CONTENTS

- RURAL TOURISM PATH TO ECONOMIC & REGIONAL DEVELOPMENT IN INDIA  
  Dhurjati Mukherjee  
  3

- FARM BASED RURAL TOURISM IN KERALA  
  Dr. Gracious James  
  7

- RURAL TOURISM – A GLOBAL VIEW  
  T. Prakash  
  11

- ENLARGING THE POTENTIAL OF RURAL TOURISM IN INDIA  
  Barna Maulick  
  13

- TOURISM : AN ENGINE TO ECONOMIC GROWTH IN THE RURAL ECONOMY OF HIMACHAL PRADESH  
  Dr. Jai Singh Parmar  
  17

- AGRI TOURISM: AN INNOVATIVE INCOME GENERATION AVENUE  
  N B Ubale  
  21

- ICT: A CATALYTIC INTERVENTION FOR EMPOWERING RURAL INDIA  
  H V Borate  
  27

- RURAL SOLID WASTE MANAGEMENT: ISSUES AND ACTION  
  Anupam Hazra  
  30

- RGGVY: TURNING THE WHEEL OF RURAL INDIA  
  Pravash Chandra Moharana  
  36

- HYDROPONICS: A BOON FOR INCREASED AGRICULTURAL PRODUCTION IN CLIMATE CHANGE ERA  
  Gargi Malik  
  38

- HI-TECH TECHNOLOGY FOR CULTIVATION OF SOME VEGETABLES IN SOIL-LESS CULTURE  
  Dr. R.S. Sengar  
  42

- DOCTOR FARMER  
  Dr. Shalani Gupta  
  44

- MENTHA: A MEDICINAL PLANT  
  Kalpana Sengar  
  48

- AGRO-MET ADVISORY SERVICES FOR THE FARMERS  
  Dr. M. Pandey  
  52

Kurukshetra seeks to carry the message of Rural Development to all people. It serves as a forum for free, frank and serious discussion on the problems of Rural Development with special focus on Rural Uplift.

The views expressed by the authors in the articles are their own. They do not necessarily reflect the views of the government or the organizations they work for.

The readers are requested to verify the claims in the advertisements regarding career guidance books/institutions. Kurukshetra does not own responsibility.

The Monthly Journal
Kurukshetra
MINISTRY OF RURAL DEVELOPMENT
Vol. 60  No. 7  Pages 52
May 2012
Rural tourism is currently the focus of attention throughout the world and is being recognized as an important instrument of growth for the rural economy. Planners are using Rural tourism, which also includes eco tourism and farm tourism to increase economic opportunities for the rural people.

In India where 70 per cent of the population live in rural areas and are dependent solely on agriculture, newer opportunities need to be created and Rural tourism is certainly on top of the charts of fulfilling this dream.

We discuss, in this issue, how farm tourism will boost economic prosperity for the vast majority of the population.

Rural India has much to offer beyond agriculture. It has a great potential for different segments of tourism like eco tourism, adventure tourism, health tourism, farm tourism, nature tourism, cultural tourism, religious tourism and the like.

While tourism in general is growing at an annual rate of 4 per cent, nature travel which is also part of rural tourism is growing at a rate of 10 per cent to 30 per cent.

Studies on the subject have concluded that there is evidence that in Europe rural tourism has made important contributions to rural incomes both at the level of the individual farmer and more widely in the local community. While not necessarily substituting for agricultural income, it has delivered supplementary income and inter-sectoral linkages.

The importance of tourism as a creator of job opportunities can be understood from the fact that in India every one million invested in tourism creates 47.5 jobs directly and around 85-90 jobs indirectly. In comparison, agriculture creates only 44.6 jobs and manufacturing a mere 12.6 jobs. Moreover tourism is the third largest foreign exchange earner after gems and jewellery and ready made garments.

Economic gains apart, urban people want to see rural India because that is where they belong.
With tourism gaining immense popularity the world over, there has been focus in recent years on rural tourism and eco tourism. It is generally agreed that if properly planned, developed and managed, rural tourism or eco tourism can improve the living standards of the local population while supporting the conservation of the natural ecosystem. While tourism as such has emerged as a dynamic industry in India, the challenge is to take advantage of the situation by ensuring best use of the nature’s assets.

One may ask what is rural tourism? The government has taken a broad view. “Any form of tourism that showcases rural life, art, culture and heritage at rural locations, thereby benefiting the local community economically and socially as well as enabling interaction between the tourists and the locals for a more enriching tourism experience, can be termed as rural tourism”, a Tourism Ministry policy paper pointed out. Rural tourism is essentially an activity which takes place in the countryside. It is multifaceted and may entail farm/agricultural tourism, cultural tourism, nature tourism, adventure tourism and ecotourism. As against conventional tourism, rural tourism has certain typical characteristics: It is experience-
oriented; the locations are less populated, it is predominantly in natural environments and it is based on the preservation of culture, heritage and traditions.

**Ecotourism**

Not everyone applies such a broad definition. Ecotourism -- which concerns with the preservation of the environment -- has become fashionable these days. And some in government and the tourism industry would like to focus on ecotourism rather than rural tourism, which could have a down-market, rough-it-out connotation. Ecotourism and rural tourism are not exactly the same but can be clubbed together for greater benefits.

One may mention here that way back at the Earth Summit two decades back, chapter 13 of Agenda 21 of the global blueprint for sustainable development was devoted to maintaining fragile ecosystems and sustainable mountain development with special emphasis on mountains and hilly terrains. This was significant from the viewpoint of eco tourism as most tourists flock to hill areas in India.

Several research programmes and projects have been carried out with mountains and rural areas as the focus for further tourism development. The national tourism policy introduced in 2002, identified rural tourism as a focus area to generate employment and promote sustainable livelihoods through development of art, craft, culture, heritage, handloom, etc. According to the 2002 policy, special thrust was to be imparted to rural tourism and tourism in small settlements, where sizable assets of our culture and natural wealth exist.

The tourism policy placed a lot of emphasis on ecotourism, specially the mountainous areas of the North East and the Himalayan region as also the islands of the Andaman & Nicobar and Lakshadweep to tap the natural resources of these areas and develop them as part of an overall strategy to improve the economic conditions of the people of these regions. However, the interest of tourists for these places has greatly been on the rise though not much development of infrastructure in some of the areas has taken place, specially in the far-flung remote areas.

Rural tourism is understood differently in different parts of the world. Ecotourism and rural tourism are the same only in a sense. They are cousins really. Rural tourism may not necessarily be the protector and enhancer of conservation. It is much more community-oriented while ecotourism is more holistic and has a role in environmental protection and development.

The point about community involvement was also made by Mott MacDonald, a global management engineering and development consultancy that the Ministry of Tourism asked to evaluate the rural tourism scheme. Its report, submitted in June 2007 after five years of operation, observed: “In order to make the scheme more meaningful, it is very important that the sustenance issues be discussed with the community before the start of the project.” Fear of the unknown once was common, but it has disappeared in the projects undertaken. "Xenophobia has been removed from the minds of the local people," the report noted.

**Fear of Foreigners**

At one point of time, the fear of foreigners was just one of the basic issues that hindered the flow of tourists to the sites chosen by the government and the UNDP. From the start, the sites had the
advantages of historical importance, craft, culture, cuisine and natural beauty. But hindrances included a lack of basic infrastructure including sanitation, drinking water and wayside amenities; a lack of accommodation and food facilities; and a lack of awareness about site importance and the need for local guides.

Most of the issues have been addressed. “With the intervention of the Ministry of Tourism, there has been considerable change,” the Mott MacDonald report noted. “The rural tourism scheme has been a valuable vehicle to bring the ultimate rural stakeholders in touch with the tourism sector to increase employment.” The report pointed out: “Rural tourism is not the end, but the means to stimulate economic growth, to increase the viability of underdeveloped locations, and to improve the living standards of local populations.” One cannot deny the fact that with proper infrastructure in place, rural tourism as also ecotourism certainly has the potential to generate large-scale employment. In fact, the development of a strong platform around the concept of rural tourism is definitely useful for a country like India, where over 70 per cent of the population resides in its six million villages.
Bottomline

Yet increasing the bottom line for tourism is equally important. After all, there is a limit to the number of tourists you can pack into the Taj Mahal and Khajuraho. Today, amid the global economic slowdown, tourism has become a key foreign-exchange earner. According to Ministry of Tourism figures, foreign-exchange earnings from tourism are estimated around US$15 billion presently and the total number of tourists visiting India are estimated at around 7 to 8 million.

Delving into ecotourism, it may be understood as travel to fragile, pristine areas in hilly locations. It helps educate the traveller while at the same time the visits generate money for conservation and development of the areas, thereby benefitting the local communities. Ecotourism has been very successful and, if infrastructure facilities are upgraded, it will become more and more attractive. Both the central and state governments have a responsibility to focus on new areas so that the crowding in the traditional hilly areas is diffused.

In India, as in most Asian countries, a lot of attention is being paid to environmental conservation while tourists prefer visit to environmentally sensitive locations. Mountainous regions and marine beaches have long been popular sites but in recent years parks, bird sanctuaries and forests have attracted a sizeable number of tourists. It is necessary the present to the world the wonder that is India not only in terms of beauties and bounties of nature but also in terms of a civilization that was born, bred and beckoned here.

As is generally agreed, rural tourism is one of the main drivers of economic growth and employment generation in more than 80 countries. It has the potential of addressing issues such as rural poverty, employment of women besides strengthening the economic status of rural artisans, earning foreign exchange etc. As such, it is necessary to create the right environment to attract FDI by establishing the required legal and institutional framework and facilitating the process at the earliest. It may be mentioned here that presenting key bankable projects to investors not only increases the possibility of attracting foreign but also establishes benchmarks for the future.

Delving into statistics, in India every one million invested in tourism creates 47.5 jobs directly and around 85-90 jobs indirectly (in sub sectors like hotels and restaurants, transportation etc.), while agriculture creates 44.6 jobs and manufacturing a mere 12.6 jobs. Moreover tourism is the third largest foreign exchange earner after gems and jewellery and ready made garments.

As a multi-sectoral activity, using multiple services provided by a range of suppliers, rural tourism is an area where a strong public-private partnership is of prime importance, particularly given the number of ministries beyond tourism -- for example, rural development, culture, environment and tribal welfare -- that could be gainfully involved. It may be pertinent to mention here that the Union Tourism Minister recently called upon the private sector to take active part in tourism development for specific tourist destinations in the North East and said his ministry would facilitate in marketing the region as a new destination. Also he informed that allocation has been fixed in the ministry’s annual budget for the North East and more funds would be made available on request from private operators and state governments.

Rural tourism is in its nascent stage in India but it is bound to grow. There is a huge market out there. The experience of many countries shows that rural tourism can be seen as an alternate source of livelihood and employment. The main problems with rural tourism are, of course, the same as with any rural development project. Strong village-level institutions, which can take up the execution once the project has been initiated, would go a long way in boosting rural tourism.

Thus at this juncture, when there is a raging debate all over the world on the need for sustainable development and creation of an eco-friendly and liveable society, it would be imperative to give all-round encouragement to ecotourism and rural tourism in such a way that it could be availed by the national and the international traveller and, in turn, help the process of rural development of the country.

[The author is a freelance writer on development issues, based in Kolkata. E-mail: dhurjatimukherjee54@gmail.com]
Rural tourism encompasses a broad range of activities yet it is often seen to be synonymous with ‘farm tourism’ which is currently the focus of much attention throughout Europe. In some countries, especially southern Germany, there is a long tradition of rural tourism based largely on accommodation on farms. Agricultural and regional development policies throughout Europe have resulted in a significant increase in farm-related tourism activities. Villages in Kerala have made a cocktail of its hospitality with the traditional way of farming to attract more tourists, creating a heady concoction called “Farm Tourism” being developed as a relatively new tourism product. With nearly half the plantation area in the country and a major interest in all the four crops-tea, coffee, rubber and cardamom, Kerala is undoubtedly India’s most important plantation state. Kerala has a substantial share in the four plantation crops of rubber, tea, coffee and cardamom. These four crops together occupy 6.89 lakh ha, accounting for 31.58 per cent of the net cropped area in the state and 43 per
cent of the area under these crops in the country. Kerala’s share in the national production of rubber is 91 per cent, cardamom 75 per cent, coffee 22 per cent during the year 2008-09. Kerala’s share in the production of tea is 5 percent during 2008-09. Kerala, being an agricultural dominated state, has tremendous potential for developing Farm Tourism in a big way without much additional investment.

Kerala has 30.22 lakhs hectares of gross cropped area which is 56.78% of the State’s total geographical area. The State has about 350,000 lakhs hectares of land under paddy cultivation. With minimum intervention, these can be converted into tourist attractions in order to transfer the benefits of tourism directly to the farmers. Farm based Rural Tourism is an effective medium for sustainable rural development, alleviating rural poverty and fighting rural unemployment. In Kerala the agricultural sector which is associated with rural environment, contributes only 13% to the state domestic product (SDP) and the whole primary sector contribution is up to 17%. The Farm-based Rural Tourism in Kerala aims at revitalising the plantation sector through additional income generation and boosting the image of agriculture sector. It also aims at the creation of a layer of employment opportunities for the educated unemployed in the agriculture sector who otherwise opt for non-agriculture activities.

