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ARTICLE

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A MULTIDIMENSIONAL APPROACH TO SUSTAINABLE RURAL DEVELOPMENT

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A little more than seven decades after independence, India has undoubtedly emerged as a global player- politically, economically, and strategically. However, Indian villages seem to be missing out on the overall progress of the country even though they form the backbone of India's self-sufficiency in food.

Indian villages are rich in natural resources of one kind or another. We argue that there exist considerable economic opportunities for the marginal farmers outside standard agriculture such as in animal husbandry, poultry farming, apiculture, pisciculture, mushroom farming, organic agriculture, etc.

Increasing the use of local renewable energy resources can, not only address the energy needs of the villages but also trigger innovation and entrepreneurship in the villages creating jobs and wealth. The villages can also benefit by exporting the surplus electricity to the grid or by producing storable and transportable fuels like hydrogen and ammonia for several transport and industrial applications in the future.

The need for country-wide mapping of resources at the village level, widespread dissemination of success stories that can be replicated, incentives for entrepreneurship, and investments in villages are also highlighted.

Introduction

We start with a well-known observation by Mahatma Gandhi in the early years of the twentieth century, "The soul of India lives in its villages". Nearly 90% of the Indian population at that time was living in villages. For ages, artists have portrayed a charming village landscape in detail: happy children driving herds of cattle home along dusty roads as the Sun sets, chirpy and giggling village women in colourful dresses gracefully carrying pitchers of water- their bright sarees billowing in the wind behind them, jubilant men driving their bullock-carts overflowing with harvest or grain. Writers and poets have written gloriously about isolated rural settlements in the lap of a bountiful Nature, unspoiled by urban civilization. The legendry painter Amrita Sher Gill was perhaps closer to the truth as we see today. In her paintings depicting village scenes (e.g., Fig. 1), we see sad-faced and incredibly thin men and women moving silently, images of infinite submission and patience.

The famous sculpture, "The Santhal Family" by Ramkinkar Baij, immortalised the image of famine-stricken parents leading their two small children and a dog away from the disaster- the woman carrying a head load of their belongings in a basket, yet with palpably intact dignity. It symbolises both the anguish and the hopes of the smallest of family units (Fig. 2).

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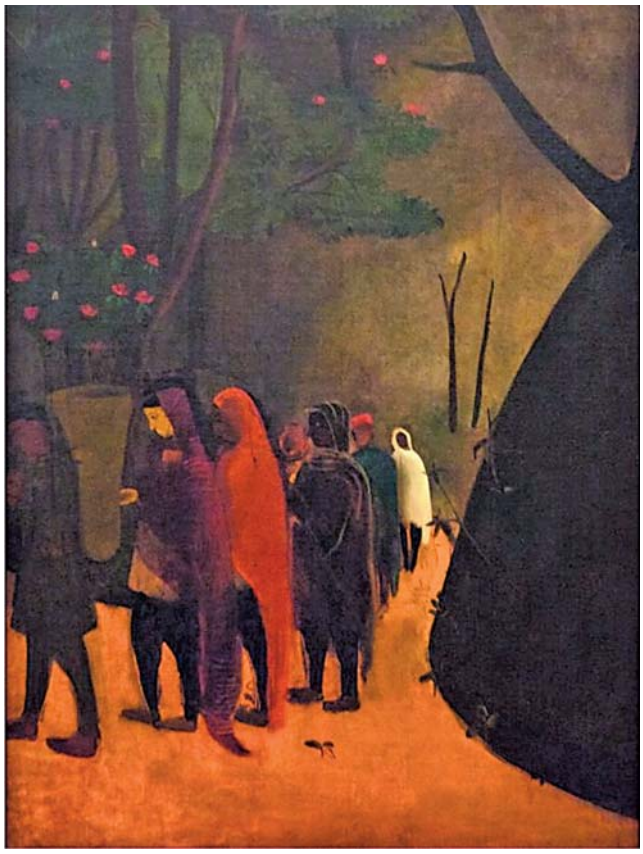

Fig. 1: Hill Scene: Painting by Amrita Sher Gill (1938)

The greatness of Ram Kinker Baij lies in giving his subjects- villagers toiling in fields- dignity and grace which were till then reserved only for the portraits of the aristocrats. Their proud gait exuding self-respect and their heads thrown back in the face of adversity is very effectively portrayed by him. The truth, we feel, is perhaps a superposition of all the three narratives and much more.

Fig. 2: The Santhal Family: Sculpture by Ramkinkar Baij (1938)

For Mahatma Gandhi, the village was a place of authenticity and spirituality. For Pundit Jawaharlal Nehru, it represented backwardness but for Dr B. R. Ambedkar, it represented oppression. A village is possibly all the three and much more.

