



Agribusiness and Food Processing Industries in Uttar Pradesh State of India

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Authors' contributions

This work was carried out in collaboration between all authors. Author RSS designed the study, analysis, wrote the protocol and wrote the first draft of the manuscript. Authors KNS and SSB managed the analyses of the study. Authors GLM and NS managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Uttar Pradesh is at the forefront in the production of the total food grains (20%), sugar cane (36%), potato (34%), livestock excluding cow (11%) and milk (17%), wheat (33%), lentil (45%), vegetables (30%) in the country. The purpose of the paper is to throw light on the process and structure of agribusiness and agro-processing in Uttar Pradesh. This study focuses on the untapped potential and highlighted the scope for the agro based agro-processing and agri-business in Uttar Pradesh. Efficient arrangement with favorable policy support and incentives, by taking into account the strengths, weaknesses, opportunities and threats of decisive components like human and land resources, crops, livestock and agro-processing activities would lead to plan the state of Uttar Pradesh as one of the major players in the field of agro-processing as well as agri-business sector of India. The diversified commodity mix in

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crop sector, livestock compositions, large geographical coverage, variety of soils and diverse agro climatic conditions, abundant availability of labour force, varied availability of agricultural raw materials in state offers excellent prospects for the development of high value agro-based industries and promotion of agri-business. Still state needs to address the issue of strengthen the agribusiness sector with proper implementation of business policies and to create strong mechanism for forward and backward linkages in it.

Keywords: Agribusiness; food processing; agro-processing; SWOT.

1. INTRODUCTION AND BACKGROUND

Today, agriculture has received commercial importance and changed from subsistence to commercial farming. Agriculture has widened the scope from localized to import/export oriented, supply driven technology to demand driven technology. Over the years, the agricultural transformation through creation of forward and backward linkages with Agro-industry has been emerging as an important option to overcome from the increasing challenges of creating employment opportunities for increasing labour force and sustaining the livelihood of households in rural areas. Agro-processing is now regarded as the sunrise sector of the Indian economy in view of its large potential for growth and likely socio economic impact specifically on employment and income generation. Some estimates suggest that in developed countries, up to 14 per cent of the total work force is engaged in agro-processing sector directly or indirectly. However, in India, only about 3 per cent of the work force finds employment in this sector revealing its underdeveloped state and vast untapped potential for employment [1]. Uttar Pradesh is most populous and densely populated state of India. State constitutes 16 per cent population and 7.3 per cent of the geographical area of the country. Uttar Pradesh is predominantly an agrarian economy with 77.73% lived in rural area and more than 70% of the total population directly or indirectly depend on agriculture and allied. The contribution of agriculture to total State Domestic Product (SDP) was 24.11 percent at constant (1999-2000) prices for 2009-10. A large population and poverty have put excessive pressure on natural resources which has led to fragmentation of landholdings (less than 0.9 ha). Agriculture provides not only employment to the majority of the population but also fulfills the food and nutritional requirement of the state. Uttar Pradesh is the hub of agriculture in India which occupied first position is the country in the

production of the total food grains (20%), sugar cane (36%), potato (34%), livestock excluding cow (11%) and milk (17%), wheat (33%), lentil (45%), vegetables (30%), mango and aonla; second position for rice (13%), total pulses (13%), bajra (20%) and rape seed and mustard while for tobacco (15%) and inland fish at third and for tur (12%) standing at 4th position during year 2009-10 [2]. Uttar Pradesh contributes sixty per cent of the meat export from the country. Uttar Pradesh has a number of favourable factors for success of agri-business such as vast geographical area (2, 40,928 sq. km), variety of soils (Loam soil, Sandy loam, sandy soil, alluvial soil, rocky soil, stony soil, saline and alkaline clay loam etc.) and diverse agro climatic condition for growing a wide range of cereals, pulses, oilseeds, fruits, vegetables, flowers, medicinal and aromatic plants. The abundant availability of labour for production of primary agricultural products and diverse availability of raw material required for processing, favorite policy and incentives, proximity to large consumer markets (state itself, Delhi and neighboring area) which has a large share of food consumption in the country [3]. Uttar Pradesh's agriculture sector offers various opportunities for the successful establishment of vibrant and potential profitable agro food processing unit. Once the processing technology are devised and easy marketing of processed products are ensured the agri-business will gear up. The state is making considerable efforts for promoting industrial growth by offering gamut of attractive package of incentives and is on its way to rapid industrialization [4]. The economic policy of the state mainly focuses on agro food processing industries, biotech, tourism, energy and IT. The state offers favourable and conducive milieu for undertaking industrial ventures coupled with availability of skilled and semi skilled labor force, investor friendly policy framework and speedy clearances through web based single window system "Nivesh Mitra" [5].

