Public Support for Agriculture Extension and Marketing Extension System in Nepal

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Abstract

Nepalese economy heavily relies on agriculture because it is the single largest contributor to GDP, generates direct employment to two third population and is the major source of livelihoods of large number of people. The public support for agriculture development mainly includes organizational arrangements, provision for human resources, formulation and implementation of policies, laws, plans, programs, projects and research activities. Public support also includes delivery of extension and marketing services, input supply and infrastructure development. In Nepal, research, extension and market development are mainly the public sector responsibilities but there are several issues related to these programs. Such issues mainly include lack of master plan, public investment dependent market development, failure in linking market development with production, lack of focus on smallholder farmers' situation, poor storage, processing and transportation facilities, weak market intelligence, and lack of orientation to extension agents. In this backdrop it is recommended to execute the activities such as development of master plan for agriculture market, market development through partnership and collaboration, cooperatization of farmer groups, support provisions for smallholder farmers, and infrastructure development. Endowments of enormous natural resources offer a great opportunity for commercialization of agriculture sector in Nepal. Such resource endowments could be best utilized not only for the benefit of Nepal but also for the benefit of all SAARC member countries. However, all of us need to put our hands together to address underlying issues.

1. Main Features of Public Support

Nepalese economy heavily relies on agriculture. It is still the single largest sector which contributes 33 percent to Gross Domestic Product (GDP), generates direct employment to 66 percent population and is the major source of livelihoods of the Nepalese people. Hence, the Government of Nepal (GoN) has been providing various kinds of supports for the development of agriculture sector in Nepal. Following are the major features of public support for agriculture sector development in Nepal.

- Organizational arrangements
- Human resources
- Formulation and implementation of policies
- Regulatory services through the formulation and implementation of acts, regulations and orders
- Formulation and implementation of plans, programs and projects
- Research activities
- Agriculture extension services
- Agriculture marketing services
- Input supply
- Infrastructure development
1.1 Organizational Arrangements

Historically, agriculture has been the individual farmer activity since time immemorial. The planned development of agriculture sector began with the establishment of Department of Agriculture (DoA) in 1951. In 1965, DoA was transformed into five departments as Department of Agriculture Extension, Department of Fishery, Department of Horticulture, Department of Animal Health, and Department of Agriculture Research and Education. Since then such organizational structures were integrated and disintegrated several times for the agricultural development in the country. Currently, there are four departments, one Nepal Agricultural Research Council (NARC), Boards, Committees and Corporations under the Ministry of Agriculture and Cooperatives (MoAC). Figure 1 presents the overall organizational arrangement being made.

![Organizational Arrangements Diagram]

**Figure 1: Major public sector organizations for agriculture development in Nepal**

The public support modality for agriculture development is changing fast in the world. There have been dramatic changes and reforms in the implementing actors and service providers. However, in Nepal it is still the responsibility of the GoN in implementing programs and providing agriculture research, extension and marketing services to the farmers and entrepreneurs.
MoAC is at the apex for formulating policies and programs as well as for the overall coordination of agriculture development programs in the country. The Ministry formulates and implements agriculture development plans, programs and projects through its departments, regional directorates, district, service and sub-service center level offices.

MoAC is an umbrella organization for NARC, corporations, companies, boards, committees and departments. The Ministry is headed by the Minister. The ministry has five divisions. Each division is headed by the Joint Secretary. The sections in each division are headed by senior officers. The sections look after specialized tasks through internal and external coordination with other ministries and departments.

Four departments viz. Department of Agriculture (DoA), Department of Livestock Services (DLS), Department of Food Technology and Quality Control (DFTQC) and Department of Cooperatives (DoC) have been established mainly to carry out agriculture extension activities and service delivery to the farmers and entrepreneurs in the country.

NARC was established with the main responsibility of carrying out agriculture research. Since Nepal has diverse climatic and physiographic zones, the researches in a few research stations are not sufficient to represent wide variation in different regions. Hence, for the wider coverage of innovations four Regional Agriculture Directorates, 18 Agriculture Research Centers and 50 Location Specific Research Stations have been established in various parts of the country.