**Farm Tourism-A non-seasonal approach**

Farm based rural tourism is a non-seasonal tourism product and it must be promoted as such. Eco-tourism in Kerala can also be linked with rural tourism because the objective of the former is to throw open natural areas for tourist visit by conforming to strict rules and regulations for preserving the local, ecological conditions of the area. Many attractions and activities have evolved as a result of the development of farm tourism. They are:

- Roadside stand selling fresh farm products and craft items
- Processing of farm products and sale
- A shady spot for visitors to rest – like a big banyan tree
- Farm Schools to teach a particular skill
- Collection of old farm Machinery
- Miniature Village
- Farm Theme Playground for Children

Apart from the above, a number of different activities, including horse-riding, fishing and shooting, are widely available on farms. There is a large potential market for farm-based rural tourism especially for foreign tourists in Kerala. The cost of food, accommodation, recreation and travel is least in Farm-Tourism which widens the tourist base. The urban population having roots in villages always have had the curiosity to learn about sources of food, plants, animals, raw materials like wood, handicrafts, languages, culture, tradition, dresses and rural lifestyle. Farm-Tourism which revolves around farmers, villages and agriculture has the capacity to satisfy the curiosity of this segment of population. Rural games, festivals, food, dress and the nature provide varieties of entertainment to the entire family. People are in constant search of pro-nature means to make life more peaceful. Ayurveda which is a pro-nature medical approach has roots in villages. Tourism is a means for searching peaceful location. Peace and tranquillity are inbuilt in Farm-based Rural Tourism as it is away from urban areas and close to nature.

Villages provide variety of recreation to urbanites through festivals and handicrafts. Agricultural environment around farmers and the entire production process could create curiosity among urban dwellers. Places of agricultural importance like highest crop yielding farm, highest animal yielding farm, processing units and farms where innovations tried will add attraction to the tourists. Farm-based Rural Tourism could create awareness about rural life and knowledge about agriculture science among urban school children. Treating guests is pleasure for the villagers than pain. The farmer entertains the guest while entertaining himself in the process. He is not like an exploitative natured businessman which itself facilitate a clean tourism atmosphere. There is an
increase in the number of tourists preferring non-urban tourist spots. Hence, there is scope for the promotion of non-urban tourist spots in interior villages by establishing Farm-based Rural Tourism centres.

**Farm-based accommodation**

Tourist accommodation can be of various forms and many of these are already prevalent in Kerala, including some exclusive and innovative ones. But there is a mismatch between available tourist accommodation and estimated total tourist nights in Kerala. Although rural tourism utilises virtually every type of accommodation, one of the most popular forms of tourism accommodation in the rural areas is on farms. In many countries farm-based accommodation represents a significant proportion of the total accommodation facilities. For example, around 18 percent of tourist bed spaces in Austria are located on farms. At present, 50 percent of hotel accommodation in Kerala is concentrated in Ernakulam and Thiruvananthapuram districts. A greater dispersal of tourist accommodation is desirable together with the dispersal of tourist traffic. On an average, 850 tourist accommodation rooms need to be added each year to meet the growth in demand over the next two decades. At present, most backwater resorts and houseboats are at the high end of the price spectrum and consequently out of reach of the average tourist, both domestic and foreign. Kerala has registered a huge growth in urban population over the decade with slightly over 47 per cent of 33.38 crore people living in cities and towns, according to the 2011 census. People living in rural areas fell from 74.04 per cent in 2001 to 52.30 per cent in 2011. These facts point to the high prospects and necessity of Farm-based Rural Tourism development.

**Green Farms Kerala project**

*Green Farms Kerala* is an innovative project envisaged by Government of Kerala. This project will prepare the Farms/Plantations of Kerala to receive tourists in view of revitalising the agriculture sector through tourism with minimal investment. It will result in direct and indirect employment of people into this new stream of tourism business. Under this project an individual or a group owning at least 10 acres of farm or 50 acres of plantation at or near a tourist centre, or along an established tourist circuit or major transport corridor, be a part of *Green Farms Kerala* and harvest the benefits of tourism. The project helps the farmers to generate additional income from their farm/plantation. As a part of this project the farmer will have to develop their farm and add on a host of facilities as prescribed by Kerala Tourism. The farms/plantations under *Green Farms Kerala* can be converted into tourism products by adding several components in order to make them more tourist-friendly and to enable owners to get the most out of them. As a participant of this project, the farmer will enjoy a host of benefits and advantages including promotion of the brand by the Government. To ensure the sustainability of the approved *Green Farms Kerala* units, there will be a permanent mechanism that monitors their activities.

An incentive to the tune of 25% for the additional specified facilities targeting exclusively at the tourists, subject to a maximum of Rs. 5.00 lakhs will be given to the owners of the project. All units under *Green Farms Kerala* will be marketed by Kerala Tourism through the print and electronic media. No specific quantum of investment has been stipulated by the Government. Investment will depend on the facilities being set up, and will therefore be more for units that provide accommodation. The scheme is also very appropriate in the background of the Government’s decision of allowing 5% of the farm area for tourism purpose. It will be a boost to the Tourism sector in Kerala through the introduction of the new tourism product ‘Farm Tourism’ in a big way without much additional investment.

**Kerala Farm Tourism Destinations**

*Pathanamthitta* is a true farm tourism destination housing tropical diversity adorned with fertile agricultural land where plantations, paddy, tapioca, varieties of vegetables and spices like cardamom, pepper etc. are extensively cultivated. About 80% of the district population depend on it directly or indirectly. *Kottayam* as a farm tourism destination is an important commercial centre of *Kerala*, thanks to its strength as a producer of cash crops. Most of India’s natural rubber originates from the acres of well-kept plantation farms of *Kottayam*. *Vagamon*, located along the Idukki-Kottayam...
border, is a paradise for the seekers of peace and tranquillity and abundance of nature and is a developing farm tourism destination in Kerala. Mattupetty, the farm tourism destination in Munnar, is situated at a height of 1700 m above sea level, 13 Km from the town. Mattupetty is well known for its highly specialized dairy farm. There are over 100 varieties of high yielding cattle at the specialized dairy farm at Mattupetty and visitors are allowed into three of the eleven cattle sheds at the farm. The dairy farm is a unique one of its kind with several varieties of high-yielding cattle being reared. There is a unique farming venture at Chittur in Palakkad district that has undertaken the mission to bring back the fast losing significance of Navara, a grain considered to be of great value from the healthcare point of view. Spread over an area of 18 acres, the Navara organic Eco Farm near Chittur in Palakkad can accommodate eight visitors at a time. Idukki district in Kerala has been known for its spices and travellers around the world have journeyed here for trading in spices. Kerala has the pride of starting a rural tourism project at Kumbalangi near Kochi with assistance from the Department of Tourism, Government of India. Kumbalanghi is a perfect farm tourism village destination in central Kerala, close to the port town of Cochin which has a vast stretch of backwaters connected by interlocking waterways to the whole of Kerala. A day in Kumbalanghi farm tourism destination can be a festival to remember; a treat for the eyes and the mind.

The pros and cons of farm based rural tourism

Farm-based rural tourism will create employment for the rural people and generate income for them. They will have an additional source of income along with their agricultural income. With the rise of income their education, health etc will rise. The price of the agricultural land will rise. Demand for other goods and services will increase and there will be improvement in the public services. Through the increased flow of tourists, local small businessmen will be benefited. The rural people will learn to develop healthy environment with proper sanitation, roads, electricity, telecommunication, etc. They will learn to preserve the natural habitats, bio-diversity historical monuments. Market for agro products and handicrafts will develop in rural areas and the farmers and artisans will develop a direct contact with the customers.

Although rural tourism can bring various benefits such as described above, it can also damage many indigenous societies. The economic benefits may go to urban communities and entrepreneurs. The different tourism facilities provider and investors such as resorts, hotels and tour operators will be mainly from cities; who will take away most of the profits. Food, drink and necessary products will be imported from outside and not produced locally. The rural people can be exploited by urban entrepreneurs. Local artisan may not be benefited. There will be increase in the price of local agro/farm products. The tourist may exploit natural resources which will have a heavy impact on the environment. Poorly planned tourism can affect the villagers. It can disrupt the rural culture. It may affect the traditional and cultural practices, agriculture and other allied activities.

Conclusion

In order to meet the developmental needs on a sustainable basis, it is imperative to use the earth’s natural resources wisely. With a strong position in the world as ‘God’s own country’, and its internationally acclaimed development model, Kerala is in an excellent situation to develop its tourism industry through farm-based rural tourism. We must take the local community into confidence by suitable participation programmes so that they feel the project is part of a development activity which is meant to eradicate rural poverty and unemployment. Farm based rural tourism too must be limited to carrying capacity levels. In Kerala, every village can boast of at least one or two tourism projects. Kerala’s age-old culture is evident in her rural life. The government should promote farm-based rural tourism to ensure sustainable rural development and positive social change.

(The author is Asst. Professor, Post Graduate Department of Commerce, Government Arts College, Thiruvananthapuram, Kerala, e-mail: graciousjames@gmail.com)
Strategies to use tourism as an instrument of growth in rural areas emerge in different contexts. They are, at heart, about enabling rural producers to reduce reliance on agriculture, and engage in new economic opportunities that are competitive in the more globalised markets, which now reach their doorstep (or farm gate).

**Regeneration in the face of agricultural decline**

In Europe, tourism has long been considered a catalyst for *regeneration* of rural areas, particularly where traditional agrarian industries are in decline (Williams and Shaw 1998, Hoggart, Buller and Black 1995). Studies of rural tourism are predominantly set within a European (including Eastern European) or North American context, focusing largely on domestic visitors and economic restructuring. Farm facilities and infrastructure (such as basic transport) are in place, thus the strategy is to adapt them for tourism purposes, market the rural attractions, and draw clients, particularly domestic visitors, from the cities. There is evidence that in Europe rural tourism has made important contributions to rural incomes both at the level of the individual farmer and more widely in the local community.
important contributions to rural incomes both at the level of the individual farmer and more widely in the local community (ETB 1991). While not necessarily substituting for agricultural income, it has delivered supplementary income and inter-sectoral linkages. This approach to rural tourism has received priority attention in Eastern Europe since the fall of the iron curtain and the collapse of communism. The need for rural regeneration has been immense. In the early 1990s countries in Eastern Europe needed to respond quickly to previously unknown circumstances: high levels of industrial closure, a loss of Soviet-controlled markets, break down of the non-competitive and over-staffed agricultural sector and consequently high unemployment, price inflation and diminishing living standards. High unemployment due to privatisation of largescale agricultural co-operatives, coupled with a new freedom to move to urban centres severely depopulated rural areas. At the same time the level of domestic travel was seriously reduced due to financial constraints, a thirst for the outside world, and loss of financial subsidies for previous forms of ‘social’ tourism. Interregional travel, on which former Eastern Bloc countries depended heavily, was reduced to a minimum.

At the same time, interest by Western visitors in previously unseen countries and attractions increased drastically. The early 1990s were characterised by large-scale, short-stay tourism, especially from Germany, to formerly closed-off countries such as the Czech Republic. Although, the overwhelming demand was initially for urban destinations, such as Prague, rural tourism made sense since Eastern Europe is generally more rural than Western Europe (in terms of levels of urbanisation, and socio-cultural characteristics). Rural areas in the East should be able to offer an appealing product to the West if appropriately developed and promoted. Furthermore, rural areas were in dire need of regeneration and means to operate in a market economy.

**Rural diversification of under-developed areas**

In developing countries, the language of policy-makers focuses more on *diversification* than regeneration of the rural economy. In this context, the problem is not so much the structural collapse of agriculture, but the insufficiency of agricultural livelihoods, and the search for new sources of growth and economic opportunity. Smallholder farming is facing growing constraints.

In this context, tourism is promoted as a new activity, which is supplementary to agriculture. Although building on existing assets where possible, it is not a matter of simply switching existing infrastructure to a new purpose. New assets and infrastructure are invariably needed. Tourism is a means of bringing the concomitants of economic development (infrastructure, communications, services) to an under-developed area. There are of course some rural areas that have already been transformed into ‘destinations’, sometimes involving depopulation of large parts in the process: e.g. in Africa, the Massai-Mara in Kenya, the Ngorongoro Crater in Tanzania, the Okavango Delta in Botswana and Kruger National Park in South Africa are well-known examples.

*(The First author is Ph.D Research Scholar and the Second author is Associate Professor, PG & Research Department of Economics, Urumu Dhanalakshmi CollegeTrichy-19, e-mail: tprakash1973@sify.com)*
ENLARGING THE POTENTIAL OF RURAL TOURISM IN INDIA

Barna Maulick

Rural tourism can be harnessed as a strategy for rural development. The development of a strong platform around the concept of rural tourism is definitely useful for a country like India where almost 74 percent of the population resides in its 7 million villages.

The scheme of rural tourism was started in 2002-03 with the objective of highlighting rural life, art, culture and heritage at rural locations and in villages which have core competence in art, craft, handloom, textiles and natural environment. The intention is to benefit the local community economically and socially as well as to enable interaction between tourists and local population for a mutually enriching experience. The promotion of village tourism is also aimed towards generating revenue for rural communities through tourist visits, which may stop exodus from rural to urban areas.

According to World Tourism Organization, “The concept of sustainable tourism development is that which meets the needs of present tourist and host regions while protecting and enhancing opportunities for the future. It is envisaged as leading to the management of all resources in such a way that economic, social and aesthetic needs can be fulfilled while maintaining cultural integrity, essential for ecological process, biological diversity and supporting system.”

