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RESEARCH ARTICLE

Communicating Science in India through People's Science Movements (PSMs)

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ABSTRACT

It hardly needs emphasis that People's Science Movements (PSMs) in India have been very unique and such movements are not seen elsewhere although science popularization/science communication movements were seen in USA, Europe and Australia. Since, PSM as social phenomena have caught our academic fascination, we first tried to characterise the phenomenon and second, tried to locate such phenomena in their historically context, tracing their socio-historical roots. Lastly, through extensive studies of six cases of various types of PSMs (e.g., *Bharat Gyan Vigyan Samiti*, Delhi Science Forum, *Jana Vignana Vedika*, *Paschim Banga Vigyan Manch*, *Odisha Bigyan Prachar Samiti*, and *Marathi Vidyan Parishad*) we have tried to analyse them from the view point of a social movement perspective, such as the Resource Mobilization Theory.

KEYWORDS: Science Movement, *Jan Vigyan Jatha*, Campaign, BGVS, Scientific Temper

Introduction

People's Science Movements (PSMs) is a little studied phenomenon in India although these have been in existence for several decades now. But these are seen as wider current of social movements. Rooted in social reformists' thinking of the

1950s, PSMs attempt to popularise non-mystical, scientific thinking, especially among India's common masses. Many PSMs have evolved into significant centres of activism.

There is variety in PSMs of different shades. These shades can be combined under three trends: (1) humanitarian — a matter of personal conscience, without any social rationalisation; (2) nationalist — an urge to contribute to the development of the national personality, coupled with realisation that requires development of the economic conditions and the creativity of the broad masses of the people with whom S&T must link directly, and (3) radical — an urge to contribute to the liberation of the masses from social oppression and exploitation and through this to the release of creative mass energy, a task mobilisation which needs intellectual input and a scientisation of mass culture.

A mixture of these three trends generates a variety of people's science initiatives:

(a) Frontier challenges: going to the people and enquiring what their material needs are, and applying scientific and technological knowledge to meet them at costs within the means of a greater number of people;

(b) Knowledge transfer: mass education in science and technology;

(c) Stimulating mass creativity: working together with the masses to devise 'appropriate technology', in the process stimulating technological creativity of the masses;

(d) Technology as a tool in political struggle: devising technology to serve as a tool in the political struggle of the exploited masses against their exploiters, more 'self-reliant' technology from the point of view of the poor, through which they may have greater control over the production process;

(e) Conscientisation: seeking to raise the capacity of the poor to analyse their environment scientifically and bringing to them scientific knowledge of wider reality to help them take appropriate courses of action to change reality in their favour (Rahman, 1979:59).

The first three varieties are consistent with the first two trends i.e. humanitarian and nationalist. The third may not be

inconsistent with the radical trend and may be seen to overlap with the fourth. The fourth and fifth are explicitly radical. However, the 'conscientisation' in improperly motivated hands can be reactionary or reformist aimed at preserving or marginally improving the societal status quo.

PSMs have been widespread in India at the regional and national level since 1960s. They make an important group among Indian science movements. Indian science movements include all science movements that have emerged in response to modern science and technology. However, it can be seen that the idea of PSM has evolved historically under the initiative of certain voluntary science groups. Many of these groups have multi-prolonged activities in areas including education, development, environment, health, science popularisation, appropriate technology, etc. The present study uses the term PSM in this strict sense.

PSM's critical role has been recognised through the symbolic value of science. By accepting the symbolic value of science as its major political value, PSM finds its demand for the dissemination of the scientific temper among the masses as a pre-condition for social transformation. On the other hand, they demand the use of scientific information and procedures in the method of decision-making and implementation of decision by the ruling elite. They even objectively probe the social and political dimensions of scientific temper that scientists provide when they underplay the hazards of nuclear technology or the use of dichlorodiphenyltrichloroethane (DDT).

Therefore, whether it is in the area of science education, spreading reasoning and scientific temper in society, or the critical role of science in the developmental process for creating an equal and social just society, the changed nature of relationship of science and society can no longer be ignored. Studying people's science movements would examine these issues with visions and perspectives.

Background of PSM: The Socio-historical Context

Among various people's movements, PSM is a growing and unique movement in India. It is unique to India since it is difficult to find a similar movement in other parts of the world.

Parayil (1992) calls the PSM as a 'unique social movement'. He finds that it is probably the only citizen's movement of its kind, and perhaps in the whole World. PSM has been initiated in specific contexts, by middle class intelligentsia (Guha, 1988:8). Guha notes:

'For the PSMs, science has been distorted by the capitalist imperialist system and the task is to free it from these chains of domination and allow it to realise its true potential. In this sense, the PSMs are attempting to bring to fruition the ideals of the French Revolution — democracy, equality, and fraternity — that were taken out but never fully realised by the classical socialist tradition. The PSMs believe that modern science and industrialisation are not antithetical to the vision — rather, once freed from the imperatives of capitalism and militarism, science can be a major instrument in the creation of a just, egalitarian and economically prosperous society.'

For PSM organisations, the human society is divided into two broad sections such as majority (have-nots), which is being continuously impoverished or faces the threat of impoverishment, and a minority (haves), which is continuously getting enriched at the expense of the majority. S&T have been and still is a powerful weapon in the hands of this minority in their exploitation of the majority as well as the plunder of natural resources. And PSMs are partisan towards the majority whenever their genuine interests clash with the interests of the minority. The PSMs believe that they should arm the majority and their movements carrying the critical attitudes in their fight against exploitation and deprivation. While trying to take science to people the PSM groups show their own partisanship with the people (have-nots).

Zachariah (1989), one of the protagonists of PSM, stresses that economically poor and politically powerless people constitute the vast majority in most of the nations of Asia, Africa, and Latin America. Although the governments of these nations are or appear to be committed to development, their policies and actions to promote development mainly through stimulating growth in certain sectors of the economy do not necessarily improve the living standards of most poor people and, indeed, create large groups of victims of development. The attempts of

various Western governments, institutional agencies, national governments and non-governmental organisations (NGOs) to promote development in Asia, Africa, and Latin America during post-World War II and their acknowledged failure to do so in large measure have resulted in vigorous criticisms of the motives, approaches and actions of these institutions.

The most persistent and valid criticisms of the attempt by most Western as well as national governments to promote development is that it ignores, except in rhetorical statements, the genuine aspirations of poor and powerless people. Three other major criticisms too follow. The national and international elites use the state to put in place policies that promote their own class interests prompting the legitimate question — development for whom? These elites do not understand the real problems people face and the contextual rationality that motivates such people to think and act in the ways they do. The elites do not value the knowledge and experience of the people on whom they impose their policies for development. This has been known as the 'top-down' approach.

The phrase 'development from below' acknowledges the validity of these criticisms and argues for a perspective focusing on the (a) importance of confrontation and conflict in any genuine development process and (b) the necessity to make genuine, deliberate attempts to improve the living standards of poor people, attempts that cannot be too hasty or too slow. The dominant class of the society, commonly referred to as elites, controls and manipulates all affairs of the state. They control scientific and technological knowledge hubs i.e. the university and research institutions, which do not have any form of social commitment. They also control all developmental superstructures. This has pushed the citizens of the state into background and ultimately into oblivion.

Of late a class of intelligentsia is emerging in the society which appears to have a deep concern about growing alienation between minority dominant classes i.e. elites with access to knowledge, resource, power and privileges, and the majority common masses deprived from it. Such deprivations resulted in the 'people's organisations' in the country. There has also taken place a remarkable spurt in consciousness of common people

which largely remains unnoticed and unserved by institutional structures that prevails and exploits the masses. For example, when the state's corporate policies destabilized the environmental balance by polluting air, water, and deforestation it triggered the emergence of people's movements in various parts of the country.

While the servility of the elite to the western paradigm of progress and modernisation gave rise to academic colonialism which produced a university system and a research and development set up that are turning out a class of scientists and professionals without social commitment, many people's organisations are coming up with commitments to disseminate scientific knowledge among the masses. Many of the PSM organisations are of this kind. It is not merely intellectual content but initiatives from 'intellectuals' that distinguishes PSMs from other movements. Throughout Indian history intellectuals originated and existed away from the common people. Such intellectuals have, by and large, confined themselves to writing in alien language which could not empower the masses with their ideas. Post 1960s brought some intellectuals who resulted from the growth of people's movements in rural areas. These intellectuals who are equipped with the direct experience of various problems and expressions existing in the society started contributing to spread and strengthening of PSMs in different parts of the country.

PSM organisations present opportunities to intellectuals for interacting with people. Intellectuals also learn from the life experiences of the people. They have vast unstructured experiences. They are not capable of viewing their experiences in a structured whole and consequently unable to understand the complexity of the problems in the larger social context. The intermingling and interaction of intellectuals and the common people brings an enrichment of knowledge. From intellectuals' side, this leads to the democratisation of knowledge which in turn helps not only in reducing the prevailing social and economic inequality in the society, but also in achieving a better quality of life.

PSMs consist of a large number of actors consisting of science professionals, engineers, doctors, scientists and a large

number of teachers, local people and communities, and in many instances *panchayats* (elected local governing bodies of India), in very large numbers to work across the country. The movement combines reconstruction and struggle in its efforts working in areas of education, literacy, environment, health, rural production, energy and local governance systems and uses various forms of struggles to resist the neoliberal policies. Whenever feasible, it collaborates with the government, but also confronts it when it finds itself in disagreement. In particular, it has experimented actively in local level people's planning methods, in collaboration with the *panchayats*, as a means of resisting the centralising tendencies of the neoliberal paradigm (Raina, 2003). The crux of the PSM seems to be in making scientific and technological thinking and knowledge available and relevant to the common people in terms of their everyday experience.

Genesis, Formation and Growth of People's Science Movement

The genesis of the concept of PSM in Indian context is a post-colonial phenomenon. The decisive intervention came from the *Kerala Shashtra Sahitya Parishad* (KSSP). It was formed in 1962 as a Forum of Science Writers. The Science Writers Association of India (SWAI) was another independent initiative. KSSP was confined to the language of Malayalam (a south Indian Language), while SWAI, mostly in Hindi and English. In 1966, half a dozen other organisations came into existence in Bombay (now Mumbai), initiated mainly by scientists from Bhabha Atomic Research Centre (BARC) and Tata Institute of Fundamental Research (TIFR). These organisations were also networked into a Federation of Indian Languages Science Association (FILSA) in the same year. It was founded by M. P. Parameswaran (popularly known as MP) and his associates.