1.2 Human Resources

The farmer population is estimated at 17.7 million or about 2.9 million farm families. There are about 11,838 government personnel for agricultural development and to serve farming population in the country (Table 1). Among 10,073 staffs from the Ministry and the Departments 5,402 are technical manpower and the rest are administrative and support staffs such as computer operators, typist, drivers, office assistants and others.

Table 1: Human resources for agriculture development under major public sector organizations

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Organizations</th>
<th>Human resources, No.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Technical</td>
<td>Non-technical</td>
</tr>
<tr>
<td>1</td>
<td>Ministry of Agriculture and Cooperatives</td>
<td>57</td>
<td>75</td>
</tr>
<tr>
<td>2</td>
<td>Department of Agriculture</td>
<td>2848</td>
<td>2126</td>
</tr>
<tr>
<td>3</td>
<td>Department of Livestock Services</td>
<td>2267</td>
<td>1793</td>
</tr>
<tr>
<td>4</td>
<td>Department of Food Technology and Quality Control</td>
<td>179</td>
<td>52</td>
</tr>
<tr>
<td>5</td>
<td>Department of Cooperatives</td>
<td>3</td>
<td>591</td>
</tr>
<tr>
<td>6</td>
<td>Other central level organizations*</td>
<td>105</td>
<td>109</td>
</tr>
<tr>
<td></td>
<td>Sub-total</td>
<td>5402</td>
<td>4671</td>
</tr>
<tr>
<td>7</td>
<td>NARC</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

*Agriculture Information and Communication Center, Seed Quality Control Center, and National Agriculture Research and Development Fund.

The technical manpower directly facing farmers are the ones working in district offices. Such technical manpower to farm family ratio is 2,500 in crop sector. Such high ratio indicates a poor access of farm families to technical manpower considering Nepal’s difficult and remote physiographic setting. Realizing this, the GoN has adopted group approach and public private partnership to increase access of farm families to technical services.

1.3 Formulation and Implementation of Policies, Acts, Regulations, Orders, Plans and Programs and Regulatory Services

The GoN has formulated policies, acts, regulations, orders, plans and programs for the development of agriculture sector in the country. The brief about these are presented below.

a. Policies

In the past, agriculture development programs were mainly guided by the government directives and the periodic plans. Hence, various attempts have been made on the formulation of agriculture strategies and perspective plans. The Asian Development Bank initiative in 1983 in formulating Agriculture Development Strategy was the first attempt in this direction. However, it could not be implemented due to various reasons.

In 1995, the GoN in association with John Mellor and Associates formulated a twenty year Agriculture Perspective Plan, 1995-2015 (APP). This has been the major guideline for agriculture development of GoN till now. Since this is considered as agriculture development strategy, the GoN formulated National Agriculture Policy, 2004 (NAP) and was implemented in November 2004. Now, all agricultural development plans, programs and projects are guided mainly by NAP. Till now, following 10 policies have been formulated and these policies are in implementation.

- National Agriculture Policy, 2004
- Agri-business Promotion Policy, 2006
- Agro-biodiversity Policy, 2007
- National Seed Policy, 2000
- National Fertilizer Policy, 2002
- Irrigation Policy, 2003
- National Tea Policy, 2000
- National Coffee Policy, 2003
- Dairy Development Policy, 2007
- Agriculture Perspective Plan, 1995-2015

b. Acts, Regulations and Orders

The acts and regulations have been formulated whenever there is a need for legalizing the policy provisions being made in the policy. Such laws have to be passed in the parliament which requires rigorous exercise and substantial time. The GoN can declare orders to address emergency situation for mitigating such situation. Declaration of Bird Flu Control Order, 2064 in 2006 is such an example. Currently, there are 18 acts, nine regulations and six orders related to agriculture development as listed below.
Acts

