

# Agriculture and Food Security in Nepal

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## **Abstract**

Agriculture is regarded as the polar of Nepalese industries, therefore, improving the sustainability and resilience of agriculture and food security in Nepal is highly correlated with the common welfare of Nepalese people. Agriculture is of geographic benefit, but still, problems exist that makes it can't meet the growing need for productivity and efficiency in the trend of globalization. This paper provides a general summary for domestic and international efforts before, evaluating their effectiveness and also offer some suggestions for future development with reference to Chinese success in agricultural optimization.

## **Introduction**

### **Agriculture**

Agriculture is a crucial sector in Nepal, employing a significant portion of the population. It contributes to the country's GDP and provides livelihoods for many rural communities. Major agricultural activities include crop cultivation, livestock farming, horticulture, and forestry.

The main crops grown in Nepal include rice, maize, wheat, millet, barley, pulses, oilseeds, fruits, and vegetables. Rice is the staple food crop, while maize and wheat are also important. Cash crops like tea, coffee, sugarcane, jute, and tobacco contribute to the economy.

One distinct feature of agriculture in Nepal is that the majority of Nepalese farmers engage in subsistence farming, growing crops primarily for their own consumption. However, especially in recent years, commercial farming has also been increasing with both governmental and folk efforts, particularly in areas with favorable agro-climatic conditions and market access.

### **Food Security**

Access to adequate food and nutrition is a significant concern in Nepal. Despite improvements, a significant portion of the population still faces food insecurity. (数

据) Factors like poverty, unequal distribution of resources, natural disasters, and political instability contribute to this issue. With growing attention to food security sector from international community and a series of initiatives taken by local government, Nepal has made great progress in recent years, but still, a considerable portion of the population in Nepal faces food insecurity. Nepal ranks among the countries with the highest rates of malnutrition, particularly among children.

## Past Efforts

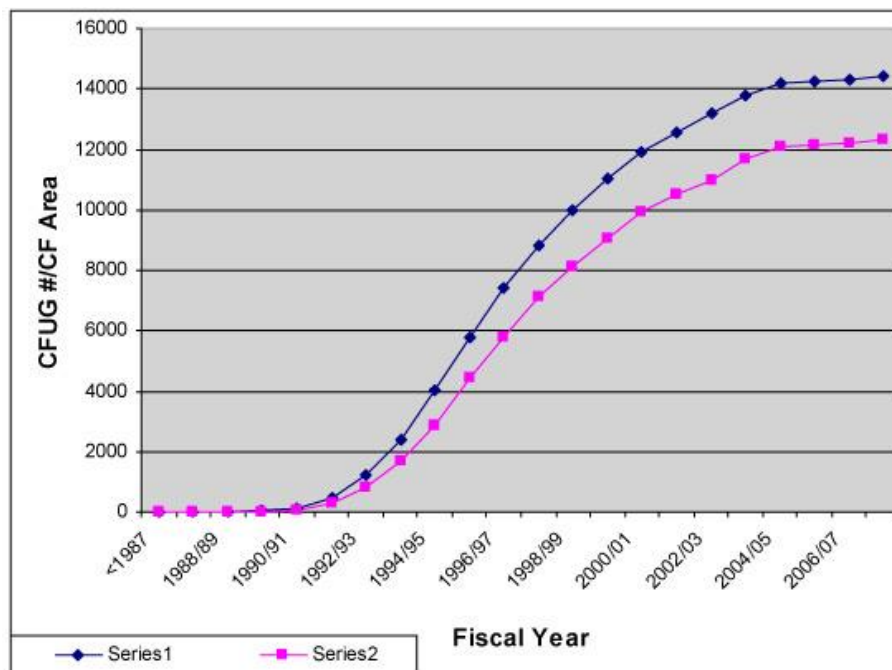
### Agriculture

#### Green Revolution

In the 1960s and 1970s, Nepal experienced a Green Revolution, which aimed to increase agricultural productivity through the adoption of high-yielding crop varieties, improved irrigation systems, and the use of chemical fertilizers and pesticides. This initiative significantly increased grain production, particularly in the Terai region.