As an individual, he was influenced by the Soviet model for science popularisation while pursuing his doctoral studies in Nuclear Engineering from the Moscow Power Institute in 1965. He saw then in Soviet Union, science being popularised in native languages. It was popularised in three areas such as

Turkmenistan, Uzbekistan, and Kazakhstan. Such an idea motivated Indian scientists to meet once a week and think of popularising science in Indian languages. This underlying philosophy provided Parameswaran a proposal that knowledge should be available in people's language. He also realised that the then Soviet Union was a motivation to the Indian intelligentsia, as it stood before them as the model of socialist system, in contrast with the capitalism in United States of America (USA), during cold war days. The then Soviet Union had an upper hand in S&T in comparison with USA. This raised hope among the intelligentsia all over the world to utilise modern S&T for the progress of the society.

Initially through the efforts of FILSA, various Indian languages were used for science popularisation. These languages were Malayalam, Tamil, Kannada, Telugu, Hindi, Gujarati and Marathi. But FILSA was active only for two years i.e. from 1966-1968. It had no formal office during the functioning period. It had held two or three workshops over the period of two years. It did not have funding. However, it organized half a dozen meetings during the period of two years. Most of the meetings were workshops by nature. Even the organisations under FILSA are almost now deceased except *Hindi Vigyan Sabha* (Hindi Science Assembly). The headquarters of FILSA was in BARC, Bombay. FILSA was the pre-formation of the present All India People's Science Network (AIPSN). In other words, FILSA was the proto of AIPSN.

One of the important constituents of PSMs in India is KSSP. A brief background of KSSP helps to understand the formation of the PSMs in India. KSSP is the largest[1] among all the PSM organisations in India and most active association in this field since 1962. KSSP was formally inaugurated in September 1962 at Kozhikode in the state of Kerala. It was formed by the merging of three groups of intelligentsia. The first strand was the

[1] According to AIPSN member organisation profile (2002, May), KSSP has 45,051 members. *Paschim Banga Vigyan Mancha* of West Bengal, the second largest PSM has a membership of 25,000; 16,000 in Tamil Nadu Science Forum of Tamil Nadu State, *Jan Vigyan Vedika* of Andhra Pradesh State consists of 12,000 members; 5,000 in *Karnataka Rajya Vigyan Parishad* of Karnataka State (Isaac, *et al.*, 1997).

Sastra Sahitya Samithy (Science Literary Forum) formed in 1957 at Ottappalam, by a group of activists and science writers. The second group was formed in 1962 at Kozhikode by a group of science writers. The third group was the Malayalee scientists working in Bombay, who started *Sastra Sahitya Parishad* in January 1966 after coming in contact with KSSP.

As a part of KSSP's activities, several publications were brought out in order to popularise science in keeping with its objectives of science for the development of society in Kerala. In the 1970s and 80s, the KSSP as an organisation expanded into a mass movement[2] which devoted itself to other concerns, such as elementary education, health, environment, literacy, energy, development, micro planning, etc. In 1973, the KSSP adopted the theme 'Science for Social Revolution' (Zachariah and Sooryamoorthy, 1994:20) and took up specific issues for intensive mobilisation. Till 1978, KSSP was situating all the dissemination of science activities under the very term 'science popularisation' only. But the phrase 'people's science movement' was coined by K. P. Kannan, another activist of KSSP and introduced formally, for the first time, in 1978 at the Trivandrum Convention of people's science groups. A distinction can be drawn between science popularisation and people's science movement on the basis of the nature they played in Indian context. The former is apolitical by nature and the latter is political.

The Trivandrum convention brought all the voluntary groups[3] working in areas at the interface of science and society together under the banner of PSM. While some voluntary groups attempted to popularise the natural sciences, some were engaged in focusing attention on the irrational attitudes and policies towards such basic issues as health and sanitation; others were engaged in highlighting the adverse impact of development activities as a result of wrong application of science and technology, particularly in the field of environment; a few were

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[2] KSSP achieved the status of mass movement, 'the only of its kind in perhaps the whole of Asia' in mid 1970s itself (Krishnakumar, 1977; Krishna, 1997b).

[3] The website of KSSP provides the list of PSMs, who are the members of AIPSN.

engaged in demonstrating innovative and interesting ways of teaching science; while quite a few were engaged in the application of local/indigenous S&T in development activities in the areas of health, non-formal education, appropriate technology, housing, etc. The role and experiences of these voluntary groups in the broader socio-economic and political context of the country was discussed in the convention. The deliberations were around four general themes such as (i) formal and non-formal education, (ii) people's health movements, (iii) scientific research and technology, and (iv) utilisation of science for social revolution (Vaidyanathan *et al.*, 1979:57).

A second All India Convention was organised during February 9-11, 1983, at Trivandrum, which focused on the need to define the term PSM from a national perspective. In the wake of formal and informal discussions and interactions of organisations in the convention, four areas such as health, education, environment, and use of art as a medium of communication were identified for future programmes of actions as a basis for initiating a PSM in the country. This led to the recognition of two forces that the movement was opposed to. The first of these forces consisted of godmen who oppress the poor socio-culturally by perpetuating supernatural and superstitious beliefs; the second force is that of capitalist development which is 'impoverishing the majority while enriching the few' (Jaffry *et al*., 1983:372).

In May 1985, the KSSP and the other science-based voluntary groups organised an all India *jatha* (procession) in memory of thousands who died during the Bhopal disaster. The science-based mobilisations in states like Karnataka, Maharashtra and Andhra Pradesh joined with the KSSP in organising this *jatha*. As the contacts among the various groups and organisations grew, the concept of a *Sastra Kala Jatha* (Science Art Procession) took shape. The KSSP had been organising such *jathas* since 1980 with the involvement of local artists. The 1985 *jatha* was followed by similar programmes in Tamil Nadu Science Forum (TNSF) and the Pondichery Science Forum (PSF), and in the state of Gujarat with the assistance of the *Gujarat Vigyan Sabha* (Gujarat Science Assembly).

It was these initiatives that enhanced the conceptualisation of PSM. By the early 1980s other organisations for the propagation of science had also emerged in different parts of the country. These voluntary organisations, through mutual interaction and sharing of ideas influenced each other and these interactions empowered and equipped them to be relevant in the Indian context. Along with the KSSP, 26 other like-minded organisations came together during the same year on the eve of the third anniversary of the Bhopal Gas Tragedy in October-November 1987 to organise the *Bharat Jan Vigyan Jatha* (All India People's Science Festival/People's Science Procession of India) which was sponsored by Department of Science and Technology (DST), Government of India (GOI). The *jatha* covered 500 centres in 14 states of India. Five *jathas*, along with cultural or *kala* (art) groups from five different regions of the country, gathered in Bhopal. A 2,000 km procession converged at Bhopal from five different directions. The message was – science for peace, humanity, secularism and self-reliance. This was a massive attempt for the development of scientific communication to promote scientific awareness through a cultural caravan. It helped the expansion of PSM into a network of people's science organisations across the country. The success of *Bharat Jan Vigyan Jatha* (BJVJ) was followed by the first All India People's Science Conference, which was held in Kannur in Kerala in 1988. At this conference, AIPSN, a loose coalition of people's science organisations across the country, was formed. It is an existent network, one of the leading actors of PSM.

Conventionally, the headquarters of AIPSN resides in the Secretary's office because the organisational job is done by the Secretary of AIPSN. Currently, the AIPSN is a large federation of 40 organisations from over twenty states (except in Jammu and Kashmir, and a few North Eastern States) and with a total membership of over 300,000 spread throughout India. The AIPSN is a fairly extensive network. It is committed to the use of science to promote science for equitable and sustainable development. The network has a reach in 18,000 villages spread over 300 districts of the country. The organisations under this network vary from each other in terms of their size, specific and local level initiatives. These PSM organisations are not only

specialised in roles but they are also localised in some part of particular province/state. The network has brought together students, school and college teachers, scientists, professional experts, writers, workers, farmers, political activists and thinkers on a single platform. The network played the role of establishing strong communication among the activists from various PSM organisations.

The basic philosophy of the PSM is to treat S&T as a means to achieve the goal of an equitable and sustainable society. The PSM organisations believe that the public needs to develop a critical understanding of S&T in order to be able to participate in the application of S&T, especially in the choice of technologies in different contexts. Given the widespread literacy, the efforts to propagate science awareness and create a scientific temper among the people should go hand-in-hand with efforts in mass literacy. In 1989, the KSSP undertook a massive literacy drive in the district of Ernakulam in collaboration with the district administration. The KSSP made use of its well-honed medium of *kala jatha* to reach out to the population. This proved to be a major success. The success led AIPSN to take up literacy as an empowerment programme in the campaign mode, for which it set up a separate organisation called the *Bharat Gyan Vigyan Samiti* (Indian Organisation for Learning and Science) with the primary responsibility of placing 'literacy' on the national agenda. Indeed, literacy campaigns later on formed an essential component of almost all the people's science organisations.

However, the PSM activities in India can be classified into four broad categories:

1. *Science Communication and Science Educatio*n: The basis of PSM in several states has been science communication and science education. It is the basis for the movement in several states. It involves science teachers, working scientists and the science-qualified middle-class and students. The activities include science publications, popular science lectures, street plays and school science activities. The publication of science books, periodicals, articles in the vernacular languages was the initial and central activity. Cultural forms of communication are extensively used in the *kala jathas*.

One of the sustained activities of the *Haryana Vigyan Manch* (Haryana Science Forum) has been its campaign against superstitions and myths. For children, in particular, science popularisation by the PSM organisations has been through children's science festivals, children's science projects, quiz contests, science tours and children's science books. An Annual Children's Science Congress is held every year by the AIPSN shortly before the Annual Indian Science Congress. Besides, innovative science teaching methods are also propagated by some of the PSM organisations. Many of the PSM organisations are the recipients of the National Awards for Excellence in Science Communication e.g. PSF, TNSF, Haryana Science Forum, the *Karnataka Rajya Vigyan Parishad* (Karnataka State Science Association), the *Madhya Pradesh Vigyan Sabha* (Madhya Pradesh Science Assembly), *Srujanika in Orissa*, the Assam Science Society, the *Paschim Banga Vigyan Manch* (West Bengal Science Forum) and the KSSP (in Kerala).

2. *Policy Critiques especially in S&T*: The PSM organisations allow scientists and professionals not only to critically evaluate state policies about S&T and research and development policies but also to study their inadequacies and propose viable alternatives. The underlying idea is that a detailed critical understanding of developmental policies may enable people's organisations to intervene in scientific decision-making. Sustained interventions in the area of S&T policy and management are required if people-oriented science-society linkages emerge. The PSM organisations have periodically intervened in this direction through the means of advocacy and campaigns. The studies and articulated positions of the PSM organisations have played a significant role in national debates on issues like nuclear disarmament, patent laws and intellectual property rights, health and drug policies, energy and environment policies, reforms in the telecommunication and power sectors, *panchayats* and other decentralisation policies. The burning example of this is DSF, New Delhi.

