Chapter-1

Introduction

Economic development has always been an area of intense debate in academics, a challenge for planners as well as policy makers and a subject of serious research for economists. Every economy consists of several distinct sectors that are functionally related to one another. Economic history of nations indicates that as an economy progresses, the interdependence of its sectors gets strengthened. Apart from accepting that development of agriculture holds the key to the growth of economy as a whole, the linkages between agricultural and non-agricultural sectors also need to be identified and recognised. This interaction facilitates the progress of both sectors. This in turn creates demand for consumer goods and services thereby providing a further stimulus to industrialisation and expansion of markets (Suryaprakash, et. al. 1996).

It may be further observed from the historic pattern of economic development that the planners adopted a positive approach to create employment opportunities for non-farm employment in the rural areas and thereby keeping the released surplus labour force from agriculture in the rural areas by encouraging traditional processing industries which were more labour-intensive. Thus, a programme for the development of agro-industries was considered necessary. Traditional processing methods which were more labour-intensive with limited use of capital were accepted as the Indian way. Thus, the agro-industry policy could be said to have employment orientation (Kamala and Khot, 1972).

The basic task of economic planning in India is to bring about a structural transformation of the economy so as to achieve a high and sustained rate of growth, a progressive improvement in the standard of living of the masses leading to the eradication of the problems of poverty, unemployment and inequality as well as building up of self reliant socialist economy (Government of India, Planning Commission, 1981). The objective of removal of poverty and unemployment through gainful employment opportunities can be achieved by starting and developing small-scale industries, mainly agro-based industries. By doing so pressure on land will be reduced which leads to increase in the productivity of agriculture sector.
Agro-based industries assume great significance in the context of developing economies like India. Even after six decades of planned development agriculture still accounts for about 15 per cent of our national income, 58 per cent of our working population as well as about 70 per cent of our people are residing in the rural areas. It is not only due to of their being labour-intensive and capital-saving in nature but also because of the fact that these industries generate better gainful employment opportunities to the surplus agricultural labourers during the lean agricultural seasons.

Agro-industries have been given high priority in India due to their significant potential for contributing to rural development. The emphasis on village-based agro-industries was initiated by Mahatma Gandhi in the 1920’s as a part of India’s independence movement. However, even today the development of agro-industries is a central part of the national development strategy due to their significant role in bringing value-addition to agriculture’s output, increasing rural incomes and employment and alleviating poverty in the countryside (Government of India, 2008).

Mahatma Gandhi’s approach of village agro-based industries was founded on a strong economic, social as well as political ideology (Goyal, 1994). However, later it failed because it was used as a blanket argument by ultra-nationalists to favour less-efficient techniques of production and to oppose modern industry. Thus agro-based industries became incompatible with market preferences. After independence, up to early 1980s, agro-industrial policy was dominated by the thinking of Nehru-Mahanalobis model that was based on the argument that India needed large number of industries for the capital goods sector, while the consumer goods sector should be reserved for small-scale, agro and rural industries which were labour-intensive and required less capital. This was consistent with the objective of reducing demand on the limited available capital and savings, and expanding employment. However, the kind of agro-industries that came up miserably failed because of outdated technology and poor management and inability to meet dynamic expanding demand for quality goods from a rapidly growing population with rising incomes (Gandhi and Jain, 2011).

Starting in the 1980s, there has been a more invigorated effort for promotion of agro-based industry in India with emphasis on market demand, up-to-date technology, and efficient management of the supply chain. There has been a substantial relaxation of government restrictions of technology import and private foreign direct investment.
(Goyal, 1994). However, the current trend of greater role of large private corporate sector in agro-industries development has an inherent risk of bypassing small and marginal farmers and the rural poor. This may result in a negative impact on rural employment, and a weakening of the development linkage for which agro-industries have been given high priority in India.

In the eleventh plan, Indian Council of Agricultural Research (ICAR) focussed on research in strategic areas which would help to evolve cropping systems suited to various agro-climatic zones. A national food security mission has been launched in the first year of the 11th plan which aims at increasing cereal production. The target of 4 per cent growth in agriculture will require much faster growth in horticulture, floriculture, dairying, poultry and fisheries etc. The Rashtriya Krishi Vikas Yojana has been launched to incentivise State governments to prepare district level agricultural plans that take account of local conditions (Government of India, 2008).