#### Community Forestry

The introduction of community forestry in the 1970s empowered local communities to manage and sustainably utilize forest resources. This approach helped improve livelihoods, enhance land productivity, and conserve biodiversity. As is shown in the graph below, the approach has been greatly popularized since its promulgation.



Community Forest User Group (CFUG) Area in Nepal<sup>1</sup>

One representative example is the optimized administration for Patle Forest in Nepal. Since 1970, due to an increase in population pressure on the forest and a lack of

<sup>1</sup> Satoyama Initiative, "Community Forestry in Nepal," Nepal Site, December 27<sup>th</sup> 2011, June 9<sup>th</sup> 2023 Accessed.

sufficient source of income for the people to their livelihoods, anthropogenic pressures in this forest has risen tremendously, leading to massive deforestation and degradation of the forest. To conserve the forest, it was then handed over to the CFUG to be managed as a community forest in 1994 after promulgation of the new Forest Act of 1993. The detailed management of the forest under the regulation of CFUG included: Protection of forest from uncontrolled grazing, illegal cutting, and forest fires; Regular patrolling by CFUG members to conserve the forest and prevent illegal activities like encroachment and tree cutting; rewarding informants informing about the activities of illegal activities within the CF etc.

## Agricultural Research and Development

The establishment of research institutions, such as the Nepal Agricultural Research Council (NARC), has contributed to agricultural innovation and technology transfer. Research focuses on improving crop varieties, pest management, soil fertility, and climate change resilience.

Take the Nepal Agriculture Research Council, one of the most authoritative agricultural technological organizations in Nepal, we could catch a glance of its developing progress and connection with international advanced technologies from the content of its journal published in 2021.

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## Microfinance and Rural Credit

Access to credit is vital for farmers to invest in productive agricultural activities. Microfinance institutions and rural credit programs have been established to provide financial services and loans to farmers, especially those from marginalized communities.

For example, the USAID/Nepal Feed the Future Knowledge-Based Integrated Sustainable Agriculture in Nepal (KISAN) II project stepped in to help banks fill this gap. Through a no-cost partnership with Nepal's Laxmi Bank, KISAN II is helping the bank expand Branchless Banking (BLB) to directly serve farming communities through the project's extensive network of almost 60 agricultural supply stores<sup>2</sup> — known as agrovets — over 25 districts. Agrovets bring an existing customer base of farmers, as well as the necessary expertise to oversee agricultural loans. Through BLB, banks meet their targets to reach poor and rural populations and to disburse agriculture loans, while agrovets enjoy financial incentives and business growth. Meanwhile, farmers gain access to formal financial services to expand and sustain their production.

### Other Programs

**Organic Farming Promotion:** Nepal has embraced organic farming practices to promote sustainable agriculture. The government provides support and training for farmers engaged in organic farming, encourages organic certification, and promotes organic products in domestic and international markets.

**Irrigation Infrastructure Development:** Recognizing the importance of water management for agriculture, Nepal has invested in the development of irrigation infrastructure. Projects include the construction of irrigation canals, reservoirs, and small-scale irrigation systems, aimed at increasing agricultural productivity and reducing dependence on rain-fed farming.

**Agricultural Extension Services:** The government, in collaboration with international organizations, has implemented agricultural extension programs to disseminate knowledge and modern farming techniques to farmers. These services provide training, technical support, and advisory services to enhance agricultural productivity and farmer incomes.

**Livestock and Poultry Development:** The government has focused on promoting livestock and poultry development, as these sectors provide additional income opportunities for rural communities. Efforts have included cross-breeding programs, improved veterinary services, and the establishment of cooperatives for marketing and processing.