3. *Grassroots Level Development Intervention*s: This has been a major component of the PSM's initiatives through mass campaigns and discussions. By developing pilot models in literacy, health, agriculture, credit cooperatives, watershed development, local level planning programmes, promotion of small enterprises and their networking, the PSM organisations have been able to intervene effectively in the decision-making process in several instances. These campaigns serve the purpose of people's resistance to bad policies and highlight their demand for appropriate alternatives. The best illustration of this kind could be the BGVS.
4. *Alternative Technology and Development*: The PSM organisations have engaged in developing and encouraging people-oriented alternative technologies that are less capital-intensive and empower a large number of people, workers, craftspersons and artisans. Some examples of such initiatives are: wireless in local loop for telecommunications, the computer and village information software, bio-mass as replacement for cement/concrete in civil constructions, windmills and bio-mass based energy systems, organic inputs to boost agricultural productivity, improved small-scale mechanised looms, small-scale oil presses and other food processing units, and mechanised black smithy. Roughly, once in every two years, the PSM organisations come together at the All India People's Science Congress (AIPSC) to review their actions, interact with experts, and learn from their experiences and plan ahead.

Thus, the PSM has come a long way from merely disseminating scientific information to involving the people in advocacy, discussions, and interventions in science-related policy and developmental issues. The movement has gone from strength to strength to become a vibrant mass movement with practically every State having an active people's science organisation. The efforts of the PSM are becoming more relevant in contemporary Indian society as the adverse impact of liberalisation and globalisation is felt increasingly by the common masses and the state is gradually

abdicating its responsibilities in education, employment, health and social welfare.

In India, people's science (voluntary) organisations do refuse to identify themselves under the generic banner of non-governmental organisation (NGO). To them, understanding the notion of NGO requires two definitions. First, the people's definition of NGO which has certain characteristics such as: (a) normally limited membership, (b) mostly paid activists, (c) for many of them it is a livelihood, (iv) they get funding, (v) with the funding they do developmental activities, (vi) knowingly/unknowingly they are the members of agents. Second, United Nations defines an NGO as a legally constituted organisation created by private persons or organisations with no control or participation or representation of any government e.g. trade unions, companies. They do not adopt either of the definitions to be considered as NGO. Consequently they claim that a PSM organisation is contrary to NGOs.

Rather people's science organisations prefer to call themselves as 'public trusts', 'activists groups', 'pressure policy agencies/groups', 'professional research consultancy agencies', 'membership and non-membership based organisations' etc. All these come under the broad category of voluntary organisations (VOs) and are based upon the act of voluntarism. The term voluntary organisation encompasses a wide range of agencies, i.e. societies, co-operatives, trusts, trade unions, forums of activism, etc. (Panda, 2003). The voluntary organisation as it stands can be defined as an organisation rooted in civil society domain; that is non-profit and voluntary in nature and needs to be registered under an Act such as: a society registered under the Societies Registration Act 1860; a trust registered under the Indian Trusts Act 1882; a cooperative under the Co-operative Societies Act 1904; a trade union under the Trade Union Act of 1926; and a company under section 25 of the Companies Act 1956 in order to meet the judicial requirements. To avail foreign contribution, they need to register under Foreign Contribution Regulation Act 1976. The absence of a common and concrete definition of voluntary organisations has led scholars to use other synonymous terms such as Non-Profit Organisations

(NPOs), Action Groups (AGs), and Voluntary Development Organisations (VDOs) interchangeably.

Ideology and Worldview

Ideology is a particular type of understanding reality and a movement cannot keep itself alive unless it develops its ideological frame and identity. An ideology of a movement relies on sets of ideas that explain and justify its purpose and methods. Moreover, ideology provides legitimacy to the action programmes of a movement. The ideological underpinnings grant the movement acceptability and recognition among the people at large in a society. It also helps to generate involvement to the cause and becomes a rallying point to assemble people to consolidate the gains of collective mobilisation.

The ideology of a people's movement is very similar to the ideologies of certain political parties in India where the objective is to capture political power. Many actions of people's movements are similar to the actions of political parties. Yet, people's movements generally avoid overt identification with political parties for several reasons even when there is considerable overlap in membership. However, people's movements can be purely non-political. These can be subtly political or covertly political and not overtly. People's movements wish to appeal to broader segments of the population than political parties typically do. They are not limited by their appeal only to one class, one caste, one religious group or one gender group. They do not wish to be tainted by association with the 'dirty tricks' every political party inevitably indulges in sooner or later (Zachariah and Sooryamoorthy, 1994:27). Too close an association with political party may compromise their ability to criticise it when it comes to power. People's movements do collaborate or cooperate with other groups, including political parties, on specific issues, to increase the strength of pressure groups, to marshal mass support and so on. They employ different action methods to accomplish their goals such as group study sessions, propaganda (including publications and street theaters), legal actions and massive protests. They tend to identify and then personify an adversary in order to focus their

active energy. In their actions, they will have a clear sense of the limits and possibilities of their capacity to bring about change.

People's movements act as a pressure group in order to help the state to accomplish popular issues in a better way. Based on their vision of a better society, they raise radical questions about the current authoritative allocation of human and financial resources to maintain or change society. One of the constant problems in relation to the PSM ideology is whether the leadership of the movement genuinely believes in the ideology which drives the members or whether it merely uses the ideology as a tool to control and manipulate those members. This ideology is, of course, in competition with other ideologies and this creates many tensions and problems for the movement.

On the one hand, PSM links science with society and studies the impact of modern science on society and vice-versa. On the other hand, it envisions a better, egalitarian society and believes that modern science can be used as a tool to transform the social system from capitalism to socialism. It believes that science has the inherent potential to change society. S&T are developed by sharing of the experiences of the community and is the result of the generalisation of the experiences. Therefore, science is the common property of humanity.

Having said so, we now present six empirical as well as secondary source based case studies (of various shades) in People's Science Movement in India, e.g., case studies of BGVS, JVV (both based on science activism of radical type), DSF (purely discursive and critical), OBPS (discursive and science popularizing turned social activism type), PBVM (fusion of science popularizing and social activism type) and MVP (purely reformist and science popularizing type).

Bharat Gyan Vigyan Samiti (BGVS)

In order to understand cognitive process in formation, it may be useful to divide the BGVS into three major phases with defined characteristics. The first phase, from 1989 to 1993, a period of awakening, was characterised by mobilisations for literacy, starting from the formation of the BGVS of 1989 followed by

three major *jathas*. The second phase, from 1994 to 1997, a period of movement building, was marked by a transition from literacy to other development initiatives and an attempt to establish a strong interface between the two. These were mainly in the areas of natural resource management, health, initiatives in basic education and the generation of social awareness through publications and the formation of saving groups on the heels of major women's mobilisations through *Samata Vigyan Utsavs* from 1996 to 1999. The third phase, from 1998 to the present, is defined by an attempt to consolidate through decentralised institutionalisation, around continuing education centres and *Gyan Vigyan Vidyalayas*, i.e. centres of non-formal education and interface with formal schooling.

According to Saldanha (2003), an assessment of the history of BGVS, suggests that there were two primary factors that influenced its trajectory; the external environment and the organisational dynamics and strategies internal to BGVS, in response to the former. Factors related to the external environment may be seen as those related to the socio-economic contexts of intervention and those resulting from the interactions with the other major agency in the literacy campaigns e.g. state/government. The strategies of the BGVS were largely in response to the spaces provided to it by the government.

Perspective and Ideological Formulations

Given that the process was visualized as being essentially democratic in character (towards strengthening people's power), it was clearly conceived as being a people's movement with the collaborative participation of various sections of society, at most time on a voluntary basis, i.e. with no payment for part time services.

The intervention of BGVS was primarily within the social developmental sector, generally considered as a sector with low political legitimacy and salience. The long term perspective of the BGVS was to contribute to social transformation towards creating a society that would be equitous and self-reliant. Other potential arenas for a social transformatory role would be those based on the political economy of agitational struggles on

livelihood issues (land, access to other natural resources, wages and conditions of labour) and the political representational struggle of an electoral character.

The keywords of the ideological perspective of the BGVS interventions over more than a decade are the following:

1. *Equity and Self Reliance:* Access to literacy and basic education itself was seen as access to equal opportunities. A perspective on self reliance was especially required in a growing unipolar and militarised superpower context and where other basic educational programmes were tending to be flooded with 'foreign aid'. This perspective was increasingly being influenced by liberalisation and privatisation of the economy in the contexts of globalisation. It was further promoted by restructuring of economies and innovation in communication and knowledge distribution.
2. *A People's Movement Approach, Decentralised Democracy, Secularism and National Integration*: The mobilisation process and organisational structures for implementing the literacy campaigns emphasised these values. The very structure of Village Education Committees was an operationalisation of this principle where an attempt was made to put together major social forces such as the government, the voluntary organised and unorganised sectors and the teaching-learning community. Secularism and national integration were important in a context where dominant national hegemony was increasingly being influenced by sectarianism and communalism.
3. *Voluntarism and Scientific Awareness*: The main body of the literacy campaigns worked on the principle of voluntarism. This involved at different times and over more than a decade voluntary activists that might number over 10 million persons. Involving these persons in acting through popular, electronic and the print media in the spread of critical scientific awareness, and literacy as possible as enabling skill to this end, was one of the important features of the literacy campaigns.

Objectives of BGVS

The objectives of the Samiti are very broad and cover the entire spectrum of socio-economic political issues. These macro objectives also reflect the nature of the Samiti. BGVS has concretized these objectives in the form of certain specific programmes, but it remains largely a movement for the comprehensive restructuring of society. It is a nation-wide mobilisation leading to a mass action. It aims to communicate the basic problems such as water, nutrition, health, environment and literacy through a self-reliant, humane, participatory process and a scientific approach. Further, it directly addresses these basic problems through deeper intellectual and physical environment. It promotes the formation of groups at the *gram panchayat* (village local bodies) level, block level, district level under the three tier system of *panchayati raj* institution (PRI) that will understand the use of science and technology for the benefit of the common man.

Technical Dimension: Campaigns, Mobilisations and Strategies

The technical dimension of the BGVS consists of the tactics and strategies, techniques of protest such as campaigns and mobilisations through which the specific objects are opposed. The two kinds of tactics used by BGVS include *jatha* and *kalajatha*. In *jatha*, there will be approximately 12 to 15 amateur performers, elocutionists and the like in two groups, selected from various districts on the basis of acting and speaking ability. They hold a camp to develop the ideas to be presented, the scripts, the roles, and to learn their parts. The puppet plays, short plays and songs they develop would constantly be revised on the basis of group and self-criticism. To minimise costs, events are held in locations as close as possible to major routes e.g., National Highway. The objectives of *jatha* are to promote scientific thinking and awareness of society's problems through the arts that the people of India can understand and identify with.