No doubt, development of agriculture has raised agricultural productivity but it has not ensured a corresponding increase in employment opportunities. Therefore, agriculture alone cannot solve the economic problems and ensure rural development; we need to diversify the rural economy by establishing agro-based industries in the rural areas. The establishment of these industries will provide alternative gainful employment opportunities especially to the rural landless, marginal and small farmers. It will also mitigate the forced migration of labour force from the rural to urban areas.

1.1 Agriculture-Industry Linkages

Agro-industry concept based upon the symbiotic relationship between agriculture and industry not only helps in the development of both the sectors but also augments income and employment in rural areas, ensures regional dispersal of industries and contributes to the foreign exchange earnings. Agro-industries, thus, as opined by Hoffman, Chenery and others, should act as forerunners of industrialisation in a developing country (Bagalkoti, 1996).

In India, agro-industries have a vast role and responsibility to foster an integrated and interlinked development of agriculture and industry. Being labour-intensive and capital-saving and in many cases power-saving, these industries are located in villages and owned and established by the villagers. These industries tend to have a more healthy
impact on the economic well-being of the vast multitude of village population than other types of industries.

The agro-industries provide a bridge between agriculture and industry, rural and urban cultures for each other’s benefit and happiness. It helps open up the village economy to the exploitation of its vast potential of growth and development. The linkages are strong and lasting. The divisibility of these industries fits very well into the factor-endowment of population pressurised countries like India. The industries thus move faster and further to play the role that is desired for it (Singh, 1978).

In the development of any economy, both agricultural and industrial sectors play an important role. But in the earlier stages it is not possible for any country to develop the industrial sector due to a number of constraints. As the economic history of developed countries has shown, more can be added to national income by same amount of capital if invested in agricultural equipments or other agriculture inputs instead of a large industrial enterprise. Thus, there exists a conflict between industrial and agricultural development, but the development of two sectors is inter-dependent. On the other hand, agricultural development cannot go vary far unless there is industrial development to take up the released manpower and to provide solid base for equipment and services essential for modernisation (Singh, 1992).

Agro-based industries develop on the basis of agriculture-industry interrelations. Agriculture and industry are integral components of the development process due to their mutual relationship as agriculture provides inputs to the industry and output of the industry is used in agriculture to expand production. There are many industries which are based on agricultural output. Agro-based industries can be dependent upon agriculture for their raw-material and other basic inputs. The concept of agro-industries is quite old but the term has acquired new significance in recent years in the wake of growing need of inter-dependence between agriculture and industry and the modernisation of former. This inter-dependence must be oriented to suit the need of our country and State (Gupta, 1989). Stabilisation and growth of agricultural production results in rapid advancement in output and employment in agro-industries. Further, the cumulative effect of agricultural growth and growth of agro-industries creates greater opportunities for industrial growth as well as integration of the different sectors of the economy (Verma and Kesavan, 1986).
1.2 Concept of Agro-Based Industries

Agro-based industries develop on the basis of agriculture-industry inter-relations. Agriculture and industry sectors are integral components of the development process due to their mutual relationship. The term agro-industries connotes different meanings to different writers, institutions and agencies. In fact, this concept is shrouded in vagueness. There is no unanimity as to which industries can be classified under this category. In a way, relationship of agriculture with industries is quite old. But the term agro-industries has acquired new significance in recent years in the wake of growing need of interdependence between agriculture and industry and modernisation of the former.

Agro-based industry would mean any activity involved in cultivation, under controlled conditions of agricultural and horticultural crops, including floriculture and cultivation of vegetables and post-harvest operation on all fruits and vegetables. The development of agro-industries has assumed crucial importance in the economic planning as well as progress of the country (Bayineni and Vooka, 2004).

According to United Nations Industrial Development Organisation (UNIDO), the term agro-industry signifies those industries, which use raw materials from agriculture as main material from that manufactured goods are produced on commercial scale. The term also applies to those industries, which are contributing for the development of agriculture including agriculture produce. Thus, agro-based industries can be broadly defined as those industries that are dependent upon agriculture for their raw material and other basic inputs.

Agro-based industries may be classified into two categories namely food processing industries and non-food processing industries. Food processing industries mainly deal with the preservation of perishable products and utilisation of by-products for other purposes. These types of industries include the processing of wheat, rice, maize, barley, pulses, meat, fruits, vegetables, etc. Non-food processing industries mainly satisfy our need for shelter and clothing. These industries produce such items as wool, cotton, rubber, leather, etc. (Venkaiah, 1987).