Although tourism has started receiving some attention from last decade, but rural tourism was never given priority. Worldwide tourism is ranked as the second highest revenue generating industry next to oil industry. So, the country must differentiate between different types of tourists so that the purpose of visit could be understood and analysed.
The foreign tourists’ arrival (FTA) in India increased from 4.43 million in 2006 to 5.78 million in 2010. Tourism continues to play an important role as foreign exchange earner for the country. In 2010, foreign exchange earnings (FEE) from the tourism were US $ 14.19 billion as compared to US $ 11.39 billion in 2009, registering a growth of 24.6 percent.

<table>
<thead>
<tr>
<th>Year</th>
<th>FTAs in India (in lakh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1981</td>
<td>12.79 (2.0)</td>
</tr>
<tr>
<td>1991</td>
<td>16.78 (-1.7)</td>
</tr>
<tr>
<td>2001</td>
<td>25.37 (-4.2)</td>
</tr>
<tr>
<td>2002</td>
<td>23.84 (-6.0)</td>
</tr>
<tr>
<td>2003</td>
<td>27.26 (14.3)</td>
</tr>
<tr>
<td>2004</td>
<td>34.57 (26.8)</td>
</tr>
<tr>
<td>2005</td>
<td>39.19 (13.3)</td>
</tr>
<tr>
<td>2006</td>
<td>44.47 (13.5)</td>
</tr>
<tr>
<td>2007</td>
<td>50.82 (14.3)</td>
</tr>
<tr>
<td>2008</td>
<td>52.83 (4.0)</td>
</tr>
<tr>
<td>2009</td>
<td>51.68 (-2.2)</td>
</tr>
<tr>
<td>2010</td>
<td>57.76 (11.8)</td>
</tr>
</tbody>
</table>

Note: Figures in the parentheses denote percentage of annual growth.

In the last decade there has been remarkable increase in the arrival of foreign tourists.

Therefore, rural tourism has great potential and can earn high revenue in near future. The economic quality of a region is due its own resources to produce a gross income, which can provide high levels of consumption and accumulation in the region for a long time. The ecological quality of a regional development is the ability of the region to maintain its natural resource potential and high qualities of environment during a long period of time. Thus, tourism depends upon human, it has to respond to the needs of the tourists, needs of the local communities, be socio-economic and culturally well planned and environmentally sound. Thus basic cultural identity of these people should not be adversely affected. So the rural tourism aims at:

- Improve the quality of life of the rural people
- Provide good experience to the tourists
- Maintain the quality of environment that is essential for both tourists and the local community

**Infrastructural Development is needed for Rural Tourism:** Rural tourism can be harnessed as a strategy for rural development. The development of a strong platform around the concept of rural tourism is definitely useful for a country like India where almost 74 percent of the population resides in its 7 million villages. The trends of industrialization and development have had an urban centric approach across the world. Along with this, the stresses of urban life styles have led to a counter urbanization syndrome. This has led to growing interest in rural areas. On the other hand, the growing trend of urbanization has led to falling...
of income levels, lesser job opportunities leading to desertion of villages. Rural tourism could be a solution to this. Along with this, increasing level of awareness, growing interest in heritage and culture and improved accessibility and environmental consciousness is also increasing the importance of rural tourism. In the developed countries, this has resulted in a new style of tourism of visiting village settings to experience and live relaxed and healthy life style.

Therefore, to promote village tourism as primary tourism product and to spread tourism’s socio-economic benefits to rural and new geographic regions, key geographic regions would be identified for development of rural tourism. The implementation would be done through a convergence committee headed by the district collector. Apart from financial assistance, the focus would be to tap the resources available under different schemes of Ministry of Rural Development, State Governments and other Ministries/Departments of the Government of India.

**Challenges in rural tourism**

The major challenges are need to preserve the environment and natural resources, the need for education, proper understanding for both tourists and local people, and the need to generate a democratic movement which helps people at all levels to participate in tourism development.

Also they need to focus on occupation training, handicraft promotion, and improvement of both the landscape and the basic infrastructure, to increase the villagers’ quality of life by creating a healthy environment. The cooperative system in rural tourism can be an effective approach in bringing positive impact in rural areas. Local people can monitor and control the negative impacts of tourism on their own society, if they have an equal stake and authority in management and development.

**Along with these challenges, there are**

**Lack of Trained Manpower** - People trained in hotel management would not like to go to the rural areas so it will have to depend on rural people who are required to be trained to cater to the needs of the tourists. To attract different type of tourist, whether it is a nature tourism, health tourism or agro tourism, everyone expects quality service at right time. Government can start short term monthly courses to develop the manpower to carry on all the duties efficiently.

**Insufficient Financial Support** - Government has just started promoting rural tourism. Central and State government should encourage rural tourism by providing financial support to start the project. It will create employment in rural areas and will also help in flow of fund from urban to rural. It can help in preventing the migration of people from rural area to urban areas. Sufficient financial support is required for essential developments like human resource, enforcement of rules and regulations, building of physical infrastructures, and land use management.

**Lack of Local Involvement** - Since the rural people lack knowledge and skills, they may get the jobs of unskilled worker. The basic concept behind rural tourism is to emphasize on participation of rural people. But in practice local people are seldom involved in decision making, planning and implementing policies. Most of the rural people do not have much knowledge of tourism, and are misled by outside investors who hope to take most of the economic benefits from rural areas. Consequently, local people become confused about what kind of tourism they want to establish in their own area.

**Illiterate Population** - Vast majority of the rural populations are uneducated and illiterate so they are bounded by the traditional values and customs. Their culture, religion, superstition have a strong influence on their attitudes and behaviors. They follow a slow life style pattern and like to stick to their traditional jobs whether they are remunerative or not and are not interested to take up risk. But after globalization even the rural economy has been affected by the growth dynamism, the media is playing an important role in changing the mindset of the rural consumer. Through television they got exposure to different products and
services. They are exposed to different technology provided through government or non-government initiatives. For development of rural tourism rural people need to understand the urbanites.

**Lack of Communication Skills**- Language and education is the basic hindrance in communication. The ability to communicate effectively is very essential. Much of success will depend on your ability to give warm welcome to tourists. After seeing a historic site or buildings if tourist generates some interest to know more and if there is no one to answer those questions, it will create negative impacts. Villagers will have to understand the tourist wants and needs. There should not be any communication gap between the guest and the host.

**Lack of Proper Physical Infrastructures**- Nearly half of the villages in the country do not have all weather roads. Just getting to some of these villages is very difficult task. In northeast states, like Assam landscape is very beautiful, but due to heavy rainfall it is inaccessible for developing tourism especially during rainy season. For developing tourism in rural areas, not only all-weather roads but also safe drinking water, electricity, telephone, safety and security, etc. are needed.

**Lack of Basic Education**- The rural literacy is 69 percent as per the Census report 2011 while it was 59 percent in 2001 and 44 percent in 1991 in rural India. Continuously, through six decades the rural literacy rate in India is below the average. According to 2011 census, while the urban literacy rate is 84.97 percent and total literacy rate is 74.04 percent, the rural literacy rate is still below the average. Therefore, lack of basic education in rural areas is a major hindrance in rural tourism.

**Language Hindrance**- There are 16 recognized languages and 850 dialects in India. Although Hindi is an official language, but in many parts of India people do not understand it. Either the rural people have to upgrade themselves to communicate with the tourists or they will not get much benefit from the rural tourism. Along with this, villagers will have to understand Hindi to interact with the Indian customers and English to communicate with the foreign customers.

**Business Planning Skills**- For any business, technical knowledge and skill is required to organize and maintain it. With the help of government or non-government organization, business plan could be prepared. But, the villagers should participate in developing and implementing the project on rural tourism, otherwise it will not give much benefit to the rural people. Advertisement and sales promotion will play a very important role in creating awareness and attracting the customers. It can also be promoted through print media, brochures, public relations etc.

**Trained Tourist Guide**- The guide plays a very important role in attracting tourists. The guide should have thorough knowledge about the place and he or she should able to generate interest in the mind of tourist to visit the site. The guide can show the album, video film, brochure to give knowledge about the places. The guide should be intelligent to handle different type of tourist and should have good communication skill and good rapport building attitude. Department of Tourism can select and train the guide and then provide the license.

India is a multi-dimensional country with a variety of tourist attractions and facilities. India’s rich, religious and cultural past has created distinctive architectural styles, temple towns and famous monuments. The stunning beaches that cover India’s vast coast line and India’s mountains offer unique experience to rejuvenate. Tourism is one of the highest revenue earning sectors of India and rural tourism which has been neglected so far has a vast potential in itself. Rural India has rich traditions of art, craft and culture along with the pollution free environment. Therefore, the rural tourism has the capacity of attracting both foreign and domestic tourists. Rural tourism projects in India have 310 million domestic tourist potentialities.

*The author is Research Scholar, Patna University, and Research Associate in Centre for Economic Policy and Public Finance (a research wing of the Department of Finance, Government of Bihar), Asian Development Research Institute, Patna, e-mail: barnaganguli@yahoo.in*
Tourism has emerged as one of the world’s largest service industries with sizable economic benefits. With the emergence of e-commerce, innovations and technological advancements, demographic changes and the deregulation of airline industry, the travel and tourism is spontaneously contributing to improve (GDP) Gross Domestic Product and creation of jobs across the world economy. This has led to the improvement of other related industries especially transportation, construction and retail etc. The WTTC (World Travel and Tourism Council) estimates that the travel and tourism sector now accounts for 9.9% of global GDP (World Economic forum, 2008). In addition, world tourism is the world’s largest employer, generating 231 million jobs, or nearly one out of every 12 jobs globally (WTTC, 2009). This booming tourism industry is emerging as an important driver of growth and prosperity, employment generation, raises national income and improvement in balance of payments.

Tourism and rural economy of Himachal Pradesh

The economy of the state of Himachal Pradesh is based on agriculture, horticulture, forests and hydel power. The agro-horticulture produce based industries, wool based industries, sericulture and herbal based industries are the main industries of the state of Himachal Pradesh. The numerous researches in the past have indicated that the wider participation of local communities in tourism policy making can enhance the local level democracy which is widely associated with sustainable tourism development in general and ecotourism in particular. The local communities have a significant role in the development of tourism activities and the conservation of natural resources. The involvement of local communities in tourism development can help in creating a sustainable and responsible tourism model. The local communities can be involved in the decision-making process, which ensures that their cultural and environmental values are preserved while promoting tourism. This can lead to a win-win situation where both tourism and the local communities benefit.

Dr. Jai Singh Parmar
Residents play a vital role in tourism development because they have considerable direct experience of the impact of tourism in their respective areas because they are considered as potential custodians of their home area. For the last few years, the World Tourism Organization (WTO) has recognized the importance of rural tourism. Rural tourism comprises especially outdoor sport tourism, agro tourism, ecotourism, adventure tourism, cultural tourism etc. Tourism as a nontraditional rural development strategy provide ample opportunities for entrepreneurship on the one hand and on the other locally developed small scale tourism can be less costly than other developmental strategies such as manufacturing.

Rural areas are growing as the main tourist centers in the state of Himachal Pradesh because they have experienced a decline in traditional industries over the last few decades. To diversify their economies, rural economies have begun to adopt new economic strategies that build on their natural and cultural resources. Hence, tourism has been considered as a vehicle of economic development and promoted as an effective source of income and employment in rural areas of the state of Himachal Pradesh. These rural areas in the state have a great potential to attract tourists who are in search of authentic natural and cultural resources. The promotion of tourism has been a pillar of the economy of the state of Himachal Pradesh for many years. The overseas visitors have shown an increase over the years.

