# How Might India's Public Health Systems Be Strengthened? Lessons from Tamil Nadu

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The central government's policies have inadvertently de-emphasised environmental health and other preventive public health services in India since the 1950s. Diseases resulting from insanitary conditions impose high costs even among the more affluent, and rapid urbanisation increases the potential for disease spread. We analyse the central government's policies and then describe Tamil Nadu's public health system, which offers basic principles for strengthening public health within the administrative and fiscal resources available to most states. We suggest establishing a public health focal point in the health ministry, and revitalising the states' public health managerial and grassroots cadres. There needs to be phased progress in four areas: (1) enactment of public health acts to provide the basic legislative underpinning for public health action; (2) establishment of separate public health directorates with their own budgets and staff; (3) revitalisation of public health cadre; and (4) health department engagement in ensuring municipal public health.

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> Focusing on clinical services while neglecting services that reduce exposure to disease is like mopping up the floor continuously while leaving the tap running.
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> – (Paraphrased from Laurie Garrett. *Betrayal of Trust: The Collapse of Global Public Health*.)

India suffers a staggering toll of ill-health from communicable diseases, largely resulting from poor environmental health conditions. Outbreaks of diseases such as dengue, diarrhoeas, hepatitis, and even cholera are commonplace, affecting all from the richest to the poorest. Half of India's children are stunted (IIPS and Macro International 2007), and the fact that 25% of those in the highest wealth quintile are similarly affected reflects the burden of morbidity even among the affluent. The World Health Organisation (WHO) estimates that half of malnutrition is attributable not to lack of food but to infections arising from poor sanitation (Pruss-Ustun et al 2008).

This imposes heavy economic costs, from lost productivity, business disruption, and the costs of treatment for people who should not have been exposed to disease in the first place. The World Bank estimates that the costs of communicable diseases amount to several per cent of GDP in developing countries.[1]

Health systems have three major sets of services, of which the first two constitute public health services: (1) population-wide preventive services to reduce exposure to disease through measures such as implementing health and sanitary regulations to ensure environmental health, monitoring health conditions, acting to avert potential health threats, and controlling outbreaks if they occur; (2) clinical preventive services provided to individuals, such as screening and vaccination for maternal and child health; and (3) medical services to care for and treat individuals with injuries and disease. In this paper, the first two of these sets of services together are referred to as "public health", while the first alone is called "environmental health".

Public health services in general, and environmental health services in particular, constitute a pure public good, and form a basic part of a country's developmental infrastructure. Countries with limited health budgets per capita need to focus their resources primarily on these services.

The ultimate measure of effective public health service delivery is that nothing happens – no major disease outbreaks occur. Its hallmark is planning to avert any serious potential threat. This requires institutional structures capable of formulating a long-term perspective (with ring-fenced financing), in the face of the inevitable political pressures to cure the

ill and fight only visible fires such as epidemics that have already broken out.

The Union Ministry of Health and states' health departments have done much to improve health services, building an enormous infrastructure of medical facilities, medical schools, laboratories, and research institutions. However, central public health interventions are focused largely on single-issue programmes for controlling specific diseases, delivering maternal and child health services, disease surveillance, etc.[2] This approach does not adequately address the need for development of public health systems to anticipate and reduce exposure to disease.

In developed countries, environmental health services form the core of health services, underpinned by a framework of public health regulations.[3] Public health authorities are responsible for planning and implementing services to anticipate, monitor, and avert health threats of all kinds. One of their core functions is to assure environmental health by monitoring other agencies' services – for example, in the United States (US), health authorities' core responsibilities include assuring that the water supply is safe, solid waste and sewage is safely managed, and establishments meet public health standards before being licensed.[4] Similarly, the duties of environmental health officers in Europe include assuring water safety, food safety (including food vendors, processors, food storage, slaughterhouses, and markets), management of solid and liquid wastes, housing, vector control, investigating disease threats, disinfection (WHO 1978).

In the developed world, intensive efforts to strengthen these services resulted in rapid improvements in health outcomes from the late 19th century, as countries shifted from simply responding to disease outbreaks to actually averting their occurrence (Figure 1, p 56).[5] Constant vigilance helps keep the incidence of communicable disease low – for example, malaria was eradicated in the southern US by the 1940s, but the health authorities continue to monitor environmental management and vector breeding, to prevent resurgence.[6] Developed countries regularly upgrade their public health systems,[7] and citizens have come to expect their governments to protect them from exposure to major communicable diseases.

India's health ministry recognised its role in supporting population-wide public health services in the early 1950s. The central role of environmental health services was mentioned in the first two five-year plans which covered the period 1951-61, but not thereafter. The National Health Policy of 2002 (para 2.24) states that environmental health conditions fall outside the purview of the health ministry. Strangely, this view is shared by donor agencies, despite the fact that health agencies in donor countries view assuring environmental health as central to their work.[8] By re-assessing this fragmented approach to public health services, health resources in India could be used more cost-effectively to protect the health of the population.

The costs of these services typically form a small fraction of a country's total public expenditure on health, and of its GDP. For example, Sri Lanka spends less than 0.2% of GDP on its well-organised public health services, which contribute to its high levels of health equity and life expectancy, despite relatively low GDP per capita.[9] Sri Lanka's public health inspectors address environmental and public health issues similar to those described above for the developed world (Appendix 1, p 60).

Rapid urbanisation further increases the urgency for building strong public health systems, because of the massive potential for disease outbreaks in urban areas. Diseases can spread easily in urban areas because they are crowded, generate huge quantities of waste, and have a high density of food vendors, markets, factories, and other activities that can create health hazards. Migrants bring new diseases, often to slums that are already vulnerable due to poverty and poor infrastructure. Sanitary infrastructure needs not only to be developed, as the Urban Renewal Mission did, but their maintenance must also be monitored for compliance with health standards. Assuring urban public health benefits greatly from health department involvement – as is routine in the developed world – since local bodies have many other priorities that are not always compatible with protecting public health. However, the National Health Policy of 2002 underlined the need for extending public medical facilities for improvement of urban health, rather than building of public health systems. The upcoming National Urban Health Mission could do much to strengthen urban public health systems.[10]

In Section 1, we discuss the central policies that while seeking to improve health systems and outcomes through policies such as amalgamating medical with public health services inadvertently marginalised public health services at central and state levels, and diminished the health ministry's stewardship in this area. Section 2 describes the key ingredients of Tamil Nadu's public health system and how these help to protect public health in both rural and urban areas. Section 3 discusses the evidence that better-organised public health systems help protect health, and the replicability of Tamil Nadu's system in other states. We conclude with some policy suggestions.

## 1 The Central Government's Public Health Policies

### 1.1 Marginalising Public Health Services

Constitutionally, public health and sanitation are primarily the responsibility of the states. However, the central health ministry has a major influence on the states' public health policies because of its fiscal leverage, convening power, technical resources, and ability to draw and disseminate lessons across states. The central government's policies have inadvertently de-emphasised public health services, through a series of policy decisions since the 1950s (Das Gupta et al 2009a).

**(a) Amalgamation of Medical and Public Health Services, Eroding Career Incentives for the Latter:** The first major change came with the central government decision to amalgamate the medical and public health services as recommended by the Bhore Committee Report of 1946,[11] and to instruct the states to follow suit. Most states followed this instruction.[12] This was compounded by the recommendations of the Jungalwalla Committee in 1967 that health services should have a unified cadre, with common seniority.[13] Prior to these changes, there were separate structures for each of these services – since they require very different orientation and activities – and each service had its own career ladder.

The amalgamation was intended to increase efficiency and coordination between the medical and public health services. However, it opened the way for the public health services to be gradually eclipsed by the medical services, which attract far more political and public attention. It also diminished the career incentives of the public health staff, as described below. Gradually, public health services fell off the radar screen of the health ministry and of most state health departments, and their capacity for public health policy and planning was weakened.

The pre-Independence public health systems were focused primarily on protecting the European population and the army (Ramasubban 1989, Guha 1993). However, this goal required reducing the prevalence of highly contagious diseases in the whole population – and separating the medical from the public health services allowed the latter to offer good career incentives, build world-class technical institutions, and maintain services effective at meeting the limited policy goals (Harrison 1994, Das Gupta 2005). This parsimonious but systematic colonial approach sharply reduced mortality from killer diseases such as cholera (Arnold 1989), while diseases such as malaria and gastro-enteric infections continued to take heavy tolls.

**(b) Single-focus Programmes That Erode Public Health Systems:** A second change came with the decision to focus the health ministry's public health resources on single-issue programmes – typically sponsored and supported by international agencies – beginning with the malaria eradication programme of the 1950s. As discussed below, the way these programmes are financed and monitored encourages states to use their public health resources primarily for them, instead of on organising broader environmental/preventive public health services. Most state health departments now focus essentially on implementing the single-issue public health programmes, and providing curative medical services.[14]

Nor is the single-issue approach necessarily always successful. It can be spectacularly successful for addressing diseases for which simple and highly-effective medical interventions are available, such as smallpox vaccine. It has proved much less effective for other diseases such as malaria, whose control depends also on more complex management of the disease environment.[15] International agencies' emphasis on "measurable results" has created incentives for international and national policymakers to design more narrowly-focused programmes that may be less effective than broader ones but whose outputs/outcomes can more easily be measured.

A sharp reminder of the pitfalls of prioritising single-issue programmes over other preventive services is the fact that the polio eradication programme has faltered in Uttar Pradesh and Bihar because poor sanitation causes such a high burden of gastro-enteric illness that some children's digestive tracts are unable to absorb the vaccine (WHO 2009:11-12). They therefore contract polio despite repeated vaccination, and the disease spreads to other parts of India and the world, necessitating re-vaccination programmes where the disease had been controlled.

