

## Sustainability at Border Villages of Punjab (India): A Critical Study on Initiatives and Practices

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### Abstract

The focus of this review is the sustainability of villages under the 'Smart Village' concept with special emphasis on the Border Villages, primarily that of the Punjab state. Based on various case studies, this article summarizes some of the major issues and challenges which these border villages face. What hindrances they have? Which rural development plans are implemented and how sustainable are their environments? The review is based on the implementation of 'Smart Village' concept in the villages worldwide, an effort to make them more sustainable. Fast progress and development of rural and urban communities is adversely affecting the environment on account of unsustainable technologies. Sustainability of ecosystem is the most important prerequisite of all development plans, be it the Smart City or Smart Village. The study aims to project different case studies taken up globally as well as locally under this concept. It reflects that border villages are in a state of neglect and need attention. It also aims to highlight various constraints and problems of the border villages along with certain trans-boundary environmental issues. Findings indicate that the various government plans/schemes launched at different times, are less effective due to lack of proper follow up. The need of the hour is to make a country wide comprehensive development plan to identify the actual issues. It must be in an integrated manner, primarily with people's participation to make the villages in the vicinity of international border environmentally smart and sustainable.



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### Introduction

Sustainability is the basic requirement to nurture all the natural resources for existence, thereby maintaining and avoiding their depletion for an ecological balance. The Brundtland commission

has emphasised that the goals of Sustainable Development (SGD) need to focus on social, economic, and environmental aspects. A society that enforces sustainable ways to meet the needs, embraces environment, conserves the natural

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resources, and has good sustainable economic growth.<sup>1,2,3</sup> India lives in its villages and dominance of agriculture<sup>4,5,6,7</sup> vividly indicates that most of the Indian population (68.84%) resides in villages and rest 31.16% lives in urban areas.<sup>7,8,9,10</sup> Therefore, the most efficient way is to build up from the bottom. A village being the basic or fundamental unit of development<sup>7</sup> must be progressing. Rural development and progress are possible only if sources of livelihood are better and can be achieved through occupational heterogeneity.<sup>11</sup> Thus, sustainability has to be initiated at the grass root level or the village level so as to embrace and enhance the pillars of sustainable existence. Distinctly the economy as well as mass employment depends on agriculture.<sup>12,13,14</sup> At the same the contribution of agriculture in the Indian economy is declining and it is almost 17% of the total GDP.<sup>14</sup> The major determinants of the current agrarian economic crisis are decreasing soil fertility, lowering water-table, climate change, poor productivity, changing demand, excessive production, and lack of buyers etc. The Asian Centre for Development Administration (ACDA2004) put forth certain benchmarks of rural development, namely the removal of social barriers to gain access to basic facilities, enhanced employability and agricultural productivity, improved poverty and literacy, better infrastructure, and less income gap etc. Accessibility to basic amenities would make their life better and increase the standard of living of these rural communities thus reducing poverty<sup>13</sup> as well as put an end to rural-urban migration.<sup>4,7</sup> Rural development with focus on the above issues laid the foundation of the SMART VILLAGE concept. A (smart) village is a rural community that is smart enough to be self-sustaining, possess all core facilities and has a perfect combination of social, economic and environmental development.<sup>6</sup> It is a community featuring quality education, good infrastructure, conservation and management of natural resources, gender equality and good economic growth, thus building holistically developed entities.<sup>5</sup> Focus of the development must accordingly be on reducing carbon footprints, recycling of waste, and working on zero waste initiatives.<sup>2</sup> As per the data, the sustainability score of India is between 42-69 for States and 57-68 for Union territories.<sup>15</sup>