### Table 1: District-wise tourist inflow in Himachal Pradesh (2008-2010)

<table>
<thead>
<tr>
<th>District</th>
<th>Year</th>
<th>Indian</th>
<th>Foreigner</th>
<th>Total</th>
<th>Indian</th>
<th>Foreigner</th>
<th>Total</th>
<th>Indian</th>
<th>Foreigner</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bilaspur</td>
<td>683761 (7.30)</td>
<td>190 (0.05)</td>
<td>683951</td>
<td>886495 (8.03)</td>
<td>170 (0.04)</td>
<td>886665</td>
<td>962061 (7.50)</td>
<td>86 (0.02)</td>
<td>922147</td>
<td></td>
</tr>
<tr>
<td>Chamba</td>
<td>644309 (6.87)</td>
<td>3953 (1.05)</td>
<td>648262</td>
<td>686136 (6.22)</td>
<td>3353 (0.84)</td>
<td>689489</td>
<td>786163 (6.12)</td>
<td>3253 (0.72)</td>
<td>789416</td>
<td></td>
</tr>
<tr>
<td>Hamirpur</td>
<td>279745 (2.98)</td>
<td>53 (0.01)</td>
<td>279798</td>
<td>432433 (3.92)</td>
<td>34 (0.01)</td>
<td>432467</td>
<td>554970 (4.33)</td>
<td>12 (0.003)</td>
<td>554982</td>
<td></td>
</tr>
<tr>
<td>Kangra</td>
<td>1275155 (13.61)</td>
<td>70819 (18.80)</td>
<td>1345964</td>
<td>1403963 (12.72)</td>
<td>75549 (18.86)</td>
<td>1479512</td>
<td>1631232 (12.73)</td>
<td>91709 (20.22)</td>
<td>1722941</td>
<td></td>
</tr>
<tr>
<td>Kinnaur</td>
<td>147754 (1.58)</td>
<td>20773 (5.51)</td>
<td>168527</td>
<td>2224649 (20.16)</td>
<td>119514 (27.84)</td>
<td>2344163</td>
<td>2395990 (18.70)</td>
<td>133707 (29.48)</td>
<td>2529697</td>
<td></td>
</tr>
<tr>
<td>Kullu</td>
<td>2001674 (21.36)</td>
<td>112910 (29.97)</td>
<td>2114584</td>
<td>2224649 (20.16)</td>
<td>119514 (27.84)</td>
<td>2344163</td>
<td>2395990 (18.70)</td>
<td>133707 (29.48)</td>
<td>2529697</td>
<td></td>
</tr>
<tr>
<td>Lahaul Spiti</td>
<td>172931 (1.85)</td>
<td>41398 (10.99)</td>
<td>214329</td>
<td>251415 (2.28)</td>
<td>65101 (16.25)</td>
<td>316516</td>
<td>362660 (2.83)</td>
<td>59125 (13.03)</td>
<td>421785</td>
<td></td>
</tr>
<tr>
<td>Mandi</td>
<td>603086 (6.43)</td>
<td>9154 (2.43)</td>
<td>612248</td>
<td>869904 (7.88)</td>
<td>8070 (2.01)</td>
<td>877974</td>
<td>1006418 (7.86)</td>
<td>10485 (2.31)</td>
<td>1016903</td>
<td></td>
</tr>
<tr>
<td>Shimla</td>
<td>2061539 (21.99)</td>
<td>112917 (29.97)</td>
<td>2174456</td>
<td>2175314 (19.71)</td>
<td>108981 (27.21)</td>
<td>2284295</td>
<td>2485564 (19.40)</td>
<td>127737 (28.16)</td>
<td>2613301</td>
<td></td>
</tr>
<tr>
<td>Sirmaur</td>
<td>575798 (6.14)</td>
<td>1785 (0.47)</td>
<td>577583</td>
<td>653668 (5.92)</td>
<td>2090 (0.52)</td>
<td>655758</td>
<td>748599 (5.84)</td>
<td>2712 (0.60)</td>
<td>787311</td>
<td></td>
</tr>
<tr>
<td>Solan</td>
<td>480125 (5.12)</td>
<td>2693 (0.71)</td>
<td>482818</td>
<td>586388 (5.31)</td>
<td>3811 (0.95)</td>
<td>590199</td>
<td>673932 (5.26)</td>
<td>5780 (1.27)</td>
<td>679712</td>
<td></td>
</tr>
<tr>
<td>Una</td>
<td>446820 (4.77)</td>
<td>91 (0.02)</td>
<td>446911</td>
<td>594920 (5.39)</td>
<td>99 (0.03)</td>
<td>595019</td>
<td>819461 (6.40)</td>
<td>268 (0.06)</td>
<td>819729</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>9372697 (100.00)</td>
<td>376378 (100.00)</td>
<td>9744433</td>
<td>11036572 (100.00)</td>
<td>400583 (100.00)</td>
<td>11437155</td>
<td>12811986 (100.00)</td>
<td>453616 (100.00)</td>
<td>13265602</td>
<td></td>
</tr>
</tbody>
</table>

Source: Directorate of Tourism and Civil Aviation, Government of Himachal Pradesh. (Figures in parentheses denote percentages to the column totals)
demonstrated sustained growth in international tourist arrivals between 2000-2011. However, the historical data reveals great fluctuations in the number of international arrivals, which are sensitive to international events. Hence, the policy makers should understand the volatility of overseas tourist arrivals and find ways and means to stabilize the economy and society in addition to improving the development of the industry.

**Trend of tourist inflow**

For the last few years, Himachal Pradesh is emerging as a favorite destinations for the tourists both domestic as well as foreigners. The number of visitors are increasing over the years and the state government is working over the ‘20 Year Tourism Master Plan’ to attract more and more tourists. With the growth rate of over 13% in tourist arrival, the tourism industry is emerging as a major contributor to the gross state domestic product (GSDP) for the years to come. Early 1.50 crore tourist visited in the state during 2011, as against 1.32 crore in 2010 with an increase of 13.74%.

**The new policy initiative and action area**

The growing tourism industry is emerging as an engine to economic growth in the rural areas of Himachal Pradesh. In order to diversify tourism activities with a view to promoting rural tourism, the government of Himachal Pradesh has launched a new initiative “Har Gaon Ki Kahani” to exploit the tourism potential of the villages which have rich historical significance. In these selected villages the focus should be on the promotion of local culture and hospitality by providing basic amenities and other requisite infrastructure so that the villages can be benefited with an employment and additional income. The tourism department need to link these villages with main destinations so that the tourists keen to have a peep into the rural lifestyle can visit these places. In order to link these villages to the popular tourist destinations the government need to create infrastructure like pathways, restoration of natural water sources and other developmental works in these selected villages. Further, in order to give a new dimension to rural tourism, the government should work out a effective plan for conserving and preserving the cultural heritage. The ancient glory of temples, museums, heritage and historical buildings and places need to be restored.

Considering the immense potential of tourism in the state, the government needs to develop efficient strategies to exploit new unexploited areas in such a manner where the local community
is involved and benefit accrue to the people of the area. The public involvement in tourism related developmental activities is necessary so that the local community and the villagers realized the importance and benefits from tourism related activities.

The forest rest houses, mostly which are located in the rural and interior areas should be developed properly so that eco-tourism activities can be effectively started. The staff employed in these guest houses should be upgraded with the requisite skills to serve the hospitality sector and to manage professionally these rest houses.

Adequate accommodation and catering management need to be strengthened in various tourist destinations. More tourism reception centers need to be identified and organized with the objectives to cater the budget and high class tourists travelling by road to visit different locations. These tourism reception centers should provide beverages, food items and snacks at the restaurants at reasonable prices to the tourists.

[Dr. J.S. Parmar is Associate Professor, Himachal Pradesh University Business School, Summer Hill, Shimla-]
India’s tourism industry is experiencing a strong period of growth in high spending foreign tourists, and coordinated government campaigns to promote ‘Incredible India’. Tourism is termed as an instrument for employment generation, poverty alleviation and sustainable human development. Promotion of Agri-Tourism needs conceptual convergence with Rural Tourism, Eco-Tourism, Health Tourism, Adventure Tourism and culinary adventure.

Agri tourism or agricultural tourism, is one alternative for improving the incomes and potential economic viability of small farms and rural communities. India is an agriculture country and most of its people live in villages.

Present concept of travel and tourism is limited to urban and rich class which constitutes only a small portion of the population. However, the concept of Agri tourism takes travel and tourism to the larger population, widening the scope of tourism due to its cost effectiveness.

A novel concept of additional revenue is by developing farms into vacation ventures with hospitality facilities. Agritourism is the concept of visiting a working farm or any agricultural, horticultural, or agribusiness operations for the purpose of enjoyment, education, or active involvement in the activities of the farm or operation. In general Agri Tourism is the practice of attracting visitors to an area used primarily for agricultural purposes.
It could be described as - **Rural/Agricultural Environments + Farm Commodities + Tourism Services = Agri tourism**

Agri tourism or agricultural tourism is one alternative for improving the incomes and potential economic viability of small farms and rural communities. India is an agriculture country and most of its people live in villages. A village is a collection of small huts in the midst of fields on which the village farmers work. Some villages are big, while others are comparatively smaller. They are generally cut off from the cities and have a different kind of life. As we rise early in the morning, we can listen to the sweet songs of birds. We can enjoy the beauty of the rising sun and the sweet breeze of the greenery of fields around, are the various pleasures that abound in the countryside. The villagers live a healthy, peaceful life. Establishment of Agri tourism units will promote livelihood security through improving the diversity and security of resources, skills and technologies that are available to agricultural communities. It will help to achieve income, employment and economic stability in rural communities in India. It would help boosting a range of activities, services and amenities provided by farmers and rural people to attract urban tourists to their area thus provide opportunity for urban people to get back to the roots. The promoting and showcasing the culture of the Agriculture and Rural families of different states in India will help the agriculturist (Farmers) earn the well-deserved respect in addition to the supplementary income to his family and introduce this concept of Agri tourism to the Urban Citizens as an, Educational and Recreational, Entertainment opportunities.

**Present status in India:**

Agro tourism is considered as the fastest growing sector in the tourism industry. The concept has been successfully implemented in states like Maharashtra, Kerala, Rajasthan, Jharkhand, Gujarat and Himachal Pradesh. It has become a new avenue for earning the income for the rural farmers.

In Maharashtra, rural areas have formed an organization named Maharashtra State Agri and Rural Tourism (MART). There are about 150 Agri tourism centers in the state working without financial assistance of the government schemes. In Kerala, the government has played a key role in boosting up the rural and health tourism. Rajasthan is one of the preferred ventures to attract the foreign visitors. In Himachal Pradesh, the state government is motivating promoting the rural people to create required facilities in rural areas for tourism purpose.

**Features of Agri tourism:**

The establishment of Agri tourism units in the heart of India i.e. in rural places will have an impact on upliftment of socio-economic and livelihood status of the farmers. It will provide opportunities for-

a. Conservation of plant biodiversity
b. Conservation of forest areas
c. Generation of additional revenue
d. Bringing economic diversity
e. Relationship building
f. Improve understanding of local farmers and their families
g. Upliftment of traditional business
h. Improving socio-economic status of farmers
i. Make a positive contribution
j. Promote local development
k. Increase environmental awareness
l. Provide visitors with personal experience of nature and culture

**Scope of Agri tourism:**

*Affection with rural life style*

The urban population having roots in villages always has curiosity to learn about sources of food, plants, animals, raw materials like wood, handicrafts, languages, culture, tradition, dresses and rural lifestyle. Agri tourism which revolves around farmers, villages and agriculture has the capacity to satisfy the curiosity of this segment of population.

*Least expense approach*
The cost of food, accommodation, recreation and travel is least in Agri tourism. This widens the tourist base. Present concept of travel and tourism is limited to urban and rich class which constitutes only a small portion of the population. However, the concept of Agri tourism takes travel and tourism to the larger population, widening the scope of tourism due to its cost effectiveness.

**Bonding with the farming culture**

Cities are growing at the cost of villages. Villagers are migrating to cities in search of jobs and to seek the comforts of modern life. Any opportunity to visit villages and spend time with family is dream of any urbanite. But, minimum decent facilities are always problem. Agri-Tourism helps to overcome this problem.

**Components of Agri tourism**

“Seeing is believing, doing is learning.” This experience based concept is the nerve of Agri tourism. Agricultural environment around farmers and the entire production process could create curiosity among urban life. Agro tourism is a knowledge intensive sustainable way of tourism which combines the pleasure of tourism along with learning experiences of areas of agricultural aspects. Agro tourism includes having people pay to visit or stay on the farm to experience the rural life and learn about different farming activities.

Places of agricultural importance like highest crop yielding farm, highest animal yielding farm, processing units, farms where innovations tried add attraction to the tourists. Agricultural products like farm gate fresh market, processed foods, organic food could lure the urban tourists. As result of this agricatmosphere in the villages, there is scope to develop Agritourism areas like agri-shopping, culinary tourism, pick and own your tree/plot, biodiversity park, various models of watershed development, models of soil-water conservations, rain water harvesting, nursery management (ornamental, medicinal, fruit crop, vegetable crop), spice garden, fruit processing units, small poultry unit, apiculture unit, sericulture unit, bed and breakfast, pick and pay, bullock cart riding, camel riding, boating, fishing, herbal walk, rural games and health (ayurvedic) tourism.

For better enjoyment, group of members can spend some time on the farm while lodging and camping programs for special purpose could be arranged under the sole theme as follows-

- Youth camp
- Farm vacation (farm stays, feeding animals, picking fruit/vegetables)
- Day trips/picnics
- Weddings, receptions, honeymoons
- Special events and festivals
  - Music festivals
  - Holiday celebrations
  - Camp fire
  - Harvest festivals
  - Rural Festivals/ Jatra

**Daily activities in the agriculture farm:**

1. Animal Feeding
2. Guided Crop /Vegetables / Fruits farms visits and tours
3. Watching domestic animals and How to care for cattle
4. U-Pick Operations
5. Harvest festivals
6. Milking the Cow
8. Agricultural education programs: how to grow cereals, fruits, vegetables etc.

**Off the farm visits :**

- Farmers’ markets at tahsil place
- Tahsil Milk Collection centers
- Roadside produce stands
- Religious Temples Visits etc.
Free facilities:

*Rural Games, Bicycle Rides, Bullock Cart Ride, Tractor Ride, Farm Tours, Bird watching and jungle trek, Local Site Seeing, Evening Entertainment programs like rural folk dance, music, campfire & lot of fun filled games.*

Agro tourism Resources:

1) Natural resources
   - Wildlife
   - Water
   - Vegetation
   - Flora and fauna
   - Climate
   - Landscape

2) Built cultural resources
   - Industrial heritage
   - Ancient monument
   - Religious building

3) Agro tourism event resources
   - Sport
   - Historical
   - Cultural

Customer or visitors satisfaction depends on:
1. Listening, understanding and responding to Customers
2. Providing Superior quality facilities.
3. Requires caring, friendly people to deliver it.
4. Appropriate timeline.
5. When unexpected surprises occur, effective problem resolution is required
6. Creation of friendly environment
7. To understand guests needs, gather their opinions and comments, most importantly, to assess guests’ satisfaction with services provided.

Benefits for Communities

From a community perspective, Agri tourism can be a vehicle for-
   - Generating additional revenue for local businesses and services from tourists;
   - Increasing protection of rural landscapes and natural environments for tourists and residents;
   - Helping preserve and revitalize local traditions, art and craft;
   - Promoting inter-regional, inter-cultural communication and understanding;
   - Increasing awareness of agricultural issues and values among the public;
   - Promoting the on-going use of local agricultural products and services;
   - Helping to diversify and strengthen the rural economy via job and income creation; and
   - Providing a more energetic business environment for attracting other businesses and small industries.

