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A COMPARISON OF VECTOR CONTROL THROUGH SPECIALIZED SERVICES, GENERAL HEALTH SERVICES AND PRIMARY HEALTH CARE/COMMUNITY

BY

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1. INTRODUCTION

Vector Control in India dates back to 1902 when Royal Society of London in consultation with the military authorities conducted an experiment in Mian-Mir, a cantonment near Lahore (now in Pakistan). The objective was to demonstrate the practicability of malaria control by minor and inexpensive methods suggested by Sir Ronald Ross himself in 1902. The work was started by Major James in April 1902 and breeding was controlled in canals, irrigation ponds, rainfall pits, surface drains, ponds etc., and this work was continued by Captain Christophers from July to November 1903. The first experiment proved a failure as it was not possible to destroy anopheles mosquitoes by simple and inexpensive methods. From 1904 to 1909 more intensive work was done on the biology and control of mosquito breeding, but experiments on the control of mosquito breeding were again considered a failure. Therefore further research and development was stressed by Norton et al. in 1910 (1). During the period till 1936 fight against malaria continued by control of mosquito breeding using the biological control methods and larvicides. Paris green was extensively used and so also the drainage. By this time there were several examples of successful malaria control in limited areas, but the control measures were considered costly. During 1934-35 malaria transmission was interrupted in South Africa by killing adult mosquitoes using pyrethrum insecticide as space spray. This new method of mosquito control was repeated in India in 1936 and successful control of A. culicifacies was achieved at low cost, thus raising the fresh hope of tackling the problem of rural malaria in India (2). Soon after world war II, DDT was released for use in public health. Trials with DDT started in India in 1945. These experiments were very promising and by 1948 several states in the country demonstrated the almost spectacular effect of DDT spraying on malaria control in rural and urban areas. With this background, the National Malaria Control Programme (NMCP) was launched in the country in 1953. This 5 year NMCP operation achieved remarkable success in malaria control. As a result of this spectacular success the National Malaria Eradication Programme (NMEP) was launched in 1958 with the hope to eradicate malaria before the large scale onset of insecticide resistance in the country. Malaria was nearly eradicated in early 1960s and there were no deaths due to malaria. This euphoria was short lived and in late 1960s there was widespread resurgence of malaria in large parts of the country. Malaria cases continued to increase until 1976 when there were 6.4 million parasite positive cases in the country and deaths due to malaria started to occur (3). The NMCP/NMEP was a centrally sponsored vertical programme. With the resurgence of malaria in big way in 1970s, a revised strategy known as the modified

plan of operation (MPO) was implemented in April 1977 (4). MPO was a vertical programme which is in the process of being gradually replaced by the multi-purpose worker (MPW) and village health guide (WHG) scheme under the general health sources of the ministry of health and family welfare, Government of India. This action was the result of the country's commitment to undertake comprehensive health services including the control of communicable diseases, which necessitated the integration of anti-malaria activities with the primary health care system. Among the vector borne diseases, control of malaria alone was merged with the primary health care system. The control of other vector borne diseases such as Filariasis, Kala-azar, Dengue, Japanese Encephalitis (JE) and Dracunculosis was retained as a vertical activity to be carried out by the specialized agencies like the Filariasis Control Programme and Guineaworm Eradication Programme etc. Kala-azar control is a routine operation carried out by the state governments with the help of central government. Similarly the control of JE and dengue is carried out where ever the outbreaks are reported by mobilizing vector control staff by the State Governments with the help of NMEP. Because of this reason our discussion on vector control under the primary health care system would be restricted to the control of malaria and possibilities of including other vector borne diseases in the existing infrastructure of the country's health delivery system.

2. STATUS OF VECTOR BORNE DISEASES

Large parts of India are endemic for malaria. In rural areas about 350 million population are being protected by residual spraying of insecticides and chemotherapy under the MPO/primary health care system (3). Malaria control in urban areas (> 40,000 population) is carried out under the urban malaria scheme (UMS) of the NMEP launched in 1971 (5). At present 133 towns showing 2 or more API are under the UMS (6). In addition to above activities, malaria control is strengthened in areas showing high incidence of P. falciparum by a Swedish International Development Authority (SIDA) supported scheme "P. falciparum Containment Programme (PfCP)". The scheme (PfCP) is working in 89 districts with 98 million population (3,7). PfCP is an additional input to the MPO to help to reduce/eliminate mortality due to P. falciparum malaria. It may be mentioned that in 1976, NMEP recorded 6.4 million parasite positive cases which were highest since the resurgence of malaria. Malaria situation improved as a result of the implementation of MPO, UMS and the PfCP. The cases have gradually stabilized to about 2 million, but there is no further true decline in the

incidence of malaria. It may be noted that during the years of improvement in malaria situation there was a declining trend in P. vivax but the incidence of P. falciparum has remained at about 0.5 million cases for several years now (8).

On the vector side, there are atleast 9 vectors of malaria in India. A. culicifacies transmits rural malaria throughout the plains and in peri-urban areas. The vector has become resistant to DDT and HCH in large parts of the country and to malathion in Gujarat and Maharashtra. It is also a complex of atleast 3 sibling species (9). A. culicifacies is finding additional breeding grounds due to increase in irrigation. It has also replaced the other well known vectors e.g., A. minimus in U.P. terai (10) and A. sundaicus in chilka lake, Orissa (11). A. culicifacies breeds in sunlit pools, borrow pits, rice fields, tanks, reservoirs and irrigation channels in the sandy margins. A. stephensi is the vector of urban malaria but A. stephensi var. mysorensis transmits rural malaria in parts of Rajasthan, Gujarat and Andhra Pradesh etc. It breeds in sunlit wells, cisterns fountain pools, overhead tanks, irrigation channels and reservoirs etc. A. fluviatilis is a vector in foot hill areas of south and north west and irrigation tracts in Decccan plateau. It breeds in grassy margins of slow moving waters, seepage, irrigation channels, terraced rice fields and occasionally margins of swamps. A. minimus is widespread in foot hills of W. Bengal and NE states. It breeds in slow moving water with grassy edge and little shade. A. philippinensis is widespread in Bengal, Bihar, NE states and Karnataka. It breeds in tanks permanent weedy pools and rice fields with green algae. A. sundaicus is now restricted to A & N Islands and may also be present in parts of Sunderbans in WB. It has preference for breeding in brackish water with algae and can tolerate high organic pollution. It breeds in lagoons, salt swamps, large borrow pits, ponds etc.

In India,the nocturnally periodic Bancroftian filaraisis (Wuchereria bancrofti) is widely distributed. The Brugia malayi is found in small pockets in seven states of which the largest tract is in Kerala. As per the 1981 estimates, the population at risk of bancroftian filariasis was about 304 million of which 222 million live in rural areas. Out of the 290 districts in 17 endemic states and union territories, 260 districts are endemic for filariasis. There are about 22 million microfilaria carriers with 16 million diseased people (12). While Cx. quinquefasciatus is the vector of Bancroftian filariasis, the members belonging to the genus Mansonia i.e., Mansonia annulifera and M. uniformis are the vectors of Brugia malayi. The former breeds in polluted water throughout the country and the later 2 species breed in

association with Pistia plants in ponds.