1.1 Agro-based Industries in Uttar Pradesh

Agro-industries based on inputs in Uttar Pradesh are mainly classified into three types which are follows.

- i. Agriculture and food processing industry: Industries based on agriculture raw material are oils and fat industries, grain milling industries, fruits and vegetables, gur and khandsari, beverages and other food products industries. The locations of such
- ii. Livestock based industry: Industries based on livestock and livestock products are milk and milk products, leather, meat and cattle feed etc. The location of such agro-industries in the state of UP are as follow Table 2.
- iii. Forest based industry: - Industry based on forest products such as silk, gum, wooden work, paper and match box making. The locations of such agro-industries in the state of UP as follows Table 3.

Table 1. Location of agriculture and food processing industries in Uttar Pradesh

Type of industries	Locations
Oils and fat	Saharanpur, Pilibhit, Muzaffar Nagar, Merrut, Gaziabad, Gautambudh Nagar, Buland Shahar, Bareilly, Kanpur, Etawa, Lucknow, Unnao, Raibareilly, Sitapur, Hardoi, Fatehpur, Allahabad, Jalaun, Basti, Gonda, Behraich, Barabanki, Faizabad, Varanasi, Chandauli, Jaunpur
Grain milling	Saharanpur, Bijnore, Pilibhit, Shrarasti, Muzaffar Nagar, Merrut, Gaziabad, Gautambudh Nagar, Buland Shahar, Bareilly, Moradabad, Rampur, Agra, Aligarh, Mathura, Jhanshi, Banda, Gorakhpur, Maharajganj, Gonda, Behraich, Deoria, Balrampur, Faizabad, Barabanki, Sultanpur, Chandauli, Mirzapur
Fruits and vegetables	Saharanpur, Pilibhit, Muzaffar Nagar, Merrut, Gaziabad, Gautambudh Nagar, Buland Shahar, Nagar, Sahjanpur, Jalaun, Santkabir Nagar, Gonda, Behraich, Barabanki, Faizabad, Ambedkar Nagar Varanasi, Sultanpur, Chandauli, Jaunpur
Gur and Khandsari (Sugar)	Gorakhpur, Deoria, Basti, Gonda, Merrut, Saharanpur, Muzaffar Nagar, Bijnore, Moradabad, Mau, , Mainpuri, Banda, Jaunpur, Azamgarh, Hamirpur, Mahoba, Jhansi, Jalaun, Lalitpur, Rae Bareli, Ghazipur
Beverages	Saharanpur, Bijnore, Pilibhit, Muzaffar Nagar, Merrut, Gaziabad, Gautambudh Nagar, Buland Shahar, Bareilly, Moradabad, Rampur, Agra, Aligarh, Mathura, Mahamaya Nagar, Sahjanpur, Kanpur, Lucknow, Unnao, Raibareilly, Khiri, Fatehpur, Allahabad, Jalaun, Banda, Gorakhpur, Kushi Nagar, Siddharth Nag`ar, Gonda, Balrampur, Mau, Faizabad, Barabanki, Varanasi, Jaunpur, Ghazipur

(Source: - Annual Report 2013-14, MSME - Development Institute, Kanpur) [1]