Benefits -

For Tourist
- Safe and pleasant travel
- Free from fear and stress
- True and friendly interactions
- Contentment
- Rich and complete feeling
- Warmth and genuine welcome

For Locals
- Cultural exchange
- Empowerment
- Awareness
- Community Bonding

Impact of Agro tourism:

Economic impact:

- Income from entrance fees and direct payment for access right.
- Income from associated value added services.
- Development of related economic sector e.g. Sustainable agriculture and forestry.
- Increase local land values.
- Increase foreign exchange where tourism is dominated by foreign national.

Social Impact:

- Training and skills development for provision of economic services.
Education- primary schools/environmental education.
Healthcare- clinics/ visiting doctors, nurses offered by tour operators.
Improved local infrastructure communications/transport.
Increased social capital–building local organizational and managerial capacity.

Environmental impact:
Protection and conservation of environment.
Improved resource management practices.
Increased multi-stakeholder will to conserve at landscape level.
Conservation of Biodiversity.

Conclusion
Agri tourism can be an effective tool and technique to educate consumers about local agriculture. Agri tourism also showcases the diversity and uniqueness of local agriculture, thereby increasing the visibility and the appeal of locally grown products. Hence the opportunities in this sector can boost the rural economy. Promotion of Agri tourism requires conceptual convergence like other tourisms e.g. rural tourism, eco tourism, adventure tourism for better growth.

(N B Ubale is Research Scholar, Department of Fruits and Orchard Management, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Dist-Nadia, West Bengal and H V Borate is Assistant Professor, Department of Agriculture Extension, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Dist-Ratnagiri, Maharashtra, e-mail: ubalenb@rediffmail.com)

SUBSCRIPTION COUPON
(For New Membership/Renewal/Change in Address)

I want to subscribe to_________________________________________(Journal's name & language) for

1 yr. for Rs. 100/-       2 yrs for Rs. 180/-       3 yrs. for Rs. 250/-

DD/IPO/MO No. ________________________________________________Date____________________

Name (in block letters) _______________________________________

Address ____________________________________________________________

PIN □ □ □ □ □ □

Note: For Renewal/change in address-please quote your Subscription No.
Please allow 8 to 10 weeks for the despatch of the 1st issue.
Alternative Learning Systems

Admission Notice for IAS 2012-13
at North & South Delhi Centre

In the past nine years, ALS is credited to have illuminated the career graph of 2 IAS toppers, 42 rankers in top 20, 98 in top 50 and altogether 1215 successful Candidates.

20th Anniversary Celebration offer

Avail Special discount of ₹ 35,000 on joining General Studies & CSAT along with an Optional subject and also get ALS Privileged Card worth ₹ 5000. This offer is valid only till May 28, 2012.

We offer the Most Meticulously Designed Classroom Package in

Geography

By Shashank Atom
& Jojo Mathew

North Delhi: 12 June
South Delhi: 5 June & 12 June

Public Admn

By D M Ravi Kumar
(Renowned faculty from Hyderabad)
A Srivastava, Manish Gautam & other Experts

North Delhi: 11:15am-1:45pm
South Delhi: 07:00am-9:30am

History

By Y D MISRA
K Krishna Reddy

Sociology

Ranjana Subberwal

Batches Begin: 12 June
at North and South Delhi Centre

Strategist

GS

GS Main 2012
North Delhi: 19 June (02:30pm-05:00pm)
South Delhi: 19 June (07:30am-10:00am)

GS Strategist + CSAT
North Delhi: 01 Aug (07:30am-10:00am)
South Delhi: 05 Oct (06:15pm-08:45pm)

GS Current Affairs Crash Course
7 days after PT result

CSAT 2012-13: 05 Sept (11:00am-01:00pm)

Samaanya Adhyayan

Vach Prarambh
10 July & 10 Aug (11:00am-01:30pm)
10 Sep & 10 Oct (08:00am-11:00am)

ALS Main Test Series Programme 2012
Subjects Offered:
GS, Geography, Public Admn
10 June

IMPORTANT
Registration & Admission Dates
April 24 to May 28

For Registration: Please deposit ₹15,000 as a Registration fee through cash or DD in favour of Alternative Learning Systems Pvt Ltd. Balance should be paid on or before June 05. You can also deposit full fee through DD/Cash.

Alternative Learning Systems (P) Ltd.
Corporate Office: B-19, ALS House, Commercial Complex, Dr Mukherjee Nagar, Delhi-09
South Delhi Centre: 62/4, Ber Sarai, Delhi-16
9999343999, 9910602288, 9810312454, 9810269612

We are in touch...
Manoj K Singh
Managing Director, ALS
Email: manoj@alslearning.in

Kurukshetra May 2012
India still breathes in villages and this becomes obvious when the fact is taken into consideration that more than 700 million of its population reside in about 636 thousand villages of this country; but even after sixty years of independence, rural India is characterised by severe poverty, illiteracy, lack of health services, lack of employment opportunities and overall backwardness. Rural areas are often regarded as information-poor and information provision has always been a central component of rural development initiatives. Keeping in view these predominant features of rural India – Information and Communication Technology (ICT) has earned its reputation to be the key to information-flow for intensifying the development efforts in rural India and is being considered as an imperative strategy for achieving the goal of sustainable rural development. To empower the rural communities with a sustainable approach, ICT has been one of the most effective instruments and the following table provides a better insight to this fact.
ICT and Sustainable Rural Growth

**Strengthening Rural Governance:** Introduction of ICTs in rural India is expected to bring in changes in the whole process of rural governance by improving transparency, accountability and administrative efficiency of rural institutions, promoting participation of the poor in decision-making processes and improving the efficiency and responsiveness of rural service delivery. It can facilitate speedy, transparent, accountable, efficient and effective interaction between rural citizens - this not only promotes better administration but also saves time and transactions costs of government operations. At the same time, ICT improves interaction with and within civil society and encourages civil society participation in the rural governing process.

**Encouraging social transformation:** Access to information is of fundamental importance to any development process. The recent development of ICT is greatly facilitating the flow of information and knowledge, beyond the border of social and economic status. In this context, ICTs are now widely recognized as a critical tool to tackle development issues in developing countries which ultimately lead to social transformation.

**Ensuring A Better Quality of Life:** Application of ICT has the potential to improve living standards of people in remote and rural areas by providing important commercial, social and educational benefits. By expanding the use of government services – ICT strengthens the livelihood opportunities for rural India. ICT can ensure a better quality of life for the rural poor with an improved access to markets, health, and education – which pushes rural India towards economic development, job-creation and poverty-alleviation.

**Strengthening the Information-base of rural communities:** ICT initiatives may be designed to provide support to local governance as well as to react to the queries generated by local needs of the rural communities. As rural poor are often unaware of their rights, entitlements and the availability of various government schemes and extension services, ICT can also improve their access to the information they need. It has the potential to ensure improved provision of short-term information required by the rural poor for effective livelihood strategies.

**Intensifying Effort towards implementation of the rural development initiatives:** For ensuring effective implementation of the rural development programmes-ICT plays a crucial role through demand-driven information and communication services. It has the potential to increase the benefits and reduce the opportunity costs of people’s participation in the process of rural development. The potential of using ICT to promote rural development lies in addressing the information gaps and blockages by strengthening the decision-making capacity of the rural poor as well as the resource institutions of every rural community.

**Enhancing people’s participation in nation-building process:** The importance of communication in mobilizing people and seeking their willing participation in the development process of a country is well recognized. In India, this concern about reaching people, communicating with them and equipping them with new skills have been emphasized over and again in successive five year plans which provide the blue print of the country’s planned development. In a developing country like India—ICT is regarded as one of the key elements in modernizing agriculture, in producing healthy, literate and trained workers for industry and for bringing about effective participation in nation building activity. All these together contribute immensely for making rural development a reality.

In India, around 70% of its total population lives in the rural areas, they all have the right to acquire information; but it is almost impossible to expect that people at grass root level, living in rural areas, and those who have only elementary education, to participate actively in the world of information and communication which is solely based on computers and the Internet. Rural information systems have traditionally focused on supplying information to the rural poor and supplying information about rural areas to policy makers, but it is now recognised that past systems have been largely ineffective in addressing the needs of the rural poor. The extension of agricultural information in particular is evolving beyond merely transmitting messages. It is becoming more open, more participatory and more demand-driven, involving interactivity, negotiation and two-way information exchanges. There is a new emphasis on the acquisition of information and enabling the rural poor to request information
specific to their particular livelihood needs. Communication specialists increasingly recognise the enormous potential of ICT to support and enhance these changes. On the other hand, social scientist observed that access to required information is rightly proportionate with the rate of any integrated development, like rural development and ICT has been one of the major components and driving force for rural development.

The power of knowledge for development can be greatly enhanced by ICTs if they are harnessed to improve access and break down barriers to knowledge because while education develops cognitive skills, information gives content to knowledge. In this sense the use of ICTs is integral to realising the potential of collective knowledge as the technologies themselves represent tools for achieving development and not merely the rewards of it. ICT can be considered as a fundamental element of any rural development activity as it addresses the design, delivery and utilisation of community information systems which eventually guarantee empowerment of rural communities through addressing the following issues and agendas by:

- familiarising communities with their existing use and sources of information as well as with the gaps that exist between existing and desired information resources
- defining community information requirements based on needs and priorities that have been expressed by the communities themselves
- alerting communities to the potential application of information to their problem-solving efforts and to their development aspirations
- igniting community aspirations and empowering communities with appropriate skills for fostering local development that is information-based
- expanding a community’s social capital through enhanced access to communication facilities and information resources
- extending and intensifying existing development programmes that carry a significant potential for additional community benefit from enhanced information management capabilities that are based on ICT
- propelling communities towards the acquisition of the new knowledge they will require in order to exploit the power of ICT
- embedding community based ICT services within existing economic, governance and social structures

So, nowadays it has become imperative to use the print and broadcast media effectively in order not only to communicate messages of relevance and importance in the context of rural development but also to motivate and encourage the people of rural India to participate in the development process. Thus, in the current context of sustainable rural development, ICT has been recognized as a catalytic intervention in respect of transforming the lives and livelihoods of rural India.

The development of a society largely depends on the access to information and so far in rural India - ICT has greatly facilitated the flow of information and knowledge offering the socially-marginalised and unaware community unprecedented opportunities to attain their own entitlements. On the other hand, to break the vicious circle of rural poverty and to bridge the digital divide and empower the rural communities - ICT-intervention has proved its effectiveness in the sphere of capacity-building of rural communities for breaking these barriers. So, the government, technology industry and society should work together to deploy ICT to accelerate economic and social development in rural areas. Hence it may be concluded that an integrated framework for ICT interventions in rural areas will unquestionably pave the way towards sustainable rural growth.

(The author is Assistant Professor, Department of Social Work at Assam (Central) University, Silchar – 788 011, Assam, e-mail: anupam688@yahoo.co.in)
Modern world functions as a “throw away” society. The reduce, re-use, re-cycle slogan remains a mere rhetoric in a world that generates approximately 450 million tonnes of waste annually. With the emerging concern on large quantity of the waste being produced both in the form of solid and liquid waste, the concept of waste management becomes one of the key focus of sustainable development principles which is based on policies and practices. The quantities of solid wastes are increasing and if the wastes are disposed in an uncontrolled manner these may cause adverse impact on public health and environment. Hence these wastes need to be managed efficiently so as to safeguard public health and environment. In order to improve the quality of life of the rural population, environmental sanitation needs to be improved. The time has now come to move onward, to garner the benefits of other aspects of environmental cleanliness, and use the present momentum to achieve important milestones in a “Sanitation Plus” drive to holistic waste management in every village.

On the basis of crop production levels it is estimated that ten major crops (rice, wheat, sorghum, pearl millet, barley, finger millet, sugarcane, potato tubers and pluses) of India generate about 312.5 Mt of crop residues that have nutrient potential of about 6.46 Mt of plant nutrient.
Solid waste generation in Rural areas of India

In India especially in the rural areas, waste is a severe threat to the public health concern and cleanliness. Though, the form of waste (both solid and liquid) generated in rural areas is predominantly organic and biodegradable yet it has become a major problem to the overall sustainability of the ecological balance. It is estimated that rural people in India are generating solid waste (organic/recyclable) 0.3 to 0.4 million metric tons per day respectively. On the basis of crop production levels it is estimated that ten major crops (rice, wheat, sorghum, pearl millet, barley, finger millet, sugarcane, potato tubers and pluses) of India generate about 312.5 Mt of crop residues that have nutrient potential of about 6.46 Mt of plant nutrient. India produces around 33 million tonnes of fruits and 50 million tonnes of vegetables annually. It is estimated that roughly 10 to 15% of total produce is available either as residues or bio-degradable wastes for recycling in agriculture. The total dung production estimated to be 450 Mt including the dung available in Union Territories. Recently, the wastes that are not rotten easily, such as bottles, cans, plastics and polythene are increasing gradually in rural area which create big problem to manage them.