A village is said to be SMART when execution of technology brings an integrated development

in social, economic and environmental sectors.<sup>4</sup> A Smart (sustainable) village is an “ideal village with technology” and such an application of technology is the basic approach to have global means to the local needs.<sup>10,12</sup> The philosophy of smart village in India was conceptualized on 2<sup>nd</sup> October 2014 to commemorate the birth anniversary of Mahatma Gandhi and is known as Sansad Adarsh Gram Yojana (SAGY).<sup>16</sup> It was adopted by central, state and local governments of the Union of India. At the international level, it coincided with the the launch of Development Goals. The basic theme of this programme pivots around the concept of Gram Swaraj (Self-reliant) and Adarsh (Ideal) Gram, foresighted by the Father of the Nation<sup>17</sup> and Village Swaraj.<sup>18,19</sup> This scheme aims at holistic rural development accomplished through improved living standards and quality village life. The purpose of this yojana (scheme) is to develop model villages, firstly by the adoption of some villages by their respective Member of Parliament to make them smart and sustainable. And secondly, through the application of smart & innovative technology to frame better rural development plans as well as their effective implementation to incorporate amenities like school, housing, health facilities and latest infrastructure. Thus, the SAGY scheme is based on the principles of Sustainable Development Goals (SDGs). Towards this Smart (sustainable) village initiative, accessibility to sustainable energy services would serve as a stimulant for development especially Information and Communication Technology (ICT). e.g. innovative agriculture technologies. There would be food security, good health and better welfare of people who are also provided quality education and earn good livelihood through local means. The implementation of Smart Village concept becomes all the more important & challenging for the villages present near the international borders. A village in the vicinity (0-16 kms) of an international border is called a Border village.

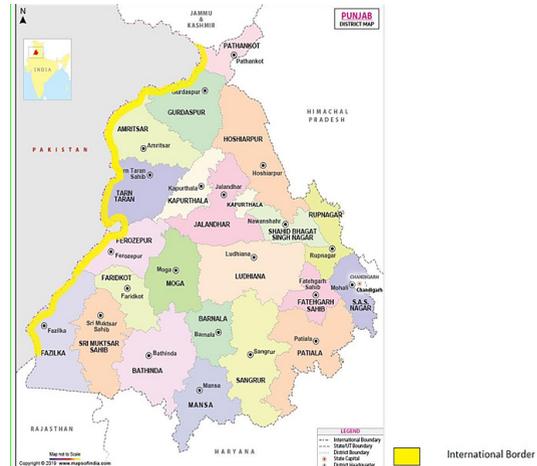
The main objective of the study is to highlight the efforts taken up in the villages in different parts of the world to make them environmentally smart and sustainable. Emphasis is on the Indian villages especially the border villages of Punjab. Various rural development plans, more so that cater to the needs of border villages and its impact has been discussed. The study brings to focus different issues and problems that these villages (in specific) face

along with the possible ways to address them. How such healthy practices if followed and implemented in the border villages could help in achieving the sustainability goals in the social, economic, and environmental sectors.

**Villages of Punjab under the Border Belt**

People, who live at the fringe of international border, undoubtedly have a life different from those living in other areas. India shares its boundary with Afghanistan and Pakistan. The triangular shaped state of Punjab touches Pakistan on its western border (Map1). It has an extent of about 553 kms of border length (Radcliffe line) which it shares with Pakistan. This state predominantly depends on the agriculture for its economy and livelihood. Across the length of the border there is fencing of barbed wire from half to three kilometres to prevent human infiltration. District-wise, the state has 1931 villages with many of them at the zero-line border zone(Table 1).

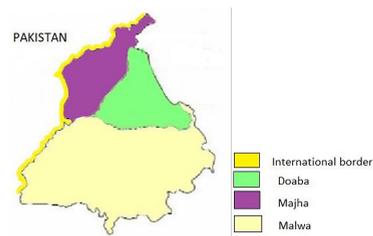
is more hostile than other border areas<sup>20</sup> and shows less development.



**Map. 1: International Border (Western) of Punjab with Pakistan (Source: Maps of India)**

**Table 1: District-wise village in Punjab Border**

District	No. of Border Blocks	Villages
1.Gurdaspur	5	600
2.Ferozepur	3	290
3.Fazilka	3	339
4.Amritsar	3	360
5.Tarn Taran	3	209
6. Pathankot	2	133
TOTAL	19	1931



**Map. 2: Regions of Punjab (Source: Map of Punjab)**

Three rivers –Ravi, Beas, Sutlej flow through the state and dissect it into three regions-Majha (Ravi on west, Beas on the east, Sutlej on the south west, Doaba (Beas on the west and Sutlej on the south), Malwa (Sutlej on the north-west and seasonal river Ghaggar on the south).