Table 2. Location of livestock based industries in Uttar Pradesh

Type of industry	Location
Meat and fish	Saharanpur, Pilibhit, Muzaffar Nagar, Merrut, Gaziabad, Gautambudh Nagar, Buland Shahar, Bareilly Nagar, Sahjanpur, Kanpur, Etawa, Lucknow, Unnao, Raibareilly, Sitapur, Hardoi, Fatehpur, Allahabad, Jalaun, Basti, Gonda, Behraich, Barabanki, Faizabad, Varanasi, Chandauli, Jaunpur etc
Dairy cooperatives and products	Saharanpur, Muzaffar Nagar, Merrut, Gautambudh Nagar, Buland Shahar, Bareilly, Moradabad, , Raibareilly, Sitapur, Hardoi, Allahabad, Kaushambi, Jhansi, Gorakhpur, Faizabad, Barabanki, Sultanpur, Chandauli etc
Cattle feeds	Saharanpur, Bijnore, Pilibhit, Shrarasti, Muzaffar Nagar, Merrut, Gaziabad, Gautambudh Nagar, Jhanshi, Banda, Gorakhpur, Maharajganj, Gonda, Behraich, Deoria, Balrampur, Faizabad, Barabanki, Sultanpur, Chandauli, Mirzapur etc.
Leather	Agra, Kanpur, Noida and Unnao
Woolen textile	Kanpur, Shahjahanpur, Mirzapur, Varanasi, Agra, Modi Nagar, Tanakpur
Carpet	Shahjapur, Mirzapur, Sant Ravidas Nagar, Agra
Jute	Gorakhpur, Kanpur

(Source: - Annual Report 2013-14, MSME - Development Institute, Kanpur) [1]

There are bright prospects and tremendous scope for development of processing industries based on agricultural raw material, forest produces and livestock in Uttar Pradesh. Agro-processing industries have higher value addition and have high potential for direct or indirect employment, particularly in the rural sector of the economy. Even after that Agro-processing is in its infancy in the state.

1.2 Commodity Mix for Agri-business

Diversified cropping and availability of agricultural produces in the term of raw material in the state is the real feasibility and opportunity for agri-business. The commodity mix of the state during 2011-12 for agri-business is presented in the Table 4. The cereal crops that are having

processing potentials (paddy, wheat, jowar and barley) occupied 71.02 per cent of the gross cropped area (GCA). The pulse crops (9.59% of GCA) like gram, arhar, moong bean, urad, pea and lentil etc. are traditionally processed at household level as well as at industrial level in the state. The major oilseed crops are rapeseed and mustard, ground nut, sesamum, sunflower and linseed etc. cultivated in the 4.63 per cent of the total gross cropped area of the state which require processing support to convert oilseeds in to oil and cake. Farmers of Uttar Pradesh are growing sugarcane as a cash crop in the area of 8.93 per cent of the total GCA in the state. For the processing of sugarcane to produce sugar, jaggary and other by products industrial set is required and a large number of sugarcane mills are exist in the state of different level of capacity.

Table 3. Locations of forest based industries in Uttar Pradesh

Type of industry	Location
Wooden toys	Hathras, Varanasi, Saharanpur, Lucknow, Bareilly, Agra, Merrut, Kanpur
Match-box making	Gazipur, Behraich, Gorakhpur, Muzaffar Nagar, Kanpur, Kanpur, Gautam Budh Nagar, Sultanpur, Gorakhpur, Faizabad
Handmade paper	Jalaun, Lucknow, Kanpur, Allahabad, Firozabad, Lakhimpur kheri, Agra, Bareilly
Silk	Lucknow, Sitapur, Pratapgarh, Saharanpur, Etawah, Merrut, Varanasi, Mirzapur, Behraich
Kathaa, lakha and gum	Bareilly, Baghpat, Balrampur, Bijnore, Lakhimpur, Behraich
Bidi	Moradabad, Merrut, Rampur, Kanpur, Allahabad, Amroha, Basti, Pilibhit

(Source: - Annual Report 2013-14, MSME - Development Institute, Kanpur) [1]

Table 4. Commodity mix in the state of Uttar Pradesh (2012-13)

Commodity group	Major crops of the group	Area ('000 ha)	Production ('000 tones)
Cereals	Paddy, Wheat, Jowar, Maize, Bajra, Barley and other coarse cereals	17593 (71.02)	48413.4 (23.14)
Pulses	Gram, Pigeon pea, Pea, Moong, Urad bean, Lentil	2367 (9.59)	2332 (1.11)
Oilseeds	Rapeseed & Mustard, Sesamum, Ground nut, Linseed and sunflower	1147 (4.63)	1030.5 (0.49)
Cash crop	Sugarcane	2212 (8.93)	132427.7 (63.30)
Spices and condiments	Cumin, Coriander, Chilli, Garlic, Fennel, Ginger, Turmeric, Fennel, Fenugreek	60.2 (0.24)	212.3 (0.10)
Vegetables	Potato, Onion, Tomato, Cauliflower, Cabbage, Brinjal, Okra, Cucumber, Spinach, Chilli, Ridge gourd, Raddish, Pumpkin, Carrot, Sweet Potato, Tinda	912.7 (3.67)	19571.6 (9.36)
Fruits	Mango, Orange, Lime, Grape, Guava, Custard Apple, Papaya, Pomegranate, Malta, Lemon, Aonla, Blackberry	326.2 (1.32)	5176.1 (2.48)
Aromatic & Medicinal plant	Aloe, Kalmeg, Lemon grass, Vetiver, Rose	133.7 (0.54)	13.4 (0.007)
Flowers	Rose, Gladiolus, Tuberose, Gerbera, Chrysanthemum, Marigold	16.2 (0.06)	31.5 (0.015)
Total		24768	209208.5