**(c) Separation of Public Health Engineering from Health Services:** A third change came with the decision in the early 1970s to separate public health engineering services from the health departments. This fractured the provision of public health services, and undermined the capacity of the health department to undertake crucial interventions to assure environmental health. Public health engineers can contribute to a wide range of environmental health activities such as managing subsoil water drainage to control vector breeding, and safe disposal of solid waste. Instead, the activities of the public health engineering departments narrowed sharply, such that today they typically limit themselves to the provision of water supply and, in some cases, sewerage. Public health will be better protected if these departments broaden their range of activities to cover more public health needs, in coordination with the health department.

**(d) Amalgamation of All Male Grassroots Staff, Eliminating Environmental Health Services:** A fourth change came with the decision in the 1970s to amalgamate all grassroots male health workers into one cadre of "Multi-Purpose Workers".[16] This combined all the erstwhile sanitary inspectors with other staff such as smallpox and malaria workers, and put them all to work on implementing the priority programmes of the day. The environmental health services provided earlier by the sanitary inspectors fell by the wayside.

### 1.2 Implications for Central Capacity for Public Health Stewardship

The health ministry's capacity for public health planning and stewardship could perhaps be strengthened. This manifests itself in several ways.

**(a) No Focal Point in the Health Ministry for Public Health Services:** The health ministry has focal points for dealing with many issues, including each of its single-issue programmes. However, there is no focal point for environmental health services. The same applies to the directorate general of health services, which is the technical wing of the health ministry. Without a focal point, the health ministry is poorly placed to provide public health stewardship.

A recently-added post entitled "Special Director-General of Health Services (Public Health)" is disappointingly entasked primarily with overseeing the health ministry's single-focus programmes, and is to be filled on the basis of seniority regardless of whether the person is a medical or public health specialist.

Lack of public health advocacy is one of the many consequences of the absence of focal point. Advocacy helps increase citizens' awareness about public health issues and builds demand for services that reduce their exposure to disease. Public health authorities in the developed world see advocacy as a key part of their work (IOM 1988). It is fundamental to building political pressure for public health services – instead of only for the medical services for which there is always political demand since their benefits are immediate and hence easily understood.

**(b) Health Ministry Expertise in Public Health Planning Could Be Strengthened:** The health ministry is staffed with professional administrators and technical people who are highly

qualified, but might benefit from more exposure to the needs of public health planning. The ministry is headed by people from the administrative services, deeply experienced in public administration from the districts upwards. This is an elite cadre of administrators, tightly networked across the central and state governments. However, they are rotated between line agencies, so they do not necessarily have prior exposure to the health sector.

The central government has a cadre of public health specialists (unlike most state governments), who are highly qualified. However, their career path does not offer hands-on experience of actually planning or managing public health services on the ground. Such experience is limited to people who work in the very few states that have separate public health departments. Moreover, the cadre is small and poorly utilised, because promotion above the deputy director general level is based on seniority, regardless of public health qualifications. This reduces incentives to join the central public health cadre,[17] and their ability to provide technical backing for the states.

### 1.3 Implications for States' Capacity for Public Health Planning and Implementation

**(a) Fiscal Incentives for States That Inadvertently Weaken Public Health Systems:** The central government influences state public health policy through the fiscal leverage of the centrally-sponsored schemes which have been used to launch many single-issue public health programmes. The centre typically covers a substantial part of the costs for the First Plan period (usually five years), and the states are expected to cover all the costs thereafter. Although states are free not to participate in these programmes, the fiscal leverage of the large initial central contribution makes them attractive. This is similar to the mechanisms whereby donors influence government policy in developing countries.

These programmes can crowd out other public health priorities of the states, both because of the large budgetary demands after the initial period, and because the states are required to send regular progress reports on these programmes to the centre. These programmes therefore become high priority activities for the states, crowding out other essential population-wide health services. States spent only 8.9% of their health budget on public health programmes in 2001-02 (Government of India 2009: Table 2.1.10), and this includes the states' significant budgetary contribution to the single-issue programmes. By contrast, they spent over 40% of their budget on tertiary and secondary care services, illustrating the power of the curative sector to capture public budgets for health. Single-issue programmes can also weaken state health systems in other ways, for example, by bypassing the state's normal arrangements for fund flows and implementation.[18]

**(b) Lack of a Public Health Act:** Most states lack the basic legislation to underpin public health services. In 1955 and again in 1987 the central government developed a Model Public Health Act, but did not use its very considerable fiscal clout to encourage states to adopt them.

A Public Health Act enables proactive measures to avert threats to the public health before an emergency occurs. First, it specifies the legal and administrative structures under which a public health system functions, assigns responsibilities and powers to different levels of government and agencies, and specifies their source of funding for discharging these duties (Hamlin and Sheard 1998). Second, it sets out powers for taking action for protecting the public health, including powers of regulation and of inspection – and the responsibility to use these powers to monitor any situations or activities ("public health nuisances") that could potentially threaten public health, and seek to redress them if needed. Third, public health laws set standards, such as those for food hygiene, slaughterhouse and market hygiene, water quality, and local government activities for sanitation and environmental health. They also specify who is responsible for assuring that these standards are met, as well as the procedures for ensuring that they are met.

Without a Public Health Act, states must depend on very blunt instruments such as the Epidemic Act of 1897 and the Indian Penal Code of 1860, which can be used if a severe health threat has already occurred. Local body Acts such as the Municipalities Act and Panchayati Raj act offer much less comprehensive provisions than a Public Health Act, and they (by definition) do not apply uniformly across a state.[19]

This places much of India in a situation with some analogies to that of Europe before its public health revolution. As Hamlin and Sheard (1998:587) point out:

> The 1848 Public Health Act for England and Wales marked the start of a commitment to proactive, rather than a reactive, public health in which the state became guarantor of standards of health and environmental quality.... That public action can substantially improve the health of the general population now seems obvious, and it also seems obvious that public authorities owe their citizens that improvement.

Some efforts are now underway to strengthen public health legislation in India. The National Health Bill 2009 drafted under the National Rural Health Mission seeks to encourage states to prepare public health acts. The draft Public Health Emergency Act updates the Epidemic Act of 1897. Some states, such as Gujarat and Karnataka, are working on drafting Public Health Acts.[20] Properly designed, such Acts provide the fundamental legislative underpinning for public health action and service delivery. The very fact of having a regulation in place can raise awareness and compliance, as evidenced by drivers' increased use of helmets and seat belts.

In drafting public health legislation, it will help to pay careful attention to implementation mechanisms. Regulatory enforcement carries inherent risks, such as the potential for harassment and corruption. In India, the credibility of regulatory enforcement is undermined also by the slow judicial processing of cases in courts with large backlogs. Some of the key issues for effective regulatory implementation are (1) setting reasonable standards; (2) disseminating information on the regulations; (3) designing mechanisms to facilitate compliance; (4) minimising the scope for corruption and harassment; and (5) minimising reliance on the judiciary. Models for transparent and quick implementation methods are available from both the developed and developing world.

**(c) Diminishing of Public Health Managerial Cadres:** The amalgamation of medical and public health services reduced the career incentives for public health personnel in the state governments. In colonial times, the public health cadre had faster promotions and better pay than the medical cadre (Harrison 1994:19-26). These incentives were sharply reduced after amalgamation. The decision to grant promotions by seniority – so senior public health positions could be held by clinical specialists – reduced public health specialists' inputs into decision-making on public health programmes, and curtailed their promotion prospects.

Following amalgamation, the public health cadre was abolished in most states – depriving the states of public health planning and management capacity.[21] Some states have sought to partially redress this situation, but the success of such efforts is severely limited while the services remain amalgamated. For example, West Bengal established a public health administrative cadre in 2004, but their job is to oversee the medical facilities up to the secondary level, as well as public health services (the latter defined essentially in terms of the group of single-focus programmes). Training in public health management is not required. This is quite different from managing a public health system.

Public health management training atrophied, in response to the diminished demand. Medical training capacity was vastly expanded, but public health training capacity did not increase commensurate with the growing needs of population growth and urbanisation.

**(d) Diminishing of Grassroots Workforce Responsible for Environmental Health:** The main category of staff responsible for grassroots delivery of public health services was effectively undermined with the creation of the multi-purpose worker (male) cadre, merging sanitary inspectors with workers from disease-specific and other programmes. This merged cadre of male health workers is not tasked with supporting population-wide health services, as were the sanitary inspectors. Their main charge is to help implement the national programmes, and provide other miscellaneous support that the health department may need.

The central government also decided to fully support the salary and training of the grassroots female health workers – the Auxiliary Nurse Midwives (ANMs). This is because they are charged with implementing the family planning and maternal and child health programme, which occupies a very high position in the government's list of priorities. States were left to pay for the male health workers – except for those hired for a new national programme, whose salary is covered for the First Plan period.

The states have little incentive to invest in their male health workers, so the male cadre has growing proportions of vacancies in most states, unlike the female cadre. Male workers have been heavily disincentivised in various ways. Their cadre is used for accommodating people who have become redundant elsewhere, even without the qualifications required from direct recruits. Their training programmes have withered in most states, while the ANMs continue to receive a full 18 months' training according to a standardised curriculum.

Male workers have also increasingly lost status relative to their female counterparts ANMs. They are expected to support the work of the ANMs, who are also supported by Integrated Child Development Services (ICDS) workers and Accredited Social Health Activists (ASHAs).[22] The working conditions are also poorer (see below). In response to this succession of disincentives, the male health workers in many states started agitating. They then came to be viewed as unproductive and difficult to manage. Many states have taken to underfilling these posts, so there are increasing numbers of vacancies.

## 2 Lessons from Tamil Nadu

### 2.1 Model of Managing Public Health Services

We describe here how Tamil Nadu's public health system works (Das Gupta et al 2009b). In discussing the strengths of Tamil Nadu's approach, we have used examples from several other states to illustrate the negative consequences of having merged public health with medical services. This should not be interpreted as reflecting negatively on these specific states, but merely to reflect problems common to most states, resulting from decades of gradual erosion of their public health systems.