**Issues and Challenges of Border Villages**

Various challenges and issues related to the economic, social, and environmental aspects of these villages are discussed below:

As indicated in the map, only Majha and Malwa regions share the international border with Pakistan (Map 2; Source: Maps of India). There are 3 districts comprising of 12 border blocks in Majha region that have almost 1210 villages near the international border. In the Malwa region there are 2 districts with 6 border blocks and nearly 628 border villages (Table1). Life is entirely different in these border villages. Due to the decade long terrorism, this region

**Economic Issues**

Due to their location, the people in the border villages face social exclusion because they do not get same opportunities & exposures as their counterparts.<sup>21</sup> Although the major villages in this belt are not very isolated & backward, yet they are way behind the non-border villages. People generally live under stressed conditions and always have the psychological fear of evacuation if war like situation arises.<sup>20,21</sup> Secondly these villages have the disadvantage of being inaccessible & insecure, so industrial development is low especially in the district of Gurdaspur and Ferozepur. By and large many units have shut down

but those which are functional have out-dated or conventional technology, as a result only consumer-oriented units have survived.<sup>21</sup> Agriculture reigns the village economy but with more awareness of better means of livelihood, the educated youth have less preference for this occupation, thereby stagnation of this sector. Crop diversification is low due to factors like non-availability of resources, lack of initiatives in this direction and changing market trends.<sup>20,21</sup> Thirdly fencing poses a hindrance to the farmers, for they are not allowed to grow crops that are more than three feet in height (security reasons). Restricted field visiting hours, rigorous security check-ups, land cultivation with only registered farm machinery, 2-3km distance to be covered by foot from the check point, no new electricity connections, erratic power supply, lack of sources of irrigation, attack by boars, and infiltration etc. are some of the major hindrances to the farming community.<sup>21</sup> Thus, the farmers are left only to follow monoculture crop pattern. Issues of land inequalities, land utilization, irrigation, water resource management especially in the Ferozepur district<sup>20</sup> have also come to light. Fourthly, the increasing cost of agricultural inputs, declining income, limited resources, mounting debts and incapability of farmers to cope up with changing demand patterns in the local and global market have put peasantry into crisis.<sup>20,21</sup>

### **Social Issues**

There is lack of adequate infrastructure & service delivery, poor road connectivity and pathetic condition of education & health facilities. No good multi-speciality hospitals are available, so people have to rush to nearby cities in case of emergencies.<sup>22</sup> Except for the peripheral roads, rest all other roads are unmetalled. Situation of health and education of women is also deplorable especially the reproductive health care. Drug abuse, illegal distilleries, synoptic drugs are some other prevalent issues in this belt. Moreover, employment avenues for the youth are meagre and sports & recreational facilities are lacking.<sup>20,21</sup> With international rivers flowing through these villages, many a times floods cause a lot of damage to the crops and adjoining areas leading to financial and epidemic like issues. No proper sanitation facilities are there as all wastewater flows in open drains. As addiction to drugs is very common due to easy availability, nearby de-addiction centres are lacking. Recent trends of growing immigration, old

people are left alone to take care of themselves so old-age homes are lacking.<sup>22</sup> Many a times there is severe power shortage problem and residents have tough times to face especially in summers. Telecommunication and internet facilities are also affected because of security reasons. By and large no village has any provision of streetlights which makes movement at night difficult.

### **Educational Issues**

In the field of education, the paucity and absenteeism of teachers is the rationale behind high dropout rate especially in higher education. School buildings are in a state of despair and have insufficient classrooms. But programmes like Midday meal & Sarv Shiksha Abhiyan (Education for all) are quite functional in these schools. Literacy rate<sup>20,23</sup> in border areas has been reviewed but no direct relationship is seen between literacy and employment.<sup>24,25</sup> Here the overall Human Development Index (HDI) is low<sup>21</sup> as compared to the HDI of Punjab.<sup>26</sup> Here all indicators of Human development have still not been achieved or are lacking. The percentage of illiterate farmers is highest in district Ferozepur (56.7%) followed by Tarn Taran (50%). People of different castes form the composition of these villages, with dominance of Sikh community.<sup>21</sup> Punjab is one of the leading SC populous states of India.<sup>27</sup> The school dropout rate is high in the sub-castes of certain castes/classes due to poverty, large family size and to some extent drug addiction of the young generation.<sup>27,28</sup> There is inadequacy of vocational training & skill development programmes for the lack of higher education among students, thus an issue of priority.<sup>20</sup> Moreover the schools available are mainly of primary or middle level and never have been upgraded to make it easy for the students to complete their basic education in the village itself. The existing school buildings need repair and renovation and there is lack of community centres also.<sup>22</sup>