- Food Act, 2023 (3rd Amendment 2049)
- Substitution of Mothers’ Milk (Sales and Distribution) Act, 2049
- Iodized Salt (Production, Distribution & Sales) Act, 2055
- Feed Act, 2033 (Amended in 2055)
- Patent Design and Trade Mark Act, 2022 (Amended in 2048)
- Aquatic Animal Protection Act, 2017 (Amended in 2055)
- Contract Act, 2056
- Seed Act, 2045
- Pesticide Act, 2048 (1st Amendment 2064)
- Plant Protection Act, 2064
- Animal Health and Animal Service Act, 2055
- Animal Slaughter House and Meat Inspection Act, 2055
- Cooperative Act, 2048
- Nepal Agriculture Research Council Act, 2048
- Nepal Veterinary Council Act, 2055
- National Tea and Coffee Development Board Act, 2049
- National Dairy Development Act, 2048
- National Cooperative Development Board Act, 2049

Regulations

- Food Regulation, 2027 (4th Amendment 2054)
- Feed Regulation, 2041
- Seed Regulation, 2054
- Pesticide Regulation, 2050
- Irrigation Regulation, 2056 (1st Amendment 2060)
- Animal Health and Animal Service Regulation, 2056
- Animal Slaughter House and Meat Inspection Regulation, 2057
- Cooperative Regulation, 2049
- Nepal Veterinary council Regulation, 2057

Orders

- Chemical Fertilizer (Control) Order, 2055
- Chhadrangi Seed and Milk Development Committee (Constitution) Order, 2052
- Kalimati Fruit and Vegetable Market Development Committee (Constitution) (3rd Amendment) Order, 2063
- Cotton Development Committee (Constitution) Order, 2037
- Animal Feed Production Development Committee (Constitution) Order, 2041
- Bird Flu Control Order, 2064
c. Plans and Programs

The first periodic plan was begun in 1956. Till 2011, nine Five Year Plans and three Three Year Plans (including the recent TYP 2067/68-2069/70) have been implemented. The recent periodic plan is the 12th Plan. The past periodic plans had focus on different aspects. These ranged from infrastructure development, social development, integrated rural development, basic needs fulfillment, and poverty alleviation.

Some important achievements have been realized after the implementation of periodic plans. These included reduction in population below poverty line (25.4%) and child and maternity mortality rate and increase in literacy rate, enrollment in the school and average life expectancy (64.1 years). There has been substantial reduction in population below poverty line from 31 to 25.4 percent during the last Three Year Interim Plan (2064/65-2066/67). It was mainly due to increase in wage rate in agriculture and non-agriculture sectors, increase in urbanization and economically active population, and increase in income from remittance.

1.4 Major Research Activities

Multiple partnership research involving both public and private sectors in research activities have been on focus since 1990s. Now, a number of new partners have emerged to provide research services. Such partners include the research arrangements between NARC and other private sectors, Non-government Organizations (NGOs), Consultative Group on Agriculture Research centers, overseas universities and private sector firms.

NARC was established to carry out research activities in different parts of the country. The research activities are guided by the GoN policy and NARC vision. The major research activities of NARC are focused on fulfilling the following objectives:

- develop suitable varieties which are resistant to major insects and diseases;
- develop production technologies;
- produce high quality breeder and foundation seeds;
- accelerate transfer of technology; and
- establish technical collaboration with relevant national and international research centers to exchange germplasm and information as well as train scientists and technicians.

NARC conducts research in the following areas through its own and in collaboration with other institutions.