The feasibility of agro-industry can be judged from their vast employment potentials. At the output level, agro-industries are more labour-intensive and create more employment opportunities. These industries have locational advantage near the source of their basic raw material. Thus, these industries play a vital role in decentralisation of
economy and promote agricultural development in those areas from which the raw materials are drawn.

### 1.3 Types of Agro-Based Industries

The classification of industries is explicitly shown below:

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<th>INDUSTRIES</th>
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<td>Demand Based</td>
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<td>Forest Based</td>
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<td>Agro Produce Processing Units</td>
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Agro-based industries may be classified into four categories:

1. **Agro-produce Processing Units**
   Those industrial units that merely process agricultural produce fall under this category. They do not manufacture any new product; they merely process the raw material so that it can be preserved or transported at lower costs, e.g., rice mills, dal mills, groundnut decorticating mills, etc.

2. **Agro-produce Manufacturing Units**
   These units manufacture entirely new products based on agriculture produce as the main raw material. The finished goods are entirely different from the original raw material, e.g., sugar factories, bakeries, solvent extraction units, textile mills, straw board, etc.
3. **Agro-inputs Manufacturing Units**

Those industrial units that produce goods either for the mechanisation of agriculture or for increasing the productivity of agriculture come under this category. These units are directly linked with agriculture; they support agriculture at various stages, e.g., industries manufacturing fertilizers, pesticides and insecticides, all types of agricultural implements, pump sets, etc.

4. **Agro-service Centres**

Agro-service centers are workshops and service centers which are engaged in repairing and servicing pump sets, diesel engines, tractors, and all types of farm equipment (Venkaiah, 1987).

### 1.4 Importance of Agro-based Industries

Basically India is an agricultural economy and agricultural growth has direct impact on the poverty reduction as well as prosperity of the country. As such India is mainly dependent on integration of its agricultural sector with the industry. Much of the recent literature on economic development has emphasised the rural-led employment-oriented strategy of growth, especially for developing countries with a labour surplus (Mellor, 1976).

Agro-based industries help to improve the level of income and its equitable distribution among the different sectors, regions and sections of the society. Further they also help to promote decentralisation of development in the economy. These industries generate large scale employment opportunities and contribute enormously to the process of self-sustained economic growth. Agro-based industries are instrumental in harnessing the potentials of agriculture as well as industry through their mutual integration; they accelerate the rate of rural and economic development (Yadav and Rana, 2005).

Jawahar Lal Nehru once remarked, “Real progress must ultimately depend on industrialisation” (Ezekial, 1975). Not only in India or Punjab but also in all the States and countries of the world it is realised that industrialisation is the major source of economic development and is key for reconstructing the economy. According to Sutcliffe, “Industrialisation is a process by which a non-industrialised country becomes an industrialisation one” (Sutcliffe, 1971).
The planned development of agro-industries would on the one hand, restrict the flow of people from village to industrial cities and on the other hand integrate rural and urban economies by eliminating imbalances (Verma and Kesavan, 1986).

As the population of India is increasing at a high rate and there is significant growth in the labour-force, the avenues of employment are one of the serious concerns. In this situation, the establishment and development of agro-industries is a keystone to a nation’s economic and social development and is one of the solutions to unemployment problem. Punjab is agriculturally developed State within the Indian Union and economic growth in Punjab has been closely associated with the well-known ‘Green Revolution’ and the future development lies in rapid industrialisation. Both the sectors, agriculture and industry, play an important role in the development of economy.

Green Revolution has produced highly favourable impact on industrial sector. Firstly, demand for agricultural machinery, pesticides etc. has increased leading to growth of agro-industries. Secondly, increase in the production of raw materials for industries have taken place. Finally, increased prosperity of agriculturalists has meant greater demand for industrial goods like cloth, household gadgets etc. This effect has been produced by increase in export incomes too, on account of large agricultural exports made possible by Green Revolution (Pannu, 2001).