### **Environmental Issues**

The most integral and important part of sustainable development of a community is the environmental aspect. The facility of latrines in households below poverty line is comparatively less in border villages than in non-border villages.<sup>20</sup> Many such households were given financial aid from government schemes for making toilets as part of the Swachh Bharat Abhiyan plan, to make India Open –Defecation Free

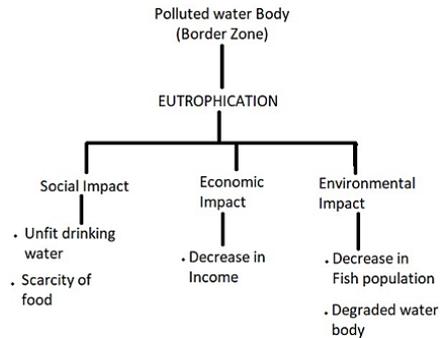
(ODF). Still some percentage of people practice Open defecation making villages not completely ODF. There is also lack of basic amenities like safe drinking water, proper system of waste disposal and its management, sewage system, open drainage system. People simply throw the waste either outside their houses or at a common dumping place and sometimes even burn it,<sup>34,39</sup> without being aware of the health hazards and degradation of environment & pollution.<sup>35,40</sup> Ponds and other natural bodies are in a state of neglect as Eichhornia, and other aquatic weeds have rapidly encroached upon such water bodies. Land filling of certain ponds has been done for building houses.

Open drains and lack of sewage reflect an overall poor sanitation & hygienic conditions. Improvement was seen in this regard when awareness is imparted through group discussions and social media.<sup>31</sup> Stubble burning, a major environmental issue, is one of the contributors to winter smog and haze in north India leading to poor visibility and respiratory health problems. Procurement of eco-friendly field machinery is less as they are and out of common man's reach. Provision of such equipment was less than the demand (14000 against 23000). A similar trend has been witnessed for stubble management machines (28600 machines in 2018 and 10111 in 2019).<sup>32</sup> A wider section of the village community depends on conventional methods of cooking and irrigation, limiting the use of renewable energy resources to just a few so overall environmental awareness is lacking and still many follow age-old agricultural practices<sup>33</sup> that harm the health and environment. Awareness in issues like conservation of natural resources, falling water table, crop diversification, safety measures to be taken in pesticide application and agro-chemicals<sup>31</sup> also need to be generated.

**Trans-Boundary Issues**

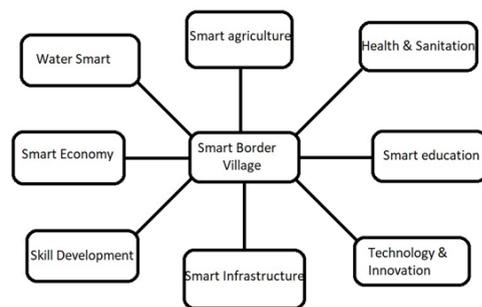
Besides the above stated issues, the bordering villages of two nations also experience many Trans-boundary issues (political as well as environmental) that are contributed by or originate in a country and affect the neighbouring country. Often one such issue leads to another issue. The two nations at the international edge cannot separate the air/ environment as well as the common water bodies. They share the rivers, air, epidemics & pandemics and soil (silt) that the water carries with it. When

spaces are shared between two nations, it has both direct and indirect impact on the sustainability of environment. The industrial units that are set up near the borders need to follow the International Environmental Laws as well as management practices. A set of legal principles and practices laid down by the international regulatory bodies cater to all regulatory bodies with an aim for the protection & management of natural resources.<sup>35</sup> The effluents or pollutants that are released into the water or air need to stringently follow these rules as per the EPA (Environment Protection Agency) guidelines. For any industrial unit, its location, disposal of waste/ effluents, type of unit (as per border specification) are some specifications to be considered. The release of effluents/waste into the nearby water bodies not only pollute them but also cause death of aquatic life as well as destruction/ alteration of habitat and over- exploitation of biodiversity. (Fig 1). Other trans boundary issues include cross-border smuggling, illegal drug trafficking, fencing at the borders, hindrances in cultivation practices, political cum military tensions, cross border prostitution<sup>22</sup> etc.



