

Towards Developing Diversified Food Systems in Bihar for Improving Nutritional Outcomes

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Bringing Green Revolution to Eastern India (BGREI) holds utmost importance for Bihar. It has the potential to not only transform Bihar’s agricultural sector, but will be a key input into improving food security and poverty reduction. Agriculture is the main source of livelihood in Bihar, supporting nearly 74 percent of the workforce. However,

its contribution to state GDP is declining and currently stands at 18.3 percent. Bihar is also one of the least urbanized states in India, with a very high incidence of rural poverty. It is also much further behind other states in the structural transformation process (See Figures 1-4).

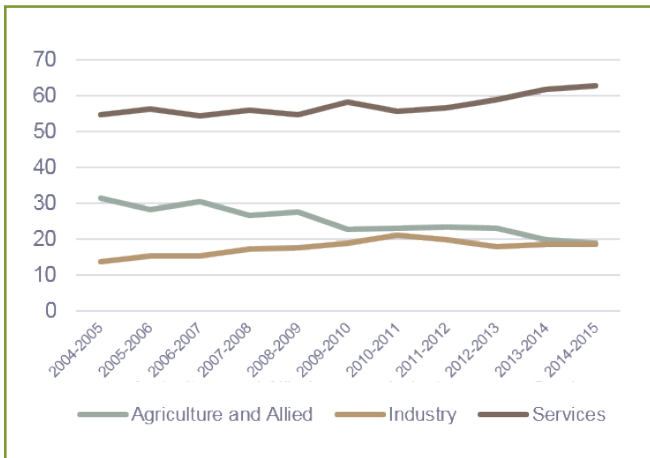


Figure 1. GDP shares. Source: National Accounts.

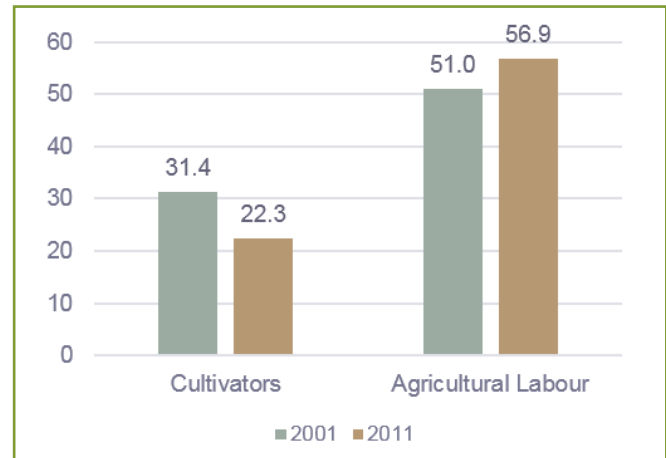


Figure 2. Share in rural workforce. Source: Population Census.



Figure 3. Income shares in rural households. Source. India Human Development Survey (IHDS) I and II.

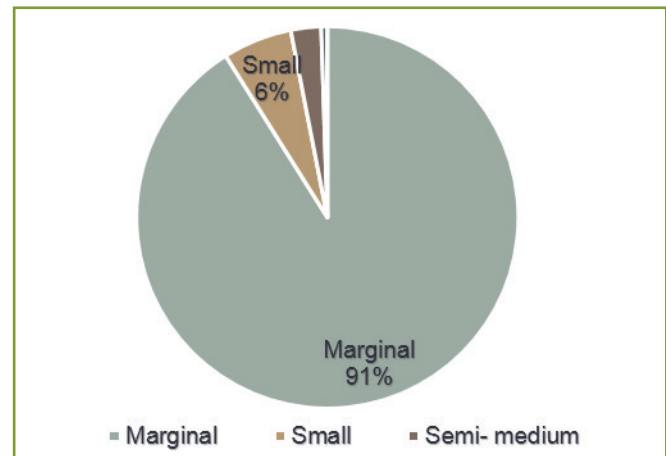


Figure 4. Size of landholdings. Source: Agricultural Census 2011.

Gains in agricultural productivity are the most essential lever for overall growth. Bihar could not benefit from the productivity achievements of Green Revolution of the 1970s. In recognition of this fact, the government of Bihar has been actively promoting agricultural development in the state in recent times. An agricultural policy roadmap was launched in 2008, to reorient policy towards boosting growth in agriculture and its allied sectors, such as horticulture, animal husbandry and dairy development. The challenge remains however, in the institutionalization of a strategy that is cognizant of the role of agriculture for the wider economy and for structural transformation of the same.

Growth of agriculture and allied activities is imperative from the perspective of food security and the improvement of overall nutritional outcomes. However, a transformation of the food system in Bihar requires careful understanding of the interrelationships between agricultural production, food security, nutrition, and the environment. Policy needs to consider the existing socioeconomic realities and inherent agricultural risks, such as climatic threats, limited finance, unequal access to inputs and information, as well as the potential for market opportunities to modernize the food systems. In order to ensure that the food system is nutrition sensitive, the Bihar Agricultural Roadmaps need to be supplemented with greater focus on farm health, rural public infrastructure, market reforms, technology transfer, and improvement in extension services to ensure an innovation-oriented, highly remunerative, nutritive-rich agricultural growth in the state.