- Food and cash crops
- Horticulture crops
- Animal husbandry and animal health
- Pasture and fodder crops
- Agro-forestry/farm forestry
- Agriculture engineering
- Soil and irrigation management
- Agriculture botany and biotechnology
- Entomology, plant pathology and plant protection
Farming system
Agriculture extension
Food science
Other subjects related to agriculture

Farms and research centers have been established in different parts of the country with the main aim of conducting location specific research activities and testing new varieties to be released. In Nepal 229 varieties of agronomic crops have been released and registered since 1960 for different types of agro-ecological belts (Table 2). However, only a few of them have been observed popular among the farmers. In other words, not most of the varieties being released and registered have been adopted by the farmers. There is a need to analyze the reasons for lower adoption of the varieties being released and registered in order to actually find out the gaps. This will guide the researchers, policy makers and development experts design their future plans. There are few studies but these are not comprehensive in finding out the gaps. They cover only a few varieties of a crop but not all varieties of one crop. Therefore, there is a need for such a comprehensive study which assesses all varieties of all crops or a few selected crops in order to analyze the underlying issues and problems on lower adoption of varieties being released.

Table 2: Important agronomic or field crops and their released and registered varieties in Nepal, 1960-2010

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Crop</th>
<th>No. of varieties</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cereal Crops</td>
<td>122</td>
</tr>
<tr>
<td>2</td>
<td>Commercial or Cash Crops</td>
<td>24</td>
</tr>
<tr>
<td>3</td>
<td>Pulse or Grain Legume Crops</td>
<td>35</td>
</tr>
<tr>
<td>4</td>
<td>Vegetable Crops</td>
<td>46</td>
</tr>
<tr>
<td>5</td>
<td>Pasture, Fodder Crops and Oat</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>229</td>
</tr>
</tbody>
</table>


1.5 Major Extension Services

The agriculture extension and marketing programs in Nepal are guided by the agriculture development policies, periodic plan guidelines and the GoN directives. Annual programs and budgets are formulated and implemented mainly through four departments namely DoA, DLS, DFTQC and DoC and the regional and district offices under these departments. Bottom-up planning has long been practiced in agriculture sector and now this has been mandatory with the devolution of district agriculture extension programs. The major program initiatives currently in implementation are listed below.

- **Institution Development Programs:**
  - Farmer Group (FG) formation and strengthening
  - Transformation of matured FGs to agriculture cooperatives and agriculture cooperative development
• **Infrastructure Development Programs:**
  - Small irrigation development, rehabilitation and strengthening
  - Cooperative irrigation development
  - Cooperative farming

• **Input Supply Programs:**
  - Chemical fertilizers
  - Seeds
  - Saplings

• **Production Programs:**
  - Pocket programs
  - One Village One Product (OVOP) programs
  - Mission programs
  - Seed multiplication programs
  - Cropping intensification programs

• **Service Delivery Programs:**
  - Technical advice
  - Laboratory services
  - Regulatory services

Considering the difficult terrain as well as lower human, financial and physical facilities different **approaches** have been adopted. Some important ones are listed below.

• Agriculture Service Center (ASC)
• Farmer Groups
• Cooperatives
• Public Private Partnership (PPP)
• Private Sectors such as Agro-vets, NGOs, CBOs etc
• Farmers’ Field School (FFS)
• Farmer to Farmer (FtF)
• Demonstration Farm (ATEIP initiative)
• Agriculture Alliance (CADP and PACT)

The extension programs are mainly focused on dissemination of technology. Different extension activities are carried out for this purpose. These mainly include meetings, visits, fairs/exhibitions, campaigns, trainings, demonstrations, studies, institution building and strengthening (groups and cooperatives), infrastructure development, service delivery, monitoring, supervision, evaluation etc.
1.6 Major Marketing Extension Services

The need for marketing extension services is very much important as farmers become market oriented. In such situation, extension agents should be in a position to advise them not only on how to grow crops but also on how to sell them. The extension agents should advise farmers on product handling (collection and processing), grading and standardization, packaging, transportation, storage, financing, risk bearing, market intelligence and selling. For effective marketing extension the capacity of extension agents should be strengthened. Some important public sector marketing extension services in Nepal are listed below.

- Development of collection and market (wholesale and retail) centers
- Formation of market management committees
- Promotion of consumer cooperatives
- Flow of market information
- Provision for credit
- Regulatory measures

For the implementation of above mentioned programs and activities the GoN has formulated and implemented following policy and guidelines.