**Fig. 1: Adverse effects of polluted water bodies (Trans-boundary Issues)**

(Adapted and modified- Taqwadin 2014)



**Fig. 2: Model of a Smart Border Village**

Such issues also need to be addressed at the border villages especially in Punjab, to assess their environmental sustainability. Eventually border

villages need a sustainable and smart framework as depicted in Fig. 2.

**Table 2: Rural Development Initiatives by the Indian Government**

Schemes	Year	Objectives
NATIONAL SOCIAL ASSISTANCE PROGRAMME	1995	Financial assistance to widows and elderly
MEMBER OF PARLIAMENT LOCAL DEVELOPMENT SCHEME (MPLADS)	1993	Development work in their respective constituency
ANTODAYA ANNA YOJANA (AAY)	2000	Food grains to BPL families
SARV SHIKSHA ABHIYAN	2000	Free education to children below 14 years
SAMPOORNA GRAMEEN ROZGAR YOJANA	2001	Employment to poor and food
PROVISION OF URBAN AMENITIES IN RURAL AREAS (PURA)	2004	Urban amenities to rural people
NATIONAL RURAL EMPLOYMENT GUARANTEE (NREGA)	2005	100 days of employment to unskilled labour
SWARNJAYANTI GRAM SWAROZGAR YOJANA (SGSY)/NATIONAL RURAL LIVELIHOOD MISSION	2011	Women self-employment
UNNAT BHARAT ABHIYAN	2014	Higher education to rural people
SANSAD ADRASH GRAM YOJANA (SAGY)	2014	Self-reliant villages
SWACHHA BHARAT ABHIYAN	2014	Sanitation and cleanliness
DEENDAYAL UPADHYAYA GRAMEEN KAUSHALYA YOJANA	2014	Employment and education to rural youth
PRADHAN MANTRI GRAM SADAK YOJANA (PMGSY)	2015	Road connectivity
PRIME MINISTER RURAL DEVELOPMENT FELLOWS SCHEME	2018	Rural development
JAL SHAKTI ABHIYAN	2019	Water conservation

#### Initiatives Taken by the Indian Government Towards Sustainable Rural Development

The Government of India, Ministry of Rural development along with allied departments have launched various schemes /plans from time to time for the upliftment of the rural sector of the country. Some of the schemes have been listed in Table 2 as depicted below:

For the development of Border Villages there is one special scheme-BORDER AREA DEVELOPMENT PROGRAMME (BADP)

The Department of Border Management, Ministry of Home Affairs has been implementing this scheme through the state governments for the comprehensive development of Border areas. This was first started in (1993-94) for the western (border) region only but now it covers 17 states of India, with a total of 394 border blocks of 111 border districts. It is an initiative

of the central government to cater to the special needs of the inaccessible border villages/areas to bridge the gap between border and non-border areas w.r.t socioeconomic infrastructure and secure environment. The programme also covers proposals related to Swachh Bharat Abhiyan, skill development programmes, promotion of sports activities in border areas, promotion of rural and border tourism, protection of heritage sites, construction of helipads in hilly areas that are inaccessible by roads. The programme aims at making living in border areas sustainable by providing of basic amenities to these villages.<sup>28,29</sup>

#### Healthy Practices to make Villages Sustainable

Review of the literature reveals several studies have been carried out to gauge the awareness level of the villagers, towards the environment and the healthy practices which they follow for sustainable existence. Emphasis has been laid on the application of

science & technology, Information & communication technology etc. to make the villages more resilient and sustainable.

A press release by the Ministry of Finance, Government of India, states that the nation is advancing towards the target 2030 of Sustainable Development Goals (SDGs) amidst the launch of various schemes like Swachh Bharat, Pradhan Mantri Awaas Yojana, Smart cities etc. India's SDG index is between 42-69 for the states and 57-68 for the union territories.<sup>15</sup> Various targets can be achieved through the concept of eco-villages, a way of addressing the issues at grass root level.<sup>7</sup> Some case studies segregated based on different issues have been discussed.