**(i) Policy and Planning: A Separate Directorate of Public Health:** The health department has three key directorates which are organisationally on an equal footing under the health secretary: the Directorates of Public Health, of Medical Services, and of Medical Education. Each of these directorates has its own dedicated budget and workforce. Each service stream has its own career paths and incentives, and offers the possibility of rising to the same level within the health department – thereby precluding the status dominance of medical specialists over public health specialists which is common elsewhere in India.

The Directorate of Public Health (see organogram in Appendix 2, p 60) is staffed by a professional cadre of trained public health managers, who are promoted to the directorate after long experience of managing public health services in both rural and urban areas. Other technical staff in the directorate, such as entomologists and statisticians, also first obtain strong hands-on experience in the districts.

This means that the Directorate of Public Health is run by highly experienced staff. Interestingly, the medical cadre staff begin their career in a primary health centre under the public health managers, making the medical cadre more appreciative of public health needs and approaches.

This system makes possible the proactive planning and effective disaster management described below. It contrasts sharply with many other states, where the planning and management of public health services is under the merged health service, so people in charge of public health planning may be clinicians.

**(ii) Dedicated Funding: A Separate and Substantial Budget:** The directorate is able to sustain its proactive public health work because it has a dedicated budget, whose size is large relative spending on medical care and medical education (Table 1, p 51). It can thus ensure that the public health workforce includes not

**Table 1: Health Spending (by Directorate), Tamil Nadu Health Department, 2008-09**

| | % Share |
|---|---|
| Directorate of Public Health | 38.8 |
| Directorate of Medical Services | 23.1 |
| Directorate of Medical Education | 38.1 |
| Total | 100.0 |

1 The Directorate of Public Health's budget includes the entire public health workforce down to subcentres, and all the single-issue programmes except TB and leprosy.
2 The Directorate of Medical Education's budget includes teaching hospitals and attached institutions.
3 All rupee figures are in current (nominal) prices.
4 Excludes cash subsidies to pregnant/lactating mothers
Source: Budget Documents.

only the managerial and grassroots workers mandated by the central government, but also a wide range of technical staff as well as the field staff and labourers needed for environmental sanitation measures such as clearing vector-breeding places. Thus, for example, Tamil Nadu has 120 entomologists, whereas many states have just a few, seriously hampering their efforts at controlling vector-borne diseases. Secondly, it provides the budget for ensuring service delivery. This includes maintaining needed technical units, such as the plague surveillance unit discussed below.

By contrast, the public health workforce has weakened in many other states. For example in Karnataka, health officers used to be seconded by the health department to municipalities, but this position was abolished except for the five cities large enough to classify as corporations (Krishnan 2005:46). This is a severe blow for urban health. Activities at Karnataka's plague surveillance unit in Kolar (near the plague focus at the tri-state junction) have ground to a halt since the abolishing of the post of labourers.[23] Even if there is excellent public health expertise in top positions, it can be difficult in the absence of a separate directorate and budget to put together an effective team for implementing needed services.

**(iii) Legislative and Regulatory Underpinnings for Public Health Services:** Public health service provision in Tamil Nadu is greatly facilitated by its Public Health Act, whose crucial advantage over other available legislation with public health implications is that it includes a very broad definition of a public health "nuisance". A few examples of nuisances are premises or animals kept in unhealthy conditions, stagnant water or ill-maintained drains, and accumulation of refuse. Health officers are empowered to detect nuisances following a complaint from a citizen or by using their powers of entry and inspection, and to contain nuisances, including by direct action if needed. Unlike the health provisions in the Municipalities Act and Panchayati Raj Act, its provisions are much more detailed and comprehensive, and apply uniformly across the state instead of just in specific areas.

The Tamil Nadu Public Health Act needs updating, but it still provides the legislative basis for the planning and implementation work of the Directorate of Public Health. For example, the annual district plans for responding to public health threats posed by floods are drawn up under the legislative authority of the Public Health Act.

This is in sharp contrast with most other states, which lack such an Act. For example, in Karnataka, the old colonial-era Public Health Acts for the different parts of the state have not yet been consolidated into an act applicable across the state, and are in disuse. This makes it easier to get away with creating health hazards, such as meat sellers dumping their waste in or near drinking water sources (Krishnan 2005:70).

**(iv) Workforce-training, Incentives, and Responsibilities of Public Health Managers:** The public health managerial cadre is given careful training. They are oriented towards an administrative and management role rather than a clinical role, and towards examining health issues from a population-wide perspective instead of focusing on the needs of a specific patient. Medical graduates who choose to enter this service are given three months pre-placement training in public health, and must within four years obtain a postgraduate diploma or degree in public health. They are prohibited from private medical practice, and indeed given the non-clinical nature of their work, they are unlikely to attract patients. This cadre has faster promotion avenues than the medical cadre, as well as enjoying considerable administrative responsibility and authority – all of which helps keep them incentivised.

Their career path provides all-around exposure. Their first posting as municipal health officer (MHO) puts them in charge of public health services of a city or large town. From there they are promoted to deputy director of health services (DDHS), in charge of a whole district. Thereafter they are promoted to the Directorate. They can also opt to teach for a while, imparting their experience to future public health managers.

The DDHS is supported at the district level by an entomologist (district malaria officer), a statistician (assistant director, State Bureau of Health Intelligence), a district maternal and child health officer, and a technical assistant promoted from the health inspector cadre. Below this is the block primary health centre, headed by the block medical officer and supported by clinical as well as public health staff. The latter include a community health nurse and a block health supervisor, who respectively supervise the teams of female maternal and child health (MCH) workers and male health inspectors down to the subcentres. These supervisors are promoted from amongst the cadre of workers they supervise.

The DDHS manages all the workers at the district and block levels downwards who work on rural health, down to subcentres. Primary health care is provided by the block medical officer (BMO) and the medical officer of the PHC (MO-PHC), but they are also oriented towards population-wide concerns. For example, when cases of communicable diseases present themselves in the health centres, they are expected to have their health inspectors follow up to investigate contacts and sources of infection, to prevent further spread of the disease. They supervise all the block public health workers, but belong to the medical cadre. Before being posted as BMO/PHC-MO, they are given 15 days' intensive training for their public health supervisory duties, on public health acts and food safety, environmental health issues, national health programmes, prevention and control of epidemic outbreaks, administrative and financial powers, and health education of the community.

The DDHS is responsible for the health of the district as a whole, and not just for the rural areas, as is the case in many states. The MHOs report to the DDHS on public health matters in the

municipalities of the district. The DDHS has the residual responsibility to address public health threats in all urban areas in the district, should the matter not be satisfactorily resolved by the urban health staff.

The DDHS is responsible for organising an annual cycle of work, corresponding to the potential threats of the upcoming season. Every February they prepare the district's Epidemic Contingency Plan, including plans for responding to natural disasters such as floods and cyclones. In May, they carry out preparatory measures for the summer, including anti-diarrhoeal measures such as ensuring adequate supplies of disinfectants and water purifying agents, and distributing information to communities about how to avert diarrhoeal outbreaks. In June, they undertake preventive measures against mosquito-borne diseases, including activities such as drain cleaning to prevent mosquito breeding, spraying as needed, providing technical support to local bodies in their vector control activities, and creating community awareness of the need to remove potential vector-breeding sources. Monsoon preparedness work is carried out for both annual monsoon seasons, including preparation for prevention and control of diarrhoeal disease and floods.

The DDHS and the Directorate of Public Health play an important role in reducing the potential for the single-issue programmes to dominate the public health agenda of the state, as they do in many other states. Their training and career experience highlights the importance of services other than the single-issue programmes. However, as discussed below, the single-issue programmes have undermined the role of the health inspectors in providing environmental health services at the grassroots.

### 2.2 Tamil Nadu Approach and the Delivery of Public Health Services

Through its management of public health services, Tamil Nadu is able to respond proactively to avert potential health threats, and respond quickly and effectively when confronted with disasters and emergencies. A few examples of this follow.

**(i) Long-term Planning to Avert Outbreaks:** As mentioned above, the hallmarks of effective public health service delivery are (a) planning to reduce exposure to potential disease threats, and (b) continued vigilance to ensure non-recurrence of disease as long as the potential threat remains. This approach manifests itself in the anticipatory planning described above, undertaken annually to prepare for controlling disease in the wake of potential recurring natural disasters such as floods and cyclones. This seeks to avert a public health disaster instead of scrambling to respond to it once the disaster has struck.

Such routine preparation is very helpful when massive freak disasters strike, such as the tsunami that hit Tamil Nadu in 2004. The state was able to respond to this quickly because the annual planning exercise creates a high level of clarity amongst all members of the team about the needed actions and the roles of the different actors, including the roles of other public agencies. This is reflected by the state's Chief Entomologists:[24]

> In a flood, a sheet of water flows into waterbodies so water sources become highly contaminated with human and animal excreta, etc, so the first task is to purify the water sources. This is done by the local body, but the Health Department staff monitors the water quality and chlorination level. If there are internally displaced people, then arrangements have to be made in their camps for toilets and for food sanitation in the kitchens where their food is prepared. Fly control is undertaken. If water begins to stagnate, mosquito control is carried out. The bodies of dead animals and humans are disposed of by the local bodies in collaboration with the Revenue Department (the authorised department for declaring the number dead and digging mass graves) and under the supervision of the District Collector. If the disposal of bodies is not done promptly, the Health Department has to notify the local bodies and higher authorities of this public health nuisance, and mobilise their support in removing the nuisance. This is normally done by the Health Inspectors, along with vector control measures.
>
> When the tsunami hit, there was contamination everywhere – our main focus was on water source chlorination, disinfection of the environment around all habitations using bleaching powder and lime, and all actions for assuring sanitation and hygiene in the camps for displaced people. We selected the sites for the Revenue Department to construct latrines, and oversaw the arrangements for the safe disposal of waste. NGOs helped the local bodies dispose of dead bodies under Revenue Department supervision, and the Health Department provided the technical expertise on how deep to dig the graves and prepare them with lime to minimise the scope for contamination. Fly breeding began, and we undertook fly control measures. We checked donated food for basic safety. Health Department staff (including DDHS and their teams and 10 entomologists) from other areas were brought in to help with the environmental sanitation arrangements as well as providing outpatient care.