Impact on Rural Health

- Insect/mosquito breeding in stagnant water pools on waste sites and in canals and waterways blocked or constricted with waste resulting in the spread of disease
- There are significant health risks due to the existence of vermin, insects, flies and scavenging animals particularly to workers and neighbouring residents.
- Nuisance caused to the neighbourhood due to odour and flies

Objectives of Waste Management in Rural Areas

- To protect human health and improve quality of life among people living in rural areas
- To reduce environment pollution and make rural areas clean
- To promote recycling and reuse of solid waste
- To convert bio waste into organic manure which is nutrient source of agricultural and horticultural crop
- To generate employment for rural poor by offering new opportunities in waste management by adopting cost effective and environmentally sound solid waste treatment technologies

Types of Solid Waste

Solid waste can also be defined as the organic and inorganic waste materials produced by households, agricultural farm that have no economic value to the owner. Solid waste in rural areas generally includes-house sweeping, kitchen waste, garden waste, cattle dung and waste from cattle sheds, agricultural wastes, broken glass, metal, waste paper, plastic, cloths, rubber, waste from markets and shopping areas etc.

As per biodegradability, solid waste can be classified as:

**Biodegradable**: Waste that are completely decomposed by biological processes either in presence or in absence of air are called biodegradable e.g. kitchen waste, animal dung, agricultural waste etc.

**Non-biodegradable**: Waste which cannot be decomposed by biological processes is called non-biodegradable waste. These are of two types: i)
Recyclable: Wastes having economic values but destined for disposal can be recovered and reused along with their energy value e.g. plastic, paper, old cloth etc. ii) Non-recyclable: Waste which do not have economic value of recovery e.g. tetra packs, carbon paper, thermo coal etc.

Approaches for Solid Waste Management

The solid waste management is the collection, transport, processing, recycling or disposal of waste materials, usually ones produced by human activity, in an effort to reduce their effect on human health or local aesthetics or amenity. For effective management of solid waste in rural areas, focus should be on management at household level. That which cannot be managed at household level should be managed at the community level. In general, the following approach should be followed:

- Segregation of solid waste at the household level (Biodegradable and non biodegradable)
- Reuse of non biodegradable waste at the household level to the extent possible
- Household level treatment of bio degradable waste
- Collection and transportation of segregated waste at the household level to a place identified at the community level (in cases where household level treatment is not possible)
- Community level treatment or recycling/reuse of waste
- All the biodegradable waste should be composted at the community level
- Non biodegradable waste may be further segregated and sold or recycled
- Waste which cannot be composted, reused or recycled may be disposed at the landfill sites following appropriate procedure, (such waste may usually be construction waste, debris etc).

Composting as Technology option for Treatment of Biodegradable Waste

Composting is one of the options for treatment of organic waste. In composting process the organic matter breaks down under bacterial action resulting in the formation of humus like material called compost. The value of compost as manure depends on the quantity and quality of feed materials poured into the compost pit. Manure from composting gives better yield to farmers and it is also environment friendly. Bio degradable solid waste can be composted either in
compost pit or in a vermicompost pit. Various composting methods which are suitable to rural areas, are described below.

i) Pit method

The site selected for the compost pit should be near to cattle shed and water source at high level so that no rain water gets in during the monsoon season. A temporary shed may be constructed over it to protect the compost from heavy rainfall. The pit should be about 1 m deep, 1.5-2.0 m wide and of any suitable length. The material brought from the cattle shed is spread and on each layer is spread slurry of dung made with 4.5 kg urine earth and 4.5 kg of inoculums taken from a 15-day-old composting pit. A sufficient quantity of water (nearly 90%) is sprinkled over the material in the pit to wet it. The pit is filled in this way layer-by-layer and it should not take longer than 1 week to fill. Care should be taken to avoid compacting the material in any way. The material is turned 3 times during the whole period of composting (i) after 15 days from filling the pit, (ii) another 15 days , (iii) after another 30 days. At each turning the material is mixed thoroughly, moistened with water and replaced with the pit.

ii) Heap method

During rainy seasons or in regions with heavy rainfall the compost may be prepared in heaps above ground. The heap should be about 2 m wide at the base, 1.5 m high and 2 m long. The sides are tapered so that the top is about 0.5 m narrower in width than the base. A small bund is sometimes built around the pile to protect it from wind which tends to dry the heap. The heap is usually commenced with a 20 cm layer of carbonaceous material such as leaves, hay-straw, sawdust, wood chips and chopped corn stalks. This is then covered with the 10 cm of nitrogenous material such as fresh grass, weeds or garden plant residues, garbage, fresh or dry manure. The pattern of 20 cm carbonaceous material and 10 cm nitrogenous material is followed until the pile is 1.5 m high and they are normally wetted so that they feel damp but not soggy. The pile is sometimes covered with soil or hay to retain heat and is turned at 6 and 12-weeks-interval. Shredding the material speeds up decomposition considerably. Organic wastes materials can be shredded by running over it several times with a rotary-mower. When sufficient nitrogenous material is not available a green manure or leguminous crop like sunnhemp is grown on the fermenting heap by sowing seeds after the first turning. The green mater is then turned in at the second mixing. The process takes about four months to complete.

iii) Vermicomposting

Vermicomposting is a method of preparing compost with the use of earthworms. Decomposable organic wastes such as animal excreta, kitchen waste, farm residues and forest litter are commonly used as composting materials. In general, animal dung mostly cow dung and dried chopped crop residues
are the key raw materials. Mixture of leguminous and non-leguminous crop residues enriches the quality of vermicompost. Different species of earthworms viz. *Eisenia foetida* (Red earthworm), *Eudrilus eugeniae* (night crawler), *Perionyx excavatus* etc are used in vermicomposting. *Eisenia foetida* (Red earthworm) is mostly preferred because of its high multiplication rate and thereby converts the organic matter into vermicompost within 45-50 days.

### Reuse and Recycling of Non-Biodegradable Solid Waste

As explained earlier, efforts should be made to segregate the non-biodegradable solid waste into two portions namely a) recyclable and (b) non-recyclable at household as well as community level. Sorting out or segregation of paper, plastic, cloth, metal, glass etc may be done at the community level by the women self helps groups. Segregated waste need to be packed and stored in a safe place. The recyclable segregated wastes sell to the local recyclers when enough quantities accumulate.

**i) Recycling of Papers**

It is possible to convert waste paper into useful recyclable product. Making pulp from waste paper is an old art. The process has now been refined. Various articles including showpieces may be made using the pulp. The articles are so sturdy that they can be an alternative to wood to some extent. Hence it is also called Pep wood.

**ii) Recycling of Plastics**

In all types of solid waste in rural areas, plastics have become a major cause of concern due to: i) Non-biodegradability and Nuisance value in waste stream and blockage of drainage channels ii) Pollution of surface water iii) Random burning here and there causing air pollution problem and iv) There is no proper collection or disposal system of plastic waste. Individual house owner should segregate these wastes at household level. Segregated plastic waste need to be packed and stored in a safe place and sell to the local recyclers.

### Landfill

In spite of composting, re-use and recycling, some waste remains untreated/unmanaged which requires final disposal, either by incineration or by land filling. Incineration is a technology where waste is burnt in a specially engineered machine called incinerator. Incineration is not simply burning, but complete combustion. Incinerators are considered to be causes of air pollution. This is not a viable option for waste management. A landfill is a properly designated area and used for the disposal of non-biodegradable and non-recyclable inorganic solid waste. Landfill is considered to be a viable option. The non-recyclable inorganic waste could be disposed by secured land filling operation.

### Conclusion

The rural India has tremendous wealth in terms of underutilized crop residues, animal excretion and domestic refuge normally known as waste. A systematic management and utilization approach applying the recent innovations will only help in maintaining rural areas clean but will also provide sufficient energy, manure and raw material for many industries. The sustainable waste management technologies have brought about a positive change in the sanitation and hygiene behavioural changes in the rural people. But, we have a long way to go before we can attain a level of maturity in the areas of waste management in the rural areas.

*The author is Ph.D. Scholar, Division of Soil Science and Agricultural Chemistry, Indian Agricultural Research Institute, New Delhi-110012. email: pravashiari@gmail.com*
Admission Open

**Foundation Batch**

**Batch Starts 30 May**

Since Mains Examination’s schedule has been preponed this year by 20 days of its regular schedule, Chronicle has planned special comprehensive 3 months programme (1 June - 30 August) for GS, Public Administration & Sociology. Test series and writing skill development programme will start from 10th June.

**Mains 2012**

**Batch Starts 1 June**

**Weekend Batch**

**GS, Public Administration & Sociology**

North Campus: 2nd floor, 2520, Hudson Lane, Vijay Nagar Chowk, New Delhi-9 (Near GTB Nagar Metro Station)

Rajendar Nagar: 2nd Floor, 18/4, Old Rajendar Nagar, New Delhi - 60 (Opp. Agrawal Sweets)

Noida: A-26, Sector-2, Noida (Near Sector 15 Metro Station)

For Enquiry SMS - CAMPUS JUNE BATCH to 56677

visit: chronicleias.com

Call: 09953120676, 09582263947, 09582948815

Civil Services Chronicle

22 yrs of Guiding Success
Above lines express the vision that the late Prime Minister Shri Rajiv Gandhi had of a developed India. Rajiv Gandhi Gramin Vidyutikaran Yojana (RGGVY) which reflects this vision was launched in April 2005 so that rural and urban India could become one in their expression of developed India. RGGVY envisages inclusive growth for the nation by bridging the rural-urban divide. The programme aims at developing the rural electricity infrastructure and household electrification to provide access to electricity to all rural households. For this programme, electricity is not just a medium to lighten the villages but also a tool to enlighten the minds and souls of rural population by helping them come out of darkness, low levels of development, low literacy levels and non-availability of basic facilities.

As per 2001 census, 1.19 lakh villages and 7.80 crore households were un-electrified in the country. A large portion of population was still living in darkness. It was in this background that the RGGVY was launched with the objectives of electrifying all villages and habitations; providing access to electricity to all rural households; and providing electricity connection to Below Poverty Line families free of charge.

Under Rajiv Gandhi Gramin Vidyutikaran Yojana (RGGVY), 576 projects targeting to electrify 1.10 lakh un/de-electrified villages and intensive
Electrification of 3,48,987 partially electrified villages have been sanctioned in the country. In addition thirty three projects in 33 districts have also been sanctioned under Phase-II of the RGGVY. Further, thirty six supplementary projects have also been sanctioned under Phase-II. The Bharat Nirman target of electrification of 1 lac unelectrified villages and providing free electric connection to 1.75 crore BPL households has already been exceeded by achievement of electrification of 1,03,611 villages and 1.91 crore BPL households as on 22 March, 2012. Under the scheme, besides electrification of un-electrified BPL households financed with 100% capital subsidy as per norms of Kutir Jyoti Programme, provision also exists to provide access to APL households, who are required to pay for their electricity connection at prescribed connection charges for obtaining household connections. Ministry of New and Renewable Energy is implementing Remote Village Electrification Programme for providing financial support for lighting/ basic electrification in those remote un-electrified census villages and un-electrified hamlets of electrified census villages where grid extension is not found feasible by the State Governments and are not covered under the RGGVY.

The implementation process of the scheme involves preparing a district based detailed project report for execution on turnkey basis. Then Central Public Sector Undertakings are involved in the implementation. Gram Panchayat is involved in the certification of an electrified village.

The Infrastructure under RGGVY includes-Rural Electricity Distribution Backbone (REDB) with 33/11 kV (or 66/11 kV) substations of adequate capacity and lines to be established in blocks where these do not exist; Village Electrification Infrastructure (VEI) which involves electrification of un-electrified villages and habitations. There is a provision of Distribution Transformer of appropriate capacity in villages or habitations; and Decentralized Distributed Generation (DDG) based on conventional and non-conventional energy sources where grid supply is not feasible or cost effective.

Under RGGVY electric connections are also provided to un-electrified public places like schools, panchayat offices, community / health care centres, dispensaries, etc. Providing power to rural areas means all round development of these areas by promoting education, health care facilities, computerisation, telecommunication, online access to land records and access to new technology in agriculture. Moreover, Khadi and village industries also get a boost with the access of electricity.

RGGVY, thus, acts as a means of social and economic inclusion in the rural Indian society. The scheme is helping in creating rural employment and slowing down the rate of migration to urban areas.

Here is what the villagers of Golaghat district of Assam said about how the scheme transformed their lives:

"Attacks by wild animals were common in my village. Before the electrification, we used to spend the nights in fear. Elephants would destroy houses and tigers would kill cows and goats. After the electrification attacks by wild animals are rare as the lights keep them away." ..........An old lady from village Halowa NC, Kaziranga

"Now our children can study in the evening and I can work in the kitchen even late in the nights.” ..........A housewife from village Haatikhuli

"Earlier villagers had to go to the nearby town just to get mobile phones charged which consumed the whole day... now they can charge it at home. After electricity came, number of mobile connections has also increased many times in my village. I have opened a mobile repair shop and my income has also gone up.” ..........Ali, Village Rongbong

It has been proposed to continue the RGGVY during the 12th Plan with 90% capital subsidy. During the 12th Plan the scheme will aim to cover all remaining habitations irrespective of population and BPL households. It is also proposed to enhance BPL load from the range of 40-60 Watt to 250 Watt and to provide LED in each BPL household. The 12th Plan also proposes to have a separate new scheme for productive loads, mainly agricultural loads. (PIB Features.)

(Mayank Agrawal is Director (Media & Communication), PIB, and Gargi Malick)
HYDROPONICS: A BOON FOR INCREASED AGRICULTURAL PRODUCTION IN CLIMATE CHANGE ERA

Dasharath Prasad and Asha Ram

Hydroponics or soil-less culture is a technology for growing plants in nutrient solutions that supply all nutrient elements needed for optimum plant growth with or without the use of an inert medium such as gravel, vermiculite, rock wool, peat moss, saw dust, coir dust, coconut fibre, etc. to provide mechanical support.