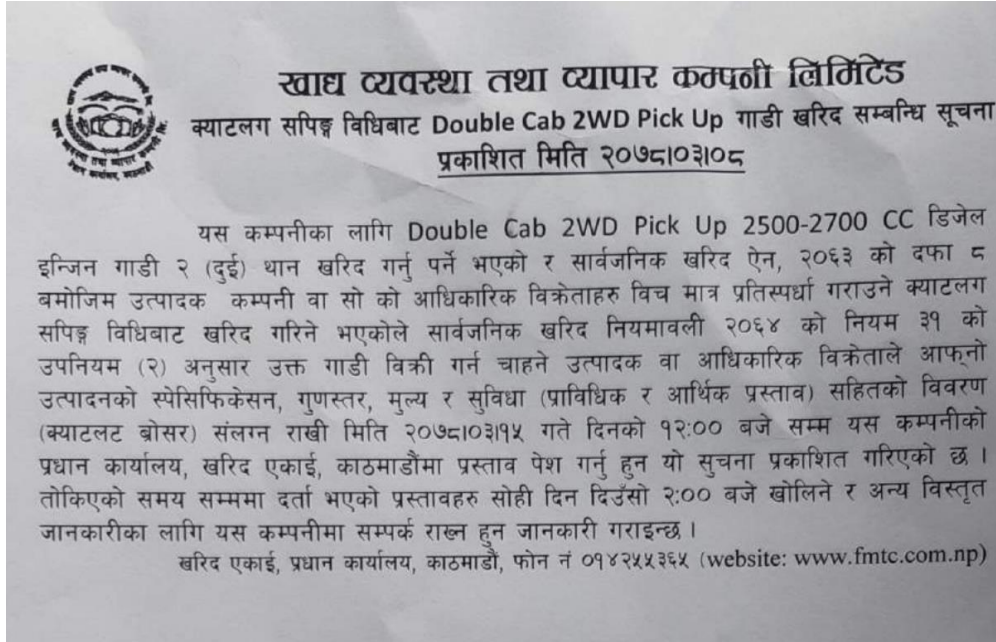
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<sup>2</sup> Agrilinks, "Expanding Access to Finance for Nepali Farmers," Winrock International, May 5<sup>th</sup> 2021, June 16<sup>th</sup> 2023 Accessed

## Food Security

### Food Price Stabilization Measures

The government has implemented measures to stabilize food prices and ensure affordability for consumers. These measures include price monitoring, market intervention, and the establishment of the Food Management and Trading Company (FMTMC) to secure food supplies and stabilize prices during emergencies.



Procurement of 2WD Double Cab Pickup Vehicle Through Catalogue Shopping  
 Method IFB No:02.2077.2078<sup>3</sup>

### Food Storage and Preservation Facilities

Efforts have been made to enhance food storage and preservation facilities, particularly in rural areas. Nepalese vegetable farmers and wholesalers bear heavy financial losses from the large-scale dumping of damaged and spoiled produce in wholesale markets. Nearly half of the produce that farmers ship to local vendors is dumped after a few days because it spoils quickly in the open-air markets. Striving to alleviate the problem, the government is developing a network of cold storage facilities to extend the shelf life of produce. It also is working to minimize food wastage by training farmers and transporters to properly grade and pack produce. Moreover, community-based food storage initiatives, including the construction of grain banks and improved storage techniques, have been implemented to reduce post-harvest losses and ensure food availability during lean periods.

<sup>3</sup> Central Office, "Food Management and Trading Company LTD,"  
[http://fmtc.org.np/storage/news\\_pic/N2zBBmWmp0IX3NRhRe0GpC01UZJY9pCb8f0Mhtr.pdf](http://fmtc.org.np/storage/news_pic/N2zBBmWmp0IX3NRhRe0GpC01UZJY9pCb8f0Mhtr.pdf)

## Targeted Social Safety Nets

The government has introduced targeted social safety nets, such as the Elderly Allowance Program, Single Women Allowance, and Disability Allowance. These programs provide cash transfers to vulnerable populations, aiming to alleviate poverty and improve access to food and basic necessities.

Among the different kinds of social allowance, it is to be noted that the Single Women Allowance is for ones who meets one of the following two circumstance. One case is that if the husband of the woman is dead i.e she is a widow, some amount of money is allocated to her from the government as her allowance. For her to be eligible, she has to meet the following criteria: She can prove that her husband is dead with the death certificate of her husband, she has to be from the local area, and if she is not from the local area, she has to either go to her native place or provide the migration certificate proving her migration to the said area. The other eligible case for unmarried woman: she has to cross 60 years of age, she needs to be a citizen of Nepal, and she has to prove that she has remained unmarried for her entire life.

## Nutrition Programs

Various nutrition programs have been implemented to address malnutrition and improve food security. This includes the promotion of diversified diets, micronutrient supplementation, and efforts to improve breastfeeding and infant and young child feeding practices.