The WHO noted that despite the scale of the tsunami, the state public health authorities' response was rapid and highly-organised, and the state government was able to carry out the relief measures largely on its own:

> The presence of a well-trained public health cadre enabled massive mobilisation and deployment of people and material in a smooth manner….this resulted in one of the truly remarkable achievements of the relief effort – the complete avoidance of any kind of epidemic (WHO 2006:81, 83).

This is in sharp contrast to most other states' disaster response. For example, after the recent hurricane in West Bengal, that state's health authorities' task was essentially to provide chlorine and other disinfection agents, and medical care[25] – not the wide range of relief and disease-prevention activities described above – and disease outbreaks followed. After Orissa was hit by a massive cyclone in 1999, a health team from Tamil Nadu was called in to assist with the health emergency in the worst-hit area, where cholera had already set in when they arrived. Even more striking is the example below of the 1994 plague epidemic in western India.

A different example of anticipatory planning is the fact that in Tamil Nadu, the DDHS deputes a health inspector to each government medical college. The health inspector's tasks include assuring sanitary conditions and vector control. The Directorate of Public Health also takes action if needed in Chennai, if the corporation does not step up to its responsibilities. For example, when there was an outbreak of leptospirosis in a government medical college in Chennai and the dean said they had no manpower to control it, the Directorate of Public Health posted health inspectors from nearby districts to carry out the preventive measures.

The consequences of not taking this small step are evidenced, for example, in the repeated dengue outbreaks in Delhi and Kerala that originated in medical colleges. This arose from the fact that mosquitoes were breeding in the colleges in ongoing construction sites, or in other places such as water-coolers.[26] Without health inspectors in place, it is easy for these apex institutions to spread disease from the patients who stream to them.

**(ii) Eradicating Diseases and Preventing Their Resurgence:** Tamil Nadu seeks to prevent potential resurgence of diseases. A striking example of this is the maintenance of a state plague surveillance unit, in an area known to have plague foci among wild rodents near the border with Karnataka and Andhra Pradesh states. This is despite the fact that the last episode of plague in south India was in the early 1960s.[27] This unit monitors wild rats, to detect a potential plague outbreak. When the plague outbreak took place in western India in 1994, a team was sent from this unit to help control the outbreak, along with their plague labourers experienced in finding rats and isolating their fleas. They were amongst the sole remaining repositories in India at the time, of hands-on expertise of how to deal with plague.[28]

This is in sharp contrast to Maharashtra, which also has a known sylvatic plague focus, but abolished its plague surveillance unit in 1987 because there had been no confirmed cases of plague for decades.[29] When an earthquake took place near the plague focus in 1993, the central government warned the state health department of the possibility of a plague outbreak, but this was ignored. As Garrett (2000:20-28) summarises, cases of plague were reported around the earthquake area but not contained so it spread to Gujarat where it found fertile ground in the spectacularly insanitary conditions prevailing in Surat at the time. Neither the state nor the central government instituted quarantine till after the outbreak was well advanced, so people fled by the trainloads to the rest of India. After the outbreak had escalated, vigorous efforts were made to contain it and clean up the city.

Plague surveillance was re-established in Maharashtra in 1994, and in Himachal Pradesh in 2002 – in both cases *after* outbreaks of plague had occurred.[30] Meanwhile, the Tamil Nadu state plague surveillance institute has been expanded to cover research and practical training on other vector-borne and zoonotic diseases.[31]

**(iii) Management of Endemic Diseases:** The strength of Tamil Nadu's public health management is illustrated also by their routine work to contain endemic diseases, such as malaria. Malaria control requires multi-pronged efforts, including (1) controlling vector breeding through environmental management and the use of chemical and biological larvicides, (2) containment of adult mosquitoes through insecticide spraying and fogging, (3) early detection and treatment, (4) personal protection measures, and (5) raising community awareness and engagement in all these measures.

A brief comparison of how these activities are carried out in Tamil Nadu and how they were carried out in a highly-endemic district of West Bengal in 2005 [32] illustrates the benefits of Tamil Nadu's approach.

The first contrast is in the technical and administrative support for malaria control staff. In Tamil Nadu, this is provided by professional public health managers, unlike West Bengal and most other states. Technical guidelines for malaria control are routinely circulated to all districts in Tamil Nadu, but had not been received in several districts in West Bengal in 2005. Moreover, districts in Tamil Nadu have an entomologist based in the DDHS' office. By contrast, the medical officer in charge of communicable diseases in the West Bengal district faced an acute lack of entomological information. Most states face an acute shortage of entomologists.

A second contrast is in the management of vector breeding. For example, in the West Bengal district, the irrigation department had left a canal half-constructed for years, and this became a notorious mosquito breeding ground. The health authorities' response was primarily to step up efforts to treat the malaria cases. Other district health authorities of that state reported similar situations. In Tamil Nadu more proactive measures are taken. For example with the Telugu-Ganga canal, vector density monitoring is regularly undertaken and if the density reaches a point there is intensification of surveillance and source reduction activities (anti-larval measures and adult mosquito control).

A third contrast is in the management of malaria spraying operations. In Tamil Nadu, teams of mosquito labourers are organised such that the spraying is completed within a month, twice a year. Their work is supervised by health inspectors and PHC medical officers. Communities are informed by health staff 15-20 days in advance of spraying, and reminded to allow the spray to remain in place for maximum effect. Entomological teams check for insecticide-resistance amongst the mosquitoes. In the West Bengal district, spraying is carried out because the central government supplies the insecticides and requires that spraying is done, but there is little supervision. Moreover, villagers reported that they had not been told when to expect the spraying, and consequently many re-plastered their homes shortly after the spraying.

A fourth contrast is in the deployment of larvivorous fish. In Tamil Nadu, fish hatcheries have been constructed at district and PHC levels, and health inspectors and labourers place them in potential mosquito breeding sites. In West Bengal, the health department asked the fisheries department to supply the fish to an NGO, for release into local water bodies. However, the health authorities in the highly-endemic district reported that they were not informed where the NGOs had placed the fish, and what guidelines were followed in their placement. Many of the fish died in the dry season, so the whole process would need to be repeated.

**(iv) Intersectoral Coordination and Support to Local Bodies in Their Environmental Sanitation Work:** With its professional public health management, Tamil Nadu is well-placed for intersectoral coordination and support to local bodies. Through their work, the citizenry, local bodies, and other parts of the state administration also become more sensitised to public health issues, and to the need for proactive efforts to address them. To begin with, the health department is active in putting forward its plans

and requests. At the district level, the district collectors become sensitised to the need for anticipatory public health planning.

In case of a suspected outbreak, the district collector calls a meeting with representatives from the health department and other departments as needed. They develop a coordinated response plan and assign responsibilities to each department – for which they will be held accountable.

The district collector is also mandated to hold meetings every three months of the public health intersectoral coordination committee (Epidemic Coordination Committee) to review the measures taken to anticipate disease threats and respond to them. Other departments are called to these meetings as needed. The DDHS must inform the collector about issues such as mosquito nuisance, contamination of water sources, breakages of pipelines etc, which are recorded in the minutes for follow-up action and the departments held accountable for these actions. At the block level, the block development officer and the block medical officer handle interdepartmental coordination for health issues on a day to day basis.

However, the district collectors do not hold these intersectoral coordination meetings regularly, if they are only for making anticipatory plans. This situation needs to be redressed, but it is still better than in other states, where it is the norm to hold a meeting only *after* an outbreak has occurred.

With its public health team reaching to the grassroots, the Tamil Nadu Directorate of Public Health is well-placed also to support local bodies in carrying out their constitutional mandate to maintain environmental sanitation and public health. Support to urban health bodies is discussed below. In the rural areas, the block health supervisors and health inspectors, along with the rest of the district public health team, are able to provide technical and other support to the rural local bodies (panchayats) in their work.

This is in sharp contrast to other states, where local bodies get little support. For example, since local health staff in West Bengal (as in most states) are expected to implement the specific programmes rather than broader public health services, the Department of Rural Development trains panchayat members directly for their duties relating to environmental sanitation and health. This requires a massive effort after each election, and it is inherently difficult to train elected officials for whom public health is unfamiliar and distant from their primary political concerns. It would greatly help if local health staff were able to provide panchayats with technical and other support, and also monitored the quality of their work – representing professionalism and continuity through electoral cycles.

### 2.3 How Does Tamil Nadu's Approach Help Protect Urban Health?

Urban areas have an especial need for well-managed public health services, and local governments have many concerns which are not always compatible with good public health outcomes. Some large corporations have the resources to support a full-fledged public health department, and are under pressure to avoid negative publicity. Other municipalities, with fewer resources and scrutiny, benefit from health department oversight since that is an independent authority focused only on protecting public health.

**(i) Directorate of Public Health Seconds Health Officers to Larger Municipalities:** In the 37 largest municipalities, public health services are managed by municipal health officers (MHOs) seconded from the Directorate of Public Health. The MHOs are supported by a staff of sanitary inspectors. In smaller municipalities, public health services are managed by a sanitary officer, while the smallest towns are served only by a sanitary inspector.

The main tasks of these staff include (a) disease prevention, control and management, (b) detection and abatement of nuisances, (c) food safety assurance, (d) monitoring environmental hazards and civic hygiene, e g, management of solid and liquid wastes, and (e) collection of vital registration data. The MHO and DDHS are also responsible for providing technical support and oversight of the urban maternal and child health services, which are provided by municipal hospitals and dispensaries.

By seconding MHOs to urban areas, the Directorate of Public Health provides municipalities with professional public health management. A key point is that they are accountable not to the municipality, but to the Directorate of Public Health which employs them and where the rest of their career lies. This means that they are focused primarily on protecting public health, not on the other agendas of municipal governments.