Sustainable diversification of food production in Bihar is a challenge, but the potential for success is immense, given its surplus labor force, fertile Gangetic plains, well-connected rural roads, and active state support. Against this backdrop, the Tata-Cornell Institute (TCI) and the Asian Development Research Institute (ADRI) have identified the following avenues for a renewed approach for the design of nutrition-sensitive agricultural policies in the state.

Need for agricultural diversification and promotion of high-value crops

High levels of soil fertility, abundant water resources, and a favorable agroclimatic zone offer an enabling environment and, thus, an opportunity for diversifying the crop sector in Bihar. Cereals—rice and wheat—occupy around 85 percent of the cropping area in the state. Among the major food crops, in addition to cereals, vegetables comprise the largest share (Figure 5). Analysis of price trends in staples, based on data from the Commission on Agricultural Costs and Prices (CACP), suggests that the net returns to cultivation of staples has been the lowest. Rice yields in Bihar are lower, compared to other rice-producing states, although Bihar seems to have a comparative yield advantage in growing

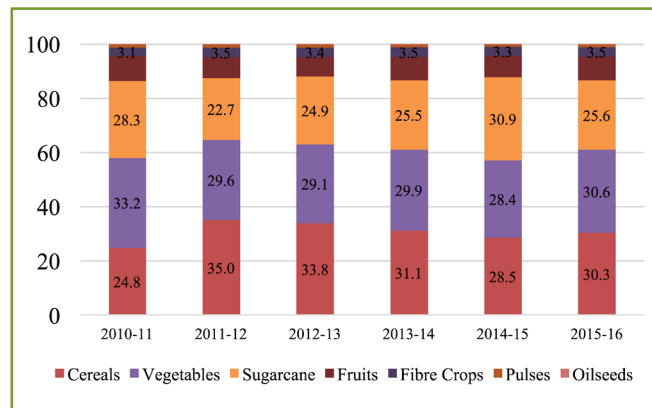


Figure 5: Production trends of crop sector in Bihar as % share (2010–11 to 2015–16). Source: Directorate of Economics and Statistics, Government of Bihar.

pulses. The agricultural policy, however, is preoccupied with the promotion of production of staple food grains. Agricultural diversification towards nonstaples and other high-value commodities, such as fruits and vegetables, needs to be encouraged, along with adequate market support to ensure commercial viability of the farms over the long run. Production of high-value agricultural products has economic benefits like greater farm profitability and reduction in poverty, especially for the small landholders. According to the Agricultural Census 2011, around 97 percent of the farmers in Bihar are classified as small and marginal. The criticality of diversification of agricultural production for rural prosperity needs

no stronger argument. For fruits and vegetables grown in the state, linking farmers to the food value chain will be a key strategy for enhancing income, generating upstream and downstream employment, and reducing poverty.

Importance of livestock and limiting constraints

Animal husbandry is one of the key sectors in Bihar, in addition to crops and horticulture. The livestock sector contributes to approximately 28.5% of the value of output from agricultural and allied sector income, and one-fifth of the total rural incomes come from livestock rearing. Livestock production also provides large-scale employment to women and workers belonging to the marginalized groups. Given the small landholding size and high rainfall dependency for crop production, animal husbandry is an important source of supplementary income for farmers in Bihar. Greater focus on increasing productivity of the livestock economy is essential for meeting the rising demand for livestock products and enhancing nutrition, while also ensuring greater rural incomes.

Production of milk in Bihar increased from 2.7 to 7.2 million metric tons between 2001–2 and 2013–14; however, milk productivity continues to lag behind other major milk-producing states in the country, such as Gujarat and Punjab. Lower productivity of milk is attributed to inadequate usage of superior breed germplasm in the state. Lack of skilled manpower, deficiencies in animal health services, and limited availability of fodder are the other major constraints for livestock development in Bihar. The productive potential of animals depends crucially on the quality of nutrition, genetic material, and health status. Currently, only one semen production center exists in the state for a total of 4,500 cattle-breeding centers, highlighting the supply and demand mismatch for cattle breeding in the state (Hoda, Rajkhowa and Gulati, 2017). Recent policy initiatives emphasizing the rearing of indigenous varieties of buffalo, procurement of pedigreed bulls of higher genetic potential, and investments

to set up a new frozen semen center are strong indicators of a positive ecosystem that is being created for this sector. Sustaining the momentum through strengthened collaboration between the state government, nationally recognized animal breeding research centers, and the private sector is warranted for overall genetic improvement of the livestock. There is also a need to undertake a mapping of preferred breeds of animals owned by farmers in the different regions in the state.