The very idea of *kalajatha* for science communication began to evolve in KSSP in 1977 while conducting a science cultural caravan. The first *kalajatha* was launched in 1981 and still the people's science movements in India consider it as an effective method to reach common masses (Narayan, 1999). The *kalajatha* were developed during 1977-88. It consisted of displays of posters, banners, hoardings, stickers; *padyatras* (marching on foot), street theatres and songs. The *kalajatha*, a powerful medium, packs its messages in the popular cultural idioms and forms, its message was hard hitting, linking literacy with many basic livelihood problems and even with questions of exploitation, oppression and discrimination against women. They attract an audience and convey messages in an aesthetically pleasing and emotionally inspiring manner. Importantly, cultural events create a forum for meeting, discussion and planning. The experience of the *kalajatha* indicates that traditional cultural forms generate the requisite social energy for a mass mobilisation like the literacy campaigns. The messages and the cultural forms that were utilised demonstrated a healthy combination of centralised initiative together with decentralised creativity through adaptations.

The BGVJ used different strategies for raising people's awareness on various scientific and social issues. These strategies were:

- developing a set of centralised messages but allowing for enough flexibility to encourage adaptation to suit local needs, problems, aspirations.
- evolving an organisational structure that is pyramidal in nature with a broad base of activists at the local or village level tapering off to smaller numbers at the taluk, district and state levels.
- involving activists on a voluntary basis and sustaining their missionary zeal through on-going training.
- undertaking meticulous planning of activities and time schedules to be followed, but allowing for corrections and modifications on the basis of feedback receive from the people.

- involving leaders and workers of political parties irrespective of ideology, and eliciting their involvement and participation in the programme.
- carrying on the whole campaign, in a time bound period i.e. almost on a 'war footing' and sustaining the tempo of the campaign and finally.
- involving the entire community in different ways, thus generating a mass support for the programme.

The major initiatives involving large scale popular mobilizations on the part of BGVS were: The *Bharat Gyan Vigyan Jatha* of 1990, *Bharat Jan Gyan Vigyan Jatha* 1992, The Campaign for *Hamara Desh* 1993-94, *Samata Jathas* (1992-93) (*Samata* Network, *Samata Vigyan Utsav*, Science Popularisation Activities: JOL and Cosmic Voyage (1994), *Gyan Vigyan Vidyalaya* Movement (2006-07), People's Health Programme (*Jan Swasthya Abhiyan*, 2003-04), People's Reading Programme (*Jan Vachan Andolan* 1994-96), and Developmental Action Programmes 1990s (Watershed development programme 1997, Integrated Drinking Water and Sanitation with People's Participation (WATSAN) 1993-1994 and Watershed Development Project from 1995-1999).

*Role of Intellectuals***:** Intellectuals have played a pivotal role in social movements and are continuing to shape ideas in the organisation and in Indian society. They play an important role to articulate and couch the terms of movement to achieve a broader appeal. For instance, BGVS was seen in the context of literacy and science popularisation to mobilise wider support for a people's science movement. In our study of BGVS, we have identified a range of intellectuals who have been formed in the social space created by this movement. In BGVS, intellectuals come from various backgrounds such as teachers, educationists, literacy activists, medical professionals and technocrats. M. P. Parameswaran, Vinod Raina, K. K. Krishnakumar, Malcolm S. Adiseshiah, Venkatesh B. Athreya, T. Sundaraman, Komal Srivastava, Kuldip Singh Tanwar are some of the intellectuals involved in BGVS. These intellectuals agreed on the nature of organisation to be a mass movement.

Delhi Science Forum (DSF)

Genesis

The government does indeed make some good and progressive policies, but during implementation these policies get distorted over the period of time. The state does not consult the people and its organisations while framing policy, yet expects these organisations to assist in implementation. Even when the people's organisations come forward to help in implementation of some progressive policies, this is soft peddled because the real agenda of the state is often different from the rhetoric. In certain cases where the people's organisations are consulted for policy formulation, this is carried out at the abstract level, and when the concrete policies are framed, the state reverts to its own pro-capitalist agenda. In this context, making the right noises is not enough; rather the intention is needed in the government to implement a pro-poor and a people's agenda. In this backdrop, the genesis of DSF was realised as a PSM in Indian context.

DSF is a noted PSM organisation concentrating on policy issues related with S&T. Though it started functioning in 1978, it was registered as a non-profit public interest organisation under the Societies Act in 1981. The organisation is based in New Delhi. It is engaged mainly in issues related to S&T policies and science popularisation. DSF works in areas of interface between science, technology and society, focusing on S&T policy issues, their impact on India's self-reliance and sovereignty, and their societal implications, particularly regarding interests of underprivileged sections of the Indian society. DSF also works to promote peace and disarmament, utilisation of S&T for environmentally sustainable development and a scientific temper including awareness of the potential of S&T. Unlike KSSP and BGVS, DSF is not a mass organisation. It is a catalyst organisation and the movement it runs is of discursivetype only. It is not a mass based organisation; rather it is a nodal agency among other PSM organisations in India. In fact, it is a pressure policy group among people's science movements in India.

Philosophy and Ideology of DSF

According to DSF's philosophy, development is long-term, sustainable and equitable with respect to both present and future generations. It is possible only by holistically integrating environmental concerns into all stages of the developmental process. DSF therefore views any environment policy as an instrument towards achieving sustainable and equitable development with particular emphasis on the interests of the poor and deprived sections of society, especially those whose lives and livelihoods are inextricably dependent upon or linked with natural resources bases.

Aims and Objectives of DSF

According to the constitution of DSF, the aims and objectives of the forum are to provide a platform for discussion on (i) social, economic and political implications of S&T policies, (ii) the problems of organisation of scientific and technological institutions, and (iii) the role of S&T personnel in the development of the country. It further argues for (i) traditional/indigenous scientific and technological knowledge and achieving self-reliance, (ii) democratisation of the work of scientific and technological institutions/organisations in the country to further the creativity of S&T personnel and people, (iii) promoting scientific temper amongst the masses, and (iv) promoting awareness amongst people about the implications of S&T policies for the society. It collaborates with other organisations both inside and outside the country with similar objectives to achieve the aims and objectives of the Forum.

Campaigns and Strategies

The technical dimension of DSF includes campaigns among working scientists, technologists, other professionals and academics on the one hand and campaigns among the general public, especially directly affected sections, for their empowerment and informed participation in decision-making by acquiring greater awareness of S&T issues. In order to do this, DSF employs various means of communication such as street plays, slide shows, exhibitions and workshops, etc. The material

produced for the communication addresses different target audiences, including policy-makers, activists, academics and general lay public. While the major content of this material is nationally coordinated, the same gets transcribed and produced at state/regional levels in local languages. The strategies of DSF are for creating material for campaigns on policies related to drug industry, health, the nuclear holocaust, the Bhopal disaster and the WTO issues. Some of the specific and major campaigns of DSF were the following: Against Indian Drug Policy (1984), Against Bhopal Gas Tragedy: industrial policy, health & safety (1985), Against New Seed Policy (1985), Against PepsiCo license in India (1986), Total Literacy in Delhi (with Delhi Literacy Society) (1991-93), Health for all and IPR-related Issues (1995), Against Enron Dabhol Power Project (1997), Against Privatisation of Power (1997), Against Privatisation of Telecom (1998), WTO-related Issues (2000), *Jatha* for Peace & Sovereignty (with AIPSN) (2003), Use of primates in scientific research: investigation into NII Primate House and CPCSEA allegations (2003), Against Privatisation of Water Utilities (2004), etc.

Publications and conferences/seminars organized

Publication is the major work of DSF which brings out critical studies of S&T policy related issues. Here DSF plays a leading role because its distinctive leadership lies in publications on several policy issues involving S&T. For DSF, a good state policy can do more good than many hundreds of NGOs working in small pockets. A bad state policy can do a lot of harm and undo the gains from several years of efforts. Therefore, there is a need to understand policy inadequacies and pose alternatives.

Developing well-studied and detailed critiques of developmental policies is essential for empowering people's organisations to seek participation/consultation in the decision-making process. S&T policies have social, economic and political implications on the people. Publications of DSF's policy work fall in the areas of (i) nuclear disarmament**,** (ii) IPRs and patent laws (iii) health policy and policies on pharmaceuticals, (iv) educational policies, (v) energy and

environment policies, (vi) sectoral policies – telecom, power, R&D, (vii) panchayats and decentralisation policies. That apart, DSF has organized a large number of seminars/conferences to pursue its agenda. Some of these were: Import of Technology & Impact on Development (1978), India and the International Drinking Water Supply & Sanitation Decade (1981), Indian Pharmaceuticals Policy (1986), Scientific Temper Workshop (1986), J. D. Bernal Centenary Seminar (1989), Sovereignty & Self-Reliance (1991), Development, Equity & Globalisation (1996), Present Trends & Prospects of Drug Industry in India (1998), Technological & Scientific Self-Reliance (1999), Science & its Public knowledge, movements and images (1999), 'Endless river': Joseph Needham Centenary Seminar (with NISTADS) (1997), International Patent Regimes (2001), etc

Jan Vignana Vedika

Genesis and Objectives

Jan Vignana Vedika (better known as JVV) was formed on 28 February 1988 by a group of people comprising of academics, medical doctors, scientists, and teachers in Vijayawada of Andhra Pradesh. The formation was as a result of the idea gathered from the *Bharat Jan Vigyan Jatha* (BJVJ), 1987 with the following set of objectives:

- To popularize science and to promote scientific temper among the public,
- To eradicate obscurantist, superstitious and paranormal and mystical practices from public by means of popularization of science,
- To understand the scientific basis behind several of the problems faced by the public and to explore remedial solutions for the same,
- To facilitate the benefits of science among the larger public which are otherwise confined to certain sections of the population,
- To encourage quest for knowledge and to strive for national integrity, self reliance, world peace, social progress and cultural vibrancy,

- To encourage research in divergent areas with public welfare and
- To design programmes corresponding to the objectives set as above.