Sanitary officers (SOs) and sanitary inspectors (SIs) belong to the Tamil Nadu Municipal Services. They are under the administrative control of the municipalities, whose first priority is not public health unless there is an outbreak which may be reported in the media. They are less interested in conducting careful health inspections before recommending issuing of licences by municipalities, since licences are a source of revenue for municipalities. They also use these staff for various purposes unrelated to health, such as census-taking.

Before 1989, the SOs and SIs were deputed by the municipal administration to work under the administrative control of the MHO and the Directorate of Public Health. This meant that the public health authorities had a say in their transfers, promotions, and capacity-building, and could initiate disciplinary action against them. When the administrative control of these staff was transferred to the municipalities in 1989, the health department lost the power to get the municipal staff to focus on their public health duties.

**(ii) DDHS Takes Residual Responsibility for Municipal Public Health:** The DDHS holds regular meetings with the person in charge of public health in all the cities and towns in the district. They must report to the DDHS on all public health matters. S/he monitors their work and gives them technical support and additional human resources as needed to carry out their work. For example, in the summer the Directorate of Public Health sanctions the hiring of additional labourers for anti-chikungunya work in both rural areas and municipalities. In smaller municipalities without a MHO, the DDHS will monitor the work and if there is any problem will intervene to offer more manpower and ask the municipal commissioner to see to it that the control measures are carried out.

The DDHS has no administrative control over these staff, and cannot ensure that all routine preventive public health work is done. For example, s/he may not report to the municipal commissioner that the SOs and SIs are neglecting their task of overseeing labourers for street cleaning. However, the DDHS takes more direct responsibility for municipal health in several ways, using his/her own staff as needed. If there is a fair or festival, s/he is responsible for the public health arrangements, including arranging for public toilets. If goats are sacrificed, the health authorities have the place cleaned and sprayed.

Most importantly, the DDHS has the mandate and responsibility to step in if there is an outbreak. S/he is formally responsible for any disease outbreak in the district, or certain other notable health events such as an infant death, maternal death, or a case of polio. In an outbreak, the DDHS can send his/her own team to investigate and undertake control measures, and/or give instructions to the Municipal Commissioner and check that the needed work is carried out.

The fact that the DDHS served earlier for several years as a MHO means that they understand well the modalities and exigencies of municipal public health work. This experience is invaluable for their monitoring of and intervention in protecting urban public health.

The multiplicity of ways in which the Tamil Nadu Directorate of Public Health uses its staff and resources to protect urban public health contrasts sharply with the situation in many other states, where the health department has little involvement in protecting environmental health in municipalities.

### 2.4 Areas That Need Strengthening in Tamil Nadu's System

Public health systems anywhere need periodic reassessment and upgrading, and Tamil Nadu has several areas that need strengthening. For example, the Public Health Act needs updating. The potential for protecting urban public health will be much enhanced by restoring the health authorities' administrative control over municipal public health staff.

A key area that needs to be addressed is the management of the health inspectors, who are the grassroots environmental health workers. They are currently demoralised and poorly utilised.

**(i) Erosion of the Health Inspectors' Training and Engagement in Environmental Health Duties:** Tamil Nadu integrated its health inspectors into the central government's Multi-Purpose Health Worker Scheme in 1982. Now most of this cadre's time is taken up in household visits to monitor diseases and the implementation of the various national programmes.

The central government also encouraged the use of this post for accommodating staff originally hired for other programmes, such as smallpox and leprosy. They have lower initial qualifications than the health inspectors, and received no further training to equip them for essential tasks such as implementing public health regulations. Now the trained and untrained staff must co-exist in the same cadre, which generates resentment on both sides.

The health inspectors' training was kept up till 1992, but since then they receive only a condensed six-month training course, and none for lateral entrants. In urban areas as well, the training of the sanitary inspectors was reduced in 1992 from 12 months to six months. To fill attrition vacancies, the state now resorts to promoting lower grade workers to the position of the sanitary inspector, and thereafter to the sanitary officer. This seriously degrades the capacity of these key urban public health workers. Much can also be done to improve the supervision and on-the-job training of both the rural health inspectors and the urban sanitary inspectors.

**(ii) Erosion of the Health Inspectors' Status Relative to the Maternal and Child Health Workers:** Across India, as discussed above, the male cadre has steadily lost ground in terms of status and authority to the female cadre. In Tamil Nadu, the female cadre is accorded higher status in many ways, such as being designated the person to co-manage (along with the village chairperson) the funds of the Village Health, Water and Sanitation Committee recently set up under the National Rural Health Mission. The female cadre enjoys many perks that the male cadre does not, including a uniform allowance, a cellphone, and an office in the village sub-centre.

**(iii) Work Programming and Supervision:** The health inspectors' work schedule leaves them little time for their environmental health work. It is a testament to people's need for job satisfaction that the health inspectors and block health supervisors continue to attempt to make time for this work, and exercise initiative to channel technical support from the directorate to the panchayats. However, the erosion of their standing and morale can only hamper them in their performance of environmental health work.

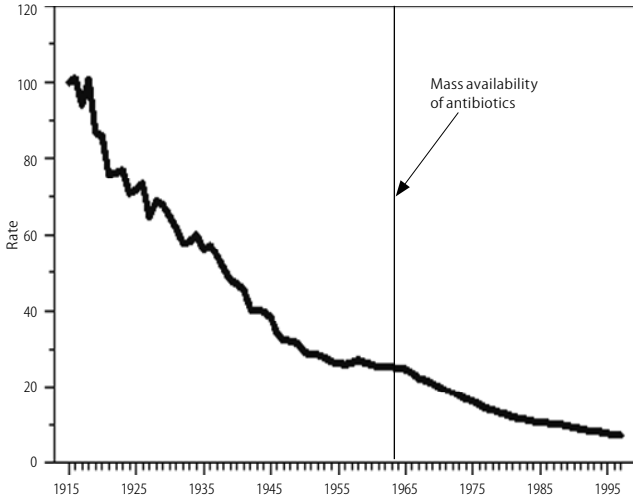
Environmental health work also requires a good measure of autonomy and joint decision-making at the local level. By nature, environmental health problems are highly localised – needing to answer questions such as "Where do the cases of illness cluster, and what are the drainage and other conditions nearby that could be causing this?". In Sri Lanka, the public health inspectors have a certain degree of autonomy in identifying and resolving problems in their daily work. In their monthly supervisory meeting they discuss problems with others in their team and their supervisors, and think through them jointly. This also helps incentivise workers (Dalpatadu et al 2008).

The supervisory structures for the environmental health workers may also need to be strengthened. The medical officers who supervise them are from the medical services, with brief training in public health issues, spending the first part of their career at primary level. They can be effective at supervising the maternal and child health workers, since the services they provide dovetail closely with their own. When it comes to supervising environmental health work, however, there is really no one below the DDHS. The DDHS's office needs a person dedicated to supervising broader public health services including environmental health. And the block health supervisors could be given more responsibility for supervising the health inspectors at local level.

## 3 Do Public Health Systems Work, and Is Tamil Nadu's System Replicable?

The questions of greatest interest to researchers and policymakers are of course (a) whether better public health systems

**Figure 1: Infant Mortality Rate* by Year – United States** (1915-97)




* Per 1,000 live birth.
Source: *MMWR Weekly* 1999, 48(38): 849-58, US Centers for Disease Control.

improve outcomes, and (b) whether Tamil Nadu's system is replicable in other states.

**(i) Do Better Public Health Systems Improve Outcomes?** It is widely recognised that good public health services are key to improving health outcomes in both the developed and developing worlds.[33] In the developed world, they helped sharply reduce mortality from communicable diseases before mass access to antibiotics (Figure 1).

The power of public health services is suggested by Japan's intensive efforts – as part of its preparation for becoming a world power – to emulate European public health systems at home and in its colonies.[34] These reduced the populations' exposure to disease, and helped raise labour force productivity and life expectancy, despite lack of rise in wages and consumption (Johansson and Mosk 1987). As discussed, India's colonial system had more limited goals. Life expectancy rose to around 50 in Japan and its colonies by 1940, far above the 32 years in India, although caloric consumption was broadly similar (Figure 2).

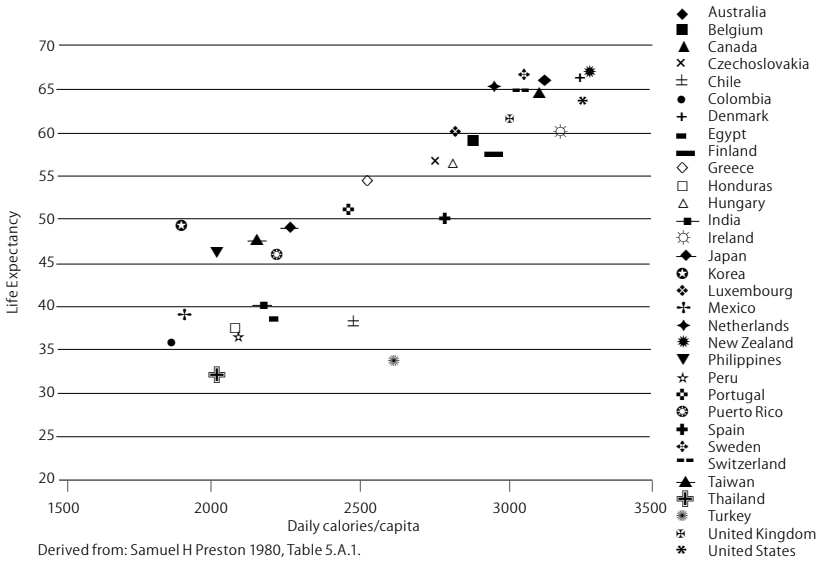
Formal evaluation of the impact of better public health systems is difficult, because of the complex interactions between health outcomes and economic factors, as well as ecological factors that cause variations in levels of exposure to disease. Regions differ, for example, in their conduciveness to breeding certain vectors, and in their pre-existing disease foci. Some regions may be watered by fresh streams, while others may be watered by rivers that have meandered for thousands of miles, collecting pollutants of every kind along the way and poisoning the subsoil water.