The importance of agro-based industries can be emphasised from the point of view of consumption and industrial use, higher income to farmers and better utilisation of by-products. The development of agro-based industries is based on total market arrivals of the important crops in Punjab. The volume of market arrivals of foodgrains and non-foodgrains has increased continuously after 1970 onwards. Therefore, the development of agro-based industries can become a significant source of absorption of surplus labour in agriculture. These agro-industries are developing in Punjab and have many advantages. As agro-based industrialisation feeds upon agricultural surpluses, so it, directly or indirectly, becomes the source of increase in agricultural production. Agro-industries are the cornerstone of developing country like India and have well-established roots in an indigenous economic development.
1.5 An Over View of Agriculture and Agro-based Industries in Punjab

Punjab agriculture has registered spectacular progress since the country became independent in 1947. At the time of independence, the Punjab agriculture was reeling under the prevalence of fragmented and scattered unirrigated holdings under zamidari system, indebtedness of farmers, outmoded farming and fluctuations in crop output. It was only after independence that an era of planning began when the first five-year plan was started in 1951.

Punjab has achieved remarkable growth since independence and is now one of the richest States of India. Punjab is one of the few States in India in which rapid agricultural growth has induced rapid industrialisation. This growth and prosperity is primarily the result of Punjab’s adoption of new technology in agriculture. Its cultivators were the first to adopt the Borlaug seed-fertilizer technology during the mid-1960s, and within a few years the State became the symbol of a green revolution in India. Punjab benefited immensely from the existence of an assured market for wheat and rice surpluses and other industrial products and the easy availability of modern intermediate inputs, such as fertilizers and diesel fuel, at nationally subsidised rates. The modernisation of agriculture and the rapid growth of the manufacturing and tertiary sectors tended to strengthen the links between the State economy and the national economy and integrate it with the national market (Bhalla, 1995).

Punjab economy can be termed as an agricultural economy as the major part of the State income comes from the primary sector consisting of agriculture, animal husbandry and forestry, fisheries etc. Punjab State represents a classic case of economic development based on agriculture. Through Green Revolution in the 60’s Punjab took a major stride in increasing its productivity of foodgrains, especially of wheat and rice. It contributed significantly towards strengthening of India’s self-sufficiency by contributing a major share in the central pool overtime. Punjab has made considerable progress in the foodgrains production.

The State contributed 107.20 lakh tonne of wheat and 92.5 lakh tonne of rice to the central pool in 2009-10. The production of wheat and rice during 2009-10 was 151.69 lakh metric tonne and 112.36 lakh metric tonne respectively (Government of Punjab, 2010). With only 1.53 per cent of geographical area and 2.96 per cent of the net area sown (NAS) of the country, it produces 11.66 per cent of the foodgrains of the
country and contributes about 60 per cent of wheat and about 40 per cent of rice to the central pool of the food reserves (Government of Punjab, 2010). There is no scope to increase area under agriculture in the State as it has already reached at saturation level where almost 99 per cent of cultivable land is under plough.

Economic history reveals that the surplus of agriculture is channelised into non-farm sector and this has led to industrial development. The ‘double development squeeze’ works to shift the resources out of agriculture, but in case of Punjab this squeeze has not worked because heavy investment has been made in new farm technology including seeds, water, fertilizer and agricultural machinery. Whatever surplus arose was invested in land, resulting in sharp increase in land prices and in transport (Raikhy and Mehra, 2000).

The much-acclaimed growth model of Punjab was essentially a single sector project. Its epicentre was the national programme of agriculture development for making the country self-sufficient in food grains. The State government enthusiastically participated in making the national programme a success. In the process the State and the farming community both became prosperous. Unfortunately, since the mid-1960s neither the Centre nor the State has given a thought to the basic issue: After agriculture, what? The implicit assumption was perhaps that agriculture would be a perennial source of growth. Agriculture is limited by the physical environment, a shrinking export base and its inability to absorb an expanding labour force. Therefore, as the economy grows the share of agriculture both in income and employment declines. Unfortunately, it did not happen adequately in Punjab. We at present have a very disturbing sectoral combination comprising a deteriorating agriculture and a very weak industrial base. For sustainable development the State’s New Industrial Policy should encourage industries having locational advantages such as agro-based, footloose and knowledge-based industries (Ghuman, 2011).

During the first three years of the 11th five year plan, Punjab has shown considerable improvement in the growth rate of its economy as compared to the 10th five year plan. It is likely to achieve growth of 7.87 per cent during the first 3 years of the 11th five year plan as compared to 5.11 per cent during 10th five year plan (Government of Punjab, 2010). Agriculture continues to be an important driver, in State economy, as according to quick estimates, it has contributed 15.78 per cent to gross state domestic
product at constant prices (2004-05) during 2009-10 (Q), as per 2001 Census, around 39 per cent of the working population of the State was still engaged in this sector.

