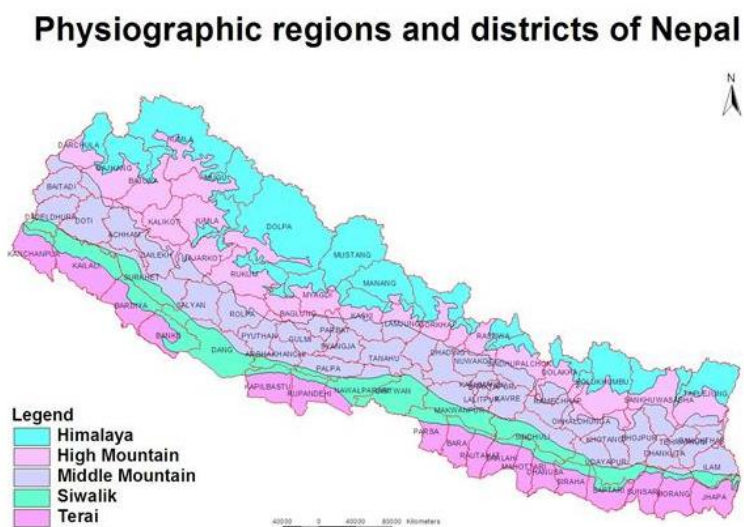
The Agricultural Perspective Plan (APP 1995-2015) assumes that fertilizer usage will increase cereal production by 44 percent and lead to a 67 percent growth of agricultural productivity. However, fertilizer usage remains low compared with other South Asian countries due to supply-side constraints (Thapa, 2006; Pandey, 2010; Misra, 2011).

Fertilizer Policy Regimes

The Fertilizer Policy Regimes in Nepal evolved through the following phases:

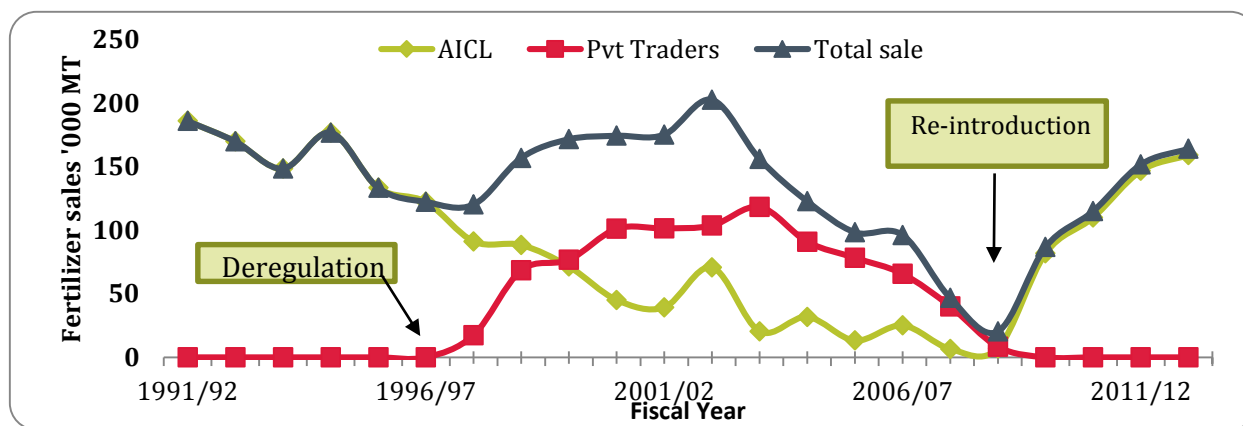
Table 1—Summary of fertilizer policy phases

Phase I 1965-1997:	Public sector monopoly (AIC) in import and marketing; fertilizer subsidy introduced in 1973
Phase II 1997-2008:	Deregulation in 1997; Subsidy phased out in 1999; Free Fertilizer Market; AICL was allowed to compete with private sector
Phase III 2009 onwards:	Re-introduction of subsidies in 2009 and public sector (AICL) monopoly in importing and marketing subsidized fertilizer



Mineral fertilizer was first introduced to Nepal in the 1950s. Organized supply of fertilizer began in 1965 with the establishment of the Agriculture Input Supply Corporation (AISC) which was later renamed the Agriculture Inputs Corporation (AIC). AIC was a public sector trading company and had a monopoly on fertilizer marketing until 1997 when the fertilizer market was deregulated and AIC was restructured as the Agricultural Inputs Company Limited (AICL). Initially, the response of the private sector was positive (Figure 1) but increased global prices and depreciated exchange rate led to a reduction in fertilizer demand which, coupled with unfair competition from smuggled fertilizers from India, discouraged fertilizer imports and use. In 2008/2009, only 4200 product tons were imported. Therefore, to revive the fertilizer use and supply the government reintroduced a fertilizer subsidy in 2009 with AICL as the sole importer and distributor.