Japanese Encephalitis (JE) appears in sporadic or epidemic form, mostly in rice growing areas of the country. Between 1950 and 1978, outbreaks of JE were reported from Tamil Nadu, Karnataka, Andhra Pradesh, West Bengal, Assam, Bihar, Uttar Pradesh, Pondicherry and Delhi. It is estimated that during 1978-83 there were 2367 deaths due to JE, out of a total of 7600 cases in India. The vectors are the members belonging to Cx. vishnui group, particularly Cx. tritaeniorhynchus and Cx. vishnui, and they principally breed in rice fields.

Dengue epidemics have been reported from several cities of India, and Aedes aegypti is the vector which breeds in over head tanks, cisterns, tyre dumps etc.

Kala-azar, both cutaneous and visceral, is transmitted by sand flies belonging to the genus Phlebotomus. Sand fly vectors P. papatasi and P. argentipus breed in mud houses and cattle sheds. North Bihar and parts of W. Bengal have become endemic for the disease.

Dracunculosis known as guineaworm disease is endemic in India. Cyclops of both sexes and all age groups are the intermediate host for transmitting the infection to man. The disease is endemic in Andhra Pradesh, Gujarat, Karnataka, Madhya Pradesh, Maharashtra and Rajasthan. It has been eradicated from 3 districts of Tamil Nadu. As of January 1985 Guineaworm disease was endemic in 77 districts (505 PHCs and 9283 villages) and the total population exposed to the risk of Guineaworm in the 6 states is about 50 million (13).

Fig. 1 shows districts in India (i)free from malaria, (ii) less than 2 API and (iii) 2 or more API. Fig. 2 shows regions which are endemic for filaria i.e., 1% or more Microfilaria (Mf) rate and non-endemic districts with < 1% Mf rate. It is noteworthy to mention that the state of J & K, Himachal Pradesh, Delhi, Haryana, Chandigarh, Meghalaya, Arunachal Pradesh, Sikkim, Rajasthan, Tripura, Mizoram, Manipur and Nagaland are not endemic for filaria, but either the entire state or its regions are endemic for malaria. The rest of the country has either low incidence of filaria i.e., < 1% Mf rate or endemic for filaria. Kala-azar is restricted to 21 districts in Bihar and 3 districts in W. Bengal and guineaworm disease is endemic in 6 states (Fig. 3). Therefore a primary health care system should be developed which would take into account the number of vector borne diseases and their endemicity levels. A uniform pattern as it exists under the MPW scheme of the primary health care

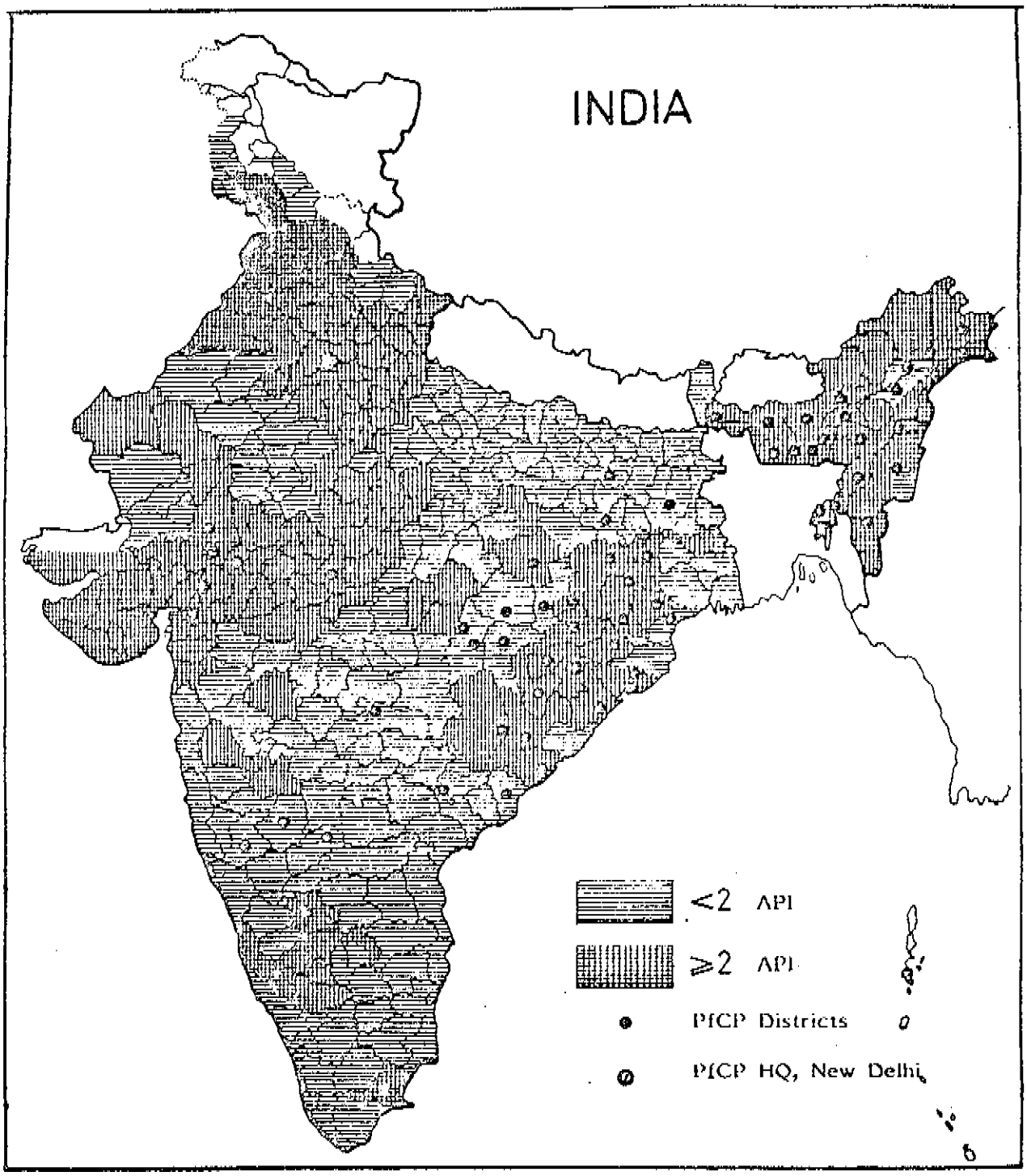

Fig. 1 : Map showing average of 3 year API (1982-84) and districts under the Plasmodium falciparum Containment Programme (PfCP).