But agriculture alone cannot improve the overall development of rural economy. It is observed that diversification in the farm sector is the need of the hour that is envisaged so as to achieve some long term benefits as optimum utilization of natural resources especially soil and water, maintaining sustainability and stability in productivity and income etc. So, future of Punjab’s economy lies in the promotion of non-agricultural activities. Economic growth is generally accompanied by a transformation of the economy from a State of the dominance of the agriculture sector to that of industrial sector. Industrial development is considered necessary to achieve high rate of economic growth to provide the basic needs of population and to create more gainful employment opportunities.

At the time of independence, Punjab had only a few hundred industrial units mainly processing foodgrains, cotton ginning and brick kilns. Most of the manufactured items of even common use came from outside. During the post-independence period, industrial development in Punjab took place in phases. Thus, in the fifties the cycle-parts and hosiery industries took their roots, while in the sixties, with the advent of the green revolution, agriculture-related industries like farm machinery manufacturing came up. The main focus in the seventies was on such industries as auto-parts and electronic items and during the eighties on such resource-based industries as food processing, vanaspati, edible and non-edible oils and sugar in a big way. Diversification of industry started, with the process of liberalisation and economic reforms, while many of the established processing units, both in the small and medium and large sectors, came under pressure (Government of India, 2005).

Green revolution have ushered the growth of agro-based and agro-related industries in the country. This has encouraged the transformation of stagnant rural economy into a dynamic and vibrant economy. The enhanced agricultural production and their effective utilisation have proved to be mutually beneficial for producers as well as agro-industrialists (Santwani and Sharma, 1979).

Punjab government has declared the Punjab economy as a special economic zone for agro-based industry because it has a lot of agro-produce. The government enacted the
agro-industrial policy 2009, in order to make Punjab the destination of processors at both global and domestic levels.

The main industrial centres in Punjab are Ludhiana, Jalandhar, Amritsar, Mandi Gobindgarh, Batala and Mohali districts. Ludhiana district is known for the production of hosiery and readymade garments, bicycles and components, sewing machines and parts, machine tools, auto-parts, industrial fasteners, electrical and electronic goods. About 21 per cent of the total industrial units in Punjab are located in Ludhiana district. Famous for hand tools, pipe fittings, valves and leather products, Jalandhar is well-known for its sports-goods too. Mandi Gobindgarh, popularly known as the ‘Steel-Town’ of Punjab, hosts more than 300 steel re-rolling mills despite being situated far from the sources of raw materials. Batala is famous in the country for its castings and machine tools, while Amritsar is known for food products, paper machinery and textiles. Mohali near Chandigarh, which attracted a number of ‘sunrise industries’, thanks to its locational advantages and infrastructure, seems to have lost its momentum for growth in recent years. District Ludhiana leads Punjab in industrialisation. More than 28 per cent of the industrial output of Punjab comes from Ludhiana, which has the highest number (166) of large and medium units. While Amritsar and Jalandhar were traditionally more advanced, Sangrur, which was one of the centrally declared ‘Backward District’ and Patiala, have become fast growth areas. Districts Bathinda, Ferozpur, Gurdaspur, Hoshiarpur, Kapurthala and Moga, each contributes two to five per cent share to the State’s industrial production; while Faridkot, Mansa and Muktsar each contributes less than one per cent share. These districts are industrially backward and ‘A’ category incentives are provided to industry coming up in them under the Industrial Policy, 1996 (Government of India, 2005).

During the past few years, certain industries have been feeling the pressure of the liberalised economic regime which has resulted in concentration of new industrial investments in the coastal States of India. Moreover, declining trend has been observed in the industrial growth as there is relocation of industries to Special Category States Himachal Pradesh and Uttarakhand due to the grant of Special Package. The incentives for industrial investment are lesser in Punjab even as compared to neighbouring State of Haryana. In order to tackle this, State Government is in the process of finalising new Industrial policy in consultation with United Nations Industrial Development
Organisation (UNIDO) in order to suggest policy measures for boosting industrial
development in the State (Government of Punjab, 2008). The State is trying to boost the
production and processing of citrus fruits, grapes, vegetables and potato seeds under
National Horticulture Mission. During the year 2009-10, 0.68 lakh hectares were under
fruits, kinnow, orange, malta, lemon, guava and mango, the main fruits grown in Punjab.
Total production reported under these fruits was 13.65 lakh metric tones for the year
2009-10.