Organization and Domain

JVV is widely acknowledged as a PSM in Andhra Pradesh and at present has more than 30,000 members. JVV is a non-governmental and cadre-based PSM organization with its units functioning actively in all the 23 districts of the state of Andhra Pradesh. It is a constituent member of the AIPSN and also linked to the *Bharat Gyan Vigyan Samithi* (BGVS). It relies on the philosophy of volunteerism and its funding comes from individual donations and through projects. It has a four-tier organizational structure, i.e., village/local unit, mandal unit, district unit and state unit. Every unit holds Conferences once every two years and elects the respective committees. The State Conference is held after the lower units are done in their hierarchical order. Neither the President nor the General Secretary holds the post for more than one term consecutively. It organizes a variety of programmes to create awareness and to draw public attention to various socio-scientific issues. It also conducts training camps for teachers, students and science volunteers on the trends of S&T. It wages relentless but peaceful struggles against all kinds of superstitions and obscurantism. It elicits public opinion against the rhetoric of paranormal, quackery, unhealthy and spurious medical practices and other unfounded claims of prevention and cure. It educates public about ecological balance and sustainable agricultural and industrial development while uncovering the real culprits behind the abuse of the environment.

JVV's Perspective on Science and Society

JVV views Indian society as divided into classes; one, the oppressed and the other, the exploiting. It opines that the powers and capabilities of science and technology have been under the control of the exploiting class. Thus the advantage of science and technology are being enjoyed exclusively by the exploiting class

of the society while the oppressed majority class, the producer of science and technology is bereft of its advantages. Whenever its control over the productive forces is likely to slip, the same exploitative class abuses science and technology to unscrupulously arm itself with war machinery and jeopardizes world peace. JVV draws its functional ideology to negate this lopsided, unscientific and unjustifiable social order fogging the science and technological spheres of life. Hence, JVV's main slogan is 'Science for Socialism'. It considers that popularization of science and promotion of scientific temper among people would sensitize and empower them to usher in a new public-friendly and democratic social order sans exploitation.

Activities of JVV

JVV involves in three kinds of activities such as: educative, agitative and constructive and such activities spread over areas like environment, health, education, energy, development, literacy, science awareness, campaigns against retrogressive social practices such as untouchability, child marriages, superstitions, etc.

JVV and Education: With the strength of several thousands of teachers as its members, the JVV organizes teacher training to make them enjoy teaching and promotes pedagogic innovations to make learning an enjoyable activity for children. It also assesses curriculum and textbook contents and concepts and organizes children's science festivals, such as joyful learning, *bala melas* (children's fair), etc. frequently on massive scales. To promote quest for knowledge and bent of socio-scientific and technological awareness among school children, the JVV has been running the largest circulated Telugu children's science monthly magazine, *Vidyarthi Chekumuki*, since 1990. It conducts Chekumuki Science Talent Test every year for high school children. As many as half a million students participate in this test. It was the Literacy Movement, spearheaded by JVV, and one of the many short stories written by JVV (V. Balasubrahmanyam, its former General Secretary and Executive Member of the AIPSN) for the illiterates, that sparked the anti-arrack movement. It has been a milestone in the successful chronology of events of *Jana Vignana Vedika*.

JVV and Health: Over the last few decades, JVV has actively been campaigning for people-oriented healthcare health policies. Led by a group of committed medical professionals and science activists, the organization conducts surveys and analyzes the ground realities of healthcare at all levels while preparing village level health plans and cost-effective solutions. As an active partner of *Jana Swasthya Andolan* (People's Health Movement), JVV has been critically examining the health policies of the government and formulating alternative health policies.

JVV and Science Communication: Popularization of science and inculcation of scientific temper among the people is one of JVV's major tasks and priority areas. Its modes of popularization of science among people include folk arts, street plays, dance, magic, sound and music and other art forms besides the usual lectures, book exhibitions, demonstrations, debates, presentations, etc.

Some of the activists of JVV regularly contribute articles and science features in vernacular media (both print and visual) and magazines. JVV has developed a series of radio episodes on the chemical sciences and other areas of science in collaboration with DST's *Vigyan Prasar*. Whenever astronomical events such as eclipses, meteors, comets, etc. occur, JVV goes to people at their habitats and makes them understand the underlying principles of such phenomena lest they should attach obscurantist attributes to them and continue to be eternal slaves of paranormal and superstitious belief systems.

JVV and Publications: JVV has published many books and literature for children and adults. One of the major strengths of JVV is its publication wing. It has been publishing and circulating different kinds of books on science, culture, history, education, health, etc. for all levels of people. Promoting reading habit from the childhood has been a regular and ongoing activity of JVV. It organizes book exhibitions, reading festivals and readers' clubs. Most importantly, it publishes and circulates booklets, pamphlets, bulletins contextually too whenever socio-scientific, natural or astronomical events take place.

JVV and Women: Samatha is the name of the women's wing of JVV. It strives to empower women so that they are aware of

their rights and sensitive to their problems and become prepared for the remedial measures. JVV organizes frequent counseling and teachings to educate adolescent girls about mysteries surrounding their own physiological changes such as menstruation, sexuality, pregnancy, menopause, and aging. These are experienced as fear and taboos. JVV felt that women's health issues hadn't become one of the main activities of PSM and there was a need to explain to women in a simple way all of their physiological functions and changes, which JVV did undertake. *Samatha* opposed the sex-determining technologies on health ground. Other than the risk of late abortion, normal health services pose a health hazard for women. *Samatha* supported the forum against Sex Determination and Sex-Pre-Selection, formed in 1985 in Bombay, which sought a ban on the sex-determining technologies and female foeticide. The nine years of campaign eventually led to the national laws in 1994 banning the practices of sex-determining technologies and female foeticide. The *Samatha* and PSM activists welcomed this law as a first stepping stone towards women's empowerment. They, however, did not question who would benefit from these laws. Their campaigns did not address the basic question of power balance between men and women, the existing patriarchal relations within family, economic dependence of women, and the role of women in society.

JVV and Campaigns against Environmental Issues: JVV organizes several kinds of programmes to bring in awareness of environmental degradation, ecological balance, sustainable development, etc., among public and policy makers. It sensitizes people against the ruthless consumption of natural resources. With the National Forest Policy of 1988, JVV educates the villagers how to manage their forest. With a pro-poor people discourse, it encourages industrialization and technological automation.

Paschim Banga Vigyan Manch

Genesis and Objectives

Paschim Banga Vigyan Mancha (PBVM) was established in the year 1986. It should be acknowledged that if the long tradition

and rich experiences of institutions like *Bangiya Vigyan Parishad* and a good number of science clubs were not there, the emergence of PBVM would not have been possible. It emerged as a common platform for expression of science conscious public and the science clubs of West Bengal. It is one of the largest PSM organisations of India. It has over 300,000 members and these members are drawn from various sections including scientists, engineers, medical doctors, students and trade union activists as well. It has got its units in all 19 districts of West Bengal. It has been working through lowest level units in rural and urban areas. With the help of innumerable units throughout the state it is maintaining links with thousands of science activists who are working with commitment to take S&T to the people. PBVM although had a soft left wing ideological leniency and had links with the then ruling Communist Party of India (Marxist) it was not a radical organization. It believed more in bringing change through awareness building, spread of scientific knowledge and consciousness and in introducing reforms in education and training (reforms). Hence we would like to treat this as a science popularization movement organization and not a peoples' science movement organization.

The aim of the PBVM is to build a science-conscious society and the concrete objectives of PBVM are: (i) to make the people conscious about the uses of S&T in daily life; (ii) to develop awareness of the people about environment, public health etc; (iii) to educate the people about the harmful effects of different products manufactured by the MNCs; (iv) to encourage innovative, fundamental, scientific R&D; (v) to promote science education in local language; (vi) to fight against fundamentalism, superstition and obscurantist ideas and the spread of scientific temper and attitude among the people of the state; (vii) to oppose the implementation of any technology that is against the interests of society; (viii) to initiate, support and coordinate in the formulation of people oriented science and technology policies; (ix) to publish popular science magazine, science related books, monographs, pamphlets for infusing the spirit of scientific inquiry and attitude in the impressionable minds of the youth in schools and colleges.

Organizational Structure

PBVM has been spread over in nineteen districts of the state of West Bengal. In each district, there is a district councilor and district committee. Under each district committee there is a Zonal Committee, Local Committee and village, school/college, university and research institution level unit committee. Nearly 152 (2006-2007) Science Clubs are affiliated to PBVM throughout the state. The entire district, zonal and local committees are elected during their respective conferences. Unit conferences only elect their office bearers. Schematically the organizational structure of PBVM can be given as below: The State Committee usually functions through sub-committees on different areas of activities (environment, technology, application, health, science education, children science, publication, agriculture, biodiversity, women science and culture).

Activities and Methods of Operation

Since its inception PBVM has taken up a large number of activities and time based programmes linked with the objective of creating, spreading scientific outlook, and taking advantages of S&T to the people who are yet to have it even in this age of unprecedented development of S&T. PBVM's activities cover issues like environment, health for all, self-reliance in agriculture, energy, technology upgradation for artisans, low-cost housing, translation of scientific works in local language and explaining scientific ideas in a simple language while making them relevant to the local context.

Environment: Environmental issues are an important agenda since the inception of PBVM. PBVM has been continually taking different steps for better environment of the state as well as conservation and protection of nature & natural resources.

Health: PBVM is engaged in awareness of people's health issues since its inception. Its conception of health planning is 'People's Health in People's Hand.' All components of health such as preventive, promotive, curative, rehabilitative health care activities come under PBVM's purview. For this, PBVM follows 'bottom up' approach which includes empowering the public to

recognize their own health problems, analyze the situation, give proper scientific knowledge to plan for solutions, prioritize the needs, implement them by integration of different available intersectoral and intrasectoral resources, target oriented programme initiation, evaluating the status after a specified period, dissemination of experience to the public, and modifying the programme according to the outcomes.

Jana Swasthya Chetana Prasar Samanvyay Committee was formed at State and District levels with the initiative of PBVM, involving many health organizations, professional and voluntary organizations as well. The first National Health Assembly was organized at *Yuva Bharati Krirangan* from 30 November to 2nd December 2000. More than 2000 delegates form 160 health organizations had participated in this assembly. Under the banner of *Jana Swasthya Chetana Prasar Samanvyay* Committee representatives of PBVM had actively participated in the 1st World People's Health Assembly in December 2000 at Dhaka, Bangladesh. Since then, health has been and remains as one of the primary activities of PBVM.

Health Intervention: In 1994, the Kotulpur block of Bankura District was selected for intense health activity by the health activists of PBVM. The knowledge, attitude, practices and application in health sector along with improvement of health status of local people were assessed in Kotulpur block of Bankura district in 1994. Later, the assessment and experiences were discussed at All India People's Science Congress. Health risks of workers were assessed in many factories and necessary interventions were done to minimize the occupation related health hazards. Industrial gas poisoning in Dashpur of Howrah District, Lake Town in North 24 Parganas were taken up to assess the effect and necessary steps were arranged. The outcome of this activity was presented at the Bangla Science Congress.