A little more than seventy years after independence and significant progress of the country on several fronts, Indian villages continue to be at the core of the country's soul with more than 65% of the population still being rural. However, rural India seems to be missing out on the overall prosperity of the country. India of the twenty-first century is often referred to as a country in a transition- a transition from "a poor country in which rich also live" to "a rich country in which poor also live". India still has the dubious and painful distinction of being the home of a large fraction of the world population below the so-called poverty line, most of them living in our villages. This is indeed strange considering that agriculture is the mainstay of Indian villages and it is this sector that not only propelled a country of acute food shortages ("of ship to mouth existence") when coming out of colonial rule, into self-sufficiency in food in a matter of few decades in what is called Green Revolution, but also sustained the country through the recent COVID-19 pandemic when the entire country was going through a lockdown.

Why are the Indian villages missing out on the overall economic progress of the urban India? It is quite clear that poverty is at the core of many of the ills facing our villages. It is essential that more economic vitality is injected into the villages. It is also important that we provide fulfilling lives to our villagers to avoid social tensions, which can only be resolved through economic solutions- which the Government of India has aptly termed as "Vikash" (development). We discuss these developments in detail and examine how one could possibly proceed and revitalize the village economy- whose resilience has helped it survive for millennia.

Understanding Rural Poverty

Indian villages are generally rich in natural resources- land, water, and renewable energy resources such as sunlight, wind, and running water. The village economy has traditionally been centered on these resources in some form or another. The rural job scene also centers on agricultural activities and associated services. However, the limited skills and the limited markets often deny the rural community full economic benefits of the local resources.

While rural resources are being increasingly exploited for the urban market, the rural economy rarely gets a fair share of the generated wealth. Resources that do not cater to urban needs are devalued. Human labour has also been devalued because of industrialization and wide-spread use of machines. Poor across the world have two resources which nature has endowed them with- muscular power and time. If a day's labour can fetch them the essentials for the day, there is no place for abject poverty; at least, not the dehumanizing poverty that one sees in many parts of the world. Unemployment is the constant and the biggest threat that they dread. As a result of the shrinking employment opportunities, non-remunerative wages, seasonal nature of employment in the agricultural sector, and frequent vagaries of nature; in times of stress, the village population goes through untold miseries. They are forced to migrate to the urban areas for lack of job opportunities. The urban economy runs on skills and services. The migrants from the villages with their limited skills have an uphill task in adjusting to the urban demands.

Impact of the Population Increase

At the start of the twentieth century, the population of undivided India was about 238 million with an annual increase of nearly 19 million. The first census conducted by free India in 1951, recorded its population as 361 million, out of which about 300 million were living in our villages. Fig. 3 shows the growth of the rural population in the following decades. The faster rate of rise of the total population than that for the rural population is also indicative of large-scale migration from villages to urban centres.A direct consequence of the increasing rural population is decreasing land holdings (Figs. 4 and 5, and Table 1) and an increase in the number of landless labourers (Fig. 6) looking for employment.At the same time, the number of large holdings which can, in principle, be truly remunerative and reasonably prosperous has decreased to 0.84 million from 2.8 million over the period 1970-2016.

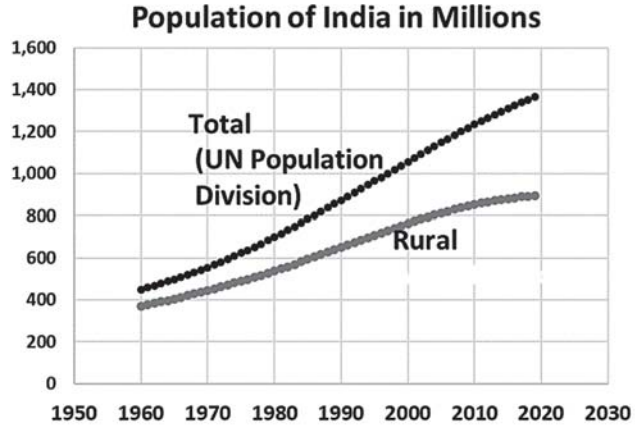

Fig. 3: Population of India[1]

Fig. 4: Decreasing Size of Average Land Holdings in India[2]

Table 1: Groups of Land Holdings

Holding Size	Area
Marginal	Less than 1 ha
Small	1-2 ha
Semi-Medium	2-4 ha
Medium	4-10 ha
Large	10 ha or more

Fig. 5: Increasing Number of Marginal and Small Land Holdings[2]

Even though the census data are not yet available for 2020, the number of agricultural labourers could be as high as 200 million or even more. It is not surprising that the country witnesses not only a periodic large-scale