### Basic Amenities

A case study on village Bakrol (Maharashtra, India)<sup>38</sup> was done with an aim to make it a dream village by providing the basic facilities related to health, irrigation, transportation, a proper drainage system and recreation. Rainwater harvesting as a step towards water conservation was also a part of this smart village development plan. Transformation of this village into a dream village could be accomplished through the application of technology with future of up gradation.<sup>12</sup> A relative study of a (local) village Alsude and Ralegansiddhi (smart) village was conducted. Issues associated with environment, social & cultural issues, education etc. were reviewed and smart applications of science & technology was suggested.

Survey based study on village Ponkurichi in Tamil Nadu was done<sup>39</sup> to assess the number of non-available essential facilities. Strategies and plans for better development were reviewed, which gradually transformed this simple village into a smart village. Up gradation of health centre & transportation, improved water rainwater harvesting system, a systematic waste disposal system, recreational area etc. were suggested as per the SAGY guidelines.

### Environmental Sanitation and Assessment

Assessment of environmental sanitation of village Sukena in Nashik (Maharashtra, India) along with evaluation of evaluation<sup>40</sup> facilities like water availability, hygiene of the houses, solid, liquid waste management as well as grey water management

was carried out. Physico-chemical parameters of soil, water and drainage water (pre and post monsoon) for their quality, level of pollution, pesticide concentration, acidity, organic matter, bulk density, porosity for quality analysis etc. showed that value of certain parameters was above normal. Practices like making compost pits, laying of drainage lines etc. if initiated would maintain the environment & health of the village and villagers respectively. Noco-relation was found between education and environmental consciousness through the conducted surveys.<sup>41</sup>

Another matter of concern, the burning and disposing of household waste in the open spaces, was a common village practice. The reason was non-availability of a proper waste disposal system by the municipal corporation. This not only lead to the pollution of land and soil, but the fumes/ smoke emitted also polluted the environment, thus putting the health and hygiene of the people to threat. This practice of incomplete combustion of the waste lead to emission of PM<sub>2.5</sub>, PM<sub>10</sub>, benzene, SO<sub>2</sub>, etc.<sup>29</sup>

### People's Participation

People's participation played an important role in the development and progress of villages.<sup>42,43,5</sup> Many good practices like community biogas units, tree (medicinal) plantation, food- processing units etc.<sup>5</sup> if put into practice, could give way to more entrepreneurship opportunities and decentralization of industries. Villages can progress in the social as well as economic sector if the stakeholder themselves took the initiative. The participation of stakeholders would also help in better implementation and the effectiveness of various developmental schemes/plans/policies. Development in the sectors of industry, agriculture, health and sanitation, education, livelihood security, environment protection etc. was emphasised<sup>43,44,5</sup>

### Environmental Awareness

Awareness level of villagers pertaining to certain environmental issues in Turkey indicated that only 7.56% people were aware, irrespective of their age and education.<sup>41</sup> This level of awareness of the villager folk was gauged through interviews/ interactions, surveys, and questionnaires. Low income, consciousness regarding environment, lack of strict enforcement of pollution laws on the enterprises/industrial units etc. were some of the attributes. Village tourism helped in increasing

consciousness level of the villagers, as dumping of the waste along the roadside/ backyard witnessed a decline and the waste was dumped at the common dumping site.<sup>30</sup> Lots of environmental awareness that was projected through social & entertainment media<sup>41</sup> was not actually put into practice and only 30% of the villagers followed such healthy practices. On the other hand, awareness imparted through group discussions, interviews, interactions, showed better results (90% of the villagers followed).<sup>31</sup>

Similarly, efforts were made to generate awareness in the farmers towards the safe use and application of pesticides<sup>41,34</sup> and their health implications. Information was collected through questionnaires and the data so generated indicated that awareness level was low, and it could be improved by focusing on educating the farmers via field trainings and by conducting workshops on safe use of pesticides. The people who dwell in rural areas were neither aware of the organizations working towards environment conservation nor about getting their membership.<sup>41</sup> Hence such information was suggested a part of the education curriculum.<sup>45</sup>