Health and economic outcomes often work in tandem. It may remain virtually impossible to formally prove the case for public health services, but the case has been compelling enough for all developed countries to invest in them continuously for over 125 years.

There are few good indicators of public health systems' quality, since health outcomes are affected by many factors other than system quality. Tamil Nadu performs better than all other states in key indicators of maternal and child healthcare (Figure 3, p 57). The child (under-five) mortality rate for Tamil Nadu for 2005-6 is less than half the national average (IIPS and Macro International 2007), lower than all the other states except Kerala and Goa. Infant mortality has also declined much more rapidly than the national average (Figure 4, p 57).

What is clear is that Tamil Nadu is better organised than most Indian states to manage public health threats. This is illustrated by the state's ability to respond swiftly to a major disaster like the tsunami and prevent epidemics breaking out as they often do when other states encounter a disaster, and by the state's technical expertise to help control the 1994 plague outbreak in Gujarat, while other public health agencies were caught off balance. Also, Tamil Nadu's health department seeks actively to protect public health in urban areas, unlike most states.

**Figure 2: Life Expectancy and Daily Per Capita Caloric Availability, 1940: Japan and Its Colonies Compared with India and Other Countries**

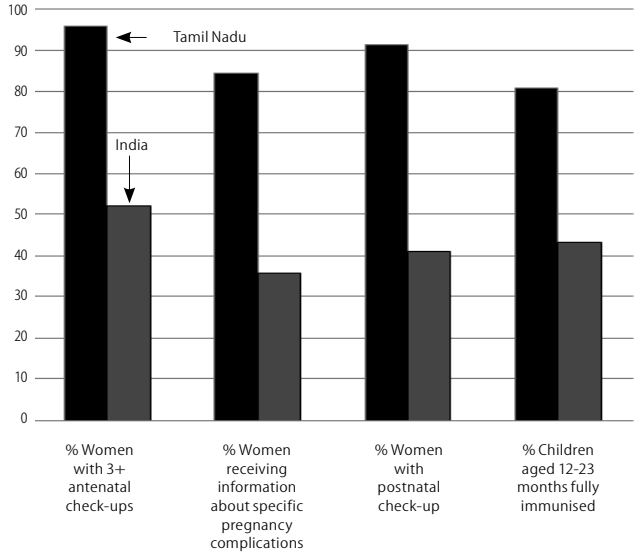



Derived from: Samuel H Preston 1980, Table 5.A.1.

**(ii) Is Tamil Nadu's System Replicable in Other States?** Tamil Nadu's system is replicable in other states because it has the same overall administrative organisation (and resources) as that of other states, with similar cadres of medical and non-medical staff organised into a similar network of services at state, district, and sub-district levels.

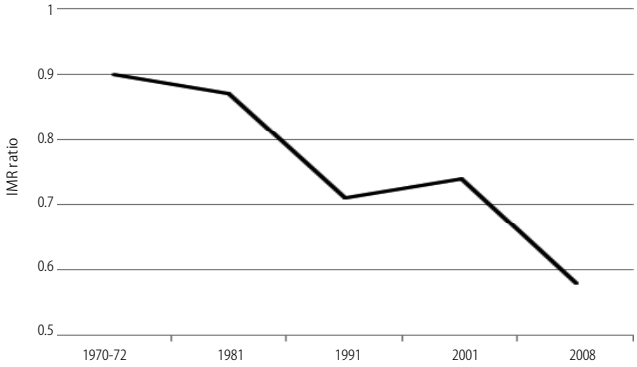
The difference is that Tamil Nadu organises these ingredients differently from most states. The state (a) separates the medical officers into the public health and medical tracks, (b) requires those in the public health track to obtain a public health qualification in addition to their medical degree, and (c) orients their work towards managing public health services – while those in the medical track are oriented towards providing hospital care. This improves the efficiency of both the public health and the medical

**Figure 3: Maternal and Child Healthcare Indicators** (Tamil Nadu and India)




The maternal care indicators refer to livebirths in the five years preceding the survey.
Source: *NFHS Survey 2005-06* (IIPS 2007: Tables 9.5, 8.10, and 8.22).

**Figure 4: Trend in the Ratio of Tamil Nadu's Infant Mortality Rate Compared with India***




* The value for India is 1 throughout.
The data for 1970-72 have been averaged to obtain the estimate for 1971, because the SRS began in 1970 and its data quality fluctuated at the start.
Source: Registrar General of India, Sample Registration System, various years.

services. Coordination between these services is facilitated by the fact that they all report to the health secretary.

Tamil Nadu uses a mere 1% of its government medical doctors to be public health managers, and trains and incentivises them accordingly. This means that other states seeking to establish a public health managerial cadre would need to train only a tiny fraction of their medical officers for this purpose. It takes two years of postgraduate training after the basic medical degree to obtain a diploma in Public Health in Tamil Nadu, which is no longer than the basic postgraduate medical specialisation courses that many government doctors obtain.

Moreover, Tamil Nadu's approach is affordable: its 2004-05 per capita health expenditures are close to the national average (Figure 5). This suggests that the public expenditures are efficiently used, to obtain the good performance indicators above. By contrast, Kerala spends 2.8 times more than the national average on private expenditures, bringing its total per capita expenditure to 2.5 times the national average (Government of India 2009).

Tamil Nadu's success seems to lie in the major *efficiency gains which result from separate and well-organised approaches to public health and medical care*. Effective public health services reduce the need for (expensive) curative services, resulting in better value for public expenditure on health. Its model is easy to replicate given that it hinges on better administration and management of resources that are within the reach of most states.

## 4 Conclusions: What Could Be Done?

Successive policy decisions have diminished the central government health ministry's capacity for stewardship of the nation's public health. At the state level, they have introduced policies and fiscal incentives which have inadvertently de-prioritised public health systems and the public health workforce's capacity.

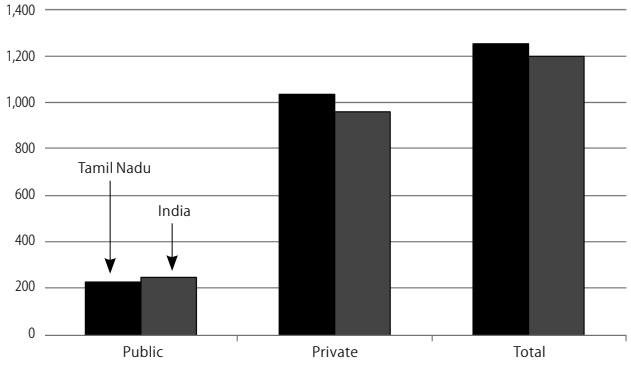
What can be done about this? There are many possible ways of organising effective public health systems. Here we offer some suggestions that may require the least modification of existing structures and systems.

First, the central health ministry could build its capacity to support public health systems across the country. A simple step would be to *establish a focal point for public health in the health ministry*. Since the ministry staff has no hands-on experience of managing such systems, they require some training in this. This focal point would need to be supported by institutions with the autonomy to function effectively. The Indian Council of Medical Research (ICMR) has considerable autonomy, but the National Institute of Communicable Diseases (NICD) has constrained ability to incentivise its staff and hold it accountable. As the NICD is converted into India's Centre for Communicable Diseases, increased autonomy will enhance its effectiveness.

The health agencies at all levels could also facilitate and monitor services provided by other agencies that are essential for good health – such as drinking water and sanitary infrastructure – through setting and implementing public health standards and regulations. The existing intersectoral coordination mechanisms, from the federal level down to local level, are effective at responding to emergencies, but should also be used to assess and avert potential threats.

Second, *the states might usefully re-establish separate services for public health and medical care*, each with its own budgets and workforce, to improve the efficiency of each service. Each service needs to have its own career ladder and incentives. The burden of additional training for the public health managerial cadre is not onerous – it comprises only 1% of Tamil Nadu's government

**Figure 5: Per Capita Expenditure on Health 2004-05, Tamil Nadu and India** (Rs)




Source: Government of India (2009: Table 1.3).

doctors. The curriculum for public health managers can be drawn from settings such as Tamil Nadu and Sri Lanka, which work within financial and administrative constraints similar to India's – and not only those of the developed world.

Third, *the government might consider revitalising the grassroots male health worker cadre,* responsible for environmental and public health. The central government could consider financing male health inspectors so that balance is maintained in the basket of services by male and female workers. States where the male cadre is dying out could consider establishing a new cadre of health inspectors. Men are best suited for the task, since it involves much mobility and entering unfamiliar (and occasionally hostile) places for inspection. A standardised training curriculum can be developed for health inspectors, such as that used in Sri Lanka, along with job descriptions, manuals, and supervisory guidelines. Adding greater scope for career progression will also help, for example by rewarding those who obtain additional qualifications.

Tamil Nadu offers some basic organisational principles whereby public health systems can be made more effective within the existing administrative and fiscal resources available to most states in the country. We illustrate how these help Tamil Nadu to protect public health across the state, including in urban areas. Better use of their grassroots male health workers and greater control over municipal health staff could further enhance public health outcomes.

Much is possible, especially given the scope for innovation offered by the large central outlays for rural and for urban health. Under the NRHM, the central government has informally encouraged the states to consider the Tamil Nadu public health system.[35] The NUHM could do much to improve urban health outcomes, if it focuses on environmental and public health, and not only on expanding the network of public clinics.

The central government could consider linking its fiscal support to states' health budgets to phased progress in (1) the enactment of state Public Health Acts – many models for which are available – to provide legislative underpinning for public health work; (2) the establishment of separate public health directorates in states with their own budget and workforce; (3) the revitalisation of the public health workforce at managerial and grassroots levels; and (4) health department engagement in assuring municipal public health. Creating a strong focal point for public health at the centre would help to support states in setting up robust public health systems, as well as provide oversight, incentives, and sanctions to ensure that they do so. These measures could do much to help use public funds more effectively for protecting people's health.