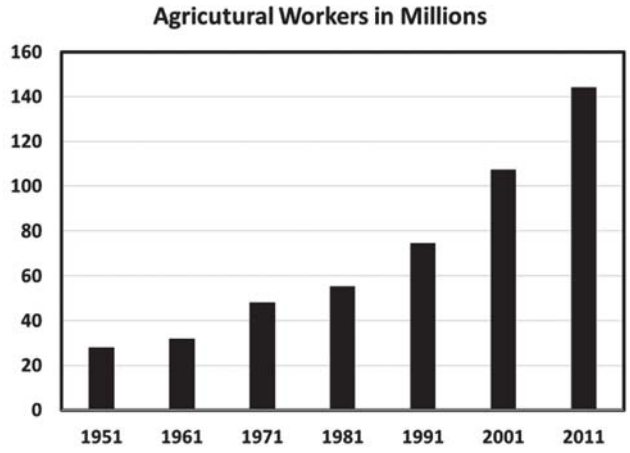

Fig. 6: Growth in Number of Agricultural Laborers[2]

migration from one part of the country to another during the seasons of sowing and harvesting but also migration from villages to urban centres. Apart from the seasonal variations in employment opportunities, the landless labourers also face extreme hardships in times of natural disasters like rains, floods, and draughts, with no safety nets of any kind to cover their basic requirements.

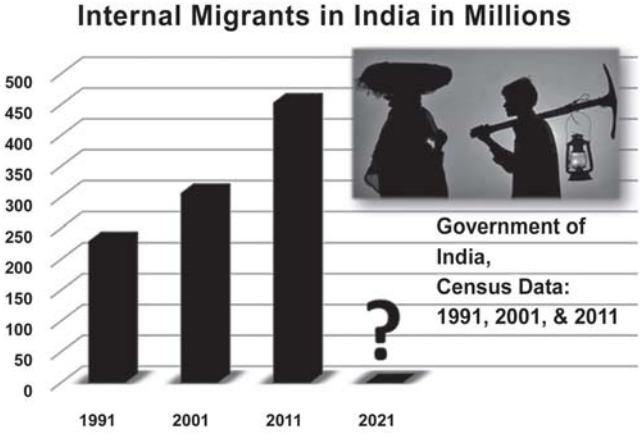

Fig. 7: Growth of Internal Migrants

Fig. 7 shows the growth in the number of migrants from villages to cities in recent decades. This increasing migration, mostly from villages to cities puts an enormous pressure on civic facilities in the cities for which they neither have plans nor resources. The increasing trend is bound to lead to further unplanned growth of slums in the cities and exploitation of migrants.

Animal husbandry and poultry has been a source of livelihood for our people for millennia. A closer look at animal and poultry census[3], however reveals that the number of animals have not increased as rapidly, though the number of poultry has been rising (Figs. 8 & 9).

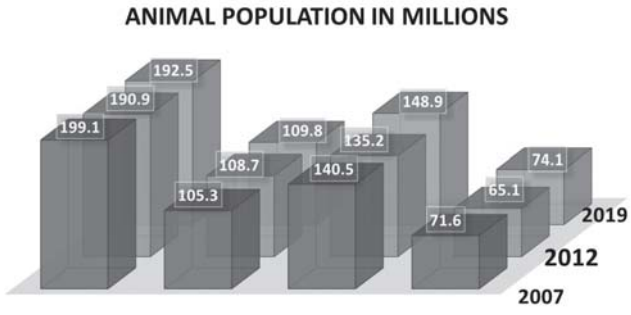

Fig. 8: Animal (Left to Right : Cattle, Buffalo, Goat, Sheep) Population in India over Years[3]

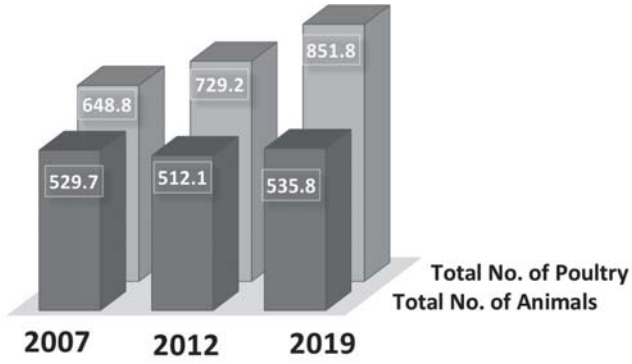

Fig. 9: Total Number of Animals and Poultry in India[3]

Economic revival of the villages

Following the Green Revolution of the seventies, paddy cultivation has been the mainstay of agriculture in Indian villages for several decades. Considerable penetration of modern agricultural techniques and tools like tractors have taken place in this sector. These, however, benefit large landholdings and are not suitable for marginal farmers. We argue that diversification into other areas like mushroom farming, beekeeping, pisciculture etc., in addition to the traditional animal husbandry and poultry offers more opportunities for villagers with small landholdings and the landless.