Figure 1—Impact of policy changes on fertilizer supply



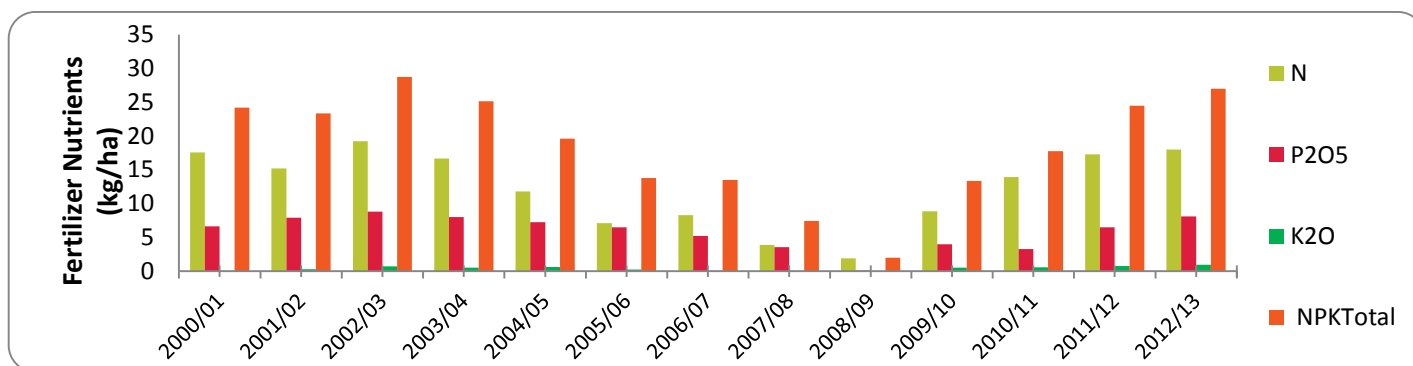
Source: MoAD, AICL

Trends in Fertilizer Use and Supply

Fertilizer supply in Nepal comes from both informal and formal sources. As mentioned earlier, in the formal sector, AICL has a monopoly on imports and marketing, whereas informal imports are smuggled from India through cross-border trade (as fertilizer use is highly subsidized and exports are banned from India). However, no consistent and reliable data are available for informal imports. Based on data on formal imports, fertilizer use in Nepal increased from less than 10,000 nutrient tons in 1970 to over 90,000 nutrient tons in 1994/1995 and remained below that level until 2012/2013. However, it is estimated that Nepal needs approximately 500,000 to 800,000 MT per year.

Household use of fertilizer by nutrients is consistently low. During 2000-2013, households applied less than 30 kg/ha of fertilizer nutrients to their crops¹. The low use of fertilizer application can help to explain the persistently low crop yields in Nepal. Nitrogen is the most utilized fertilizer, followed by phosphate.

Figure 2—Fertilizer use by nutrients over time



Source: MoAD, AICL

¹ Fertilizers bought in the informal market are not included in these data. Based on USAID/NEAT Project survey data, farmers seem to have used 68 to 128 kg/ha of fertilizer nutrients on cereal crops in 2011/12.

The Hill and Mountain Regions have negligible fertilizer use. An estimated 70 percent of fertilizer use in Nepal is in the Terai region primarily for rice. The primary crop for fertilizer use in the Hill and Mountain Regions is maize. 52 percent of fertilizer use in Nepal is used for rice, followed by wheat (17 percent), and maize (15 percent). The Terai region uses fertilizer more efficiently than the Mountain region.

There are five major types of fertilizers that are used in Nepal: Urea, Di-ammonium phosphate (DAP), Ammonium sulfate, NPK Complex (20-20-0), and muriate of potash (MOP). Ammonium sulfate originally dominated the fertilizer market, but its consumption fell and was replaced with Urea. Currently 80 percent of fertilizers in Nepal are Urea and DAP and are popular because they have high nutrient concentration, which makes transportation of the fertilizer to inaccessible and remote areas cheaper.

Additionally, issues of micronutrient deficiencies (B, Zn, and Mo) exist, particularly in areas where high yield varieties are intensively grown and heavily fertilized. There is the potential for long term fertility loss if these plant nutrients are not replenished in balanced ways since applying single nutrient fertilizer cannot sustain higher yields. Policy motivating farmers towards more balanced fertilization practices, based on scientific findings, will result in greater productivity. Specifically, policy that subsidizes the costs of only one single nutrient fertilizer (such as nitrogen) will only lead to indiscriminant use of that single nutrient and may create more soil and environmental problems in the future.