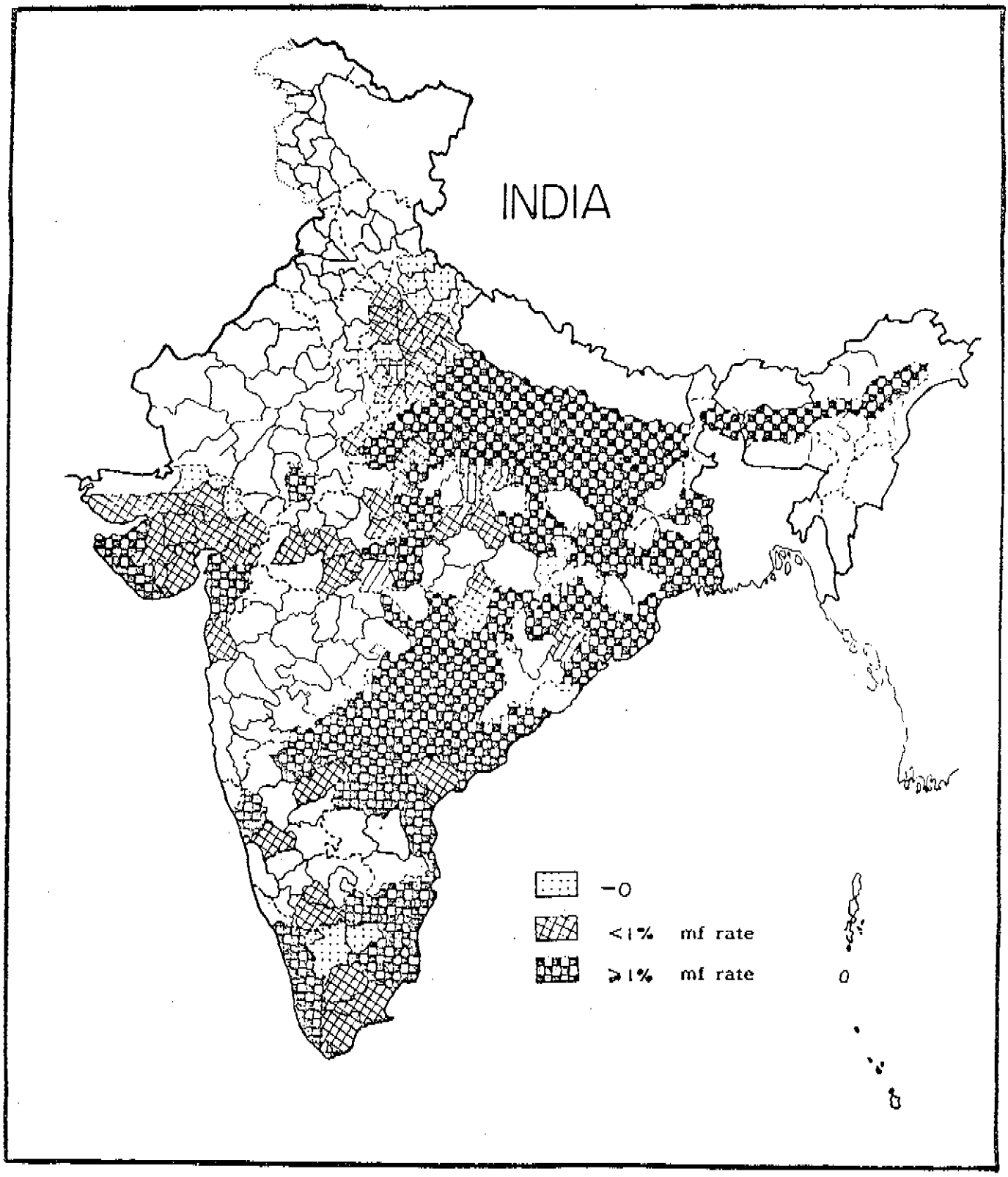

Fig. 2 : Map showing 3 year average microfilaria (mf) rate (1982-84), district-wise.

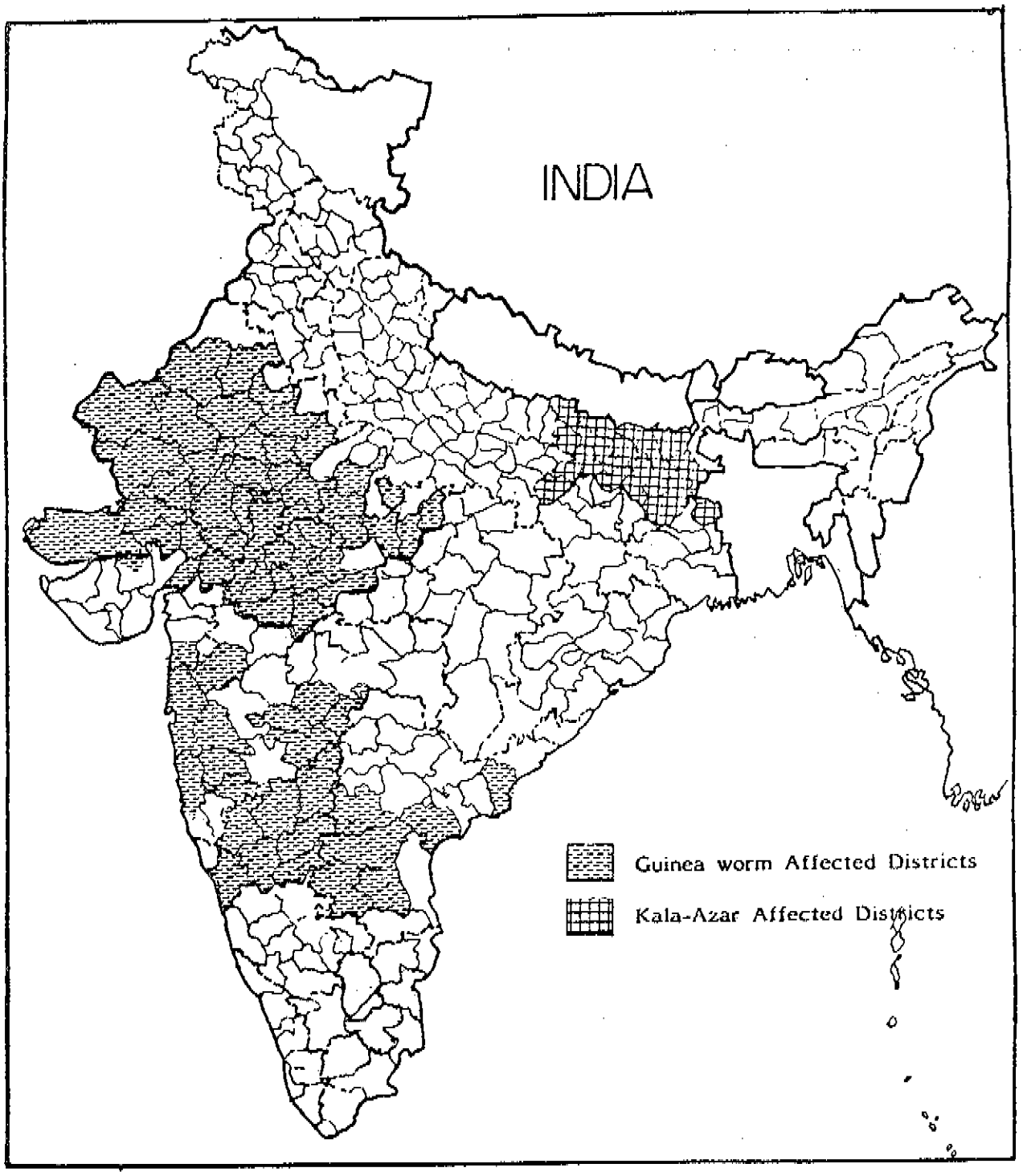

Fig. 3 : Map showing Kala-Azar and Guinue worm endemic districts in 1985.

system may not be able to fulfill the objectives of the alma ata declaration and aspirations of her people in terms of providing adequate health services.