One of the early success stories in rural India is Anand Milk Union Limited(AMUL). It has demonstrated that milk and milk-based products can be a very viable economic proposition in rural India. It has also propelled India to become the largest producer of milk in the world. With technical guidance and help, AMUL has been adding a lot more value to milk by expanding out into the production of milk powder, milkshakes, curds, buttermilk, shrikhand, cheese, clarified butter (ghee), ice-creams, *etc*. AMUL is now expanding into international markets and it is heartening to see the AMUL model being replicated across the country.

Poultry farming at commercial levels has started picking up relatively recently in India (see Fig. 9), and if done with adequate technical and marketing support, can be quite profitable, more so as the land requirements are quite limited. Here again, there is a need to do value addition by dressing, sorting, and packing in hygienic cold boxes for marketing. Chicken droppings are rich in nitrogen and make excellent fertilizers.

Another profitable avenue, which many enterprising farmers are utilizing, is the cultivation of mushrooms. Mushrooms are nutritious, low in calories and fat, cholesterol-free, and contain a modest amount of fibre and over a dozen minerals and vitamins- including copper, potassium, magnesium, selenium, zinc, copper, iron and phosphorus, and a number of B vitamins. They are a rich source of protein and highly valued in modern as well as traditional cuisine.

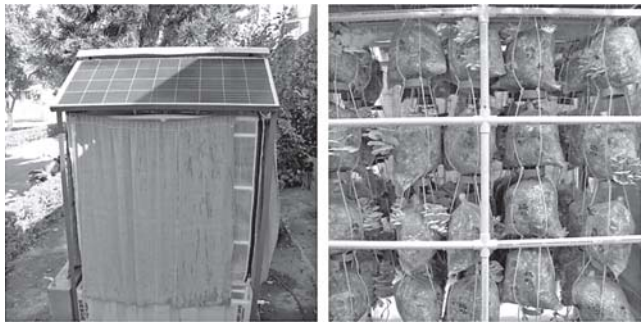

Fig. 10: Solar Power Integrated Outdoor Mushroom Growing[4].

Indian Institute of Horticultural Research has been providing guidance, and necessary technical expertise, as well as spawns to mushroom growers for quite some time. They have also developed (Fig. 10) a Solar Power Integrated Outdoor Mushroom Growing Unit [4] which can be easily replicated to provide a steady income to farmers on a small piece of land.

Honeybees play an important role in plant pollination. Honey, a dense source of energy, is known to have played a very important role in the growth of the human brain in the formative period of ancient humans. It is widely used in Ayurvedic medicine, religious rituals, and food. Modern methods of beekeeping were adopted in India only a few decades ago. Beehives do not require additional land space and do not compete with agriculture or animal husbandry for any input. One can plant native hardy flowering plants that attract bees. This increases the production of honey and increases pollination, which in turn leads to increased production of fruits, nuts, oilseeds, and vegetables, by a factor of two to three.

We must realise that in addition to honey, beeswax, bee venom, royal jelly, bee pollen, and propolis are also extremely valuable by-products of apiculture, whose extraction requires a special training.India has a vast scope for expansion of apiculture because of its diverse environment across the country and inexhaustible floral resources obtained from natural vegetation as well as cultivated crops. It is estimated that India can easily support up to 200 million bee colonies (the present number is just about 3.5 millions), which can give employment to more than 20 million persons and increase the exports from 100,000 USD achieved in 2018 easily by a factor of fifty[5]. It is essential to train our beekeepers to meet the highest standards of quality to meet the international standards of export. A niche area can also be opened by the production of mead and honey beer. The per capita honey consumption in India is still about 10-50 grams/year compared to about 2 kilograms/year in Germany- for example, which also suggests a vast scope for growth.

Fish provides more than one billion poor people of the world with most of their daily animal protein. It provides nutrients and micronutrients that are essential to cognitive and physical development, especially in children, and is an important part of a healthy diet. As an affordable animal source of protein in some of the poorest countries, fish is the primary source of nutrition, creating a growing demand for this staple. However, small-scale fishermen are particularly vulnerable as fish stocks diminish. The increasing pollution of rivers, lakes, seas, and oceans increases the risks of consuming wild fish. This is giving a further impetus to aquaculture in fresh water and brackish water ponds (Fig. 11), and it is expected that before long most of the fish consumed across the world will be grown in ponds under controlled conditions and free from the

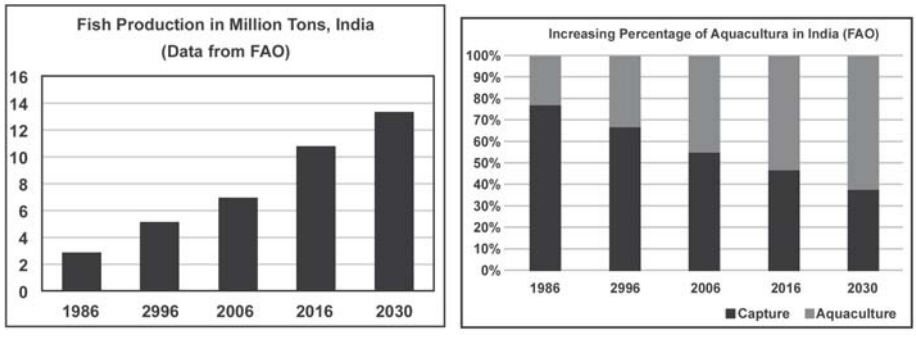

Fig. 11: Growth of Pisciculture in India according to the Food and Agriculture Organization, United Nations.