In the present scenario it is very difficult to sustain agriculture growth at 4 percent which is required to feed the burgeoning population of India. Moreover, continuous cultivation of crops through the traditional system has resulted in poor soil fertility, which in turn has reduced the opportunities for natural soil fertility build up by microbes. This situation has lead to poor yield and quality. In addition, conventional crop growing in soil (Open Field Agriculture) is difficult as it involves large space, lot of labour and large volume of water. And in some places like metropolitan areas, soil is not available for crop growing.

What is Hydroponics?

Hydroponics or soil-less culture is a technology for growing plants in nutrient solutions that supply all nutrient elements needed for optimum plant growth with or without the use of an inert medium such as gravel, vermiculite, rock wool, peat moss, saw dust, coir dust, coconut fibre, etc. to provide mechanical support.

Why Hydroponics?

Hydroponics or soil-less culture is a system of growing plants which helps reduce some of the problems experienced in conventional crop cultivation, especially land shortage in India where near metropolitan suburbs encroaching the cultivable land for various activities such as housing, factories, institutes, hospitals, recreations centres, parks and play grounds etc. Soil is usually the most available growing medium and plants normally grow in it. It provides anchorage, nutrients, air, water, etc. for successful plant growth. Modification of a soil an alternate growing medium tends to be expensive. However, soils do pose serious limitations for plant growth, at times. Presence of disease causing organisms and nematodes, unsuitable soil reaction, unfavourable soil compaction, poor drainage, degradation due to erosion, etc. are some of them.

Hydroponics offers opportunities to provide optimal conditions for plant growth and therefore, higher yields can be obtained compared to open field agriculture. Hydroponics or soil less culture
offers a means of control over soil-borne diseases and pests, which is especially desirable in the tropics where the life cycles of these organisms continues uninterrupted and so does the threat of infestation. Thus, the costly and time consuming tasks of soil sterilization, soil amelioration, etc. can be avoided with hydroponics system of cultivation. It offers a clean working environment and thus hiring labour is easy for this system of cultivation of crops.

**History of Hydroponics**

Hydroponics was practiced many centuries ago in Amazon, Babylon, Egypt, China and India where ancient men used dissolved manure to grow cucumber, watermelons and other vegetables in sandy riverbeds. The “hanging garden of Babylon” and the Aztec’s floating farms were actually prototypes of hydroponic systems. Later, when plant physiologists started to grow plants with specific nutrients for experimental purposes, they gave the name “nutriculture.” Interest in practical application of “nutriculture” developed in 1925 when the green house industry expressed interest in its use. Green house soils had to be replaced frequently to overcome problems of soil structure, fertility and pests. As a result, researchers became interested in the potential use of nutriculture to replace conventional soil culture. In 1929, Dr. William F. Gericke of the University of California succeeded in growing tomato vines of 7.5 m height in nutrient solutions. He named this new production system “hydroponics” a word derived from Greek to reflect the importance of ‘Hydros’ (water) and ‘Ponos’ (working). Thus, hydroponics broke the laboratory bounds and entered the world of practical horticulture. The term hydroponics originally meant nutrient solution culture. However, crop growing in inert solid media using nutrient solution is also included in hydroponics in broad sense. During 1960s and 70s, commercial hydroponics farms were developed in Abu Dhabi, Arizona, Belgium, California, Denmark, German, Holland, Iran, Italy, Japan, Russian Federation and other countries. During 1980s, many automated and computerized hydroponics farms were established around the world. Home hydroponics kits became popular during 1990s. In Sri Lanka, the hydroponics system of cultivation is in its infancy. Many use inert solid medium such as coconut fibre or coir-dust with fertigation and some use balanced nutrient solution alone employing both circulating and non-circulating methods in small and medium scales.

**Basic Requirements of Hydroponics**

Soils naturally maintain the temperature and aeration needed for root growth. When the soil is poor, plant growth and yield decline also due to unsuitable aeration and temperature. Plant cultivation is impossible under ill drained condition due to these conditions. Soil adjusts itself to provide suitable conditions for plant growth. It is called the buffer action of the soils. Plants also absorb nutrients released through natural mineralization. In a solution or inert medium, maintenance of acidity or alkalinity (pH) and electrical conductivity (EC) in suitable ranges for plant root system is called buffer action.

This requirement must be artificially maintained in hydroponics. In any hydroponics system the following basic requirements must be maintained at optimum levels.

- Buffer action of water or the inert medium used.
- The nutrient solution or the fertilizer mixture used must contain all micro and macro elements necessary for plant growth and development.
- Buffer action of the nutrient solution must be in the suitable range so that plant root system or the inert medium is not affected.
- The temperature and aeration of the inert medium or the nutrient solution is suitable for plant root system.

**Classification of Hydroponics**

The term hydroponics originally meant nutrient solution culture with no supporting...
medium. However, plant growing in solid media for anchorage using nutrient solution is also included in hydroponics. This technique is called aggregate system. Hydroponics systems are further categorized as open (i.e. once the nutrient solution is delivered to the plant roots, it is not reused) or closed (i.e., surplus solution is recovered, replenished and recycled). Current hydroponics systems of cultivation can be classified according to the techniques employed. A hydroponic technique refers to the method of applying nutrient solution to the plant roots. However, consider the following factors in selecting a technique:

i) Space and other resources available
ii) Expected productivity
iii) Availability of suitable growing medium
iv) Expected quality of the produce – colour, appearance, free from pesticides, etc.

Large numbers of hydroponic techniques are available

1. Solution culture or Liquid hydroponics
   i) Circulating methods (closed system)
      • Nutrient film technique (NFT)
      • Deep flow technique (DFT)
   ii) Non-circulating method (open systems)
      • Root dipping technique
      • Floating technique
      • Capillary action technique

2. Solid media culture (Aggregate systems): These can be open systems or closed systems.
   i) Hanging bag technique, (ii) Grow bag technique, (iii) Trench or trough technique, (iv) Pot technique

3. Aeroponics: Aeroponics is of two types.
   i) Root mist technique, (ii) Fog feed technique

Advantages of Hydroponics: There are many advantages of the hydroponics among them few are listed below:

- Land is not necessary. It can be practiced even in upstairs, open spaces and in protected structures.

- Clean working environment. The grower will not have any direct contact with soil.
- Low drudgery. No need of making beds, weeding, watering, etc.
- Continuous cultivation is possible.
- No soil borne diseases or nematode damage.
- Off-season production is possible.
- Vegetable cultivation can be done with leisure sense.
- Many plants were found to give yield early in hydroponics system.
- Higher yields possible with correct management practices.
- Easy to hire labour as hydroponics system is more attractive and easier than cultivation in soil.
- No need of electricity, pumps, etc. for the non-circulating systems of solution culture.
- Possibility of growing a wide variety of vegetable and flower crops including Anthurium, marigolds, etc.
- Water wastage is reduced to minimum.
- Possible to grow plants and rooted cuttings free from soil particles for export.

Limitations of Hydroponics

- Higher initial capital expenditure. This will be further high if the soil-less culture is combined
Hydroponics or soil-less culture is a system of growing plants which helps reduce some of the problems experienced in conventional crop cultivation, especially land shortage in India where near metropolitan suburbs encroaching the cultivable land for various activities such as housing, factories, institutes, hospitals, recreations centres, parks and play grounds etc.

- Leafy vegetables: Lettuce, Head lettuce, Kang kong, Gotukola
- Vegetables: Tomato, Egg Plant, Green bean, Beet, Winged bean, Capsicum, Bell pepper, Cabbage, Cauliflower, Cucumbers, Melons, Raddish
- Fodder crops: Sorghum, Alphalfa, Barley
- Grass: Bermuda grass, Carpet grass
- Cereals: Rice, Maize
- Condiments: Parsley, Mint, Oregano, Sweet basil
- Fruit crops: Strawberry
- Flower/ornamental crops: Anthurium, Merrygold, Coleus, roses, carnations, orchids, chrysanthemums
- Medicinal crops: Alovera

With the above-mentioned discussion we can conclude that hydroponics is one of the ways to increase agricultural production in India considering the problem of land scarcity and also more demand of food to the burgeoning population in the coming time and also climate change problem which is showing negative impact on the agricultural enterprises.

(The authors are Ph.D. Scholar at Division of Agronomy, Indian Agricultural Research Institute New Delhi 110012 e-mail:-Dashrath.sagar@gmail.com)

During 1960s and 70s, commercial hydroponics farms were developed in Abu Dhabi, Arizona, Belgium, California, Denmark, German, Holland, Iran, Italy, Japan, Russian Federation and other countries.
During 1980s, many automated and computerized hydroponics farms were established around the world.
in India, hydroponics was first introduced at Kalimpong in Darjeeling district of West Bengal. Soil-less planting is a method of growing plants using clean water or clean organic matter with or without additional plant nutrients. When clean water and nutrients are used, it is called hydroponics. When clean organic matters like peat, compost, organic extract are used, it is called organics.

Relevance of hydroponics in present scenario:
Each year three million acres of farmland are lost to urbanization. The population increases each day by 5000 people. This means we will have to produce more food on less land. Three million acres of farmland are lost jointly by erosion and poor land management annually. Hydroponics is the answer. There is no need for soil, it can be used in any climate, it only uses 1/25th the amount of water as conventional farming and can be grown virtually anywhere. Even rooftops of buildings and factories are being used for vegetables production. Hydroponics system may be divided into different forms. Yield of vegetables crop grown hydroponically in desert greenhouses (CEA) and in open fields (OFA). As per the data indicate that yield are usually higher in hydroponics CEA (Controlled Environment Agriculture) than in OFA (Open Field Agriculture) because of the optimal growing conditions, balanced plant nutrient, etc, provided in control environments.

Requirement of hydroponics: Following are the requirement of the well hydroponics or water culture.

a. Nutrient solution:- Many formula for hydroponics nutrient solution have been given but they are all quite similar, different mostly in the ratio of nitrogen to potassium. Plants need less nitrogen during short or dark days and more nitrogen during long days, bright sunlight, and higher temperatures. Smaller operation often buy ready-mixed nutrient formulations, only water needs be added to prepare the nutrient solutions to standard or slightly modified formula.

b. Growing medium: - i) Growing medium is used to lend support to the roots and plants. ii) A variety of growing medium are utilized for their individual qualities in various types of hydroponics systems.

c. pH:- i) The acidity or alkalinity of nutrient solution, ii) pH reading run from 0-14, iii) 0-6 acidic, 6-neutral, 8-14 alkaline, iv) The recommended pH is between 6-6.5. Few popular examples of growing medium are: Sand, Brick, Shards, Vermiculite/Perlite, Gravel, Rockwool, Sawdust, Polyethylene Sheeting.

Type of Hydroponics

Solution Culture: The plants are raised in pure nutrient medium containing only the desired elements. The pyre or any other clear hard glass vessels are used as containers and for plant support special engineered structures are required. To protect the roots from direct light and to check algal growth in the nutrient solution, the container are covered on their outer surface with black paper. The aeration for the root is provided with the help of vacuum lines which continuously keep on providing fresh filtered air to the nutrient solution. In case of any change due to absorption of nutrient by plant occasional pH adjustment are done and nutrient solutions are frequently changed. There are several culture media available but knops and Hoagland’s media is commonly used.
Rock wool culture: Rock wool is an inert, porous, sterile growing medium made from rocks that are heated at high temperature and made into this fiber. The resulting fibers can be turned into slabs or bags as a loose rockwool for bag culture. The small cubes of rockwool are used for starting transplants slabs are packaged in white or white-on-black polyethylene sleeves slabs are laid in two rows and irrigated by micro-irrigation with one emitter per plant. Fertilization of rockwool is accomplished by fertilization through drip irrigation system each time. In most systems, water is mixed with fertilizer to make stock solution in 1:100 ratio before it is applied to the slabs.

Nutrient film technique (NFT): It is type of a ‘water culture’ system in which the bare roots are continuously bathed in a flowing nutrient solution. True NFT consist of growing plants in a shallow plastic-lined trough in which nutrient is flowed continuously. Roots spread out over the width of 12 inch channel and are continuously bathed in a thin film of flowing oxygenated nutrient solution. Channels are on a slope to allow the nutrient solution to flow from one end of the channel to the other and collected for return to the sump tank. Nutrient solution is pumped continuously from the sump tank back to the channels. Nutrients are added to the solution as needed and the solution may be replaced periodically to reduce the build up of salts and disease organism.

Advantages of hydroponics culture over soil culture:
1. Hydroponics culture provides a controlled chemical composition of nutrient solution.
2. There are no soil colloids presents to immobilize any of the nutrients through adsorption.
3. The frequent replacement of culture solution prevents the accumulation of toxic organic decomposition products.
4. The growth of bacteria and fungi is minimized which may otherwise cause disease.
5. Free from soil borne disease and weeds.
6. Natural calamities such as floods, droughts, erosion etc can be avoided.
7. This system can assume high yield with good quality produce.
8. It allows the culture of greenhouse vegetables in area where soil are not suitable for vegetable production

Disadvantages of hydroponics
1. This high-tech system call for a higher investment compared to other commercial method of cultivation.
2. It requires huge investment and some basic knowledge of chemistry; plant physiology and crop botany has deferred many adopting this technology.
3. Slight mistake in calculating exact requirement of fertilizers may end up with deficiencies or toxicities in the crop.
4. Pests and diseases remain a big risk.
5. Not all plant varieties are suitable for hydroponics.
6. Plants have quick reaction to both goods and bad.