3. VECTOR CONTROL THROUGH SPECIALIZED SERVICES

National Malaria Eradication Programme (NMEP) is responsible for the control of malaria in the country. The control of malaria in certain areas like the military establishment, large estates, tea gardens, etc. is carried out by specialized services outside the ambit of the primary health care system. Malaria control in the urban areas is carried out by local bodies like the municipalities, corporations etc. Although as of now urban areas are not under the primary health care system, there is a discussion on the revamping of health services and open sub-centres in urban areas to provide health services to the hutment dwellers and other people living in the low socio-economic strata of the society. The methods of control in the urban areas are mainly anti-larval using the larvicidal oil, larvivorous fishes, source reduction and pyrethrum space spraying in and around 50 houses of a positive case. UMS scheme, although essentially directed to control malaria also receives equal emphasis in the control of mosquito populations in general. The methods of mosquito control under UMS, if carried out meticulously could be highly effective in the control of mosquito breeding e.g., malaria control in Bombay (14) and eliminate disease transmission. The urban malaria control is successful in reduction of vector densities and also reduces the man vector contact but there is no effect on the vector longevity which is only attainable by spraying of the residual insecticides.

Another example of malaria control by specialized agency is the feasibility cum demonstration project on the biological and environmental control of malaria in Kheda distt., Gujarat (15). In this area NMEPs malaria control activities have been withdrawn and all work is done by the project staff. The strategy known as the integrated disease vector control (IDVC) was initailly launched in 25,000 population (7 villages) in 1983. It has gradually expanded to the entire Nadiad taluka of 3,50,000 population living in 100 villages. In this area malaria control is being achieved by a combination of source reduction, minor engineering works, biological control, health education, community participation and chemotherapy. As the programme received acceptance by the villagers, an opportunity was availed in the introduction of profitable schemes such as the fish production and social forestry. In addition to this many

schemes of environmental improvement have been introduced such as soak pits, improved chulahas (stoves), bio-gas plants etc. As a result of these developments there is a tremendous improvement in the environment. Malaria which had afflicted a large population including deaths has nearly disappeared and mosquito densities are at the low ebb. An important benefit of the scheme is the increase in the general awareness of the community about the disease and the methods of its control. The new strategy (IDVC) was found cost effective i.e., the expenditure incurred on malaria control was estimated to be about equal or less than the routine expenditure incurred on malaria control by DDT. One objective of the study is to merge Kheda study (IDVC) with the existing primary health care system. In Kheda, it may be noted that as a result of the intervention measures malaria has gone down to very low levels. Since the strategy adopted in Kheda is not an eradication but a control strategy, longevity of mosquitoes would not be reduced, and the residual vector population could continue to transmit the disease. Therefore good vector control activities would have to be retained on permanent basis. Therefore it is important to monitor vector densities and take immediate remedial measures where ever required. On the parasite side prompt case detection and treatment must continue. IDVC would be a joint action oriented programme involving collaborating agencies, directed primarily to eliminate mosquito breeding and bring about semi-permanent to permanent changes in the environment which are non-conducive to mosquito breeding. IDVC programme also incorporates preventive measures in its strategy during all development schemes in the area which may result in creating mosquitogenic conditions. It is envisaged that as the incidence of vector borne diseases goes down, IDVC team may diversify its role in promoting income generating schemes and participate in developmental programmes to improve the environment and boost the economy of the villages. It is hoped that when IDVC is fully implemented, the incidence of vectors and the disease they transmit would be below the economic threshold, and there would be general improvement of the environment. In this programme, village panchayats would actively participate in mobilizing man power resources and providing partial funds for sustaining the IDVC activities to strengthen the primary health care based vector control.

It is noteworthy to mention that actual transfer of integrated malaria control (IDVC) to the general health services should take place only when the disease load and vector densities have been reduced to a level that the structured existing primary health care system can assume the responsibility of malaria control successfully. In order to do so an alternate structure would have to be developed and tested failing which the history may repeat itself as

happened to malaria situation under the general health services during eradication phase. The actual transfer should take place only when the vector control activities could be fully sustained by the primary health care system.

Vector control under the MPO of the NMEP was a vertical programme and NMEP is a specialized agency for the control of malaria in the country. Under the MPO overall responsibility of the malaria control rested with the chief of the district health organization. The medical officer of the PHC was involved as much as possible. Because of the specialized activities under antimalaria programme and the level of supervision required, the peripheral staff was strengthened at the district and PHC level. Technically, the phasing of the NMEP was abolished and areas with 2 API or more were earmarked for regular rounds of spray. In areas below 2 API, provision had been made for limited operation depending on the size of the foci. Spray operation was carried out by the seasonal staff under the supervision of the district malaria officer (DMO) and his supporting staff. Surveillance activities in the entire country were decentralized to PHC along with laboratory services. People's participation was solicited by involving volunteers in the distribution of antimalarials through drug distribution centres (DDCs) and the fever treatment depots (FTDs). An organizational chart of the MPO is given in Fig. 4. MPO was launched as a contingency measure with the following objectives (4):-

(i) To prevent deaths due to malaria
(ii) To prevent morbidity due to malaria
(iii) To prevent the green revolution and industrial areas from the ravages of malaria, and
(iv) Retention of the achievements gained.

A three pronged strategy was adopted to implement the MPO. The components of the strategy were:-

(i) Government efforts
(ii) Research on malaria
(iii) People's participation

It was envisaged that the 3 components of control strategy would receive equal emphasis, although budgetary requirement would be different.

The MPO was to be gradually replaced by the "Multipurpose Worker (MPW)" and "Village Health Guide (VHG)" scheme and malaria control was envisaged to be implemented as a horizontal programme under the primary health care system throughout the country.