One of the most remarkable achievements in this sector is Nepal's cooperation with United Nations International Children's Emergency Fund (UNICEF) to alleviate malnutrition among Nepalese children. UNICEF with financial support from the European Union, supports the Government of Nepal in the implementation of the Multi-Sector Nutrition Plan (MSNP-II). <sup>4</sup>UNICEF is leading the technical assistance to the Ministry of Health and Population to scale up comprehensive nutrition interventions across the country. This includes: Promoting healthy, nutritious and diversified diets for adolescents, pregnant women, breastfeeding mothers, infants and young children; Fortifying diets of young children aged 6-23 months with multiple micronutrient powder (MNP); Promoting early detection of children 6-59 months who are wasted and supporting improved access to treatment services; Promoting iodized salt; Supplementing Vitamin A for children aged 6-59 months; Deworming of children aged 13-59 months; Supplementing iron folate for adolescent girls, pregnant women and breastfeeding mothers; Nutrition education and counselling.

UNICEF also supports the Government in treatment of children with severe acute malnutrition as well as in providing emergency nutrition response and recovery actions. UNICEF supports local government units for the implementation of nutrition-sensitive action across education, water and sanitation, women and children, and agriculture in

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<sup>4</sup> UNICEF, "*Nutrition*," Nepal Site, June 20<sup>th</sup> 2023 Accessed



line with MSNP II. Gender equality and social inclusion and Disaster Risk Management has been mainstreamed within the nutrition programs. UNICEF closely works with the National Planning Commission as well as the Ministry of Federal Affairs and General Administration for the overall leadership, capacity-building and coordination for the implementation of MSNP II and to support in creating enabling environments. UNICEF is complementing the direct budget support to the Government of Nepal by the European Union for MSNP-II, as the leading technical partner through the Multi-Sector Nutrition Plan (MSNP) Support Project (2020-2022), funded by the European Union.

### **Other Programs**

**Climate Resilient Agriculture:** Promoting climate-resilient agricultural practices is crucial for ensuring food security in the face of climate change impacts. Initiatives have focused on climate-smart agriculture, which includes the adoption of climate-resistant crop varieties, water management techniques, soil conservation measures, and agroforestry.

**Market-oriented Agriculture:** Efforts have been made to promote market-oriented agriculture and enhance smallholder farmers' access to markets. This includes the establishment of agricultural cooperatives, value chain development, and training farmers in improved post-harvest handling and marketing techniques.

**Integrated Food Security Projects:** The government, along with international organizations like the World Food Program (WFP), has implemented Integrated Food Security Projects in vulnerable regions. These projects aim to enhance agricultural productivity, promote nutrition education, improve access to social safety nets, and support income-generating activities.

**School Meals Programs:** The School Meals Program, supported by the WFP and other organizations, has been implemented to improve children's nutrition and increase school attendance. Nutritious meals are provided to school children, encouraging enrollment and supporting their overall development.

## **Main Challenges**

Despite past efforts both domestically and internationally to tackle issues lying in agriculture and food security in order to optimize the whole system, some challenges rooted in geographic and historic elements still remain.

Agriculture

### **Land Fragmentation**

Land fragmentation is a significant challenge in Nepal, with small and fragmented landholdings. This fragmentation limits the ability of farmers to adopt modern

techniques, mechanize farming, and achieve economies of scale.

### **Limited Access to Irrigation**

Despite efforts to develop irrigation infrastructure, access to irrigation remains limited in Nepal. This leads to over-dependence on rain-fed agriculture, making farming activities vulnerable to weather fluctuations, particularly in drought-prone regions.

### **Low Agricultural Productivity**

Agricultural productivity in Nepal is comparatively low, primarily due to the use of traditional farming methods, inadequate access to modern inputs and technologies, and poor farm management practices. The low productivity hinders economic growth and food security.

### **Climate Change**

Nepal is highly vulnerable to climate change impacts, including erratic rainfall, increased frequency of extreme weather events like floods and droughts, and rising temperatures. These changes affect agricultural production, water availability, and crop patterns, exacerbating food security concerns.

### **Lack of Mechanization**

The agriculture sector in Nepal is largely reliant on manual labor, with limited access to farm mechanization and modern farming equipment. The lack of mechanization hampers efficiency, productivity, and the adoption of advanced agricultural practices.