pollutions mentioned above. Even small ponds, under expert know-how for preparation, maintenance, and cleanliness of ponds (including the pH value of the water, oxygen content, etc.), medicines, special feed, and 'spawn and fry', as well as funds provided by various fisheries development centres of the government are transforming the aquaculture in villages in several states like West Bengal, Odisha, Maharashtra, and Andhra and it can be easily replicated across the country on a large scale. The water from fishponds is known to be an excellent fertilizer for crops.

Organic Farming

A mention was made about the Green Revolution in the beginning- which ushered in food security- using modern seeds, chemical fertilizers, extensive irrigation, and the use of pesticides and herbicides. Views have been expressed that this scheme, though it continues to provide food security to our growing population, is perhaps running out of steam. The run-off of fertilizers and pesticides has affected waterbodies, and excessive irrigation- especially for cultivation of rice in newer areas, has depressed the water tables. There is an immediate need to develop drought and pest-resistant seeds with sufficient yields to continue to support food security.

At the same time, a fear of contamination of their food grains with pesticides and herbicides is making people turn to organic foods and people across the world have started looking for foods grown without the use of chemical fertilizers and pesticides and meat without the use of growth hormones and special feeds, due to health concerns. Organic foods are, therefore, becoming quite popular and have their niche market.

The entire state of Sikkim has turned to organic farming. Other notable examples include Organic Mandya[6] and Akal Farms[7]. Modern methods of agriculture, like tissue culture[8] for banana, and Wayanad Centre of Excellence for Vegetables and Flowers are all ushering in unprecedented prosperity using these practices.

In the following , we discuss the remarkable success story of organic coffee from Arakku valley, because of its message of hope and prosperity for the indigenous people across the world.

Araku Valley is a small hill station and a valley region in the Eastern Ghats near the Andhra-Odisha border, at a height of about 1000 meters and about 110 kilometres from the city of Vishakhapatnam. It is a notified tribal area with a population of 0.6 million tribal or indigenous people, who are mainly forest dwellers. When the pressure on forest land and foraging increased, they were forced to adapt to agriculture- mainly shifting cultivation in the 1940s. Till the 1980s there was a barter economy, and the region was characterised by loss of biodiversity, rapid erosion of soil, and the felling of trees. The valley was also plagued by social problems, till the 2000s. Literacy was low, infant and maternal mortalities were high, and the poor returns from the poor-quality farm produce were pushing debt-ridden farmers towards alcohol and drugs.

Coffee was first introduced in this tribal belt in the 1920s by British Revenue officials. However, most tribals engaged in agriculture were using primitive agricultural techniques and working as daily wage earners, if at all they could find jobs. Around the year 2000, the Coffee Board and Integrated Tribal Development Agency provided coffee saplings to tribals. But they got meagre yields of only about 85 kilograms of coffee fruits per acre against the possible yield of up to 400 kilograms, and the nexus of local traders and middlemen forced them to sell their produce at a ridiculously low rate of Rs. 2 to 3 per kilogram.

A social sector organization, Naandi Foundation, stepped in, formed Small and Marginal Tribal Farmers Mutually Aided Cooperative Society, and trained them in best practices of production of organic coffee, and by 2010 they started getting bumper crops per acre and they sold the coffee fruits at Rs. 18/kilogram, ushering in prosperity and happiness to the tribal belt. By now, the organization has created a centralized coffee processing unit in Araku, which enables farmers to process their produce efficiently and consequently fetch higher prices; expanded the cultivation to include pepper, planted 29 million trees and by direct marketing raised the Araku Coffee to the world stage, winning the Gold Medal for the best coffee pod in the Prix Epicures OR 2018 Award in Paris, France. In the process, the earning of the farmers has gone up by as much as a factor of sixty[9].

Naandi's brand of terroir based Araku Coffee is now grown on 25,000 acres of land in the valley which is the world's largest certified organic plantation. The effort has benefitted about 25,000 families, encouraging others to follow suit. Farmers are no longer at the mercy of middlemen and loan sharks. The Foundation supplies coffee across the world through their online portal.The indigenous peoples living in the Araku Valley are an example of how a lack of knowledge and support has seen them struggle over the years – but also of how cooperation and proper training can drastically overhaul operations and consolidate thriving, self-sustained industry, transforming lives. This has been termed The Blue Revolution in the literature.