Punjab is endowed with fertile land and a favourable climate to grow a large
number of cereals, fruits and vegetables, oilseeds, pulses and maize etc. The State has
basic raw materials, manpower as well as a vast consumer market, which are the
necessary prerequisites for the industrial production. The value addition in agriculture is
the answer to the wheat-paddy rotation, which has become one of the weak spots in the
State’s economy. There is a huge domestic and export market for food products, but the
consumer demands high quality food, both raw and processed, at affordable prices.
Development of the agro/food processing sector can bring more gainful employment
opportunities mainly in the rural areas. Therefore, Punjab will have to look for alternative
and commercial crops, which can increase income of the farmers and have better scope
for marketing as well as processing.

Punjab government is making all efforts to develop and boost the agro-based
industry in the State which is probably the key sector for industrial growth. Through
Green revolution in the sixties, Punjab took a major stride in increasing its productivity of
foodgrains, especially of wheat with a yield of 43.07 quintals per hectare and rice with a
yield of 40.10 qunitals per hectare during 2009-10 (Government of Punjab, 2010). Punjab
Agro Foodgrains Industrial Corporation started the programme of diversification of
agriculture in 2002-03 and in the year 2009-10, it covered the 189175 acres area in
various districts of Punjab.

The number of food, beverages and tobacco products industry in Punjab increased
from 1477 in 1980-81 to 10126 in the year 2005-06. However, in the year 2008-09, the
number of units of this industry group declined to 8033. On the other hand the number of
textile-based agro-industries was 3307 in eighties and increased to 14943 in 2005-06 but
decreased to 12314 in the year 2008-09. Similarly, in the case of wood, paper and leather-
based industries in Punjab, the number of units increased up to the period 2005-06 but declined to 23022 units in 2008-09. Although the number of units of these agro-industries declined in recent years, yet they still employ large number of people and have absorbed large number of agricultural surplus. The agro food industry employed 73758 people, agro textile industry absorbed 121428 persons and wood, paper and leather-based industry employed 110654 persons in the year 2008-09.

Industrial sector of Punjab has marginally accelerated the rate of growth of the economy in the eighties and nineties. However the employment output elasticity has declined during 1990s. One major constraint of the industrial sector is the weak linkage between agriculture and industrial sectors. To remove these constraints, agro-industries need to be set up in the State. This has been identified on the basis of comparative advantage analysis across industry and across States (Sidhu, 1997).

The food-processing sector covers a wide range of products and is one of the largest in terms of production, consumption, export as well as growth prospects. The vast potentials of agricultural resources available in Punjab can be better utilised by preserving and processing, as well as by using available technologies. Though the Government of India has sanctioned a number of schemes, so far not much progress has been made towards setting up agro-based food processing industries, proportionate to the agriculture potentials and commodities available in the State.

1.6 Need of the Present Study

This study analyses the success of industrialisation in the context of dependence of industrialisation to a large extent not only on the capability of agriculture to generate surpluses but also on whether and how these surpluses could be channeled into industrial development. The rapid growth of agriculture has significant impact on the entire economy, especially the agro-industries by supplying the inputs for processing agricultural produce. The agricultural sector can contribute to industrial growth in many ways such as by providing foodgrains, releasing surplus labour for non-agricultural activities, providing raw-material for agro-processing industries as well as creating demand for agro-input industries.

In the modern times, industrialisation is the most important tool by which developing countries aspire to achieve higher level of per capita income and find a solution to their problems of poverty, unemployment, inequality, overpopulation and
socio-economic backwardness in the modern world. Rapid industrialisation especially in the green-revolution State of Punjab can be achieved through greater emphasis on agro-based industries.

Development of agro-based industries will mobilise a growing part of national resources to develop a technically up-to-date diversified domestic economic structure characterised by a dynamic agro-based sector having and producing means of production and consumer goods. Agro-based sector is, thus, capable of assuring a high rate of growth for the economy as a whole and achieving social as well as economic progress.

Consumer demand surveys reveal that the new demand segment for high-value added agro-processed products is emerging at a very fast rate, which needs to be appropriately exploited. There is need for product development to meet the emerging demands and aggressive marketing to capture the vast potential markets globally as well as domestically. This calls for large private corporate as well as the public investment and active government support (Singh, 2004). Improving the productivity of raw-materials at the farmers’ level and of the processing units in procuring the right kind of raw-materials are the main prerequisites for developing the agro-sector.