### **Post-Harvest Losses**

Post-harvest losses, including improper storage, inadequate processing facilities, and lack of value addition, are major challenges. These losses contribute to food wastage, reduced farmer incomes, and increased vulnerability to food insecurity.

### **Lack of Access to Credit and Markets**

Limited access to credit and markets is a significant challenge for farmers in Nepal. Farmers face difficulties in obtaining loans for agricultural investments and struggle to access competitive markets with fair prices for their produce.

### **Limited Research and Extension Services**

Insufficient investment in agricultural research and extension services hampers the

transfer and adoption of new technologies, improved crop varieties, and modern farming practices. This limits the ability of farmers to enhance productivity and improve their livelihoods.

### **Gender Inequality**

Gender inequality persists in Nepalese agriculture, with women having limited access to resources, land, credit, and decision-making power. Addressing gender disparities is crucial for achieving sustainable agricultural development and food security.

### **Policy and Governance**

Inadequate policy implementation, weak governance, and a lack of coordination between government agencies hinder agricultural development. The absence of effective policies and institutions to support farmers, address market distortions, and promote sustainable farming practices is a challenge.

### **Food Security**

#### **Malnutrition and Health**

Malnutrition, particularly among children, pregnant women, and lactating mothers, is a significant challenge. Inadequate access to diverse and nutritious foods, poor sanitation and hygiene practices, and limited healthcare services contribute to malnutrition and poor health outcomes.

#### **Population Growth and Urbanization**

Rapid population growth and urbanization put pressure on agricultural land and natural resources. Increasing demand for food, coupled with shrinking agricultural land, poses challenges for sustaining food security in the long term.

**Limited Market Access:** Farmers often face challenges in accessing markets, especially in remote and rural areas. Limited transportation infrastructure, lack of market information, and inadequate market linkages hinder farmers' ability to sell their produce at fair prices and access consumers.

#### **Poverty and Inequality**

High levels of poverty and income inequality remain major challenges in Nepal. Poverty limits people's access to food, nutrition, and basic services, exacerbating food insecurity. Marginalized communities and those living in remote areas are disproportionately affected.

## Possible Solutions

### Application of Precision Agriculture (PA)

Developing from a country relying on agriculture industry, China has profound experiences and techniques that may apply in Nepal to alleviate its issues like land shortage and vulnerability, including:

**Remote Sensing and Satellite Technology:** China has been utilizing remote sensing and satellite technology to monitor crop health, soil moisture, vegetation indices, and nutrient levels. This helps farmers make informed decisions on irrigation, fertilizer application, and pest management.

**Variable Rate Technology (VRT):** VRT enables farmers to apply inputs, such as fertilizers, pesticides, and irrigation, at variable rates across a field based on variations in soil properties and crop requirements. This technology helps optimize input usage, reduce costs, and mitigate environmental impacts.

**Precision Planting and Seeding:** Precision planting techniques ensure accurate seed placement and optimal plant spacing. This improves crop establishment, maximizes yield potential, and reduces seed wastage. Advanced seeders equipped with GPS and sensors are used for precision planting.

**Intelligent Irrigation Systems:** China faces water scarcity in various regions, making efficient irrigation crucial. Intelligent irrigation systems equipped with soil moisture sensors, weather data, and automation technologies have been implemented. These systems enable automated irrigation scheduling and precise water application, minimizing water wastage and increasing water use efficiency.

**Unmanned Aerial Vehicles (UAVs) in Agriculture:** UAVs, or drones, equipped with multispectral or hyperspectral cameras are used for aerial imaging of crops. They provide high-resolution data on crop health, nutrient deficiencies, and pest infestations. This information helps farmers identify problem areas and take timely actions.

**Internet of Things (IoT) Applications:** IoT technologies are employed in agriculture to collect real-time data on soil moisture, weather conditions, crop growth, and machinery operations. This data is analyzed to optimize farming practices, improve efficiency, and reduce resource wastage.

**Big Data Analytics and Artificial Intelligence (AI):** China is harnessing the power of big data analytics and AI to analyze vast amounts of agricultural data. This helps generate predictive models, identify patterns, and provide insights for crop management, disease detection, yield forecasting, and decision-making.