- Agri-business Promotion Policy, 2063
- Agri-business Promotion Policy (2063) Implementation Guideline, 2065
- Agriculture Product Market Management and Conduction Guideline, 2053 (third amendment)
- Basic Terms and Conditions and Bases for Agriculture and Livestock Market Infrastructure Development, 2065 (conditional grant for local government)
- Basic Terms and Conditions and Priority Bases for Agriculture Market Infrastructure Development, 2066

2. Major Pitfalls in Existing Agriculture Market Development and Marketing Extension Services

The Nepalese agriculture is mainly a subsistence type with the domination of smallholder farmers scattered all over the country. Hence, the marketable surplus from smallholder farmers is very little. Moreover, most sales by all categories of farmers are generally a forced sale for paying the credits taken from moneylenders, traders, financing institutions and banks. It demands the development of collection and market centers that respond to the real situation.

Market development encourages production. Despite several efforts in the past, development of agriculture market has been slow. Till now, only eight wholesale markets and about 180 collection centers have been developed in crop sector. Hence, an analysis of issues related to market development would be very much useful for agriculture development in the country. Following are some pitfalls related to agriculture market development and marketing extension services in Nepal.
2.1 Lack of Master Plan

There is no master plan for agriculture market development in Nepal. Market development even lacks targeting in periodic plans. Hence, the market development in Nepal has been guided mainly by the annual target and government budget provisions being made every year. The collection and market centers developed so far do not meet the minimum standard of the center in terms of space for loading and un-loading, cooling, storage, cleaning, display, market intelligence, service station, garbage disposal etc.

2.2 Public Investment Dependent Market Development

In Nepal, development of market infrastructures is still perceived the public sector responsibility. However, the budgetary constraint of the government has limited such development. Moreover, such infrastructures are developed mainly in public lands which are generally located in inaccessible areas. Therefore, several structures such as collection centers, Haat Bazars, wholesale and retail market centers have been abandoned within a few years of their operation.

2.3 Failure in Linking Market Development with Production

Both production and market grow if these two are closely linked. However, market development has mainly been the target oriented. Hence, production growth and market development have not been to the level of expectation. There is little focus on development of collection and market centers that has link with production.

2.4 Lack of Focus on Smallholder Farmers' Situation

Although the Nepalese agriculture is in the process of commercialization but it is largely a subsistent type with the domination of smallholder farmers. The smallholder farmers have little but forced sale mainly for meeting their immediate cash needs. However, there is a lack of market development which is focused on production system of smallholder farmers.

2.5 Poor Storage, Processing and Transportation Facilities

Generally, agricultural commodities are bulky and perishable. Most of such commodities require processing before consumption. Moreover, agricultural commodities are consumed in small quantity but regularly throughout the life period. Hence, they should be stored and released regularly. On the other hand, the commodities which are consumed fresh should be transported immediately to the market centers for sale and consumption. However, development of storage, road network and agro-industry is very poor in Nepal.

Poor road network and poor quality of roads results several kinds of risks. First of all, it results into physical risk due to spoilage of agriculture commodities due to transportation in rough and poor quality roads. Secondly, it creates market risks due to slow or delayed delivery of agriculture commodities because price and demand for agriculture commodities are highly unstable. Lastly, spoilage and add to cost.
2.6 Weak Market Intelligence

In the past, DoA initiated broadcasting of price information of some agricultural commodities through Radio Nepal. Now, Agro-enterprise Center and some other organizations have initiated support to such broadcasting from various FM stations. Some daily newspapers also publish such information.

Agri-business Promotion and Marketing Development Directorate of the Department of Agriculture publishes such information annually in Agricultural Marketing Information Bulletin. However, such information has several pitfalls in terms of coverage of commodities being sold in the market, in-depth analysis of trend in prices and quantities, timing of broadcasting information, and wide and purposeful dissemination of information and publications.