### **Application of Technology**

Villages were made smart and clean through various projects that were designed by the students of engineering. Application of technology helped the villages in better management of waste, sanitation, renewable energy and even skill development. One of the challenges in keeping the villages & their environment clean was the practice of open defecation.<sup>46</sup> Open defecation in Cambodian villages was an issue of concern as approximately 72% of the population practiced open defecation. Strategies/ plans were made for better implementation of such rural plans. Improvement in sanitation by local authorities was suggested for hygienic living conditions. Sometimes the poor capacity of the local government and the lack of the public education was also a hindrance.<sup>47</sup>

### **Rurbanization**

Rurbanization i.e. giving urban facilities to a rural area, was another step that helped in overall development of villages. A survey of village Umbhel of Gujarat (India) was carried out to find the economic and technical advancement of the village. Basic facilities and infrastructural development were viewed and suggestions regarding health

& sanitation, solid waste management, pond rectification were put forth. A village also needs some sources of recreation.<sup>48</sup> Similarly, village Chansad (Gujarat) and Kolavada<sup>9</sup> were also undertaken for a case study to review the provision of certain urban amenities a step towards rurbanization. The study was conducted on the UDPI guidelines and the gap between the available and non-available facilities helped in designing of better plans & policies. Implementation of rainwater harvesting, availability of Wi-Fi network, door to door dustbins, sanitation facilities etc. if implemented would make the village more sustainable.<sup>49</sup>

### **Role of Information & Communication Technology**

Information & technology has always played a pivotal role in making a village smart. With advanced technologies like remote sensing & geographic information system (GIS), a Village Information system (VIS) was developed. With this web-based system, complete information of a village related to population, infrastructure, type of building, etc. was generated and collected.<sup>50</sup> Application of technology<sup>4</sup> to improve the life of villagers, GIS, web services, Global Positioning System (GPS) and other location-based technologies would help to make villages better settlements with good roads, schools, and precision agriculture<sup>51</sup> and preparedness for disaster management. Application of modern technology can help a village achieve food security, management and conservation of waste, water & energy, easy availability of safe drinking water, better conditions of health & sanitation, good education facilities etc. and make them sustainable.<sup>52</sup> Awareness in villagers had to be created with the help of NGOs and people's participation. Availability of biogas plants, RO's for safe drinking water, solar systems for streetlights & water heating, good agricultural practices etc. made a village smart and sustainable. The role of women, education and good governance played a pivotal role towards building of a village 'smart'.

It was also considered that information and technology was the only way to improve the infrastructure and the village-based activities.<sup>53</sup> Further issues like ration management, notifications of vacancies, tax payment, dairy management etc. could be accomplished through internet services. This would not only help the villagers to check their requisite details at any given time but would also save paper as well as paperwork, help in

maintenance of accounts etc. Even availability of labour could be checked through the given module. Various modules were to be generated through information and communication technology. Had there been smart technologies, there would be smart innovations, smart infrastructure, and hence smart villages, boasting of smart socio-economic status and a smart environment.<sup>11</sup>

It was a smart village that was the foundation of a developing India. The focus was on efficient use of energy, good local governance and responsible citizens who enjoyed all the basic amenities. There was need to have good governance models to monitor and execute the well-planned schemes. Application of advanced technology would help the various plans and policies to become effective.<sup>8</sup>

#### **Impact of Badp on the Study Area**

The main objective of the Border Area Development Programme (BADP) is to meet the specific needs of these inaccessible and remote areas and make them progressive and developed. This centrally sponsored programme provides funds for construction of roads (74.63%), drainage & irrigation (10.35%), (8.12%) for the development of education infrastructure and 6.90% for other works.<sup>22</sup> It has been concluded that BADP has mainly contributed towards road construction and little has been done in the education, health sector and basic village infrastructure, employment generation and agricultural development thus leaving the inhabitants by and large disappointed.