Effect on farmer
1. If hydroponics become a major part of the agriculture world then farming as we know it today no longer be same.
2. All the tractors and farm equipment will be gone and land will be used for construction of houses.
3. All of our food as in veggies will be grown in water and a greenhouse.

Future thrust area
1. Development of new temperature –tolerant, disease resistant hydroponics cultivars.
2. Disease control of water-borne pathogens in closed hydroponics system. Further development of the application of solar heating in hydroponics greenhouse will reduce cost and economics impact of hydroponics.
3. Currently plans are being drawn for using the techniques of soil-less culture on space-station, and perhaps one day on surface of other celestial bodies (planets, moon) that don’t have soil.
4. In the future developing countries, along with all other nation, will be able to feed many people using less land than current farming techniques.
5. In the future, application of hydroponics in providing food in areas having vast regions of non-arable land such as deserts and mountains terrain will be more heavily used.

(Doctor R. S. Sengar, Dr. Shalani Gupta, and Kalpana Sagar are from Sugarcane Tissue Culture Laboratory, College of Biotechnology, Sardar Vallabh Bhai Patel University of Agriculture & Technology, Meerut and Dr. M. Pandey is from Institute of Management Studies, C-238, Bulandshahr Road, Indl, Area, Lal Quan, G.T. Road, Ghaziabad – 201009, e-mail : rs.svbpatu@gmail.com)
Mentha also known as *pudina* (mint) is one of the most common herbs and extremely popular in alternative medical treatments. Mints belong to the genus *Mentha*, in the family Labiatae (Lamiaceae) which includes other commonly grown essential oil-yielding plants such as basil, sage, rosemary, marjoram, lavender, pennyroyal and thyme. The most common and popular mints for cultivation are Japanese Mint/Menthol Mint (*Mentha arvensis*), peppermint (*Mentha piperita*), spearmint (*Mentha spicata*), and (more recently) apple mint (*Mentha suaveolens*).

**Habitat**

Near the rivers, ponds and some other humid places. It is a herb, height from 30 to 100 cm long. Oval wrinkled leaves with very short stalks or more frequently stalkless; white and hairy beneath. Flowers gathered into spikes from 2 to 5 cm long. It is its strong and unpleasant smell what makes it different from other mints. This fact prevents it from being so well considered as those other species with better smell. Moreover this is the reason why the best scented species are especially suitable for cooking or cosmetics, whereas the one studied here is only intended to medicinal use.

**Origin of the herb**

It is found sometimes wild in Central and Southern Europe (where mint rubbing originated), but was probably first put to human use in England, whence its cultivation spread to the European continent and Africa.

**Cultivation**

Peppermint is much cultivated in many countries of Europe, Northern Africa, Western and Central Asia for the production of menthol. In most of these countries, peppermint entered local cuisine,
replacing in part native mints. India’s “mint belt” lies in the country’s “breadbasket”, a strip of plains and foothills about 1,500 km long and 250 km wide, just south of the Himalayan range, spanning these states of Punjab, Himachal Pradesh, Haryana, Uttar Pradesh and Bihar.

**Chemical composition**

The essential oil composition found in menta is menthol, menthone, carvone, limonene, linalool, menthy acetate, piperitone, and pulegone. Menthol is used in confectionery, perfumery and cigarettes. It is also known in mild local anesthetic, antiseptic, internally as a carminative and gastric sedative. Menthone is used as perfume and flavour compositions and carvone as flavor in liqueurs, perfumery and oral hygiene products. Limonene is an antioxidant, and can be used as solvent, wetting and dispersing agent. Linalool is used in perfumery instead of bergamot or french lavender oil, since it has similar odor. Menthyl acetate is used in perfumery and in toilet waters having a lavender odor. Piperitone is used in masking odours in dentifrices. Pulegone has a pleasant odor, midway between peppermint and camphor, but it can be toxic. Menthol and menthyl acetate are responsible for the pungent and refreshing odor; they are mostly found in older leaves and are preferentially formed during long daily sunlight periods.

**Medicinal properties**

*(a)* Internal use

- **Stomachic, hepatic, carminative**: A good remedy for indigestion. Take a tisane with the infusion of dry leaves. Just after having boiled the water, leave them rest for a while and take as soon as you can. You can sweeten it with sugar or honey.

- Mint can protect the liver and to help it to accomplish its metabolic functions. Very useful for cirrhosis. (Infusion of a spoonful of dried herb per cup of water. Take a couple of glasses a day).

- **Anti-flatulence**: Its content in carvacrol, thymol and menthol help expel the excessive gas in the intestines, (infusion of 1 tablespoon of dried leaves or 2 tablespoons of fresh leaves in one litre of water. Take a couple of hot cups a day after meals).

- **Bad breath**: It counteracts the exhalation of malodorous products of some plants, like garlic and onion. (Infusion of one teaspoon of dried plant per cup of water. Take two glasses per day).

- **Diarrhea**: Infusion of the dried plant.

- **Diverticulitis or diverticulosis**: Mints are carminative plants that can be soothing and useful in this case. (Infusion of a spoonful of dried plant per cup of water. Take two glasses per day).

*Fig: 1 Mentha plant at vegetative growth (a) and flowering stages (b)*
• **Sedative:** Mint, like peppermint, is used to calm the heart palpitations. You can drink hot water with a few drops of its essence.

• **Respiratory tract:** This is also useful for pharyngitis or sore throat treatment. (Gargles with the liquid from the decoction of 30 g of dried plant per litre of water). For bronchitis or cough (10 minute infusion of a spoonful of the dried plant. Drink a couple of glasses a day). Mint is a good febrifuge, able to reduce fever. (Infusion of a spoonful of dried plant. Take a couple of cups a day).

• **Kidney stones or gallstones:** Any variety of mint possesses soothing properties, very useful for reducing pain caused by an acute colics. (Infusion of the dry leaves).

• **Headache, Backache or neck pain:** Very useful to solve back pains or cervical pain (Infusion of a spoonful of flowering tops per cup of water. Take a couple of cups a day) (In external use, apply a compress soaked with the decoction of leaves and flowers on the affected zone).

• **Febrifuge:** An infusion made with the leaves increases perspiration and makes fever go down. Mints are very rich in menthol, a component with anticongestive and diaphoretic properties. It increases the production of sweat and relieves congestion of the respiratory channels. These Properties have been exploited in the treatment of cold and flu because they are able to reduce fever by means of body sweat evaporation. (10 minutes infusion of a spoonful of the dry plant. Drink two glasses a day).

• **Relaxing:** To stop palpitations you can drink a glass of hot water with some drops of its essence.

• **Cataracts:** The antioxidant properties of mints can prevent the onset of cataracts (Infusion of a spoonful of dried plant. Take a couple of cups a day).

• **Altitude sickness:** It contains rosmarinic acid and eugenol with anticoagulant properties that may help improve blood circulation. (Infusion of a spoonful of dried plant per cup of water. Take a couple of cups a day before leaving for the mountain or climbing) Furthermore, an infusion of one teaspoon of dried leaves of mint per cup of cold water is very suitable to reduce the temperature and restore fluids lost by the heat.

**b) External use**

In external use, can apply a compress soaked with the boiling of leaves and flowers over the part of the body suffering from rheumatic aches. It can also be applied in case of insect stings. Mixed with olive oil into equal parts, it can be used for burns. To alleviate arthritis dilute a few drops of mint oil in alcohol. Wet a compress and apply it on the affected joint. It can also be very useful to apply a poultice of mint leaves soaked in hot water directly over the painful area.

• **Muscular distensions:** For muscular pain, such as muscular distensions, apply a compress soaked in the decoction of leaves and flowers on the painful muscle. (A poultice of leaves soaked in hot water can also be applied directly on the painful area).

• **Insect bites or stings:** Infusion of the dried plant. Apply to the affected area.
- **Eczema**: Wash the affected area with the liquid from the infusion of the dried plant.
- **Lice**: Mints can be used to diminish lice itching and avoid lice approaching. (Scrub of the young plant above the skin to ward off fleas).
- **Hair care**: Mint can be used to prepare natural shampoos.
- **Tinnitus or otitis**: Because of its bactericidal properties, it is particularly appropriate for otitis and ringing in the ear, especially when tinnitus responds to an infection in the middle ear. (Carefully provide a couple of drops of diluted oil of these plants inside the ear with a piece of cotton).
- **Pyorrhea**: Mouthwashes with the infusion of dry leaves.
- **Vaginitis**: Wash the affected area with the resulting liquid of the infusion of the dry plant.

**Contraindications and Toxicity**

- Mint leaves, used in therapeutic doses, have no toxicity. However, it should not be used with people with hiatal hernia, or problems caused by acid reflux. The ability of this herb to relax the esophageal valve can worsen heartburn. Nor should this plant be used if the person is affected with gallbladder stones.
- It is also unsuitable for small children whom it can cause adverse reactions. It may cause abortion to pregnant women and its intake by breastfeeding women may affect the baby. This herb must be only taken in the last cases under medical recommendation.
- People suffering from liver diseases should abstain taking mint essential oil preparations.

All the same for people with some intestine disorders, such as ulcerative colitis, Crohn’s disease or irritable bowel syndrome.

- It is neither recommended for patients who suffer from neurological diseases, such as Parkinson’s disease.

**Properties and precautions with menthol**

Mint essential oil, rich in menthol, used pure, is toxic and can be fatal to an adult with a single dose of a teaspoon. This oil should be diluted so it can be used. In no case it should be supplied, even diluted, to people to whom is not recommended, as we have seen before. The essential oil can dramatically lower blood pressure in young children leading to cardiac depression and therefore it is not suitable for children, even used topically as an ointment or aspirated through the nose. By inhaling the vapours of menthol, the children can suffer suffocation by spasm of the larynx.

Internal use of essential oil can cause convulsions or cramps. Even diluted, mint oils, applied internally may cause sleep problems or nervousness. Used diluted externally on the skin can cause eczema, redness, blisters, headaches, by means of skin absorption. If there is any adverse reaction, it should no longer be applied. Although mint leaves, used in therapeutic amounts, have no toxicity, children should not take herbal teas made with mint leaves.

*(The authors are Research Scholars at Division of Agronomy, Indian Agricultural Research Institute New Delhi 110 012 e-mail: - dashrath.sagar@gmail.com)*
Weather Forecasting Service was introduced by the India Meteorological Department for the benefit of farmers even before independence in 1945. It was broadcast over All India Radio in the form of Farmer’s Weather Bulletin (FWB). For a very long time programmes like Krishi Darshan aired by All India Radio were the only source of information for farmers across the country. The programme had become so popular that that one of the varieties of rice was in fact named as Radio Rice. But times have since changed. The profile of the farmers is fast changing and with the revolution in the IT sector the dissemination of information to farmers too is taking multi-channel routes. SMS and voice messages on Mobiles are the latest techniques to reach out to the farmers. According to the Agromet scientist K.K Singh, over 25 lakh farmers are benefiting from this service.

Vikas, a farmer in village Nizampur near Delhi says that he was about to sow the seeds for carrots when he received the SMS that there would be heavy rains and he postponed the sowing. Had he gone ahead with his plan and not received the message he would have lost 25000 rupees worth of money in addition to the effort that would have gone waste.

In Palla village, also near Delhi, farmer Surendra had decided to irrigate his paddy crop but he received the SMS that it would rain in a day or two and he postponed the irrigation. The message helped him save cost inputs for irrigation including electricity.

One of the farmers in Nekpur village of Bulandshah told us that he was planning to spray fertilizer in September but as he received an SMS that there will be rains within next two days, he knew the time was not right for the idea and concentrated on other issues on the farm. Had he ignored the message, the rain would have washed away all the fertilizer.

**What is Agromet SMS?**

The Agromet SMS are brief notes not more than 160 letters providing information on weather for cecast and other agriculture related issues to the farmers. The content is suitable for local conditions and needs. These advisories are sent twice a week and the farmers receive them in their local language.

Various stake holders such as Ministry of Earth Sciences, Ministry of Agriculture and Telecom companies came together to start this new and innovative venture. The IFFCO Kisan Sanchar Ltd (IKSL) was launched in 2009 to empower Farmers by providing agricultural information to farmers via mobile phone using innovative voice based technology in their local language including a local support Help Line.

The source material is prepared by 130 field units that are located across the country. These field units comprise experts in various agriculture related subjects. 50 to 100 contact farmers are under each of these units who give their feed back.

**A five-tier system**

It is a five-tier system in place for dissemination of Agromet information.

1. The Ministry of Earth Sciences which is the nodal ministry.
2. IMD Headquarter which is the main source for weather forecast.

IMD started Agrometeorological agricultural Advisory Service (AAS) from its State Meteorological Centers, in collaboration with Agriculture Departments of the respective State Governments in 1976. Later an Integrated Agromet Service was introduced in the country from 2007 in collaboration with different organisations/institutes. At present bulletins are being issued from the national, state and district level.

IMD maintains a network of agrometeorological observatories across the country with the cooperation of agricultural universities and research institutions. The Division provides technical assistance to the cooperating institutions for site selection, training of personnel, calibration of instruments and their maintenance, scrutiny of data, etc. Besides this, observations of evaporation, evapotranspiration, soil moisture and dewfall are made at IMD’s own observatories. The Central Agrimet Observatory at Pune and the agrimet observatories at Bangalore, Anand and Rahuri have many specialised instruments and facilities for research.