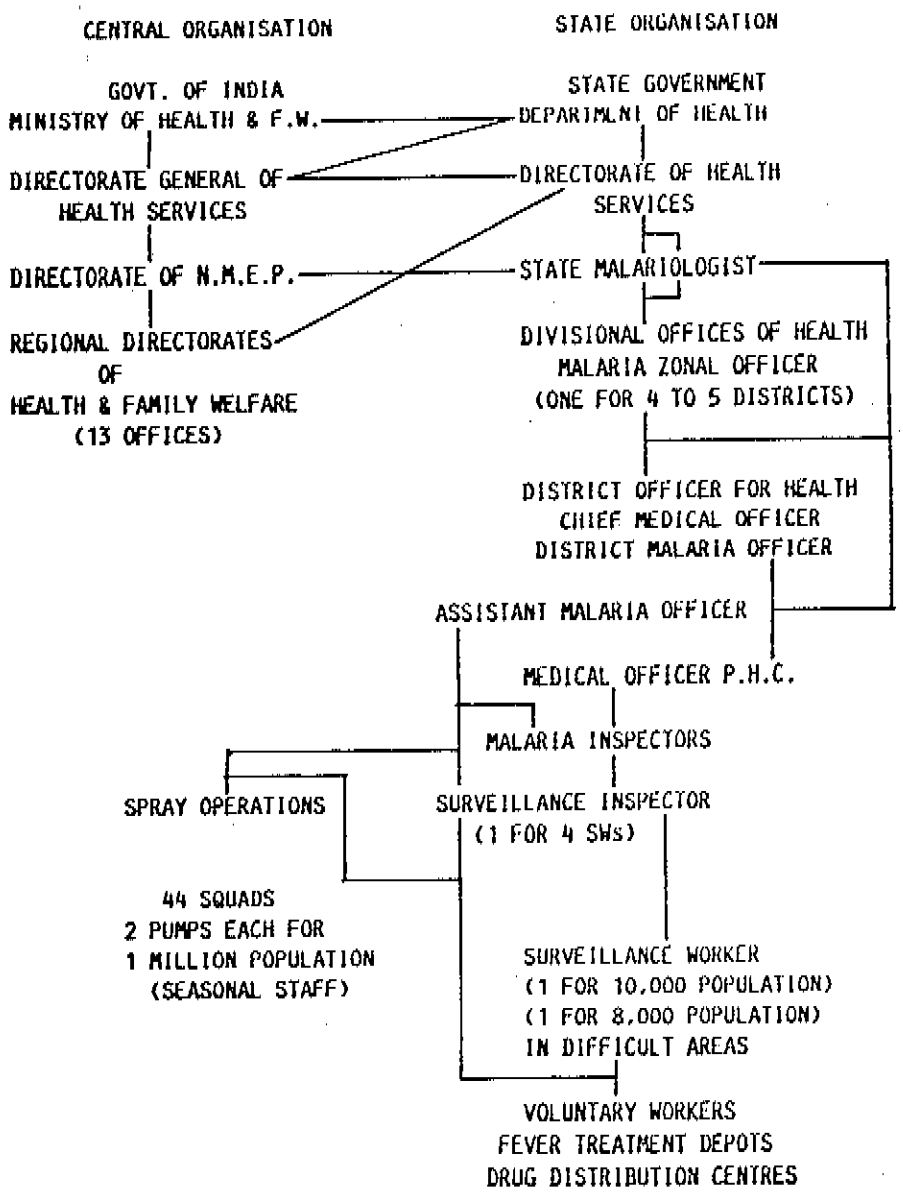

Fig. 4 : Organizational chart of the modified plan of operation (MPO) under the National Malaria Eradication Programme (NMEP).

Basic change in the concept of malaria control under the MPO of the NMEP and the multipurpose worker scheme was the component of community participation was through VHG who were expected to provide health education and motivation of the people for participation in the sanitation and vector control programmes. Although this aspect of the duty is not being currently performed by the VHG but it is envisaged that it will become an important activity when the scheme is fully in operation and there would be 2 VHG, 1 for MCH and other for the communicable diseases in each village.

4. VECTOR CONTROL THROUGH GENERAL HEALTH SERVICES AND PRIMARY HEALTH CARE/COMMUNITY

Health Survey and Development Committee known as Bhore Committee in 1946 indicated that there was no effective health service in India. The committee observed that there was high morbidity and mortality in rural areas of the country and therefore recommended short term and long terms plans built upon integrated, curative and preventive services manned by the whole time staff. The primary health centres (PHCs) were the nodal points for the medical needs of the rural population. In 1959 Health Survey and Development Committee known as Mudaliar Committee was set up to look primarily into the development in public health and medical relief. The committee recommended improvement in the functioning of the PHCs by reduction in the population coverage, strengthening of district hospitals and introduction of mobile teams to cater to the medical needs at the periphery. Malaria programme was a vertical programme and modalities of the integration of maintenance phase of the NMEP with the general health services was dealt separately by Chadda Committee (1963). In 1966, the Govt. of India following the "Mukherjee Committee" report decided to implement Family Planning Programme as vertical organization with unipurpose family planning workers for every 20,000 rural population and a block extension educator for each PHC and a auxiliary nurse midwife (ANM) in each sub-centre for every 10,000 population. The Govt. of India took cognizance of the fact that even after 3 decades of Bhore Committee's report the health services had not penetrated into the remote and inaccessible areas. The Govt. of India therefore appointed "Kartar Singh Committee" which recommended the multipurpose worker (MPW) scheme in 1974. At that time there was a felt need for the development of a primary health care mechanism with its emphasis on preventive medicine. The participation of community and self help by the individual was included in the MPW scheme of general health

services. As a result in 1977 the community health worker later re-designated as Community Health Guide (CHG) scheme was introduced in the rural areas. Under the CHG scheme one health guide was appointed for every 1000 population. The CHG was to provide preventive and curative services for minor ailments, promoting sanitation and attending to emergencies, and above all motivate people in self help and participatory activities of the health delivery system (see Fig. 5).

Historically, malaria control in the country was carried out by the specialized organization and only the maintenance phase of the NMEP was merged with the general health services. Under the NMEP, spraying of residual insecticides continued to remain as a seasonal activity, the epidemiological surveillance was carried out through active case detection (ACD) mechanism throughout the year. The ACD was a unipurpose scheme. With the eradication of malaria maintenance units were moved into the general health services and in 1964, 92 million population living in the maintenance phase was transferred to the general health services. Transferring of units from one phase to another was carried out on the recommendation of the Independent Appraisal Teams (IAT), and every year eligible areas entered into maintenance phase and finally transferred to the general health services. As a result by 1968 approximately 249 million population or 50% of the total population had entered the maintenance phase of the NMEP.

It was envisaged that vigilance under the general health services would be able to detect new cases of re-introduction or relapse and provide prompt radical treatment. But the infrastructure in the general health services was not adequate and mature enough to take up surveillance and vigilance. As a result there was an increasing trend of malaria in areas cleaned of the disease (16). As a result of reversions, the Govt. of India appointed an in-depth evaluation committee to look into the programme and make recommendations for its improvement. As a follow up of this committee's report a consultative committee of experts was appointed in 1974 to determine an alternate strategy under the NMEP. The committee drafted a strategy known as the modified plan of operation (MPO) which was launched in the country in April 1977 (4).