A smart village was the one that had the potential to meet the global needs. So socio-economic aspects of a village were to be analysed and measures were to be taken to improve the literacy rate, generate more employment, provide facilities for skilled labour and had ways and means to get information on important issues. Easy access to vocational training was needed to impart training to the unemployed youth. Various kinds of government plans had helped in rural development like fertilizers subsidy, mid-day meal scheme, NREGA (National Rural Employment Guarantee Act, Swachh Bharat Abhiyan) etc. which eventually led to overall development and progress of Indian villages.<sup>10</sup> Keeping in mind the key sustainability issues, the various practices highlighted above in different villages of the world were an indication that the nations were working

to the best of their capacities to make villages self-reliant and self-sufficient in compliance with the three pillars of sustainability. In a similar way various government plans should include such healthy practices as part of the development plans especially of border villages which are still lagging the mainstream villages.

A review of national and international research work brought to light the difference in the availability and non-availability of basic infrastructure in developed and underdeveloped nations that made a village was smart, self-sufficient and a holistic, sustainable development.<sup>54</sup> Only then the people would enjoy a good socio-economic status and a better standard of living. Environmental sustainability and participatory approach were the need of the hour to make the villages swaraj and suraj.<sup>55,17,19</sup> Although, some issues of rural communities had been addressed through the technological advancement but there was a need for a place-based approach for smart rural development. Special projects could be initiated depending on geographical, cultural, or local specifications.<sup>54</sup>

Border area villages had many types of issues and problems such as income distribution, structure of economy, agriculture related problems, industries, and illegal distillation etc. To deal with such issues, focus must be on skill development, employment generation, capacity building through co-operations, Panchayati raj, etc. Living standards could be improved by providing basic facilities such as good schools with buildings and proper teaching staff and other facilities. Special attention was needed for villages which were in the 0-5 km range of border belt.<sup>20, 21</sup> There was a need to develop a comprehensive approach towards planning of various centrally and state sponsored schemes especially BADP. Funds should be sanctioned towards neglected sectors of development like Information & Technology, health facilities and infrastructure and enhance local employability. As the economy of these villages is agriculture based so BADP should focus on the agriculture sector and set up agro-based industries to generate employment. This centrally scheme need to focus more on establishing institutes that provide skill-based training to the youth of these villages. All such schemes should address the felt needs of these special areas.

The main purpose of NREGA<sup>56</sup> was to create assets like roads, canals, wells, ponds, etc. This scheme also helps in protecting the environment, empowering rural women, providing social equity and reduces rural-urban migration.<sup>13, 21</sup> The basic amenities like school, housing, health facility, repair and maintenance of existing infrastructure etc. could be provided with participatory planning.<sup>57</sup>

### Conclusion

There are many issues that have been overlooked while policy planning which would have accelerated the rural development towards sustainability. People's participation should be made an integral part of policy making process at all the stages like decision making, planning, implementation, and evaluation etc. so that policies may be amended as per the local requirements or development. Affordable and easily available alternative sources of energy must be provided and recycling of all kinds of wastes should be encouraged as a step towards sustainable existence. Special efforts to create awareness of conservation and management of natural resources should be carried for a more sustainable rural development. Agriculture waste management units (incubation entrepreneur centres) may set up in villages on individual or cluster basis to curb stubble burning as well as generate employment. Promotion of Eichhornia based green technology can help solve related issues that villages face. Development schemes that promote skill development and vocational training should be implemented on priority basis to enhance livelihood avenues for the unemployed village youth. This would curtail the rural-urban migration to a great extent. By providing all basic amenities to the villages the standard of living and lifestyle of the villagers could be improved.

The Government of India has launched several schemes, plans or policies for the betterment of

villages or rural India and many are in the pipeline. As border villages seem not to be a part of the larger picture of progressive Punjab, thus a comprehensive master plan should be made so that the benefits of these programmes reach the target groups in a better way. Even a separate Directorate for Border Areas could be established that cater to their specific needs. A proper follow up of these plans as well as the success rate, need to be reviewed rigorously. A good coordination between different departments working for the welfare of the rural masses is very important. Funds should not be allotted to same development sector and same village every year. Yearly assessment must be done before the release of funds for the next year. Also, it would make progress better if funds are dispersed in the beginning of every financial year. Another thing is to sensitise the residents of the strategic importance of their area and involve them in the village development. If the socio-economic status and the environment (sustainability pillars) are strengthened, then these villages would stride towards a development that is sustainable in the real sense.

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