Market Structure

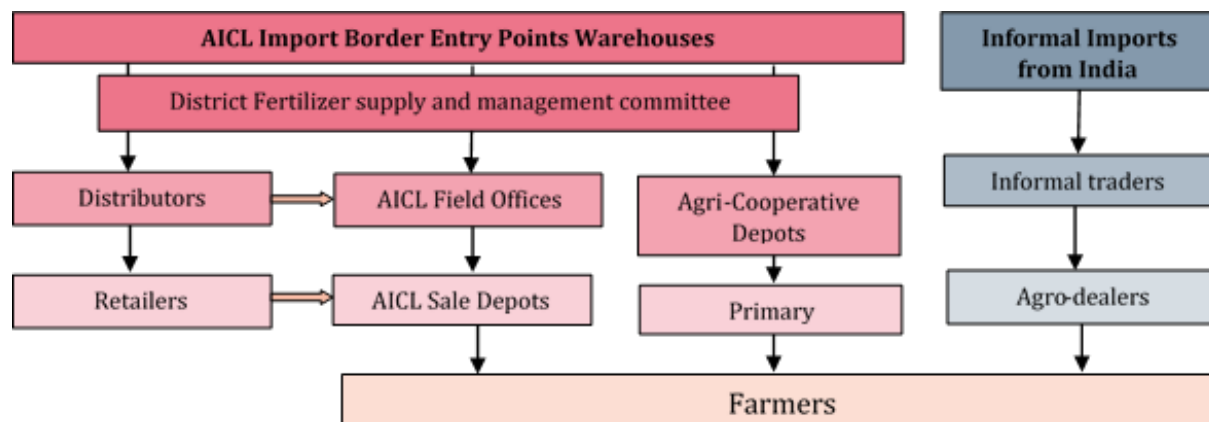
Nepal does not have a fertilizer plant and lacks natural gas, naphtha, fuel oil, and coal which are needed to produce ammonia and urea fertilizer, thus fertilize demand must be met through imports. As previously mentioned, the government re-introduced fertilizer subsidies in 2009 because the liberalized fertilizer market was unable to compete with the informal flow of cheap Indian fertilizer into Nepal. Such informal supplies continue to play a distorting role in the fertilizer market while creating heavy subsidy burdens for the government.

AICL imports fertilizer from Turkey, China, Egypt, and Jordan by publishing global tender notices and inviting companies to submit sealed tenders in a process that takes 4-5 months. AICL also imports fertilizer from India on the import parity price of India. Additionally, the AICL procures and manages fertilizer received from grant-aid as buffer stocks.

From Port Haldia, bagged fertilizers are transported to Nepal border warehouses and then are distributed to AICL regional and district warehouses. From these warehouses the fertilizer is given to AICL authorized retailers and cooperatives that, in turn, sell the fertilizer to farmers (Figure 3). There are presently 1,378 cooperatives that sell retail fertilizer to farmers at a subsidized rate plus transport cost, as fixed by the AICL Board of Directors that typically averages approximately 70 percent. Moreover, the Government of Nepal (GON) provides a transport subsidy to 26 remote districts so that fertilizer in inaccessible areas is on par with prices in feeder districts.

In addition to the AICL there are numerous private sector companies informally acting in the fertilizer sector. These companies import Indian subsidized fertilizer and operate through local agro-business dealers or various shops (such as grocery and cycle repair shops) in rural areas of the Terai Region. There is limited reliable information on the mechanism or volume of informal fertilizer trade from India to Nepal. However there has been an increase in fertilizer use at the household farm level as demonstrated by periodic farm surveys (ADB/ASPR 2001; Agrifood, 2003; USAID/NEAT-Nepal 2012) contrary to the decline of formal fertilizer supply during the same period. This paradox confirms that approximately 85 percent of fertilizers used are from informal cross-border trade.