Keeping in view the latest industrialisation trends, there is a necessity for giving a boost to setting up of appropriate agro-based industries in Punjab. A study on the evaluation of the performance of agro-based industries in Punjab in the context of generation of employment opportunities, output-elasticity and growth of production etc. may help in achieving the objectives. The study may attempt to analyse the performance as well as problems and prospects of agro-based industries in Punjab. Therefore, the present study makes a modest attempt to analyse the patterns and growth of agro-based industries in Punjab.

1.7 Objectives of the Present Study

The main focus of the study is to analyse the development of agro-based industries in the context of agricultural performance of Punjab. The specific objectives are:

1. To examine the general pattern and growth of industrial development of Punjab especially agro-based industries. Further, to analyse the development of agro-based industries in relation to marketed agricultural surplus in Punjab.

2. To evaluate the importance of agro-based industries in regard to employment and overall development of Punjab.
3. To identify the problems and prospects of development of agro-based industries.
4. To suggest policy measures for the development of agro-based industries.

1.8 Methodology

For the purpose of this study, agro-based industries namely food products, textile, leather and paper based industries, cotton, sugar, fruits and vegetables, wood and wooden products, furniture and fixtures and printing, publishing and allied industries have been included. The classification by the Annual Survey of Industries is used to identify the industries for the purpose of analysis.

The study has been based largely on secondary data, available from official reports, surveys, both published and unpublished. The main sources of data are Economic Survey, Annual Survey of Industries, Statistical Abstract of Punjab etc. And the reports of different departments and scholars have been used for this purpose. The study has covered the period from 1980-81 to 2005-06. To analyse the information, different statistical techniques have been used. For comparative analysis, the data relating to output and capital have been deflated by using wholesale price index, taking 1993-94 as the base year. As the data for the entire period was not available on a single base year, it has been converted to a single base year by using the following method:

\[
\text{Base Shifting} = \frac{\text{Old Index Number of New Base} \times \text{Index Number of Current Year on New Base}}{100}
\]

The value of the production of the food products industry under NIC code of the industries, i.e., 20 and 21 (New Code 15) is deflated by the food products index. The value of production of beverage and tobacco industries had NIC code 22 (New Code 16) is deflated with the beverages, tobacco and tobacco products index. And in order to comprise the first group of agro-based industries i.e. food, beverages and tobacco-based industries group is taken by adding the NIC industry code 20 and 21 with the NIC Industry code 22.

The value of the production of the textile industries that have the NIC Industry code 23, 24 and 25 (New Code 17) is deflated by the textiles group index. The value of production of the industry group under code 26 (New Code 18) is deflated with textiles index. The ‘other group’ consists the industries under NIC Industry code 23, 24 and 25 and 26 (17+18). It formed the textile-based industrial group.
The third group includes wood, paper and leather-based industry’s that had NIC Industry code 27 (New Code 20 and 36) is deflated with wood and wood products index. The value of industry group 28 named paper-based industry (New Code 21 and 22) is deflated with the paper and paper products index. Industry code 29 (New Code 19) comprises leather and leather and fur products’s value is deflated with the Leather and leather products. In order to comprise the third group of agro-based industry, i.e., wood, paper and leather-based industries, all the NIC Industry codes 27, 28 and 29 are added. The value of the fixed capital of all the industries is deflated with the wholesale price index of machinery and machine tools.

In order to find out the behaviour pattern of various variables, the trend and compound growth rate of area, production and yield of crops in Punjab, numbers of industries and their related variables have been calculated. For calculating the trend growth rate, the exponential function of the following form has been used:

\[ Y = ab^t \]

Where \( Y \) is the variable of which the rate of growth is estimated, \( t \) the time period, and \( a \) and \( b \) are intercept and regression co-efficients to be estimated.