The rich biodiversity of the valley also nurtures another small-scale industry, namely apiculture earning the name- The Valley of Honey.

Renewable Energy Resources in Village Economy

We begin by recalling Prof M. N. Saha's pointed reference[10] to the fact that we were not making full use of the natural energy resources for productive purposes and we were mainly relying only on human and animal power.It is known that a human being has an energy potential of about 70 Watts of muscular power. Considering an eight-hour workday, it gives just a little over a half kWh of energy output in a day. An ox or a horse, on the other hand, can give up to ten times more energy output. These numbers, then provide an upper limit to the productivity of a man or an animal, if they have access only to their muscular power and nothing else. Incremental innovations like the wheel, levers, and pulleys did broaden the scope of activities that could be achieved with the power of the muscle, but it was the discovery of internal and external combustion engines and machines that removed the constraints imposed by the limitation of muscular power,and also led to the industrial revolution.

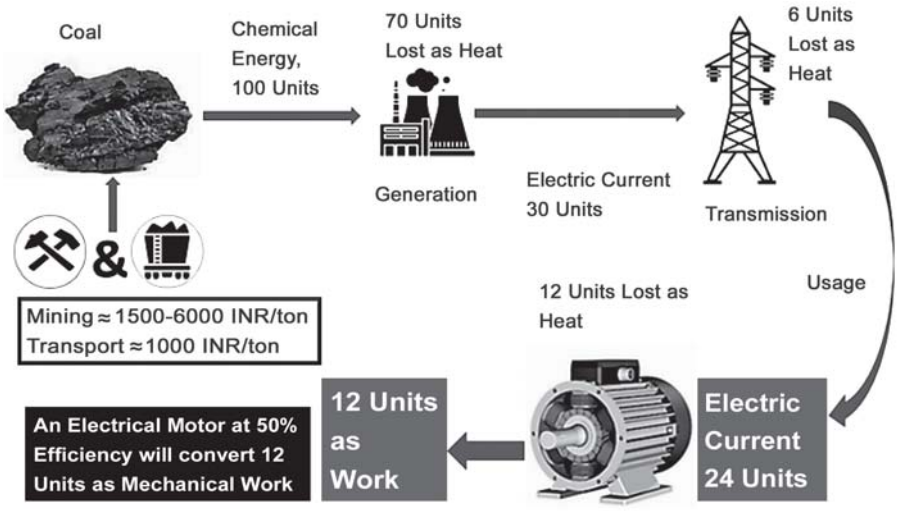

Fig. 12: Efficiency of Coal-based Electricity Utilization

The discovery of electricity that can easily be transported across thousands of kilometers brought in a paradigm shift in the generation, distribution, and use of electric power. While power on demand led to the emergence of several industrial and commercial hubs, an unintended consequence of this development was a complete devaluation of muscular power except in some service sectors. The impact of this on the agricultural sector and the rural economy has been catastrophic.While the developed part of the world shifted over to large, mechanized farms, the Indian villages were confronted with a challenge. On one hand, the decreasing landholdings did not favour large-scale mechanization of farming. The decreasing demand for unskilled labour raised the possibility of large-scale unemployment. Large scale migration of the workforce to the cities, noted earlier,were unavoidable- but with very little skills, this migrant workforce often turned into a burden in our cities while also being severely exploited.

With most of the Indian villages being rich in renewable energy resources of one kind or another, *it makes no economic sense to carry energy to a village from mines thousands of kilometers away or from oil wells in distant foreign lands when local renewable energy resources are unused or underutilized (see Fig.12). Cost comparisons do not have any sanctity because in the case of hydrocarbon fuels, the village must pay while in the case of locally generated renewable energy, the village generates wealth. Moreover, in the case of renewable energy, there are no costs associated with environmental damages.*

We argue that increasing the use of local resources including renewable energy resources, diversification of agricultural practices, and small-scale industries centered around the farm produce will not only create more jobs but also make the villages a net exporter of wealth. It must be noted that several individuals and communities have adopted such strategies with very positive results, but they have not percolated into other village communities.While the initiatives were novel, there has always been a mismatch between production and demand for electric power resulting in the underutilization of the infrastructure in these initiatives.

A thought that crosses one's mind is "if only every village can set up a Renewable Energy Farm based on the local renewable energy resources, if only the available power can sustain viable small-scale industries in addition to the household needs like lighting and other low power appliances, if only the excess power could be stored, transported and sold to the outside world". Are there technology options that would let them do it? Is the economics such as to make the village a net exporter of

not only agricultural products but also value-added products and energy vectors?