Inadequacies of infrastructure (such as veterinary hospitals or diagnostic labs) in the state further constrain delivery of animal health services. Lack of laboratories and trained veterinarian staff affect prompt diagnosis of the zoonotic diseases, thereby contributing to higher livestock mortality. Currently, the state has around 1,153 veterinary hospitals/dispensaries to cater to the needs of a livestock population of about 32.9 million (DoES). Non-availability of cold chains in the state is yet another constraint for enhancing the coverage of artificial insemination (AI) services and prevents timely delivery of health services related to deworming and vaccination of livestock. Provision of enough fodder for livestock is another problem; due to pressure on land for both agriculture and non-agricultural uses, grazing land has been gradually diminishing (DoAHDF, 2017). Production of fodder on the riverbanks, when the river water recedes, has the potential for greater fodder production.

Increasing farmers' incomes through value chains

Adequate attention to processing and value-addition is important to minimize postharvest losses, increase shelf life, and retain nutritive content of food products. Vegetables contribute to about 30 percent of the total agricultural production in Bihar, but government marketing facilities are limited largely to procurement of rice and wheat. Even in case of rice, less than 20 percent of the total produce is sold through the government procurement channels (Hoda, Rajkhowa and Gulati, 2017)¹. High levels of poverty

¹ For the TE 2013–14, the same figure stood at 73% in Punjab, 85% in the case of Madhya Pradesh and 44% for Odisha.

among farmers could be a reflection of poor state support for agricultural marketing (Chand, 2017).

Repeal of the Agricultural Produce Market Committee (APMC) Act and complete deregulation since 2006 in Bihar has failed to trigger private investments, either in developing new market infrastructure or in the expansion of area under contract farming². Farmers were forced to sell most of the crops in unregulated agricultural markets, limiting true price discovery. Deregulation resulted in the decline of farm harvest prices, with a disproportionately greater loss for poorer farmers with smaller capital endowments. From a policy perspective, large-scale investments (public and private) are required to set up newer markets, along with an upgradation of the existing marketing yards and improvements in infrastructure and equipment. Development of rural roads, extension of phone networks, and establishment of market information centers are among other measures for better price realization.

There is a strong need for policies to promote aggregation models in the form of Self-Help Groups (SHGs) and Farmer Producer Organizations (FPOs), especially among small farmers to integrate them into modern value chains. Creation of an agribusiness model in collaboration with FPOs would go a long way in linking up smallholders with retailers and can play a role in ensuring regular supplies. The state government should look for ways to make these aggregation models more sustainable by incentivizing and supporting the system. These federations should be empowered with greater managerial skills for efficient and smooth functioning.

The success of *makhana* (Fox Nut/Lotus seed) as a food product from Bihar is an outcome of its linkages to national and international markets, as well as the availability of a good quality surplus produce that can be used for value addition. For most other crops produced in the state, agroprocessing and value addition takes place outside of Bihar. For primary producers to benefit from such value addition, growth of agroprocessing units need to be incentivized.

While there has been an increase in private investment in agroprocessing facilities in Bihar, it is still restricted to value addition for staple crops. Bihar Agriculture Roadmap 2012–17 calls for active state intervention by way of creating “Common Facility Centres” for certification, warehousing, transportation, and sale of outputs. The Central Food Processing Policy of 2007 (unfortunately discontinued in 2012) that incentivized private investments in the state may require a fresh look under the emerging circumstances to attract private investments in the agroprocessing sector in Bihar.

Policy recommendations

Diversification of food systems: Policymakers need to think beyond staples to improve the situation of agriculture in Bihar. Agricultural diversification toward nonstaples and other high-value commodities, such as fruits and vegetables, needs to be promoted, along with adequate market support, to ensure commercial viability of farms over the long run. For fruits and vegetables grown in the state, linking farmers to the food value chain will be a key strategy for enhancing income, generating upstream and downstream employment, and reducing poverty. A diversified agricultural system, however, needs appropriate institutional incentives and a market infrastructure already in place. Private sector should be encouraged to set up food processing facilities and modern value chains, which would add value to agricultural output and create more employment opportunities.

Improvement of production and productivity of ruminants: For enhanced milk productivity, germplasms from superior breeds are needed. Newer animal breeding centers for genetic improvement and health quality of livestock should be set up. Quality of animal health services (veterinary hospitals, diagnostic labs, AI centers, vaccinations, etc.) and fodder availability need to be stepped up.

² An IFPRI study undertaken as part of the TARINA program of Tata Cornell Institute on the impact of the repeal of APMC Act on farm harvest prices in Bihar.

Improved agriculture markets and value chains: With the repeal of the APMC Act in Bihar, alternative markets structures need to be created. Investments in rural infrastructure to attract further private investment hold the key. Aggregation models for marketing through SHGs and FPOs need to be encouraged. Further, investment in research and extension activities to impart knowledge on commodity flows across national markets will be necessary for farmers to participate in the e-marketing processes of the global organic e-markets.

Institutional and behavioral change: Replacement of the existing policy paradigm of the rice-wheat system could present challenges for the farmers. The current incentive structure needs to be gradually replaced, with the interest of farmers in mind. New sets of institutional structures—for grain procurement, seed variety, and the protection of farmers' interests—needs to be set up with the interests of smallholders at the forefront. There should be programs to create awareness and impart greater education to farmers about the benefits and operationalization of more diversified food systems.

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