PBVM organized a State level 'Trainer Training Workshop' in September 2006 targeting reduction of maternal and infant mortality. Since then, PBVM has been providing training to the volunteers working in the health area. PBVM has planned do initiate health activity in at least one *gram panchayat* in every block and one ward in every municipality of the state.

Technology Transfer: Setting up district level S&T centres to facilitate 'technology transfer', for example, a unit was set up in the name of Kudrati-Khuda, a scientist, in Margram of Birbhum district and another such unit is being run successfully at Kalna, Burdwan, Haripal, Hoogly & Nabagram, Murshidabad. Moreover, PBVM has taken up large scale implementation programme for setting up 'Improved Chulha' for spreading the health consciousness among rural people.

Samata: Development of Samata in all the districts to ensure participation of women in science awareness programmes and also to motivate them in the spirit of self-reliance.

Publishing: One of the achievements has been in the sphere of publishing. These publications are in both Bengali and English. These publications are addressed to different audiences such as primary school children, high school teachers, college students, farmers, formal and informal members of the PBVM. Until the PBVM began publishing science literature, the only science books that were published were textbooks prescribed for specific academic courses. Some of the publications include: *Sera Sholo Vigyani*, *Char Vigyani*, *Chai Vigyani*, etc.

Orissa Bigyan Prachar Samiti (OBPS)

Genesis and Objectives

On August 7, 1949 Orissa's first society for popularizing science called *Orissa Bigyan Prachar Samiti* (OBPS) was established at Cuttack for the Oriya speaking people. This society was formed with the combined efforts of late Gopal Chandra Pattnaik and Gokulananda Mohapatra. In the first meeting of the Samiti the other members present were eminent economist Sadasiba Mishra, noted psychologist Radhanath Rath, plant scientist Shymananda Pattnaik, and professors of medicine like Mahendra Chandra Mishra and Raikrushna Mohanty. In all nine members were present in the first meeting and among them six were from Ravenshaw College and three others from Medical College, Cuttack. To begin with, it was known as Utkal Bigyana Parishad but later it changed its name to *Orissa Bigyan Prachar Samiti*. This society was registered as a formal organization in 1961. The Samiti during its inception had three objectives:

1. Spread the message of science through discussion forums and popular lectures in vernacular language
2. Publication of books based on science in vernacular language and finally
3. Publication of a popular science magazine.

Besides, the chief objective of the society was to provide a comprehensive language (terminology) and style suitable to students and common people to study science. Their sole aim was to make science simplified for the people and students in particular as it was so intricate. In 1944, *Oriya* was made the medium of instruction in schools and in the same year science was introduced into the high school curriculum. But since there was not a single science text book in *Oriya* language the students were faced with a lot of difficulties. In view of this the OBPS desired to publish *Oriya* text books on science with a view to mitigating the plight of science education in Orissa. Gokulananda Mohapatra along with Harihar Pattnaik published the first *Oriya* book on science for matriculation students which were frowned upon by some of the college teachers of the time. Those years in Ravenshaw College large number of students enrolled in Arts departments but a few in Sciences.

However, after ten years of establishment of the *Orissa Bigyan Prachar Samiti* (OBPS) the government of Orissa commended their contribution and recognized them as an educational society. The OBPS did not deny funding offer made by the government on its own. As a result, a few education ministers have extended financial help to the OBPS. It is interesting to note that *Orissa Bigyan Academy* (OBA), now a government organization to propagate science, originated from the OBPS. In the absence of a regular office usually the meetings of OBPS were held in the private quarters of its members. In one of its meeting OBPS gave birth to *Odisha Bigyan Academy* not only for science propagation but also to perform many other activities that were not done by the OBPS.

In recent years the OBA has become active in Orissa organising science exhibitions, discussions, workshops, seminars in all parts of the state, publishing magazines, newsletters, etc. to sensitise the public about the role of science and technology for

the development of the State of Orissa. Even presenting various awards to senior and junior scientists as a source of encouragement, felicitating the eminent scientists and awarding the prominent writers for their significant contributions to the scientific literature (in Oriya), imparting training to science teachers and writers of the state and the like have been the activities of OBA. Besides, the bi-monthly science magazine *Bigyan Diganta* (Science Horizons) is being published regularly with the assistance of OBA. This magazine is very popular among students.

In the year 1999, the OBPS celebrated its golden jubilee after reaching 50 years. In each meeting of the Samiti, a few essays are read followed by discussions on these. There are at least twenty meetings held in a year. During this period of fifty years, more than 5000 essays have been read and discussed in the seminars held by the OBPS. More than 4000 essays have been published in the form of magazines or books. Till now OBPS has published 41 books with its own efforts. Its Burla (in Sambalpur) branch has published five books: *Fearsome Cancer*, *Wealth from/of wastages*, *Science in Service of Villages*, *Health for All* and *Review of the Existing Customs*. The Samiti has also published a book on the science writers of Orissa called *Odishara Bigyana Lekhaka* (Orissa's Science Writers). The OBPS also edits a bimonthly science magazine called *Bigyanaloka* (Light of Science).

Many established science writers of Orissa have been the members of the OBPS. Among its members note worthy are Gokulananda Mohapatra, Radhanath Rath, Gadadhar Mishra, Debakanta Mishra, Pranakrushna Parija, Banabihari Pattnaik, Biswanath Sahoo (1910-1991, Kalantira, Cuttack), Basant Kumar Behura (1922, Bilipara, Jagatsinghpur), Harihar Pattnaik (1924, of Balarampur, Jajpur), Gopal Chandra Pattnaik (1930-1985, Kotapalla, Khurda), Nityananda Swain (1943, Kaniha, Jagatsinghpur), Pramod Kumar Mohapatra (1956, Oliha, Kendrapara), medical researchers like Niranjan Tripathy (1942, Jodapur, Jagatsinghpur), Sachidananda Satpathy (1950, Samang, Jagatsinghpur) and Ramesh Chandra Parida (1947, Jamapada, Kendrapara). The association of these active scientists with the Samiti helped other science writers to come forward for

spreading scientific knowledge. Thus the formation of OBPS may be considered as the first institutional effort to popularize science in Orissa (Pattnaik and Sahoo, 2006).

All these *Oriya* scientists resolved to popularize science in vernacular language because they thought that communicating ideas in the language of the people would be more appropriate and effective. For them, people could also understand science and apply it to their day-to-day lives, if it was done in vernacular language. To P K Parija, the noted plant biologist who guided OBPS, such a possibility would not only facilitate the task of communicating this precious (scientific knowledge more effectively to the native Indians but also enable the Indians to make achievements in science on their own. He felt that reception of instructions in the mother tongue is more instinctive and natural. Similar views were expressed by Maulana Imdad Ali, founder of the Bihar Scientific Society (1868) and by Syed Ahmed Khan, the founder of the Aligarh Scientific Society.

Parija wanted to get all the scientific terms translated into *Oriya.* For that purpose, he made a *Paribhasha Committee* (PC) during his Vice-Chancellorship at Utkal University. In the PC, he appointed experts from different fields of science who developed a scientific terminology in Oriya language for different disciplines like Life Sciences, Physics, Chemistry, Mathematics, Medical Sciences, Engineering disciplines, etc. As a result *Oriya* scientific terms increased and became popular.

Parija argued that the spread of science can change the society both at the level of structure and culture. At the level of culture, he found that beliefs about natural phenomena that existed in Orissa were based on conjectural untested claims. These beliefs and associated traditions were seen as impermeable for new ideas. Implicit here is that under Brahmanism, except the upper castes no other castes were to get access to literature and knowledge. Not merely caste system but in colonial Oriya society ruled by Zamindars and feudal Kings of Princely States, the political authority structure itself was a source constraint for the masses to get English education and acquire the benefits of modern science. It would be appropriate to focus on the socio-

cultural and political conditions prevailing in Orissa in which these scientists took initiatives for popularizing science.

Institutionalization of Popular Science Awards

Factual **e**vidences are found to establish that science popularization in Orissa had become institutionalized at the end of the successful movement (Pattnaik and Sahoo, 2006). Institution of several awards for popular science writings in Orissa include:

1. Utkal University Gold Medal for popular science writings
2. *Bigyanaloka's* Best popular science author
3. *Bigyana Bandhu* award by *Orissa Bigyana Paribesha Vikasha Samiti*
4. Samanta Chandrasekhar Award is given every year to a scientist for his outstanding research contribution in the field of S&T in a particular year
5. OBA award for most popular science writer
6. *P K Parija Bigyana Sahitya Award* by *Utkala Sahitya Samaj*
7. *Orissa Sahitya Academy Award* for popular science literature.

Role of the Press

In order to popularize the message of the Congress, Gopabandhu published an Oriya weekly, *The Samaj*. Its first issue came out on 4th October 1919. Thereafter, it became the mouthpiece of the Indian National Congress (INC) movement in Orissa. Later it turned into the most popular daily newspaper and spread the message of the nationalist movement and reformist movement among the Oriya speaking masses. *The Samaj* had special editions on health, science, environment, etc. Other newspapers like *Prajatantra* (1923) had also published popular science essays, stories, dramas and fictions for removing superstitions among the people by creating scientific attitude among them. *Sahakar*, a literary monthly magazine has been publishing articles related to science in its column called *Bigyan Bismaya*

(Wonders of Science). Thus, the then press had taken up a significant role in popularizing science by means of publishing science literature.

Science popularization movement in Orissa was a mid-20th century phenomenon. Although started in pre-independent India it continued with a vigor in 1960s to 1980s. Thereafter it got divided in its focus and experienced loss of serious involvement although it continued to be a discursive movement. By the turn of the 1990s the enthusiasm of science propagators in Orissa had slowed down. The legendary Parija had passed away and the OBPS had become defunct as some of its founders had passed away and some were ageing (G N Mohapatra, Gadadhar Mishra, etc). By the end of 1980s OBPS had already got bifurcated and OBA had emerged as a substitute Govt. funded organization. The spirit of renaissance had died down. And in the 1990s science popularization movement in Orissa experienced a different trend. Voluntarism had entered into the realm of science popularization and made it a kind of science activism. During this period an NGO named Srujanika emerged and with BGVS spearheaded the science popularization movement in Orissa. So science popularization in Orissa became a kind of science activism under the leadership of Srujanika (Pattnaik and Sahoo, 2006).

Science Popularization as Social Activism (the transformation)

In 1987, *Srujanika* was formally registered as a society for research and innovation on science, education and development with the objective of promoting education and scientific spirit among people in general, and children in particular. During the same year it coordinated the massive nation-wide science movement named *Bharat Jan Vigyan Jatha* (BJVJ) in the state of Orissa. In the process it developed an informal network of teachers and other interested persons around the state and also became a part of a national network of science-activist groups called All India Peoples' Science Network (AIPSN).