Figure in parenthesis represents the per cent share to the total
(Source: - Department of Agriculture, 2014, Govt. of UP) [6]

Almost all the major vegetables (3.67% of GCA) like potato, onion, carrot, cucumber, cabbage, cauliflower, tomato and spinach are cultivated in the state. The processing of vegetables and storage is required infrastructure like cold storage and potato chips etc. industry. Major fruit orchards like mango, orange, lemon, papaya, pomegranate and custard apple are grown in the area of 1.32 per cent of the gross cropped area of the state. Uttar Pradesh has enormous potential in the vegetables and fruit processing industry and efforts are made to establish such type of industries. The trading of these commodities itself leads to business orientation associated with crop production activities in the state. So far entire technological support is oriented to increase the production and productivity of major crops.

2. LIVESTOCK FOR AGRI-BUSINESS

The state of Uttar Pradesh accounts for 10.24 per cent cattle, 28.61 per cent buffalo, 2.08 per cent sheep, 11.53 per cent goat, 12.96 per cent pig, 1.98 per cent camel and 13.42 per cent of the total livestock (Livestock census, 2012) in the country. Uttar Pradesh accounts 17.61 per cent of the milk and 19.11 per cent of the meat production in the country during 2012-13. The state holds key position in the production of milk, meat and wool in the country (Table 5). The per cent increase in milk, eggs, wool and meat was

observed 23.69, 73.97, -1.68 and 80.16 respectively, during the 2007 to 2012. The highest growth was found in the meat followed by eggs and milk while growth in wool production was negative in Uttar Pradesh.

The change in the livestock population and its composition in Uttar Pradesh over the last two livestock census (2007 & 2012) could be seen from Table 6.

The large share of cattle and buffalo are showing the great potentials of the state of milk, meat and leather industry. Milk processing and preparation of milk products are having tremendous scope for industry development related to milk. The size of livestock population in the state makes it possible to have huge quantity of hide and skin of animals. The animal bone and skin have a variety of uses and there are large industries for making leather products out of animal skin and bones. Thus, the livestock sector in terms of milk, meat and wool as livestock output and feed, fodder and animal health services as livestock sector inputs play a vital role in the developing agri-business based on animal husbandry in the state. Still there is need to create strong mechanism for forward and backward linkages in livestock sector so that it would play a vital role in projecting the state as a major actor in livestock based business path.

Table 5. Production of livestock product in Uttar Pradesh

Particulars/ Livestock products	Milk ('000 Tones)	Eggs (Millions) No.	Wool ('000 Kg)	Meat ('000 Tones)
Production (2007)	18861.00	9814.00	1481.00	631.00
Production (2012)	23329.55	17073.67	1456.11	1136.85
% Increase over 2007	23.69	73.97	-1.68	80.16
% Contribution in India (2012)	17.61	2.45	3.16	19.11
Rank in India (2012)	1	10	7	1

(Source: Livestock census 2007 and 2012) [7]

Table 6. Changes in livestock population in Uttar Pradesh

S. No.	Species	Livestock population			
		2007		2012	
		Number (in lakh)	Share in total livestock	Number (in lakh)	Share in total livestock
1	Cattle	189.59	29.97	195.73	28.48
2	Buffalo	261.20	41.29	306.15	44.55
3	Sheep	13.72	2.17	13.66	1.99
4	Goat	145.94	23.07	155.84	22.69
5	Pig	19.73	3.12	13.29	1.93
6	Others	2.42	0.38	2.47	0.36
	Total	632.60	100	687.15	100

(Source: Livestock census 2007 and 2012) [7]

3. AGRO-PROCESSING POTENTIAL

Fruits, vegetables, sugarcane, milk and meat are commodities having export potential Uttar Pradesh. Systematic efforts by taking into account the quality specification of different countries can lead to project the state as a potential source for export of commodities like milk products, gur, sugar, rice and meat etc. The product mix of pulses, sugarcane, cereals, milk and meat etc. are the strength of the state for its processing. High share of production of fruits and vegetables from the state a large number of industries like pickle, jam, jelly and candy can be started [8]. The processable agricultural

commodities of the state and possible products are given in Table 7.