Rural Renewable Energy Farms

A typical Indian village can harvest energy from the sunlight, wind, running water, or from the biomass arising from the agricultural operations and animal waste. The energy resources and the technologies available for harvesting the energy are highly diverse.Stand-alone photovoltaic panels with battery storage are widely used for household lighting and other low power appliances such as water pumps. Larger photovoltaic farms have also been attempted to satisfy the requirements of a community. However, to address the problem of production-demand mismatch, either large arrays of batteries are required-making such farms expensive, or the farm has to be connected to the grid. Such grid connectivity is not available in many villages. Solar thermal systems for heat harvesting and storage of thermal energy – high-temperature steam for cooking, absorption cooling systems for storage of milk, egg, vegetable, fruits, and other farm produce, climate-controlled Green House farming of vegetables and fruits have also been attempted. Similar opportunities exist with windmills, micro, and mini hydel systems generating electricity. The impact of these systems on the village communities has been quite encouraging.

However, because of the diversity of the models, lack of relevant information, and shortage of trained human resources in the villages, large-scale replication of these models across the country has been minimal or has not taken place.On the other hand, decreasing costs of photovoltaic panels, thermal energy collectors and windmills, have made renewable electricity an attractive option. Also, during the last few years, considerable progress has been made in providing reliable grid connectivity to most of our villages. In principle, the villages can draw power from the grid when required and export power to the grid when the local power production exceeds the demand. The model is already in operation in cities with rooftop solar panels and can easily be adapted to stand-alone grids in villages.One can estimate that a one MW solar power plant, can meet the peak electricity needs of a village. The power caneasily be doubled using windmills to a great advantage, without requiring any additional space[11,12].

Solar panels need to be washed from time to time to remove dust from the faces of the panels, which affects their efficiency. Enterprising farmers across the world are using this to grow cash crops like mushrooms, leafy vegetables, tomatoes, chillies, tubers, and valuable spices like turmeric and ginger in what is termed agri-photovoltaics[13], under the solar panels and utilizing the area occupied by them.

Fig. 13: Growing Vegetables under Solar Panels[13]

One may also consider planting local flowering plants under the panels, which will attract bees and butterflies, so badly needed for pollination. This would also support beekeeping. These will require that there be some gap between the panels for sunlight to reach the plants and they may have to be fixed at a height of about 6 feet so that people can work under them. At some places, sheep are kept in such farms, which also enriches the land.

When more than necessary power is generated, the farm can feed power to the grid and when the production is lower, the village can take power from the grid. One can alternatively consider using a concentrated solar power option, with a provision to store the heat and generate electricity when required.

A more exciting possibility, which is emerging is to use the surplus power to produce hydrogen by hydrolysis of water (Fig. 14). This hydrogen could be compressed and stored in cylinders for a later use.

Hydrogen has several uses; including its use in industry, fertilizer production, use in internal combustion engines, and fuel cells. In fact, the farmers may even consider bartering hydrogen against fertilizers. Considering that hydrogen production needs about 55 MWh/tonne of electricity, we may be getting several tonnes of pure hydrogen (and oxygen) every month, which will greatly add to the prosperity of the village. This could be especially valuable at isolated locations, away from grids, where part of the hydrogen could be used to produce electricity when the renewable sources are not producing power.

The energy economy of the local and distant utilization of green hydrogen is shown in Fig. 15. We see immediately that the most efficient use of hydrogen would be to use it at the place where it is produced. A comparison

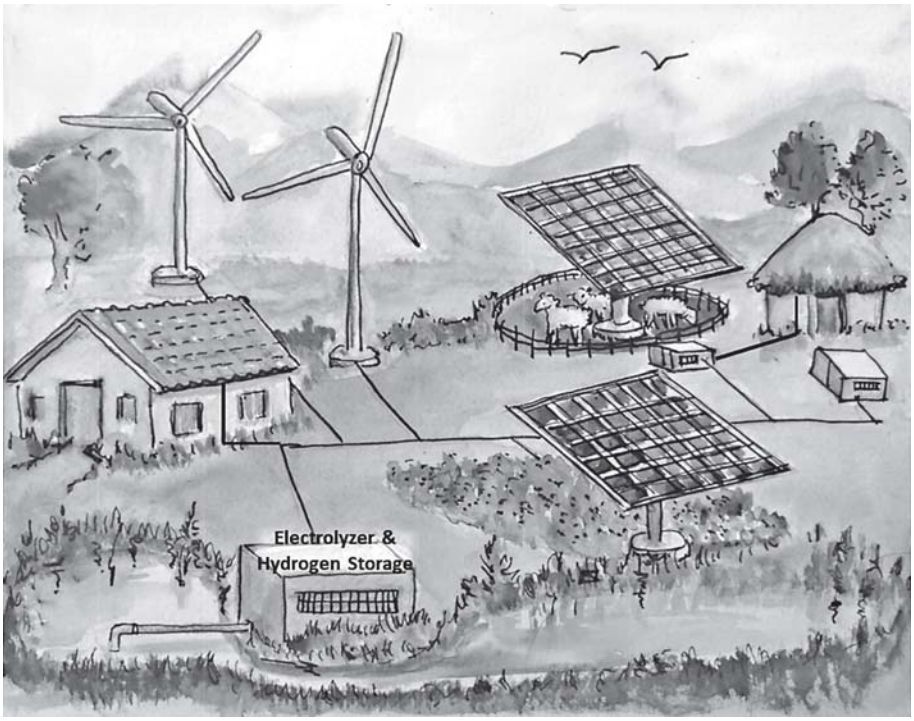

Fig. 14: Schematic of Distributed Hydrogen Production from Renewables[14]

with Fig. 12, also shows it is far more efficient than coal.