Since 1988-89 Srujanika has been engaged in developing scientific kits/toys (to stimulate children's curiosity), organizing

students/teachers workshops and contact programmes related to promotion of science and scientific method, and bringing out low cost publications on various topics in science for children. Besides, Srujanika has been organizing children's science festivals, science fairs, debates/discussions on topics related to science and society, nature, etc. with posters and has been busy in developing activity books and kits on *Khel Khel Mein* (a magazine), *Fun with Science* (a magazine). It is also publishing *Bigyan Tarang*, a monthly science magazine in Oriya for children. Srujanika's regular activities fall under the following broad categories: (i) development, production and distribution of resource materials pertaining to science education, (ii) orientating resource persons as well as providing academic support for them, and (iii) organizing interactive programmes like camps, work-shops and children's discussion groups.

The publication of *Bigyan Tarang* (1989), a resource periodical in Oriya, has been the longest running venture of *Srujanika*. It plays a link role central to all of *Srujanika's* activities. In addition to the magazine, various topical booklets and full-length books are also brought out as special releases in the *Bigyan Tarang* series. This was to develop an excitement about science and to further one's inquisitive and creative instincts through appropriate reading and activity. Therefore, formation of reader-groups, often named *Tarang Clubs*, around the state were taken up as an essential extension programme.

Some of the publications brought out by *Srujanika* reflects its participatory nature and informal method of teaching science such as: *Kheli Kheli Sikhiba* (Learning through play) 1988, *Aasa Tara Dekhiba* (Let us watch the stars) 1995, *Kahinki Bhai Kahinki?* (Why, Why and Why?) 1996, *Gachhabaida* (Healer Plants, an identification guide) 1997, *Prathamika Siksha Paddhati* (Primary Education Methods) 1997, *Bigyan Pahali* (Science Riddles poems) 1998, *Ganita Kuhuka* (Magic of Mathematics) 1998, *Akashare Luchakali* (Hide and seek in the sky) 1999, and *Kagaja Bhangaru Jyamiti* (Geometry through Paper folding) 2000. In addition, many guide books have been developed to serve as poster presentations on specific programmes by *Srujanika*.

A unique activity of *Srujanika* has been the Sunday Club activity involving the local village children which helps them in trying out their new scientific ideas (in the science-fun-corner). To reach out to the prospective adults who are keen to associate themselves in this work *Srujanika* takes up periodical interaction programmes like seminars, teachers' workshops, excursions and children's camps etc. at various places during the year. Thus, with an activist's perspective Nikhil Pattnaik, the founder of *Srujanika*, points out the following constraints in the science popularization movement in Orissa: (a) science writers in Orissa remained detached from the Government as well as grassroots organizations, (b) science writers have remained passive popularizers (devoid of activism), and (c) absence of integration of glossaries of all branches of science in vernacular medium (Mahanti *et al*., 2003).

Marathi Vidyan Parishad (MVP)

MVP is a genuinely unique social movement organization (SMO). Established in 1966, it was the offshoot of efforts of a number of scientists and engineers in Maharashtra who wanted to take science to the public as they were worried that scientific information was inaccessible to the majority of the Marathi speaking people. After a decade of success in translating scientific books and articles into the local language and making them available to vernacular schools and citizens, MVP's efforts were to foment a scientific inquiry attitude among the population aiming at self-empowerment and social change. The growth of MVP displays certain features of social movement, particularly new social movement (NSM).

Mobilization & the Movement

A group of socially conscious science writers led by M. N. Gogte came together in the mid-60s to form a science popularizing organization. They felt that it was necessary to attempt to fill the lacuna that exists in the publication of Marathi literature for the masses. Being committed to the society and public on the one hand, and the development of the approach, on the other, this group of intellectuals were also acutely conscious

of the fact that science today is locked in an 'ivory tower'. It cannot remain there if it is to develop into something worthwhile and meaningful for the larger sections of the society. Gogte argued that though in post-colonial India English language is widely used for business and higher education, English alone will not suffice. A large chunk of population does not know English. Furthermore, since the language is foreign, the subject is steeped in esoteric jargon. He pointed out that local language is very effective to convey knowledge, invoke creativity, connect individuals, enrich culture and induce social reforms.

As an organization, MVP was formed in 1966 and a constitution formulated specifying that the organization aims to:

- popularize science through local language (i.e. Marathi) and enrich Marathi language for expressing science
- explicate and enhance importance of science in human life and
- use science as a means of social criticism.

However, the activities of the MVP have grown much beyond the scope of the objectives. The initial actors of MVP unanimously felt that propagation of science does not require any ideological platform. Rather they argued for a common platform from which scientific knowledge could be aimed at bringing about rational thinking and attitudes.

MVP started initially with a group of 6-7 which consisted primarily of scientists and engineers. Today the membership has grown to over 1500 and in addition to this there are many non-members who participate in the activities which have been extended mainly through the establishment of personal contacts. During 1966-71, MVP had branches. So, all the members of MVP branches were members of the main body. In 1972, MVP provided autonomy to branches and started calling them as local chapters. When these were branches, their income and expenses were also part of main body. However, once they became autonomous, they were free to have own incomes and expenditures. By doing so, MVP stopped including the branch members in the main body.

The financial resources of MVP come through grants, donations, membership fees, and sale of books and magazines. It receives government grants from agencies such as CSIR, DAE, DST, Maharashtra Council of Science and Technology (MCOST), National Council for Science and Technology Communication (NCSTC), Vigyan Prasar (VP), etc. The sources of donations are of two types: general and corporate. The former includes individual donations (based on voluntarism), while the latter includes Hinduja Foundation, Tata Trust, Goodlas Nerolac Charitable Trust, etc. Besides, the subscription revenue comes through books and magazine sales.

Most of the individual members of MVP are urban professionals, working in different scientific establishments of India such as the Bhabha Atomic Research Centre (BARC), Council of Scientific and Industrial Research (CSIR), Department of Science and Technology (DST), Department of Atomic Energy (DAE), Inter-University Centre for Astronomy and Astrophysics (IUCAA), Tata Institute of Fundamental Research (TIFR), etc. The individual members of MVP range from scientists, engineers to teachers and academicians. It appears that MVP shares an affinity with the Maharashtra Government, as its members served in different capacities in various scientific and technological establishments. Among them, a group of elite scientific professionals like B. M. Udgaonkar, J. V. Narlikar, Prabhakar Deodhar, Raja Ramanna, and Vasant Gowarikar were involved in the activities of MVP. They believed that their duties as scientists were not confined to their laboratories only but are spread also to science communication. They consider that Indian scientists should communicate their work to a wider audience to make them understand the value of their work. Even scientists have a lot to say about problems in Indian society, and they think that MVP provides a platform to communicate their views and opinions.

Now, MVP operates through its 38 local chapters at the district and state levels. Of the 38 local chapters of MVP, 35 are working at the district levels and 3 are working at the state levels in Goa, Gujarat and Karnataka as these states have a significant number of Marathi-speaking population. The organizational activities are conducted through Marathi language.

Activities and Methods of Operation

Annual conference: MVP hosts its annual conference (*Marathi Vidnyan Sammelan*: Marathi Science Conference), a parallel event of Indian Science Congress but on a small scale. It organized the first conference in 1966 and since then the conference has become the most important feature not only for MVP but for the state of Maharashtra. Till 2003, it has organized 38 annual conferences. The conference is generally held in the last week of December of every year, coinciding with Christmas holidays expecting participation would be more during this period. The conference is held for three days and some eminent Marathi scientist is chosen as the President of the event.

This conference brings MVP in close contact and collaboration with the local people who are interested in different topics. Science-writers, science-activists and science-popularizers are felicitated every year during this conference. Science exhibitions are organized at Nehru Science Centre, Mumbai. The last day of the conference is usually reserved for visits to places of scientific interests. By following this pattern, the conference creates a sense of enthusiasm towards the propagation of science. These conferences are held in both villages and cities.

MVP had started the Children Science Conference in 1995. During this conference children are encouraged to ask questions regarding science. Experts from different S&T disciplines respond to these questions. Later, all the questions with their correct answers are published in the form of a small booklet. *Science through Game* is the first booklet in the series, published both in Marathi and English. *Science of Female Body*, *Science Quest (Biology)*, and *Science through Post Cards* are the second, third and fourth in the series respectively. The topics of the Conference range from medicinal plants to advanced farming techniques.

Science fiction writing competition: MVP has been a pioneer in evoking a sense for writing science fiction amongst Marathi writers. Since 1970 MVP has been organising a science fiction writing competition and the winners are felicitated during its annual conferences.

MVP had a science fiction section working actively from 1985 to 1990. Science fiction writers used to meet once in a month and discuss their writings. They used to modify their writings as per the suggestions received. It helped new Indian authors develop their skills and encouraged science fiction with a South-Asian focus. Specifically, the writing exercises and group-critiques of the monthly story submissions revealed individual strengths and weaknesses. This attempted to show how the subcontinent offers unparalleled story-telling potentialities. In the annual conferences of MVP usually a special session is arranged when science fiction writers present their stories to the audience. By doing so, science fiction club of MVP has produced a creative environment for literature with post-modernist underpinnings.

Vidnyan Mitra: Since 1983, MVP conducts an eight-day *Vidnyan Mitra* (Science as friend) course, especially aimed at standard eight or nine students during Diwali vacations. College students are asked to teach this course. Students are exposed to various issues like population control, recycling water, preventing diseases like cancer, and are also introduced to a hobby. In 2003, 'Water' was the theme chosen for considering its importance in human life. Experiments regarding water, it's physical and chemical properties, usefulness of water to all living beings, water conservation project, water management systems, etc. were included in the course content. The participants collect up-to-date information to make a 10-minute presentation at the end of the course. Besides, MVP workers visit schools regularly or invite teachers and students to their premises for various shows and experiments. For instance, students are taught to save water, how to fix a leaking tap and how to replace a fuse. They are supposed to use a solar cooker and prepare food, conduct experiments, watch the night sky and so on. In 2003, MVP decided to conduct *Vidnyan Mitra* course twice in a year and decided to select one subject for covering all its aspects within a week. Till 2004, about 300 students have successfully, completed the course. One of the spin-offs of this programme is that a network of students was established within the MVP premises; these students would act as the future resource persons of MVP.

Rural science clubs: MVP holds classes in rural schools to teach children science through simple experiment and gadgets. MVP started its activities in villages by establishing science clubs for high school students and although its activities now are far more broad-based, the science clubs continue to play an important role in their science education programme. In most villages, the contact point for these science clubs is the village library and the contact person is the village teacher. The teachers are involved for two reasons. First, traditionally the teachers have been easily accepted in villages and are respected by all. Second, they have direct contact with the students.

