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Policy Paper

Biomass recycling as a futuristic sector in Indian economy: policy brief

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Introduction

Surge of the three Indian growth sectors

Once known as the "Golden Bird", India has always been able to capture the world's attention due to its huge population and growth potential. According to recent report of World Bank, India is the third largest economy in terms of purchasing power parity, followed by Japan. If we compare the sectoral distribution of India's total GDP with the world and some other countries, we can see that India's income dependence on agriculture remains high among the largest countries. In the 18th century, the share of agricultural work was as much as 90 percent. India and China contributed almost half of the world's total agricultural production (Maddison, 2001) [2]. But, during nineteenth century there was a structural change in the world economy.

The dynamics of economy changed with the beginning of the Industrial Revolution, when, technology became the growth engine of the human society. The world economic growth was rapid during the early nineteenth century, especially in the European countries. The share of agricultural work fell to about 60 percent in the mid-19th century. Labor migration has been largely directed to the sector (Carter, 2003) [1]. A broad division of economic activity was made into agriculture, industry, and services. By the end of the 19th century, agriculture accounted for around 40 percent of economic activity, industry expanded, and it gave enormous riches and prosperity to society. The development of industry also created a need for services, but its share was 10 percent in the same period. At the beginning of the 20th century, economic power shifted to Western countries. Asian countries like India and China were unable to mechanize their economies and therefore were unable to take advantage of the Industrial Revolution. World economic growth was slow in the first half of the century due to World War I, the Great Depression, and World War II. Production capacity shifted to the United States during this time from European nations. In the second half of the century, the world economy developed incredibly and the United States' economy grew to become the strongest.

There has been a structural shift in the economies of developed nations. Previously manufacturing-based economies have shifted their focus to services. Capital and labor costs were very high in those countries, which gave impetus to transfer production to countries where production costs were low. The service sector became the main engine of growth in developed economies. India and China, two developing nations in Asia, benefited from the structural changes in industrialized nations by luring those nations to invest in their economy.

India, the second most populous country, swiftly became one of the fastest growing economies in the region. India's growth was largely attributed to the expansion of the service industry (Mohan, 2008) [3]. India started its democratic journey on an optimistic note, hoping for economic progress and security. The country was filled with high population, low literacy rates, poor infrastructure and social inequality. New board agenda prioritized to achieve self-reliance, social equality and alleviating poverty. The Indian government placed a strong emphasis on five-year plans and public sector enterprises to support economic and social progress, taking inspiration from the Five-Year Plan of the Soviet Union. Admittedly, the socialist policies did not produce the expected targets.

India's economy developed at a disappointing pace and the country's GDP grew nearly 1% in the first three decades, ie. 1950-1980. This slow and low economic expansion has left the country with a multitude of problems, such as corruption and licensing restrictions. The paradigm of generating economic success in public sector businesses has lost momentum in democratic India.

In the mid-1980s, steps were done to revive the economy by liberalizing some regulatory structures. These reforms proved effective and India's growth rate was a remarkable 5.6 percent (Panagariya, 2003) [5]. Industry, the service sector, and agriculture were the three sectors that contributed most to growth. It was clear that during the first five decades, the industry grew at a rate of about 6% while the agricultural sector, which employed nearly 70% of the population, grew more slowly. The service sector, on the other hand, has just formed its foundation.

In the late 19th century, Indian economy again suffered due to the instability of the world economy, majorly because of collapse of the Soviet Union and the Persian Gulf War. Fortunately, current Prime Minister P. V. Narasimha Rao followed liberalization policy. Government introduced several economic reform measures such as liberalization of industrial licensing policy, changes in exchange rate policy, relaxation of India's foreign direct investment (FDI) policy, reduction of import duties, etc. By the early 20th century, the service sector grew at an unprecedented rate, outpacing overall GDP growth and increasing, thus becoming the engine of India's growth. At that time, the world began to see India as a "knowledge economy" and China as a "factory economy". Since then, until now even the service sector is leading amongst the three i.e. agriculture, manufacture and service sectors (Figure 1).

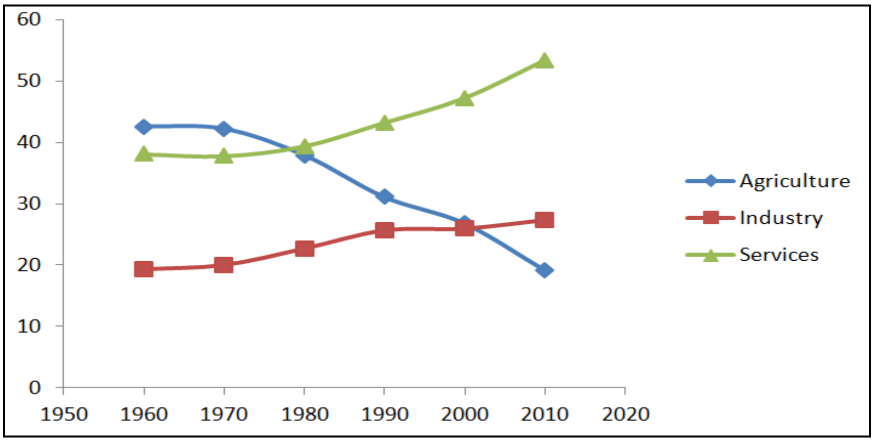

Fig 1: Graph comparing the growth trend of three sectors of Indian economy. Figures are mean values by decade of the share of key sectors in India's GDP for the timeframe of 1950-2010 (Mukherjee, 2013).