**Mobile Applications and Farm Management Systems:** Mobile applications and farm management systems provide farmers with real-time access to crop and weather information, market prices, pest and disease alerts, and best management practices.

These tools enable farmers to make timely and informed decisions.

**Smart Greenhouses:** Smart greenhouse systems employ monitoring and control technologies to optimize environmental conditions, such as temperature, humidity, light, and carbon dioxide levels. This helps maximize crop growth, increase yield, and extend growing seasons.

**Robotics and Automation:** China is exploring the use of robotics and automation in agriculture for tasks such as robotic weeding, harvesting, and pruning. This reduces labor dependency, enhances efficiency, and addresses labor shortages in rural areas.

## **Introduce more foreign investment and cooperation**

The dominance of subsistence agriculture provides every person with basic provision, but also results in its instability and vulnerability in natural disaster or other emergencies. The key to enhance sustainability and resilience of Nepal's agriculture is to make it more engage in the international market, in which introducing foreign investment is a "shortcut". Nepal is rich in crops, making it a great source of raw material for many enterprises. While cooperating with Nepal's government to importing Nepal's crops, those enterprises usually set up local factories to decrease unnecessary costs like transportation, this, may in turn accelerate modernization and commercialization in local places in Nepal. Therefore, introduce more foreign investment and cooperation might be a way to go. From my point of view, that's a step-by-step progress, which includes:

**Identify Investment Opportunities:** Conduct a comprehensive assessment of the agriculture sector to identify investment opportunities. Identify areas such as commercial farming, agro-processing, agricultural machinery and equipment, seed production, cold chain infrastructure, organic farming, and value-added products that offer potential for foreign investment.

**Streamline Regulatory Framework:** Streamline and simplify the regulatory framework governing foreign investment in the agriculture sector. Ensure clear and transparent regulations related to land acquisition, lease agreements, processing, marketing, and import-export procedures. This will provide a predictable environment for potential investors.

**Provide Incentives and Concessions:** Offer attractive incentives and concessions to foreign investors in the agriculture sector. These may include tax holidays, customs duty waivers on importing machinery and equipment, subsidized electricity rates for agro-processing units, and access to preferential land leasing arrangements.

**Promote Public-Private Partnerships (PPPs):** Foster partnerships between the government and private enterprises to promote foreign investment in agriculture. Encourage joint ventures and public-private collaborations in infrastructure development, research and development, and technology transfer in the agriculture

sector.

**Facilitate Land Procurement:** Simplify land procurement and leasing procedures for foreign investors in agriculture. Develop designated lands or agro-industrial zones with readily available infrastructure and facilities to attract investment. Establish transparent processes for land lease agreements and ensure land tenure security.

**Invest in Infrastructure Development:** Enhance rural infrastructure, including transportation networks, irrigation systems, storage facilities, and processing units. Improving infrastructure will reduce post-harvest losses, enhance market access, and create a conducive environment for investment in the agriculture sector.

**Promote Technology Transfer and Research Collaboration:** Facilitate technology transfer and research collaboration between foreign investors and local agricultural research institutions. This can benefit both parties through the adoption of modern technologies, improved crop varieties, and sustainable farming practices.

**Capacity Building and Training:** Invest in training programs to build the capacity of local farmers and stakeholders in modern agricultural practices, efficient resource management, and entrepreneurship. Encourage knowledge exchange programs and provide technical assistance to farmers to enhance their productivity and income.

**Establish Market Linkages:** Foster strong market linkages for agricultural products by improving domestic and international market access for investors. Develop market information systems, establish value chain networks, and promote farmer-producer organizations to ensure a stable and profitable market for agricultural products.

**Promote Sustainable and Climate-Smart Agriculture:** Encourage foreign investment in sustainable and climate-smart agriculture practices. Emphasize the adoption of organic farming, agroecology, precision agriculture techniques, and climate-resilient crops to promote sustainable and environmentally friendly practices in the sector.

**Enhance Supportive Policies:** Review and revise policies related to agriculture, trade, investment, and land to create an enabling environment for foreign investors. Ensure policy coherence, strengthen coordination between relevant government agencies, and address issues related to market access, quality standards, and certification processes.