PRIMARY HEALTH CARE SYSTEM

MULTIPURPOSE WORKER SCHEME

STATE ORGANISATION

STATE GOVT. DEPARTMENT OF HEALTH

DIRECTORATE OF HEALTH SERVICES

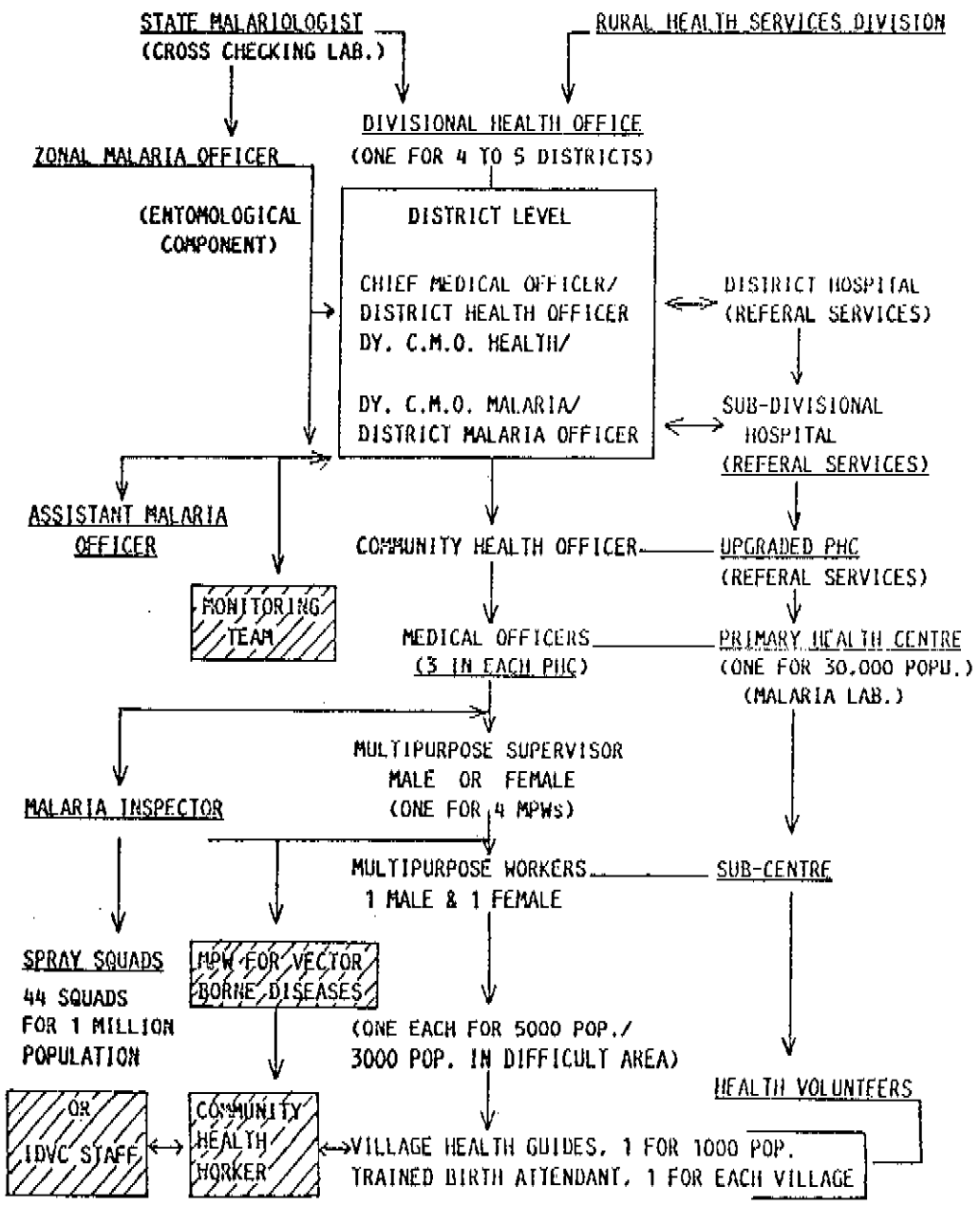

Fig. 5 : Organizational chart of the Multipurpose Worker (MPW) scheme vis-a-vis malaria control under the primary health care system. Changes proposed in the MPW scheme have been shown in boxes.

The committee also envisaged gradual transfer of areas under the MPO to the primary health care system known as the multipurpose worker (MPW) scheme. Under the new scheme a notable change was introduced in the health care delivery system by bringing MPW in health care services including control of communicable diseases. The implementation of the MPW scheme was hastened following the country's international commitment at the alma ata conference to achieve "Health for all by the year 2000 AD" and the national directive to integrate the anti-malaria operation with the primary health care services. It resulted in the change in administrative leadership and re-organisation of the delivery of health services through the MPW and VHG scheme etc. It was envisaged that the MPW scheme would be fully implemented by 1982-83. However by April 1st 1985, the training was completed in 340 districts out of 412 districts in the country, and in the remaining districts the training is in progress to be completed as soon as possible. The scheme has been fully implemented in 320 districts (17).

Under the MPW scheme, full orientation is given to the peripheral workers in all the disciplines of public health. Village health guides are also given three months training which includes collection of blood smears and administration of presumptive treatment to fever cases. However due to lack of supervision and priority given to other programmes especiallly family welfare, collection of blood smears through the ACD has shown a declining trend. At present, it is envisaged that by middle of the 7th Plan, the entire country will go into MPW scheme including malaria control.

Under MPW scheme one MPW (male) and one MPW (female) are posted at each sub-centre of the PHC. The MPW (male) is expected to carry out home visits, look after environmental sanitation, provide first aid for injuries, treatment of simple and common ailments, nutritional programmes, health education, community development, patient referrals, family planning, malaria surveillance treatment, record keeping and collection of vital statistics. In the field of malaria alone, he is expected to visit each family once in a fortnight and is expected to carry out the following duties with regard to malaria (Reproduced from Reference 17).

- From each family he shall enquire about:

  i) Presence of any fever case;
  ii) Whether there was any fever case in the family in between his fortnightly visit;
  iii) Whether any guest had come to the family and had fever and
  iv) Whether any member of the family who had fever in

between his fortnightly visit has left the village.

- He shall collect thick and thin blood smears on one glass slide from cases having fever or giving history of fever and enter details in MF-2 and put appropriate serial number on the slide.

- He shall give presumptive treatment for malaria after blood smear has been collected. He will follow the instructions given to him regarding administration of presumptive treatment under NMEP.

- He shall contact the village health guide during his fornightly visit to the village and (i) collect blood smears already taken by the village health guide (ii) also collect details of each case in MF-2 (iii) replenish both drugs and glass slides and look into the account of consumption of antimalarial drugs.

- He shall despatch blood smears along with MF-2 collected by the village health guide/multipurpose worker (female) of the sub-centres and also those collected during his visit in his section to the PHC laboratory twice a week, or as instructed by the medical officers, PHC.

- He shall verify the radical treatment administrated by the health guide if any during his visit.

- He shall administer radical treatment to the positive cases as per drug schedule prescribed as per instructions issued by the medical officer PHC, and take laid down action, if toxic manifestations are observed in a patient receiving radical treatment with primaquine.

- He shall intimate each household in advance regarding date of spray on the basis of advance spray programme given to him and explain simultaneously the benefit of insecticidal spray to the villagers.

- He shall contact the village health guide and inform him of the spray dates and request him to motivate the community and prepare them for accepting the spray operations.

- Assist the health assistant (male) in supervising operations and training of field spraying staff.