## NOTES

1 World Bank 2005, 2006, 2007a.

2 These include the programmes for (1) controlling TB, AIDS, vector-borne diseases, iodine deficiency, cancer, diabetes and blindness; (2) eradicating yaws, leprosy, and guinea worm; and (3) programmes for Reproductive and Child Health; Mental Health; Surveillance for Communicable Diseases; Nutrition; and Control and Treatment of Occupational Diseases. (http://www.nihfw.org/NDC/DocumentationServices/NationalHealthProgramme.html).

3 Barnett et al 2003.

4 Barnett et al 2003, Milne 2003, Novick and Morrow 2008.

5 Easterlin 1999, and United States Centers for Disease Control 1999. Until the therapeutic advances of the mid-20th century, these were the most effective way for elites to protect themselves from diseases spreading from neglected groups or areas.

6 United States, Tennessee Valley Authority nd.

7 See IOM (1988), and the formation of the European Union's Centres for Disease Prevention and Control to organise a multiplicity of diverse national public health systems.

8 Das Gupta and Gostin 2009.

9 Das Gupta and Gostin 2009.

10 http://timesofindia.indiatimes.com/india/Urban-health-mission-shelved-for-now/articleshow/5561845.cms

11 (http://www.nihfw.org/NDC/Documentation-Services/Committe_and_commission.html).

12 See for example Government of West Bengal 1970: 2

13 (http://www.nihfw.org/NDC/Documentation Services/Committe_and_commission.html)

14 See for example Karnataka Health Department http://stg2.kar.nic.in/healthnew/Services.aspx,

15 Lindsay et al 2004, Flemming et al 2004, Pruss-Ustin et al 2008.

16 This followed the recommendations of the Kartar Singh Committee of 1973 (http://www.nihfw.org/NDC/DocumentationServices/Committe_and_commission.html)

17 Currently less than 2% of the central government health cadre is specialised in public health, although they are expected to provide the technical backing for all the states.

18 We thank Jerry LaForgia and G N V Ramana for pointing this out.

19 Moreover, local body acts are enforced by local body officials, whose lower incentives to implement public health regulations are also discussed in the article.

20 Government of Gujarat 2009. For Karnataka, see Institute of Health Management Research, Bangalore http://www.ihmr.org/about_pc_project1_6.html. Gujarat's experience suggests that regulation of medical services should not be appended to a Public Health Act, since this can evince strong protest from doctors' associations (http://indian-medicos.blogspot.com/2009/04/gujarat-doctors-to-fight-proposed.html).

21 John (2009).

22 The ICDS workers are the anganwadi workers, and the ASHAs are the Accredited Social Health Activists under the National Rural Health Mission.

23 Govt of Karnataka, Directorate of Health and Family Welfare (http://stg2.kar.nic.in/healthnew/IDSP/PLAGUE.aspx)

24 Interviews with Sridhar and Selvaraj Chief Entomologists, Tamil Nadu, June 2009.

25 Field interviews in a coastal district, June 2009.

26 For Delhi, see http://www.hindu.com/2006/10/01/stories/2006100102111200.htm, and http://www.financialexpress.com/old/latest_full_story.php?content_id=142241.
For Kerala, see http://www.hindu.com/2009/04/20/stories/2009042055610400.htm,http://www.thehindu.com/2009/04/28/stories/2009042858270300.htm, and http://keralaonline.com/news/dengue-outbreak-med-college-campus_49933.html

27 http://www.nicd.org/1997AnnRep04j.asp

28 K K Datta, who was at the time a senior officer at the National Institute of Communicable Diseases, says that the NICD had very limited capacity to respond to the 1994 plague outbreak, and the Indian Council of Medical Research stated that they had no capacity for handling plague. In recent years, the capacity to anticipate and respond to plague has been upgraded in India (WHO 2002).

29 Government of Maharashtra, Directorate of Health Services (http://maha-arogya.gov.in/diseasesinfo/..%5Cdiseasesinfo%5CPlague%5Cdefault.htm)

30 Government of Maharashtra (http://maha-arogya.gov.in/diseasesinfo/..%5Cdiseasesinfo%5CPlague%5Cdefault.htm). For Himachal Pradesh, see Gupta and Sharma (2007).

31 http://hosur.hosuronline.com/government/vector/default.htm

32 Das Gupta et al (2006).

33 See United States Centers for Disease Control (1999), World Bank (1993:6), WHO (1978), Duffy (1990), Easterlin (1999) and Schofield et al (1991).

34 McGuire 2001 describes Japanese public health measures in Taiwan.

35 P Padmanaban (Director of Public Health, Tamil Nadu, retired), personal communication. This was at a workshop held in Puducherry 2008, for state health secretaries and the Mission Directors of the NRHM.

## REFERENCES


Arnold, David (1989): "Cholera Mortality in British India 1817-1947" in Tim Dyson (ed.), *India's Historical Demography(* London: Curzon Press).

Barnett, Darryl, Joe Beck, Worley Johnson and Steven Konkel (2003): "Environmental Health in Public Health", ch 23 in Douglas Scutchfield and William Keck (ed.), *Principles of Public Health Practice* (Clifton Park NY: Delmar Learning), (2nd edition).

Dalpatadu, K C S, C K Shanmugarajah, Monica Das Gupta, H M S S D Herath, Reggie Perera and Tharanga Fernando (2008): *The Organisation of Public Health and Environmental Sanitation Services in Sri Lanka, and the Role of the Public Health Inspector in Its Service Delivery*, Report prepared for the World Bank, Institute of Health Policy, Colombo, Sri Lanka.

Das Gupta, Monica (2005): "Public Health in India: Dangerous Neglect", *Economic & Political Weekly,* 40(49): 5159-65.

Das Gupta, Monica, Dilip Ghosh, K K Datta and Subhra Chakrabarti (2006): "Harnessing Local Governments and Communities to Improve Environmental Sanitation and Public Health in India", paper presented at the World Bank Workshop on Fiscal Decentralisation and Local Governance in India, Goa.

Das Gupta, Monica and Lawrence O Gostin (2009): "Building Global Public Goods in Health: The Roles of Donors and International Agencies", *The Lancet,* 373:1395-7, (Longer version at http://go.worldbank.org/SB4LF5GT70)

Das Gupta, Monica, Rajendra Shukla, T V Somanathan and K K Datta (2009a): "How Might India's Public Health Systems be Strengthened?", Washington DC: The World Bank Policy Research Working Paper 5140 (http://go.worldbank.org/BW6NXMA570).

Das Gupta, Monica, B R Desikachari, T V Somanathan and P Padmanaban (2009b): "How to Improve Public Health Systems: Lessons from Tamil Nadu", Washington DC: The World Bank Policy Research Working Paper 5073 (http://go.worldbank.org/7MAAGXBNA0)

Desikachari, B R (2009): *Governance of Public Health in Tamil Nadu*, report prepared for the World Bank.

Duffy, John (1990): *The Sanitarians: A History of American Public Health* (Urbana and Chicago: University of Illinois Press).

Easterlin, Richard A (1999): "How Beneficient Is the Market? A Look at the Modern History of Mortality", *European Review of Economic History,* 3:3: 257-94.

Flemming Konradsen, , Wim van der Hoek, Felix Amerasinghe, Clifford Mutero and Eline Boelee (2004): "Engineering and Malaria Control: Learning from the Past 100 Years", *Acta Tropica,* 89(2): 99-108.

Garrett, Laurie (2000): *Betrayal of Trust: The Collapse of Global Public Health* (New York: Hyperion).

Government of Gujarat (2009): The Gujarat Public Health Act 2009 (draft), (http://www.gujhealth.gov.in/PUBLICHEALTH/pdf/THE_GUJARAT_PUBLIC_HEALTH_ACT__2009_-_26-02-2009.pdf).

Government of India (2009): *National Health Accounts: India 2004-05* (New Delhi: Ministry of Health and Family Welfare).

Government of West Bengal, Department of Health (1970): *Health Manual,* Vol 1 (Alipore, West Bengal: Superintendent, Government Printing).

Guha, Sumit (1993): "Nutrition, Sanitation, Hygiene, and the Likelihood of Death: The British Army in India c 1870-1920", *Population Studies*, 47(3): 385-401.

Gupta, Devendra B (2003): "National Agencies and Centre-State Relationships in Public Health in India", World Bank, Washington DC, Processed.

Gupta, M L, A Sharma (2007): Pneumonic Plague, Northern India, 2002, *Emerging Infectious Diseases* 13(4). (http://www.cdc.gov/eid/content/ 13/4/664.htm)

Hamlin, Christopher and Sally Sheard (1998): "Revolutions in Public Health: 1848, and 1998?" *British Medical Journal,* 317: 587-91.

Harrison, Mark (1994): *Public Health in British India: Anglo-Indian Preventive Medicine 1859-1914* (Cambridge: Cambridge University Press).

IIPS and Macro International (2007): *National Family Health Survey (NFHS-3), 2005-6: India*, Vol 1, International Institute for Population Sciences, Mumbai.

IOM (1988): *The Future of Public Health*, Institute of Medicine (Washington DC: National Academy Press).

Johansson, Sheila Ryan and Carl Mosk (1987): "Exposure, Resistance and Life Expectancy: Disease and Death during the Economic Development of Japan, 1900-1960", *Population Studies,* 41(2): 207-35.

John, T Jacob (2009): "Public Health Is Infrastructure for Human Development", *Indian Journal of Medical Research,* 130: 9-11.

Krishnan, K P (2005): "Urbanisation and Public Health in Karnataka" (Bangalore: Institute for Social and Economic Change), report prepared for the World Bank.

Lindsay, Steve, Matthew Kirby, Enis Baris and Robert Bos (2004): *Environmental Management for Malaria Control in the East Asia and Pacific (EAP) Region* (Washington DC: The World Bank), 9 *Environmental Management for Malaria Control in the East Asia and Pacific* (http://go.worldbank.org/5FoWMoVUP0)

McGuire, James W (2001): "Social Policy and Mortality Decline in East Asia and Latin America", *World Development,* 29(10): 1673-97.