2.7 Lack of Orientation to Extension Agents

Generally, the Nepalese farmers consider marketing as one of their major problems to enhance their production. Lower price received by the farmers has been perceived one of such marketing problems. However, the Nepalese extension agents are well-trained and oriented in production techniques. They are poorly equipped with identifying problems related to marketing. Hence, a holistic vision and approach to identify pitfalls as well reorienting and training of extension agents is needed for successful marketing and enhancing production.

3. Suggestions for Addressing Production, Agriculture Extension and Marketing Extension Problems and Issues

There are several ways of addressing the problems and issues related production, agriculture extension and marketing extension system. Some important ones are briefly described below.

3.1 Master Plan for Agriculture Market Development

Since market development enhances production, formulation of master plan for agriculture market development will be very much helpful for planning production and market development in the long run. This will guide planned agriculture market development in the long run.

3.2 Market Development through Partnership and Collaboration

The guideline for partnership and collaboration for collection and market center development has already been formulated. Partnership and collaboration between private sector, government and non-government organizations has been instrumental for the development of collection and market centers. Several collection and market centers have already been developed based on this guideline.

There is also need for focusing on the large number of widely scattered smallholder farmers to enhance production and market development. It requires development of organized market networks near such production areas so that smallholder farmers get fair price. It will also encourage commercialization of smallholder farmers' production system as well as closely link production with the market. This could be done through the cooperatization of matured FGs.
3.3 Cooperatization of Farmer Groups

A total of 36,718 Farmer Groups, 22,358 under DoA and 14,360 under DLS, have already been formed. These FGs are scattered all over the country and are mainly involved in production activities with the technical support from District Agriculture Development Offices (DADOs) and District Livestock Service Offices (DLSOs). Transformation of matured FGs to cooperatives will be very much helpful for collective action for linking production with the markets. However, such agriculture cooperatives should be oriented towards the following crucial activities that sustain not only the production but also the marketing of agriculture commodities through agriculture cooperatives. Such cooperatization needs implementation of intensive agriculture extension activities through continuous training and guidance.

- The agriculture cooperatives should start trading of agriculture inputs such as seeds, fertilizers, tools, equipment, machineries, pesticides etc to increase farmers' access to the agriculture inputs which otherwise would have been costly and difficult to access in terms of required quantity, quality and time.

- Generally, traders or firms prefer to work with organized institutions like FGs and cooperatives instead of individual farmers in order to save input delivery, extension and procurement (collection, cleaning, grading and standardization etc) costs. In Nepal, contractual arrangements with traders or firms or NGOs are getting success for the production of high value crops and commodities such as seeds, vegetables and organic products. Such contractual arrangements lead to competitiveness for meeting quality standards specified in the contract as well as crop diversification with the introduction of new crops, varieties and commodities. In such cases, group action through agriculture cooperatives enables individual farmers to participate in contract farming schemes which may generate significant benefits.

- The agriculture cooperatives may also involve in the trading of farmers' produce so that the farmers can sale their produce locally with fair or remunerative price and get cash in time. The studies conducted by IDE/Nepal have shown that the farmers get at least 20 percent more price selling their commodities through groups or collection centers than selling individually. The cooperatives may sell the produce locally as well as in the distant urban markets. Selling agricultural commodities in the distant urban markets will link rural with urban economy.

- The number of extension activities and saving increase with the maturation of FGs. FGs are semi-formal institution registered in DADOs and DLSs. Such FGs need to be transformed into a formal institution as cooperative to perform several legal activities such as buying and selling of commodities, entering into different contractual arrangements and so on.

The FGs have been successful in collecting huge amount of saving from the members. About NRs. 430 million has already been collected as group saving throughout the country and NRs. 261 million has been invested as loan to the members. The agriculture cooperatives could scale-up their informal group saving program into a more formal saving and credit program after such matured FGs are cooperatized. The agriculture cooperatives may start differential interest rates for members and non-members. This will help agriculture cooperatives increase their internal resources as well as encourage non-members join such agriculture cooperatives.
The agriculture cooperatives should also start value addition activities in the cooperatives such as cleaning, grading, standardization, packaging and labeling. Such activities will enable such agriculture cooperatives and ultimately the farmers fetch higher price of their commodities.