**Market and Promote Investment Opportunities:** Actively market and promote investment opportunities in the agriculture sector through investment forums, trade fairs, and targeted promotional campaigns. Engage in collaboration with international organizations, agricultural trade associations, and bilateral investment promotion agencies to attract potential investors.

## **Apply Rural Revitalization Strategy**

The Rural Revitalization Strategy is an imperative leap for Chinese rural population to get rid of extreme poverty. Even though China and Nepal have different circumstances

in nearly all aspect. The basic mindset of the Rural Revitalization Strategy in China has proved to be successful and I believe it could be applied in Nepal and serve as a breakthrough point, which includes several steps:

**Assess Agricultural Potential:** Conduct a thorough assessment of Nepal’s agricultural potential, taking into account its specific geographic, climatic, and socio-economic conditions. Identify the strengths, weaknesses, opportunities, and challenges within the agricultural sector to develop targeted strategies.

**Tailor the Strategy to Local Needs:** Adapt the Chinese Rural Revitalization Strategy to suit Nepal’s specific agricultural circumstances. Customize the approach to address the challenges faced by small-scale farmers, traditional farming practices, limited access to technology, and the impact of climate change on agriculture.

**Enhance Rural Infrastructure:** Invest in rural infrastructure development to improve transportation networks, irrigation systems, storage facilities, and market access. Infrastructure development will facilitate the transformation of agriculture, reduce post-harvest losses, and enhance the value chain integration of agricultural products.

**Foster Public-Private Partnerships:** Foster partnerships between the government, private sector, and agricultural cooperatives to promote investment in Nepal’s agricultural sector. Encourage private enterprises to invest in agro-processing, value addition, and modern farming technologies. Collaborate with agricultural research institutions and technology providers to facilitate technology transfer and innovation.

**Promote Sustainable Farming Practices:** Emphasize the adoption of sustainable farming practices that are suitable for Nepal’s agro-ecological conditions. Promote organic farming, agroecology, and integrated pest management to reduce reliance on chemical inputs, enhance soil health, and ensure environmental sustainability.

**Strengthen Farmer Cooperatives:** Support the establishment and strengthening of farmer cooperatives and producer organizations. Facilitate capacity building, access to credit, marketing support, and value chain integration for smallholder farmers. This will enhance their bargaining power, improve market access, and increase income.

**Enhance Access to Finance:** Improve access to affordable and inclusive financial services for rural farmers. Develop specialized financial products, such as microfinance, rural credit schemes, and agricultural insurance, tailored to the needs of smallholder farmers. This will enable them to invest in modern farming technologies, inputs, and market linkages.

**Promote Agricultural Technology and Innovation:** Promote the adoption of appropriate agricultural technologies and innovations tailored to Nepal’s agricultural landscape. This may include the use of precision agriculture techniques, renewable energy solutions, mobile applications for market information, and climate-smart farming practices.

**Strengthen Research and Development:** Enhance investment in agricultural research and development to address productivity gaps, develop climate-resilient crop varieties,

and introduce innovative farming practices. Foster collaboration between research institutions, farmers, and relevant stakeholders to develop context-specific solutions.

**Develop Agri-Tourism and Local Value Chains:** Explore opportunities for agri-tourism and the development of local value chains. Promote rural tourism, farm stays, and direct marketing of agricultural products to urban centers. This diversification can boost rural income, create employment opportunities, and help retain skilled labor in rural areas.

**Support Skill Development and Rural Education:** Invest in skill development programs, vocational training, and rural education to equip rural communities with the necessary knowledge and skills for modern agricultural practices, entrepreneurship, and agroprocessing.

**Ensure Policy Coordination and Implementation:** Strengthen policy coordination and effective implementation mechanisms among government agencies handling agriculture, rural development, finance, trade, and education. Align policies, regulations, and incentives to support the implementation of the Rural Revitalization Strategy.

## **Conclusion**

Nepalese agriculture and food security has drawn attention from the global community long before, and we could see the advancement and in-time adjustment in strategies to develop with the pass of time. Eradicating its inherent and rooted disadvantages for development through financial, technological and systematic methods is not an easy thing. We need to keep trying and open our view to involving new perspectives that may help. In conclusion, agriculture and food security in Nepal still have a long way to go.