We have already pointed out the potential for additional employment associated with the local generation of electric power in the villages. A reliable power supply will also allow the villages to operate controlled atmosphere farming, and small cold storage plants to protect their perishable goods like vegetables, fruits, milk, or eggs. While the initial investments for the establishment of the renewable energy farms can come from the affluent part of the community itself, from the government, from the corporate sector as a part of their Corporate Social Responsibility, from individuals sharing the concern for the poor *etc.*, the Farms themselves are owned by the community and the generated wealth is shared among them.

The Government of India has declared its plans to connect all villages using fibres. This will make the knowledge of weather, soil, water resources, and training courses for a variety of skills available to our villagers at their home, in addition to connecting them to the rest of the world for directly selling their products to buyers, without middlemen. We feel that renewable energy resources like solar and wind power, along with the production of hydrogen from electrolysis can usher in sustainable development and prosperity even in remotest villages which can then become proud partners of Atma Nirbhar Bharat (Self-Reliant India).

What are the Challenges?

Let us start with the large diversity across the country in natural and renewable energy resources. This requires a mapping of resources at the village level as the first step in the road map for a village. We suggest a village wise "Map your resources" project, mapping the natural resources, renewable energy resources, human resource and the opportunities in economic activities. These are excellent projects that can be implemented by the local educational Institutions. One is reminded of the extensive field work carried out by Prof M. N. Saha in the region of Damodar Valley with his students, which led to the formulation and implementation of the Damodar Valley Project and which made the recurring floods in the region history and provided electricity and water for irrigation.

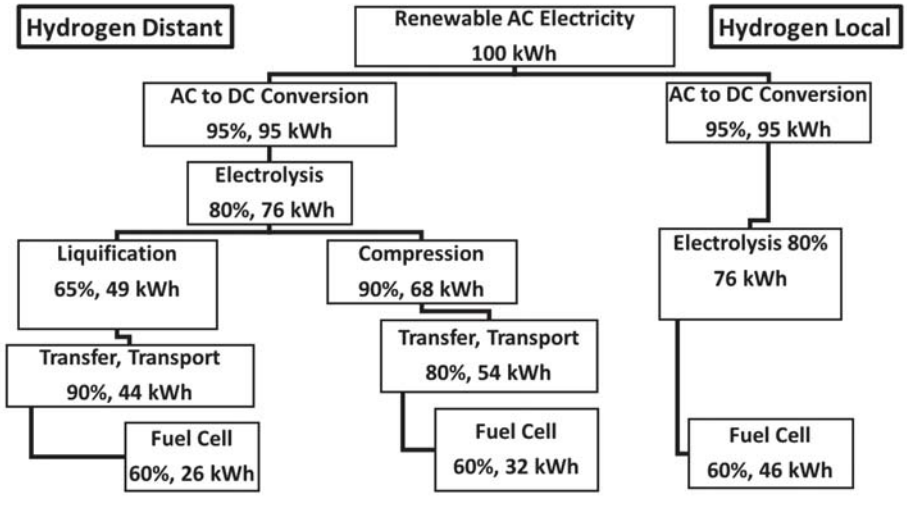

Fig. 15: Local and Distant Utilization of Hydrogen

Sharing of experiences goes a long way in charting out a road map for any specific village. We

suggest scouting and documenting success stories across the country and disseminating them widely to encourage the locals to embark on any new and ambitious initiative. One may recall the nationwide scouting of grass-root innovations by the National Innovation Foundation, Ahmedabad. The country needs a similar initiative to scout and document community-based success stories in agriculture, horticulture, food processing, and other village level activities. Promotion of Innovation and Entrepreneurship involving new and emerging technologies has received considerable government support in recent times. There is also a need to promote Innovation and Entrepreneurship at the village level. Just as the network of Technology Business Incubators set up by Department of Science and Technology to encourage and nurture technology-based initiatives, we need to consider a chain of Rural Technology Business Incubators to nurture village-based initiatives.

In summary, while we highlighted the importance of diversification of agricultural and other related activities and experience sharing for replication, we have also argued for the establishment of small and medium size renewable energy farms that can provide reliable and affordable energy to the villagers, generating skill based employment throughout the year. We believe that this could usher in a sustainable and dignified quality of life and livelihood for our villagers. ❐

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