Milne, Thomas L (2003) "The Local Health Department", ch 8 in F Douglas Scutchfield and C William Keck (ed.), *Principles of Public Health Practice* (Clifton Park NY: Delmar Learning), (2nd edition).

Ministry of Health and Family Welfare, Government of India (2002): *National Health Policy 2002* (http://www.mohfw.nic.in/NRHM/Documents/National_Health_policy_2002.pdf).

Misra, Rajiv, Rachel Chatterjee and Sujatha Rao (2001): "Changing the Indian Health System: Current Issues, Future Directions", Indian Council for Research on International Economic Relations, New Delhi.

Novick, Lloyd and Cynthia Morrow (2008): "A Framework for Public Health Administration and Practice", ch 2 in Lloyd Novick, Cynthia Morrow, and Glen Mays (ed.), *Public Health Administration: Principles for Population-Based Management* (Sudbury MA: Jones and Bartlett Publishers).

Panikar P G K, and C R Soman ed. (1984): "Health Status of Kerala: Paradox of Economic Backwardness and Health Development, Centre for Development Studies, Trivandrum.

Preston, Samuel H (1980): «Causes and Consequences of Mortality Declines in Less Developed Countries during the Twentieth Century, pp 289-360" in Richard Easterlin (ed.), *Population and Economic Change in Developing Countries* (Chicago and London: The University of Chicago Press).

Pruss-Ustun, Annette, Robert Bos, Fiona Gore and Jamie Bartram (2008): "Safer Water, Better Health", World Health Organisation, Geneva (http://whqlibdoc.who.int/publications/2008/9789241596435_eng.pdf)

Ramasubban, Radhika (1989): Imperial Health in British India, 1857-1900, in Roy MacLeod and Milton Lewis (ed.), *Disease, Medicine and Empire and the Experience of European Expansion (*London: Routledge).

Schofield, Roger et al (1991): *The Decline of Mortality in Europe (*Oxford: Oxford University Press).

United States Centers for Disease Control (1999): "Control of Infectious Diseases, 1900-1999", *Journal of the American Medical Association,* 282(11): 1029-32.

United States, Tennessee Valley Authority nd *Vector Control* (http://www.tva.gov/environment/reports/ros_eis/4-12_vector_control.pdf)

World Bank (1993): *World Development Report 1993: Investing in Health* (New York: Oxford University Press).

– (2005): "East Asia Update – Countering Global Shocks" (Washington DC: World Bank). (http://siteresources.worldbank.org/INTEAPHALFYEARLYUPDATE/Resources/EAP-Brief-avian-flu.pdf)

– (Brahmbhatt, Milan) (2006): "Economic Impacts of Avian Influenza Propagation", (http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0,,contentMDK:20978927~menuPK:34472~pagePK:34370~piPK:34424~theSitePK:4607,00.html)

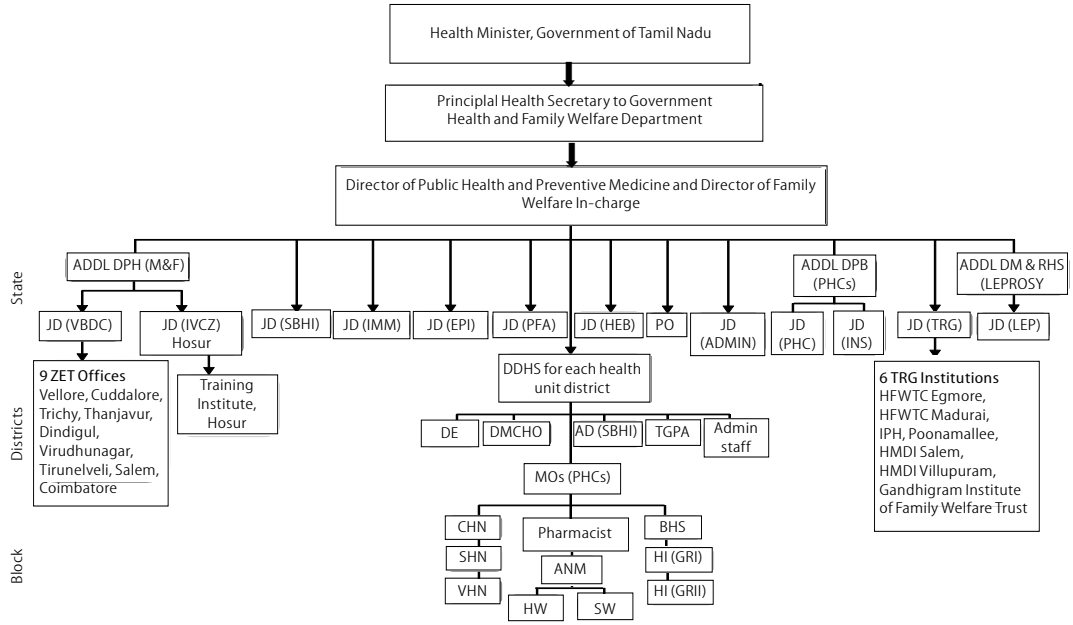
– (2007a): "Sanitation Saves Lives" (http://intranet.worldbank.org/WBSITE/INTRANET/INTERCOMM/0,,contentMDK:21556637~pagePK:87937~piPK:87970~theSitePK:86000,00.html)

WHO (1978): *Role, Functions and Training Requirements of Environmental Health Officers (Sanitarians) in Europe* (Copenhagen: WHO Regional Office for Europe).

– (2002): Plague Surveillance and Outbreak Response: Report of an Informal Intercountry Consultation, Bangalore, India, World Health Organisation, 15-17 July 2002 (New Delhi: Regional Office for South-East Asia), (http://203.90.70.117/PDS_DOCS/B3632.pdf)

– (2006): *Responding to The Tsunami – The Tamil Nadu Experience* (Delhi: WHO Country Office), (http://www.whoindia.org/EN/Section2/Section407.htm)

– (2009): *Global Polio Eradication Initiative Annual Report 2008* (Geneva: World Health Organisation).




### Appendix 1: Abbreviated List of Duties of Public Health Inspectors in Sri Lanka

**Control of Communicable Diseases:**

• investigate cases of communicable disease (including in health facilities), monitor their contacts, and prevent spread;
• assist specialised campaigns in their disease control activities;
• help trace contacts of leprosy, tuberculosis and sexually transmitted diseases, and treatment defaulters;
• study the mortality and morbidity statistics of the area and submit proposals to the superviser;
• inspect houses and advise on latrines, water supply, refuse disposal, light and ventilation, maintenance of home garden, and ensure that improvements are carried out.

**Housing:** Report on building applications, inspect buildings under construction, and make recommendations on completion certificates; report and take action on unauthorised buildings.

**Sanitation:** Get latrines constructed, recommend financial assistance where appropriate.

**Water supply**
• supervise the maintenance of public water supplies and ensure proper disinfection;
• send water samples for bacteriological and chemical analysis;
• inspect private and public wells and ensure that improvements are carried out.

**Refuse Disposal:** Supervise the scavenging services of local authorities and ensure collection and proper disposal of refuse.

**Vector Control:** Undertake fly and mosquito control, anti-rat work and the abatement of nuisances of public health importance.

**Rabies control:** Ensure vaccination of dogs against rabies.

**Food Safety**
• inspect food handling establishments and advise on improving their sanitary conditions;
• act as an Authorised Officer under the Food Act.
• pass animals for slaughter if asked by the superviser and ensure proper slaughterhouse sanitation;
• inspect fairs, markets and festivals and ensure maintenance of proper sanitation.

**Sanitation of Medical Institutions:** Supervise the sanitation of medical institutions and submit reports to the medical officer in charge of the institution.

**School Health Work**
• conduct a school health survey and formulate a programme of work;
• assist the Medical Officer in School Medical Inspections and undertake them himself if directed.
• conduct immunisations and worm treatment in schools.

**Occupational Health** (including Estate Health)
• inspect all factories and work-sites in his area, identify health hazards, and advise on remedial measures;
• inspect all estates in his area, advise on environmental sanitation and the control of communicable diseases.

**Disasters and Epidemics:** Organise and supervise health activities related to environmental sanitation and prevention of communicable diseases during disasters and epidemics.

**Records and Reports:** Shall maintain records and submit reports.

**Health Education:** Plan and implement health education in his area and ensure community participation.

Source: Sri Lanka Ministry of Health, also cited in Dalpatadu et al (2008). The fuller list is at http://go.worldbank.org/BW6NXMA570

### Appendix 2: Organogram of the Directorate of Public Health, Tamil Nadu

**Legend for the organogram:**

ADDL.DPH: Additional Director of Public Health and Preventive Medicine
M&F: Malaria & Filaria
ADDL. DM&RHS: Additional Director of Medical and Rural Health Services
JD: Joint Director of Public Health and Preventive Medicine
VBDC: Vector Borne Disease Control
IVCZ: Institute of Vector Control and Zoonoses
SBHI: State Bureau of Health Intelligence
IMM: Immunisation
EPI: Expanded Programme of Immunisation
PFA: Prevention of Food Control Act
HEB: Health Education Bureau
ADMIN: Administration
PHC: Primary Health Centre
INS: Inspection
TRG: Training
LEP: Leprosy
ZET: Zonal Entomological Team
DDHS : Deputy Director of Health Services
DE: District Entomologist
DMCHO: District Maternal and Child Health Officer
AD(SBHI): Assistant Director (State Bureau of Health Intelligence)
TGPA: Technical Gazetted Personal Assistant
MO: Medical Officer
CHN: Community Health Nurse
SHN: Sector Health Nurse
VHN: Village Health Nurse
ANM: Auxiliary Nurse Midwife
HW: Hospital Worker
SW: Sanitary Worker
BHS: Block Health Supervisor
HI GI : Health Inspector Grade I
HI GII : Health Inspector Grade I
HFWTC: Health and Family Welfare Training Centre
IPH: Institute of Public Health
HMDI: Health Manpower Development Institute