Agriculture as a buffering element in Indian economy

Though agriculture is the GDP least contributor among three sectors (service, manufacturing and agriculture) of economy, more than 50% Indian population depends on it for livelihood. The main source of revenue for more than half of the Indian population is depends on agriculture. Therefore, an increased involvement of agribusiness in India's national income should greatly contribute to the country's economic foundation. Most Indians depend on agriculture, either directly or indirectly. Some people are involved in conducting commerce with agricultural commodities, while others have a direct connection to farming.

Despite contributing toward livelihood of a large population, agriculture plays a significant shock absorbing role in the Indian economy. During covid19 period, agriculture sector played a phenomenal role in the Indian economy. During this period, this sector not only fed one sixth world population, it also contributed a positive growth % in the country's GDP. The global economy has had four worldwide economic recessions in the past seven decades: in 1975, 1982, 1991, and 2009. The global recessions were highly synchronized internationally, and many countries around the world experienced severe economic and financial disruptions. During these recession years, agriculture sector of India, not only saved from starvation, contributed significantly to the GDP growth. Agriculture sector in India, therefore requires a different 'bird eye' in economic terms.

A dynamic relationship among energy, agricultural biomass and economy can be successfully established following principles of the circular economy in a way to establish a new 'economy sector'.

The incentive investment model for developing 'biomass recycling' as a new sector

Government of India is heavily spending in the '*Swatch Bharat Mission*' for cleaning our rural and urban areas. River cleaning projects including '*Namami Gange*' and others are being debated for their expenditures and returns on investments. Investment in public health, dependency on foreign countries for energy sources and climate change impacts are also on cards. An effort can be made to address all these challenges holistically, scientifically and strategically through an 'investment-incentive' model.

Farmers usually burn their residue in the fields that can potentially be used as green substrate for bio-ethanol production. For example, potato is a root tuber crop. After harvesting of root tubers as main agri-produce, the green potato plant can be subjected to the bio-ethanol production process. Investment is required in researches for enhancing the efficiency of processes as well as start-ups can be incentivized to develop profitable-sustainable business models utilizing current and upcoming technological outcomes.

'*Waste to Wealth*' is a visionary initiative of Government of India. However, prolonged success of such initiatives largely depends on political will of Government machinery. Alternatively, if such schemes are targeted to be developed as integrated part of economy, a different scenario will be there. Long-term investment, incentivization of business, focused and targeted research and development activities and a continued effort for long time should develop new sector(s) of economy that can potentially recycle the biomass while generating income as well as revenues.

Agriculture waste, crop residues, organic wastes from rural and urban areas need to be relooked. Presently, all of these require investment in disposal, whereas, if we visualize these as raw materials of organic industry, income can be generated simultaneously mitigating the climate change impacts.

Budgetary allocation might be very challenging in implementing the above-mentioned policy suggestions. A small percentage of funds from ongoing rural and urban development schemes can be diverted to formulate a 'corpus fund for biomass recycling'. Further, a periodic scientific review process is must to understand and strategize the process from time to time.

In nutshell, schemes like W*aste to Wealth* / Biomass recycling processes need to be visualized as futuristic Indian economy sectors. To develop such sector, investment and incentives are urgently needed. Figure 2 illustrates an example of investment – incentive model.

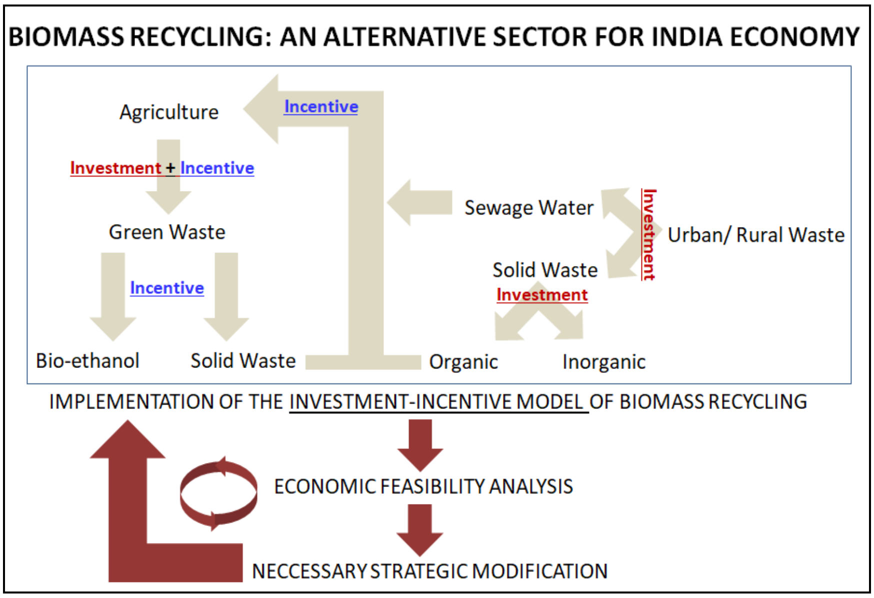

Fig 2: An example of investment – incentive model involved in developing biomass recycling as futuristic economy sectors.

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