The multipurpose worker (MPW) scheme is faced with a variety of problems. In many regions of the country, malaria incidence is very high and one MPW is not able to visit each house at an interval of 15 days. As a result his blood smear collection becomes a representative sample. Besides he is

unable to follow up the radical treatment. There is no provision of leave reserve and whenever the MPW is on leave, which may be during the peak transmission season, no work is done in his area. Besides a large number of posts are lying vacant, thus denying the primary health care to this population. There is no mechanism to monitor the performance and deticiencies of the MPW which should be corrected by providing additional training/re-training. A major problem relates to the performance of MPW in malaria work vis a vis family planning. He is expected to motivate people for sterilization for which there are incentives and targets fixed. He therefore devotes most of his time in family planning work. It is however possible to partly correct this situation in the existing set up by directing the MPWs to intensify malaria work during the monsoon season which is a lean season for family planning and take up family planning work after the rains. Besides not only that the MPWs are low paid, all MPWs do not have the same scale of pay. This anamoly was introduced as the MPWs were drawn from many unipurpose schemes and have retained their own salary grades. This situation is however being corrected. Considering the general level of education and training the assignment of so many duties to MPW is a real tall order difficult to be fulfilled. At present the population for 1 MPW has been reduced from 10,000 to 5,000 (3,000 for hilly & tribal areas) and it is proposed to further reduce the population to 3,000 or less. Instead of reducing the population, it may be more advantageous to appoint one additional Multipurpose worker (MPW) for the vector borne diseases alone. This MPW would develop better expertise and take more interest in his work and his priorities would not be diverted because of the family welfare programme.

5. PROSPECTS OF VECTOR CONTROL WITHIN THE PRIMARY HEALTH CARE SYSTEM

In 1978, the International conference on Primary Health Care (PHC), held in Alma-ata USSR issued a statement of aims and objectives for orienting national health system towards a primary health care system based on "practical, scientifically sound and socially acceptable methods and technology made universally acceptable to individuals and families in the community through their full participation and at a cost that the community and country can afford to maintain at every stage of their development in the spirit of self reliance and self determination". A basic tenet of the "health for all by the year 2000" declaration was that the new approach was participatory and the communities should be involved in the health delivery system. The new approach

calls for a radical change in attitudes, beliefs, thinking and other established practices related to health. The people should be mobilized and their potential harnessed thus making it a movement to gain strength for the more effective delivery and coverage of the integrated health programmes in the country.

In principle primary health care should include all endemic diseases. This may require strengthening of services at the periphery and also specialized services at the PHC level; but in practice it may overburden the primary health care system to such an extent that coordination, proper execution and delivery of health services may become completely faulty. It would therefore be appropriate to study and ascertain priorities and study the pattern of vector borne diseases to arrive at some commonality in the approach to vector control.

In developing countries striving to fulfil the Alma-ata declaration within the built-in constraints of resources, it is absolutely essential to determine the priorities. In India family planning takes priority over all other health services because of the almost explosive situation in regard to the population growth. The country is not able to cope with the basic needs of her ever increasing population. Similarly in the area of vector control, priority should be assigned on the basis of the threat to life by a particular disease and how it effects the socio-economic development of the country. It is commonplace that malaria is one such disease. Large tracts of otherwise fertile land could not be colonized due to ravages of malaria (10). It effects all facets of life and strikes at the very root of all developments. Control of malaria should therefore receive the highest priority. The two malarial parasite P. vivax and P. falciparum are commonly encountered in the country. Almost all deaths due to malaria are caused by falciparum malaria. Therefore malaria control in areas with high incidence of P. falciparum should receive the first priority followed by P. vivax. For this reason in India, among the vector borne diseases, malaria control has been included in the primary health care system. This has been further strengthened by the P. falciparum Containment Programme (PfCP) which is an additional input in districts showing high incidence of falciparum malaria (7). Another vector borne disease kala-azar is a serious problem in Bihar and parts of West Bengal. The control of malaria and kala-azar should be tackled together under the primary health care system as spraying of DDT or HCH to control malaria vectors also controls the sand flies. Surveillance through the MPW would however needs to be strengthened.

The control of filaria in rural areas is problematical, since the vector control programme would have to be basically anti-larval and our malaria control in rural areas is anti-adult. It would therefore be difficult to include filaria control in the primary health care system where the strategy of vector control is insecticidal spraying, but in areas where anti-larval methods are being used to control malaria (such as urban areas) it should be the normal strategy to control the breeding of the vectors of malaria and filaria and bring the control of these 2 diseases under the primary health care system.

While malaria and kala-azar are amenable to control by spraying residual insecticides like DDT and HCH, fialria vector Cx. quinquefasciatus is refractory to the cholorinated hydrocarbons. The control of filariasis is mainly carried out in urban areas by anti-larval methods. It is posssible to control filaria vector Cx. quinquefasciatus by a combination of environmental and biological control methods in rural areas. In this approach to vector control, it is possible to control the malaria and filaria vectors on Nadiad pattern at an affordable cost by making suitable changes in the existing structure of primary health care system. At present seasonal staff is hired to carry out the spray operations under the MPW scheme. This staff could be replaced with the regular staff who would be responsible for integrated control. Detailed structure could be worked out as based on the work load. Vector control should also have a monitoring mechanism which is at present non-existent. The monitoring mechanism should be independent under the supervision of CMO at the district level and provide a feed back of the impact of intervention measures on the vector density and the incidence of disease. It should also be possible for the monitoring team to predict impending outbreaks of vector borne diseases and/or sudden spurt of vector populations. IDVC strategy would need a community health worker who would interact with VHG for the more active involvement of communities in various vector control and environmental improvement schemes.

In many areas where the incidence of vector borne diseases is extremely high, the primary health care system even with the provision of an additional MPW for vector borne disease control may be over burdened to an extent that delivery of health services may become completely inadequate. Such a situation exists atleast in some parts of the country. Therefore it is important to broadly stratify the country into regions. The planning of primary health care system should therefore be "bottom up" process starting with the needs, perceptions and demands of the people themseleves.

At present the responsibilities of the MPW are uniform throughout the country regardless of the disease load. Contrary to this in China different geographical areas have adopted varying approaches to their health problems. The country should be stratified according to the incidence of the disease, the number of vector control diseases and the terrain etc. Figs. 1 to 3 were drawn on the basis of the average of 3 years (1982-84) of malaria, filaria and kala-azar cases per 1000 population. Areas have been shown without malaria, filaria and kala-azar and also areas with <2 API and 2 or more API, < 1% mf rate and 1% or more mf rate, kala-azar and guineaworm endemic zones. It was felt that JE, dengue and guineaworm can be tackled more effectively by a vertical programme, particularly guineaworm is amenable to eradication and a more concerted effort may be launched to eradicate the disease. Stratification strategy under the MPW scheme would diversify resources and optimize man power utilization to enable a better organizational approach to the vexing problem of disease vector control under the primary health care system with financial and manpower constraints. No attempt has been made here to draw a more accurate statisfaction strategy, but the stratification has been used as an example to demonstrate the "bottom up" approach to planning and structuring a primary health care system which otherwise functions faulty thus impeding the process of realization of alma ata declaration.