Initially some of the members of the MVP went into the villages, identified enthusiastic youth, spoke to them and tried to build up their confidence. The activities and discussions emerged out of the public's day-to-day problems. Among rural schools, urea pits are a novelty. Often, a rural school has no toilet. Instead of using an open space, MVP workers suggested that the children dig pits near the school and enclose them with tin sheets. The children were advised to urinate or defecate in the pit, which was filled with leaves and grass every evening. In three months, this gets converted into fertilizer which can be sold to farms. There are 79 science clubs in villages associated with MVP. In fact, the latter encourages village science teachers to establish a science club by providing them financial and material support for the first three years.

Science pedagogy: MVP has built a force of 300 science teachers from 140 schools in the state of Maharashtra who meet once every month to present their innovative ideas on science pedagogy and later experiment the discussed methods in their own classrooms. They return to refine their evolving pedagogy based on what they have learnt with students in the classrooms. The discussions help the teacher in improving their performance at school which results in enhancing the fundamental knowledge in science of students. MVP's members, particularly scientists, act as advisers and resource persons for improvising the science pedagogy. In 2007, MVP established a preliminary microbiology lab and conducted a two-day training workshop on micro-biology for the teachers where fifty teachers participated.

Gender education: An audio-visual programme followed with a question-answer session with experts on important events of the life of a woman such as menstruation, before and after pregnancy, and menopause was initiated by MVP way back in 1984. The programme was prepared under medical experts' advice. MVP has acquired a set of slides (approximately 40), spanning two hours, which explains the transition of a girl to a mature woman. After each slide show, girl students are encouraged to ask questions. During 1984-1998, as many as 1814 programmes were conducted in the city of Mumbai (then Bombay) and across the state of Maharashtra. This slide-show on sex education became a very popular programme in rural Maharashtra and the programme was scripted by Drs. Vithal Prabhu, Ashwini Gandhi Bhalerao and Mandakini Purandare and enacted by Priya Tendulkar, a well-known Indian television actress. In 2005, the gender education programme was conducted by five chapters for both the genders where approximately 43,000 boys and girls participated. This programme got financial support from the Give Foundation. In 2008, MVP converted all these slides into a short motion picture and sold nearly two thousand copies of it.

Livelihood Generating Programmes: Livelihood is considered as one of the most important educational programmes of MVP. It consists of workshops for making solar-cooker or smokeless *chullahs* and training for manufacturing scientific toys. Over the last four decades, it has started several programmes for spreading science among the masses at various levels, especially children and women. MVP believes that children can grasp the scientific principle behind a toy, while playing with it. Such toys can be prepared with the help of cheap and easily available local materials e.g. pump with the help of used film roll container, bicycle tube etc., flute with the help of simple straw, and tortoise with the help of fruity box and so on. Under this programme, children are encouraged to learn and develop their own skills. During 2003-2004, as many as 732 students at all levels, from primary to higher education, including technical/vocational education participated in ten livelihood generating programmes (MVP, 2004: 4).

After children come women, because they are looking for solutions to solve their daily problems. MVP has been successful in propagating among rural women the solar cooker because its benefits could be convincingly shown. A model was developed at the MVP and rural women were trained in its fabrication. They went on to fabricate more. The solar cooker caught on once the women realized that they would not have health problems. In order to spread public awareness regarding the use of solar-cooker, MVP started organizing training workshops in 2001 and 9 workshops were conducted till 2003 and the number of participants was 274. Furthermore, MVP organized an exhibition in 2004 where information about solar energy operated gadgets was shared with the participants. As a result, various schools in Maharashtra incorporated intensive components of solar energy into their courses. Two workshops on the use of solar-cooker were held during 2003-04 and 78 students were drawn from 13-15 age groups to participate in this workshop.

Publishing: One of the major activities has been in the sphere of publishing. The objective of publishing is to bring out science publications on different aspects of S&T in both Marathi and English languages for promoting a scientific culture. The publications include mainly books and magazines. These publications are in English and Marathi languages. These books are addressed to five different audiences: primary school children, high school students, college students, and women, formal and informal members of the MVP. It has brought out titles like *Microbiology*, *Air Pollution*, *Scientists*, *Groundwater in Marathwada*, *Irrigated Agricultural and Land Problems*, *Balance of Development and Environment in the Vidarbha*. Low-cost popular science books for children are also published. The first edition of *Set of Experiments for Children* in Marathi was published in 1994 and 5000 prints of the copy were sold out in 2001. These publications are used as resource materials for different science popularization programmes.

MVP representatives have assisted the language directorate of Maharashtra in coining new Marathi words of scientific terms. Eighteen dictionaries on different branches of science have been brought out, aiming at facilitating a conceptual understanding of scientific phenomena.

MVP also brings out *Patrika*, the in-house monthly magazine in Marathi. It is funded by the Govt. of Maharashtra (MACOST) and CSIR. More than 10,000 copies of *Patrika* are printed and supplied to more than 5000 schools and 6000 libraries in Maharashtra. The magazine targets both elementary and secondary school students. It publishes the scientific findings and biographies of famous scientists in the magazine. This magazine usually contains topics on health, fiction, experiments (physical and chemical), everyday scientific inventions, astronomy, environment, nature, mathematics, computer science, etc. Some of the special titles the magazine has published in the past years were *Plastic*, *Household Gadgets*, *Prohibition*, *Milestones in the History of Science*, *Computer*, *Pokhran Nuclear Explosion*, *Solar Eclipse*, etc. In 1985, the Department of Education, Maharashtra Government issued an official circular to all schools of Maharashtra for the magazine's subscription. The magazine is now financially supported by CSIR, and *Sahitya Sanskriti Mandal* (Literature and Cultural Circle), Maharashtra, Government of Maharashtra.

MVP: Dependence on External Support

MVP continues to depend on various governmental, non-governmental organizations and media for aid and external support towards their programmes and activities. Collaboration and joint activities with institutions and organizations such as the BARC, DST, MCOST, NCSTC, and TIFR are particularly noteworthy. To mark the International Year of Biodiversity in 2010, MVP launched a series of programmes on biodiversity, organised International Year of Chemistry in 2011 and the Venus transit in 2012. In collaboration with Vigyan Prasar (VP), MVP runs 300 science clubs in the schools of Maharashtra. Science clubs are well accepted in these schools, and this has become a regular mechanism to nurture young scientists throughout the country. MVP-run science clubs seek guidance and assistance from VP to conduct their activities. VP has initiated a network of Science Clubs (VIPNET) throughout the country to strengthen the science club movement, to work with all existing clubs and agencies. Around 500 such organizations have already associated themselves with VP in furthering the

cause of science popularization. Considering the wider reach of radio, MVP has collaborated with All India Radio (AIR) extensively over the past few years. It jointly organized a programme called 'Meet the Scientist' on the occasion of National Science Day, February 28, 2003.

MVP: Linkage to other organizations

MVP's success also depends on its links with other groups and organizations. It has good relations with the Maharashtra Government, largely due to the shared relationship between scientists and different scientific establishments. However, MVP has no direct or institutional linkage with political parties. MCOST has been a granting-aid agency to MVP during the latter's programmes on National Science Day. MVP organizes various kinds of programmes along with a number of other institutions such as Lions Club & Rotary Clubs of Mumbai, University of Bombay, Labour Institution, Bombay Leprosy Project etc. Leading institutions of science and centres for higher learning like BARC, HBCSE, Institution of Engineers and *Maharashtra Sahitya Parishad* (Maharashtra Literary Council) have been supportive of the causes championed by MVP. MVP has a strong relationship with its sister organization NCSC. MVP has links with AIR, which reaches 99% of India's population.

The networks of MVP provide a base for collective incentives. This network with its ties and reciprocity is a reservoir of resource for MVP. And MVP uses it in mobilizing support. The growth of MVP is linked to the larger people's science movement (PSM) in the country and hence shares a relationship with various PSM organizations such as KSSP, BGVS (*Bharat Gyan Vigyan Samiti*), and LVS (*Lok Vigyan Sanghathan*) in India. MVP's interaction with similar groups/organizations in other parts of India has provided a network. For instance, the interaction with KSSP urged MVP to think seriously about its perspectives on modern science and spreading science through local language. Moreover, MVP collectively participates with TNSF (Tamil Nadu Science Forum) and *Telugu Shastra Sahitya Parishad* (Council for Scientific Literature in Telugu) for publishing scientific literature in various Indian languages.

Growth and Diversification of MVP: National Centre for Science Communicators (NCSC)

The NCSC was added as a new project of MVP in 1996; with the objective of working for the science communication movement in India. It aims to (i) establish contacts among science communicators bringing them together on a common platform; (ii) promote science writing; (iii) disseminate information on the latest developments in S&T; (iv) identify the barriers and challenges of science communication, (v) encourage young science communicators and nurture their skills; (vi) organize conferences/workshops/seminars, and courses, group discussions, debates, etc. to achieve the above objectives; (vii) facilitate translation activities and finally (viii) liaison with media to help science writers publish and communicate their work. A National Conference for Science Writers was organized in December 1996 where science communicators had participated to discuss the history of scientific writing in their languages and various problems and issues.

Conclusion

PSM in India might have started as a discursive movement where activism started with a discourse and later on manifested some form of social mobilization. But as the analysis of this study shows discursive formation is not an encompassing framework to justly explain the movement. It fails to do so particularly because of the grassroots activities of KSSP and emergence of all India organizations like BGVS that indulges in social mobilizations.

The analysis indicates that of late the PSM in India has taken the shape of social mobilization. At the same time it further indicates that the PSM has grown beyond the conventional social movement framework, i.e, from mobilization to institutionalization. The emergent institutions have not culminated as the end-processes, rather make an intermediary phase, beyond which some of these PSM institutions have become dormant, some have started declining, some have withered away making way for new institutions and some have emerged stronger by re-aligning themselves under larger

umbrella organizations. In the process the movement renews itself, as new PSM organizations have also emerged. But at the same time it is observed that the movement has lost its original radical teeth, spontaneity and focus.

More of the institutions have come under the influence of the government and have shifted their areas of focus (to literacy, environmental awareness and even rehabilitation and resettlement issues). For example a radical ideologue like M P Parameswaran who spearheaded a radical movement like KSSP has been co-opted by the government through BGVS. Similarly the more independent reformist type of science popularizing movements of OBPS has been co-opted by the state government by funding OBA and the independent reformist type of science popularizing movement of MVP has been co-opted by the state government as well as the central government by heavily funding MVP as well as its offshoot NCSC. Hence, PSMs in India now have acquired more the hues of 'Social activism' (not that of pure science as it was earlier) and later on often acquire the patronage of the state by withdrawing their radical teeth.

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