The agriculture cooperatives should also start selling essential consumer commodities such as salt, sugar, oil, food items, kerosene, soap etc. It will generate not only resources but also make such agriculture cooperatives functional throughout the year. Otherwise, most of the cooperatives in Nepal are functional during crop seasons only.

The agriculture cooperative should establish market information center in the premise of cooperative. Such establishment will help cooperatives and member farmers prepare future plan of their production in terms of type and varieties of crops to be grown, quantity to be produced, type of technology to be adopted to adjust with the timing of production with the use of plastic house and so on. Similarly, it will help agriculture cooperatives prepare business plan and various kinds of transactions.

Currently, each Agriculture Service Center has to provide services to 11 Village Development Committees and each frontline extension worker (Junior Technician and Junior Technical Assistant) has to provide services to 2,500 farm households. The probability for increasing their number is very low. Hence, the cooperatives should plan for providing extension services through their own extension experts.

Directorate of Agriculture Extension of Department of Agriculture has already initiated piloting of this approach. Development of such farmers' institutions will be very much useful in providing marketing services to widely scattered smallholder farmers too. The success of such initiative lies with the benefits that such institutional development provides to the member farmers. Such benefits should ought-weigh the benefits obtained from local moneylenders and traders. Otherwise, there are chances of a net loss and failure of the initiatives being taken-up.

About 1,239 matured FGs have already been transformed into agriculture cooperatives by DADOs. There are about 22,446 cooperatives and among them only 5,000 are agriculture cooperatives.

3.4 Supports for Smallholder Farmers

The Nepalese agriculture is dominated by large number of smallholder farmers and infrastructures development such as irrigation, roads, electricity and agro-industries are still at their infant stage. Hence, such farmers and infrastructure development should be supported so that the vast opportunities offered by nature could be realized for agriculture development in the country.

3.5 Infrastructure Development

Despite the existence of enormous potential energy from water resources, Nepal has serious energy crisis. It has negatively impacted on the development of cold storage, agro-processing
industries and groundwater irrigation development. The likely chance of a big shift in hydropower generation in the near future is very low. Hence, DoA has promoted use of rustic stores and zero tillage equipments and use of alternative energy such as solar energy for drying.

4. Opportunities for SAARC Member Countries of Free Economy Policy and Globalization

Nepal is richly endowed with natural resources such as land, water, various climatic conditions and agro-biodiversities. There are abundant surface and ground water resources with the possibilities of harvesting and utilizing rain water. In addition, the water stored in the mountains in the form of snow is released slowly that maintain regular flow of water in several rivers and streams.

Three distinct climatic zones viz. mountain, hill and Terai offer three types of temperate, subtropical and tropical environment at one point of time. The stretch of these climatic zones from east to west offers opportunity for production in large volume in natural condition.

Nepal has also rich agriculture biodiversities. Many of the landraces are quite efficient in coping with climate change and other adverse conditions. Exploration and studies on such qualities will be very much useful not only for Nepal but also for SAARC region and human being at large. Moreover, water system is deteriorating fast due to degradation of watersheds. It is resulting into increased landslides, floods and soil erosion. It has severely limited farmers' access to water resources in terms of quality and quantity of irrigation water. The impact of such problem is not only limited within the national boundary but it has crossed international boundary too.

Farmers have all kinds of incentives to adopt improved and hybrid varieties. Hence, local landraces are vanishing fast due to adoption of improved and hybrid varieties. Hence, we should put our hands together to protect, conserve and utilize such precious and abundant water resources and agro-biodiversities.

Endowments of enormous resources offer a great opportunity for commercialization of agriculture in Nepal. Such resource endowments could be best utilized not only for the benefit of Nepal but also for the benefit of all SAARC member countries. However, all of us need to put our hands together to address underlying issues.
References