Figure 3—Fertilizer distribution flow chart

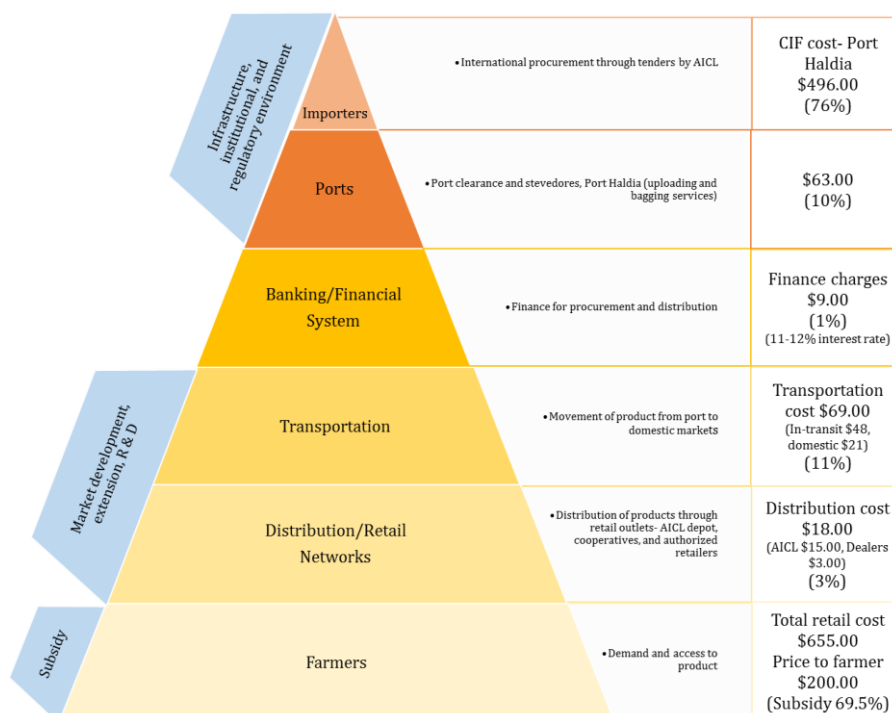


Supply Chain

The supply chain structure can be analyzed using the Structure-Conduct-Performance approach (Bumb et al., 2011), with the importers at the top of the pyramid, wholesalers, bankers, and transporters in the middle, and distributors/retailers and farmers at the base of the pyramid.

Nepal can reduce fertilizer transaction costs by increasing the size of its order and lowering trade barriers. Transport, bagging, and port clearance costs are approximately 21 percent of landed cost, decreasing transportation costs and improving port operations would reduce fertilizer prices. Nepal currently uses the Kolkata/Haldia port to import fertilizers, but this port is congested and faces long delays; there are other ports such as Vizakhapatam and Paradip that can be explored through a feasibility study.

Figure 4—Fertilizer supply chain in Nepal, with markup rates



Source: Authors calculations based on field interviews,

Note: numbers may not add due to rounding

Key Challenges and Policy Options

Supply Issues: Fertilizer supply in Nepal is 75-80 percent below estimated demand; therefore steps should be taken to ensure consistent and adequate fertilizer supply to farmers. Although Nepal has no raw materials to produce fertilizer it could produce Partially Acidulated Rock Phosphate (PAPR) from phosphate rock deposits in western Nepal. Additionally, there are a number of lime deposits in Nepal that can be used to improve soil health and productivity. The possibility of using hydro-electricity in producing N fertilizer could be explored.

Fertilizer Subsidy: The fertilizer market in Nepal is highly susceptible to external influences such as Indian fertilizer subsidy prices, changes in global fertilizer prices, and exchange rate depreciation. Fertilizer subsidies are used as a method of motivating farmers to use proper fertilizer, but the subsidies are costly and cannot be sustained in the long-term. Fertilizer subsidies should be a temporary strategy with an exit plan that leads towards a free and competitive market. In addition, the tendering system is inefficient and it takes 4-5 months to procure fertilizer, delaying the timely delivery of fertilizer to farmers.

If the subsidy system is to persist, a pilot project voucher system for fertilizer should be created as a way of increasing the efficiency of the subsidy system and potentially developing private traders and retailers. Currently, the private sector is excluded from the formal fertilizer market, however, the private sector contributed to 73 percent of fertilizer imports and distribution from 2001-2009. There is an urgent need to reestablish the role of the private sector to supplement AICL's activities. The private sector could also reduce fertilizer costs through direct negotiation, competitive import, and distribution management.

Fertilizer Quality: Fertilizer quality is an ongoing issue in Nepal. In a study it was discovered that 12 percent urea, 100 percent DAP, and 32 percent MOP fertilizers were of poor quality. There have been high yield losses of up to 1MT/ha as a result of informally imported DAP fertilizer. Government quality control and monitoring of fertilizer is not as robust as it should be; lack of funds, equipment, and trained staff make it difficult for the government to enforce fertilizer quality standards. Additionally, there are no laws regulating or relating to the environmental aspects of fertilizer use.

Regional Integration: Nepal's open border with India can be both a challenge and an opportunity. Formalization of fertilizer trade with India could increase the quality of fertilizer coming into Nepal and could reduce the price of fertilizer. India, as a bulk purchaser, can secure a lower price for fertilizer than Nepal acting alone. Additionally, policy harmonization would reduce incentives for illegal trade and support the development of competitive regional markets, thereby reducing fertilizer costs for all farmers in the region.

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