4. SWOT ANALYSIS OF AGRIBUSINESS SECTOR IN UTTAR PRADESH

Despite all probabilities like flood, dominance of food grain crops, inadequate infrastructure, high pressure of population, the state of Uttar Pradesh has inherent strength like agro-climatic diversities, diversified cropping, livestock mix and large supply of workforce for any labour intensive activity. From the point of potentials of agri-business in the state, the SWOT analysis (Strength, Weakness,

Table 7. Processing potential of agricultural commodities in Uttar Pradesh

Product category	Commodities	Products
Cereals	Rice	Rice as a whole, poha, rice flour, rice bran oil, rice noodles
	Wheat	Flour, maida, suji, bakery products
	Maize	Starch, corn flakes, corn oil
	Barley	Beer
Fruits	Mango	Sliced, canned & frozen mango products, beverages, chutney, jam, juice, pickle, pulp and squash
	Orange	Juice, as raw fruit, candy, squash
Vegetables	Aonla	Jam, chutney, Murabba, sauce, candy
	Papaya	Jam, jelly, pickle, sauce, squash, papain, candy
	Tomato	Jelly, paste, ketchup, sauce, soups, chutneys, powder
	Onion	Pickle, onion flakes, onion powder
	Potato	Flakes
	Mushroom	Mushroom powder
Edible oil	Mustard,	Oil, soya-sauce, lecithin, protein isolate, soya flour, oil cakes
	Ground nut,	
	Soybean	
Sugarcane	Sugarcane	Sugar, gur, khandsari
Milk products	Milk	Milk powder, butter, ghee, ice-cream, cheese, paneer
Meat and poultry products	Meat	Meat, eggs
Small ruminants	Sheep and goat	Meat, wool, wool products, carpets etc.
Spices	Chilli	Powder, Paste, Oleoresin
	Coriander	Powder, oil
	Fennel	Seed, powder
	Garlic	Flakes, dehydrated garlic, powder

(Source: - Department of Agriculture - Govt. of UP, 2014) [6]

Table 8. SWOT analysis of agri-business sector

Components	Strength	Weakness	Opportunities	Threats
Human Resources	Large number of work force	Large share of illiterates	Shift of work force from primary occupation to secondary & tertiary sector	Increased share of marginal worker
Crop Activity	Largest producer of wheat, sugarcane, second largest producer of rice, diversified cropping	Large domestic demand as raw food	Processing and value addition of crops	Disturbed crop mix balance

Components	Strength	Weakness	Opportunities	Threats
Livestock Activity	Largest exporter of meat. Largest producer of milk, large number of livestock	Low productivity and milk as raw	Promotion of milk, meat and wool	More number of unproductive cattle and ban on cattle slaughter
Land resources	Availability of productive land and irrigated land	Less scope of divert land to new activities	Contractual farming	Over exploitation of fragile land resources
Agro-processing activity	Availability of varied raw material	Seasonality in availability of raw material	Enhancement of employment Enhancement of income generation More export earning	Quality maintenance for market competition Development of low cost processing technology

Opportunities and Threat) of various components of agri-business in the state is done to know pros and cons of agribusiness in U.P. and summarized in Table 8.

5. CONCLUSION

Vast source of raw material in the state of Uttar Pradesh which dominants India's agricultural production, accounting for about 20% of food grain, 34% of wheat, 19% of fruits and 30% of vegetables produced in the country. U.P. has the largest livestock population in the country and tops in milk production. State is the largest producer of sugarcane, accounting for 35% of total production and ranks second in the production of sugar. It found that Uttar Pradesh plays a pivot role in development of agri-business and agro-processing sector in country. With a population of 200 million, U.P. offers the largest market for consumption of food products and offer relatively low cost skilled work force, therefore a huge opportunity exists in the sector as currently only 2% of total produce of fruits and vegetables is commercially processed. Uttar Pradesh has immense potential for agri-business and to benefit the farmers by creating income generation activity or units.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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