The growth rate (\( r \)) is computed as under:

\[ r = \left[ ( \text{Anti (log b)} - 1) \right] * 100 \]

where \( a = \)constant
\( b = \)slope of the semi-logarithmic trend
\( r = \) trend growth rate

Compound Growth Rate is calculated by the equation:

\[ \text{CGR} = \left[ \frac{V_t}{V_{t-1}} \right]^{\frac{1}{t}} - 1 \] * 100

Where \( \text{CGR} = \) Compound Growth Rate
\( V_t = \) Value in t Period
\( V_{t-1} = \) Value in t-1 Period

Besides this, the partial productivity is measured in terms of inputs like labour and capital. For this purpose the labour and capital productivity is calculated for agro-based industries in Punjab. The labour productivity has been worked out by dividing value of production with value of labour that is total output/employment. And capital productivity has been measured by dividing value of production with value of capital that is total output/fixed capital. In order to have an idea about the employment generating capacity
of the agro-industries, output-employment elasticity and employment-output elasticity have been worked out. These are calculated with the help of the following formula:

\[
\text{Output-Employment Elasticity} = \frac{\text{Output} \times \text{Change in Employment}}{\text{Employment} \times \text{Change in Output}}
\]

\[
\text{Employment-Output Elasticity} = \frac{\text{Employment} \times \text{Change in Output}}{\text{Output} \times \text{Change in Employment}}
\]

The simple correlation analysis has been used to determine the relationship between employment, production and fixed capital in agro-based industries and multiple linear regression model has been used to analyse the determinants of employment in agro-based industries.

The main focus of the study is to analyse the development of agro-based industries in the context of agricultural performance in Punjab. The specific objectives of the study are to determine the share of agro-based industries in total output, capital and employment and to analyse the general pattern of industrial development of Punjab.

1.9 Concepts and Definitions

**Factory** - It is one that is registered under Sections 2m (1) and 2m (2) of the Factories Act, 1948. The Sections 2m (1) and 2m (2) refer to any premises including the precincts thereof (a) where on ten or more workers are working, or were working on any day of the preceding twelve months, and in any part of which a manufacturing process is being carried on with the aid of power, or is ordinarily so carried on; or (b) whereon twenty or more workers are working on any day of the preceding twelve months, and in any part of which a manufacturing process is being carried on without the aid of power, or is ordinarily so carried on.

**Fixed Capital** – It represents the depreciated value of fixed assets owned by the factory as on the closing day of the accounting year. Fixed assets are those that have a normal productive life of more than one year. Fixed capital includes land including leasehold land, buildings, plant and machinery, furniture and fixtures, transport equipment, water system and roadways and other fixed assets such as hospitals, schools, etc. used for the benefit of the factory personnel.
Workers- are defined to include all persons employed directly or through any agency whether for wages or not and engaged in any manufacturing process or in cleaning any part of the machinery or premises used for manufacturing process or in any other kind of work incidental to or connected with the manufacturing process or the subject of the manufacturing process. Labour engaged in the repair and maintenance, or productions of fixed assets for generating electricity, or produced coal, gas etc. are included.

Employees- It includes all workers defined above and persons receiving wages and holding clerical or supervisory or managerial positions engaged in administrative office, store keeping section and welfare section, sales department as also those engaged in purchase of raw materials etc. or purchase of fixed assets for the factory as well as watch and ward staff.

Total Persons Engaged- It includes the employment as defined above and all working proprietors and their family members who are actively engaged in the work of the factory even without any pay, and the unpaid members of the co-operative societies who worked in or for the factory in any direct and productive capacity. The number of workers or employees on an average obtained by dividing mandays worked by the number of days the factory had worked during the reference year.

Total Output- It comprises total ex-factory value of products and by-products manufactured as well as other receipts such as receipts from non-industrial services rendered to others, work done for others on material supplied by them, value of electricity produced and sold, sale value of goods sold in the same condition as purchased, addition in stock of semi-finished goods and own construction.

1.10 Chapter Scheme

The study consists of seven chapters. The coverage of these chapters is as follows:

The first chapter deals with a brief introduction, need and importance of the study, objectives, methodology and concepts. The review of literature is presented in second chapter. Third chapter discusses the nature of cropping pattern, growth of important crops and marketed surplus in Punjab. Besides this, the chapter traces the marketed surplus of important crops. Fourth chapter deals with the pattern and growth of industrial development in Punjab. The pattern of food, beverages and tobacco-based industries,
textile-based industries as well as wood, paper and leather-based industries are discussed in this chapter. Fifth chapter analyses the rural-urban structure of agro-based industries in Punjab. Chapter sixth deals with the labour and capital productivities and output-employment and employment-output elasticity of agro-based industries. Simple correlation and multiple linear regression model has been used to examine the relationship between different variables and to calculate the determinants of employment in agro-based industries in Punjab. Last chapter presents the conclusions and suggestions for policy implications.
References


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