Main activity of vector control under the primary health care system is the spraying of residual insecticides. Spraying is a massive programme since it is carried out in 341 million population scattered all over the country (2 rounds of DDT is sprayed in 210 million population and 3 rounds each of HCH and malathion are sprayed in 210 million and 21 million population respectively). At this point it would be important to discuss the levels of vector control activities related to (i) reduction in vector longevity (ii) reduction in man vector contact, and (iii) reduction of vector populations which can be realistically accepted through the system. In early days, DDT spraying under the NMEP produced collateral benefits such as reduction in bed bug and house fly nuisance etc. In areas with kala-azar, the disease was on its own reduced to very low levels. But now spraying of insecticides is faced with the problems of insecticide resistance, large scale refusals by the house holders to allow their dwellings to be sprayed and other operational failures, thus making the present strategy difficult to perform in interrupting transmission. Even the change of insecticide from DDT to HCH or malathion has not been of much value because of the above reasons. As a result the impact of these operations on the three vector control activities cited above has been marginal in many places and the strategy of insecticidal spraying is being questioned

with increasing vigour. Although the critical levels of density of each vector species are known but in practice it is difficult to monitor or implement vector control measures so as to keep the vector longevity below threshold levels. An alternate strategy of vector control by integrating biological and environmental methods can eliminate malaria and filaria but the strategy does not reduce vector longevity, although it reduces the man vector contact and vector populations. Therefore, in the alternate strategy along with vector control, elimination of parasite reservoir constitutes an important strategy otherwise the residual vector population can maintain transmission in the area of control. It may however be noted that there was no impact spraying under NMEP on either the disease or the vectors of filariasis. Contrary to this there was considearble increase in Cx. quinquefasciatus populations and many new areas of the country have become endemic to filariasis, and there is no vector control programme in rural areas to control the disease.

Community participation should be used as an important tool and should be included from the very beginning in the planning and management of all vector control operations, if the programme has to succeed in bringing about basic change in the thinking and behaviour of people who are themselves the beneficiaries. In this approach the basic tenet is that the communities have the right and responsibilities to be invloved in the planning and implementation of the programmes designed for their own welfare. One reason for the criticism/failure of the residual insecticidal spraying in malaria control is the fact that the planning was "top down" without any involvement of communities. Under NMEP/MPO limited efforts were made to inform people of the advantages of spraying. Vector control is a preventive measure and in order to elicit response, community health workers must demonstrate a cause effect preventive relationship. This relationship was very conspicuous in the beginning of the programme but in the last decade or so it has lost its impact both in terms of vector control and collateral benefits. This has resulted in large scale refusals in allowing the human dwellings to be sprayed. In many areas the room coverage does not exceed 30% and most of the spraying coverage is that of the cattle sheds. There is already poor kill of anopheline mosquitoes due to insecticide resistance spraying of DDT and HCH has and negligible impact on Culex mosquitoes, and added to this spraying of cattle sheds and not the rooms due to refusals, drives the mosquitoes towards the living rooms. As a result the mosquito densities are partly suppressed, if at all, and they soon regain original densities, and malaria transmission is not completely interrupted. Since the communities were not involved at any stage of the planning and execution of spraying the programme

they have adopted an attitude of complete indifference. Communities can participate in vector control operations in many ways. Some of these are: (i)supplies of insecticides and spray pumps etc. may be made available to Panchayats who can carry out the spray operations on their own. (ii) village volunteers could participate in spray operations with the supplies provided by the Govt. and (iii) spraying staff may be hired by the Panchayats out of the village funds. Unfortunately, India has not tried any of these approaches to spraying involving communities, but the experience of other countries have not been very encouraging. A proposal is being made to improve spraying coverage under the MPW scheme by soliciting definite consent of the communities. Under the proposed scheme, Panchayats may be informed in advance of the spraying strategy and told that spraying operation would be carried out with the consent of the panchayats only. It should become mandatory for each village Panchayat to hold meetings and pass a resolution that at least 90% of the houses would be made available for spraying. Panchayats which fail to provide such a resolution should not be sprayed. The implementation of this scheme in the first year would result in a mosaic where some villages would be sprayed and others not. Villagers in the sprayed areas would experience the cause and effect relationship of the impact of spraying in the reduction of malaria and the vector populations. If the vector control was effective more Panchayats would come forward for spraying in the next year and so on. Such a strategy would help in providing better coverage which has at present dwindled to very low levels.

The habit of mud plastering of the houses soon after spraying in many parts of the country is also directly related to the human behaviour and almost immediately cancels the impact of spraying. This habit could be reversed by involving the communities. Because of these difficulties faced by the health workers, community participation is gaining increasing importance in primary health care based vector control activities. In many areas disease transmission and/or mosquito nuisance is high enough to convince people of the importance of vector control. But in areas with extreme poverty or tribal areas, mosquito control is not the priority. In such areas disease control alone will elicit positive response of the community. Community participation through health education is a slow process and it should begin at the grass root level. During the process of eliciting villagers help, the communities would have an opportunity to express their own felt needs and define their own development priorities. This approach may lead to multi-sectoral programmes as has happened in the IDVC project in Nadiad, Gujarat.

Similarly chemotherapy could be improved by involving community workers. It may be noted that in many areas the incidence of fever/malaria is extremely high and one technician at the PHC level can not cope with slide examination, particularly during the transmission season. The primary health care system could be strengthened by establishing voluntary malaria clinics in the villages. Under the proposal scheme, unemployed educated boys/girls could be trained in malaria microscopy and treatment. These volunteers would be provided with the microscopes and antimalarials by the Government. The volunteers would be allowed to receive honorarium at the rate of one rupee per blood smear examination from every fever or suspected case. Under the scheme it would be mandatory that the blood smears are examined the same day and the treatment to parasite positive cases is also given on the same day. It is assumed that villagers would have the capacity to pay Re. 1 per visit to the volunteer microscopist. In areas with extreme poverty, it should be possible for the Government to reimburse this amount on the production of receipt issued from the malaria clinic. The Govt. should work as a catalyst and should experiment with various approaches to community participation in order to obtain positive response. Community participation should be considered a key ingredient for the success of vector control programmes and no single model could be applied for all situations. It is also necessary to consider social and economic conditions of the society in planning the projects in rural areas. The planning itself should be evolutionary and should be flexible and dynamic to cater to the changing needs of the society.

While efforts to involve the communities should continue at the village level, a more scientific planning is required at the district level, keeping in view the aspirations and felt needs of the people. This planning should be based on the magnitude of the problem of vector control in relation to size and the endemicity level, spell out the vectors and their methods of control, and detailed protocols should be drawn and support levels identified. The communities should be fully informed and motivated and allowed to interact freely at all levels. A community health worker should be the link in educating the villagers and providing them opportunities to interact and discuss the programme. In should be possible through this functionary to motivate people and make them feel the importance of the problem in relation to the health needs of the people who are otherwise victims of various diseases. Such a vector control programme would constitute a ideal approach to disease control through the primary health care based vector control.

6. RESEARCH NEEDS AND PRIORITIES

(i) Role of Panchayats in strengthening the primary health care system by participating in (i) vector control activities, (ii) monitoring the performance of MPWs, and (iii) motivating people in accepting the spray operations.

(ii) Critical level of disease load acceptable under the primary health care structure.

(iii) Stratification of the country according to disease burden and development of a suitable primary health care system for each stratified zone.

(iv) Scope and mechanism of the integration of integrated disease vector control programme in different ecological settings of the country as part of primary health care system, at cost effective means.

(v) Scope of community participation and intersectoral collaboration in the control of vector borne diseases under the multipurpose worker (MPW) scheme.

(vi) Aptitudinal studies on the communities in regard to vector control and environmental sanitation.

(vii) Role of health education in strengthening primary health care system in the country.

(viii) Studies on the vector control monitoring mechanism suitable under the primary health care system.

(ix) Computerization of data and monitoring of the primary health care system at district level.

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