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ASSET PLANNING FOR ENVIRONMENTAL HEALTH IN THE COMMUNITIES OF AVVAI NAGAR AND UDAYAR THOPPU, PUDUCHERRY, INDIA

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Abstract :

The purpose of this study, conducted in coordination with Manchester University, was to test a participatory planning methodology (Urban Asset Planning) in two 'slum' settlements of Puducherry through a focus on health and the lived environment. The study had three main objectives: to explore how people understood the relationships between their well-being and their living conditions; to ascertain relevant agencies and institutions; to enable locality-specific solutions through interactions with the communities and governmental and non-governmental agencies. The study found that there is a multifaceted and continuous erosion of people's health and well-being; people have developed strategies to deal with issues in their immediate lived environment; there is significant differentiation in the patterns of problems, strategies, help-seeking behaviour and access to services among inhabitants of these settlements.

Keywords: participatory planning / urban poor / urban development / urban health / environment

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List of Abbreviations

AAP	Asset Action Plan
AN	Avvai Nagar
AP	Asset Planning
APW	Asset Planning Workshop
CP	Community Profile
MLA	Member of the Legislative Assembly
NRHM	National Rural Health Mission
PAA	Participatory Asset Appraisal
PWD	Public Works Department
RIA	Rapid Institutional Appraisal
SHG	Self-Help Group
TCPD	Town and Country Planning Department
UT	Udayar Thoppu
UTP	Union Territory of Puducherry

I - Introduction

a) Background

Asset Planning (AP) has been developed inductively from applied studies that focused on the accumulation of the main assets of the poor and poverty reduction policies (Moser 2007, 2009), the adaptation of these assets against severe weather associated with climate change (Moser and Stein 2010, Moser et al. 2010), the erosion and reconstruction of assets due to conflict and urban violence (Moser and McIlwaine 2004) and the use of micro planning for the financing of assets (Stein 2010).¹

Caroline Moser and Alfredo Stein at the Global Urban Research Centre (GURC), University of Manchester, developed the conceptual and operational framework for Asset Planning in urban environments. Moser and Stein received a grant from the Ford Foundation to test the AP methodology through pilot studies in cities of the global south. In the first phase of this exercise, a team from GURC collaborated with the Universidad Tecnológica de Bolívar, Cartagena, in 2011 to study adaptation strategies for severe weather among residents of an informal settlement of Cartagena (Colombia). Alfredo Stein contacted the French Institute of Pondicherry, through the mediation of Benjamin Solomon, who collaborates on urban studies projects in India held at the IFP, as a potential partner for the expansion of their AP programme in Asia.

The city of Puducherry in the Union Territory of Puducherry (UTP), which comprises former French enclaves Karaikal, Mahé and Yanam, was selected as a suitable location to test the AP methodology for several reasons, which concerned the characteristics of Puducherry as a rapidly urbanizing territory in India, as well as relevant research capabilities at the IFP.

The IFP is an internationally recognised institute for urban studies, the environment and health. Researchers who worked or collaborated on the project (Celina Jauzelon, N. Ganeshan, Bhuvaneswari Raman, Venkata Subramanian) have local expertise and good relations with government bodies, local non-governmental organisations and contacts with relevant faculties at the state University (Pondicherry University), which were essential for the effective operation of the research. Additionally, consultants on the project, Solomon Benjamin and Eric Denis, the Head of the Social Sciences Department, contributed their expertise on urban governance dynamics and research. For the IFP as a whole this study brought an opportunity to expand their programmes into local applied research.

¹ According to Moser and Stein (2010), asset planning 'represents a new form of rethinking participatory planning processes at the community level and of strategic planning processes in urban development'. Asset planning aims to:

- a) Improve poor communities' response and negotiation capacities to address their priority problems and needs;
- b) Generate new opportunities for the poor to strengthen, accumulate, rebuild and adapt their portfolios of assets.

b) Objectives of the paper

This paper has two principal objectives. First, to recount the process, from conception to culmination, of how the asset planning methodology was implemented in the six months of research undertaken at the IFP between September 2011 and March 2012. Second, to present the findings of the totality of the study as well as each of its constituent parts. The main findings are summarised in Box 1 below, and in a subsequent section they are elaborated with examples of the tools used during the Participatory Asset Appraisal.

b.i. Research components

The research comprised four main components, which were carried out sequentially with the following objectives:

- 1) Community Profile (CP). The aim of the CP was to establish basic information on the settlement selected for study and its resources. The document includes data on the location, physical characteristics and brief history of the site, the number of inhabitants, the number of dwellings, the caste, ethnicity, and religious orientation of the population, the predominant household structures, the main economic activities and sources of income, access to credit, land tenure, community infrastructure and facilities such as water, electricity, sanitation, schools, and health posts. The CP includes an outline of the dominant structures of governance in the settlement and identified key community leaders who facilitated the Participatory Asset Appraisal process (3) and the Asset Planning Workshop (APW).
- 2) Rapid Institutional Appraisal (RIA). The aim of the RIA was to identify, and create a profile of, the relevant agencies, policies, institutions as well as planning instruments and procedures that address urban poverty, the lived environment and health in the Union Territory of Puducherry on local, regional and national scales. The findings of the RIA complement the site-specific information gathered in the CP and fed directly into the planning of the summative Asset Planning Workshop at which relevant stakeholders were gathered (4).
- 3) Participatory Asset Appraisal (PAA). The aim of the PAA was to conduct intensive focus-group discussions, sensitive to the range of 'voices' within the settlement over several days. The intention was to go beyond identifying the problems of people living in an informal settlement by focusing on the range of assets and resources, skills and strategies which people deployed in order to address their concerns. The PAA allowed people to identify various external institutions that contributed to the accumulation, rebuilding and adaptation of assets. Analysis of the results of the PAA were presented at the Asset Planning Workshop.
- 4) Asset Planning Workshop (APW) and mainstreaming. The aim of the APW was to bring together in a common forum relevant authorities and people from the settlement in order to share the results of the PAA and to develop an Asset Action Plan (AAP). The main objective of the APP was to prioritise solutions to common problems that people from the community identified and that had the following characteristics: financial and technical feasibility, the identification of appropriate agencies to carry forward the plan (either among community members, local

institutions or through external agencies) within a time-scale determined at the event by the participants. The results of the AAP are returned to the community and distributed to relevant agencies which took part in the workshop.

As can be gathered from the above description, an important dimension of the research design is the alignment of its different components – how one component either complements or informs the next.

b.ii. Research results

Each of the constituent parts contributed to the total results of the research. Box 1 summarises the results of the study which arose through the Participatory Asset Appraisal. The results specific to the CP, RIA and APW are presented in subsequent sections in the body of the text.

Box 1.

The main results of this study:

- In the localities under study there is a continuous erosion of people's health and well-being. This is a layering and compounding process shaped by location, seasonality, age and gender, access to services, living conditions and social practices.
- People in these localities have good knowledge about how environmental conditions are affecting their health and well-being.
- People are not passive:
 - o they carry out strategies to deal with issues in their immediate lived environment.
 - o they are able to identify a range of institutions and channels of access to address many of their concerns. They may seek to address their concerns either through an intermediary (Member of the Legislative Assembly (MLA), 'local leaders' (Tam. *thalaivar*), etc..) or directly to find a solution among themselves.
- The methodology brought to light significant differentiation in the patterns of problems, strategies, help-seeking behaviour and access to services among inhabitants of the settlements.

c) The Process

c.i. Defining terms

Initial discussions about the IFP's role in conducting the pilot study in Urban Asset Planning in Puducherry began with the visit of Alfredo Stein from GURC to the IFP in August 2011. Stein introduced researchers at the IFP to the AP methodology and to key parameters for the study (conceptual and thematic orientation, site selection, sequence, scheduling and so forth).

In the course of these discussions, the entry point for the study was defined as 'health and the urban lived environment', through which we could explore how people understood the relationships between their well-being and the conditions in which they lived, and what kinds of institutions or other agencies were engaged in these domains in specific sites. A number of potential sites were visited during Alfredo Stein's stay, and these were supplemented by subsequent visits and revisits by members of the IFP team. Various criteria were used to evaluate the potential of each site, including feasibility (accessibility, number of dwellings, boundaries of the site); characteristics (in terms of apparent vulnerability, poverty, environmental risk and the inadequacy of basic infrastructure); willingness to work there. Several sites were eliminated against one or other of these criteria. One was rejected because of an ongoing legal struggle over land tenure between the residents and the private landowner. A further criterion emerged, namely that the site should represent relatively 'common' or at least non-exceptional characteristics of an informal settlement in the Union Territory context. In October 2011, the IFP team decided on the selection of Udayar Thoppu (henceforth UT) as the site for study (see below). The contiguous settlement of Avvai Nagar (henceforth AN) was added after further visits to the area in order to straddle legal definitions of a slum within the Union Territory. UT is classified as a 'recently identified slum', while AN is characterised as a 'notified slum', which opened up investigation into potentially different channels of access to the state and external services by people in these neighbouring localities. Among other features, this decision expanded the demographic range of the study (by including different caste and income groups resident in AN) as well as the environmental profile of the study (part of UT is on the shore of a backwater, while AN is some distance from it).

c.ii. The research components

Between October and December 2011 the IFP conducted the Community Profile (CP). Basic information on the socio-political-economic dimensions and environmental characteristics of UT/AN were collected. Very little documentation was available from secondary sources to produce the CP. The bulk of the information was gathered through site visits, interviews with community leaders, casual conversation with people on site, and interviews with institutions and other agencies (NGOs) who intervene directly on site.

Work on the Rapid Institutional Appraisal (RIA) began in October 2011. Data was sourced from various institutions rendering services or in charge of schemes and programs that were related to the lived environment (housing, sanitation, water supply, electricity, municipal services and public works) and to health, including the Health Department, primary health centres, 'anganvadi' centres, and other agencies which intervene in the management of health, welfare and nutrition in the Union Territory in general and in the localities under study).

Preparations for the Participatory Asset Appraisal took shape in January 2012. In February, a team of researchers was trained in asset planning participatory methodology to conduct the PAA on site. Following a transect walk, an intensive five days of focus groups were organized on site (sensitive to gender, age, occupation, location/habitat, caste, social position within the settlements), using the tools of the AP methodology in order to source data. Each session of research on site was followed by the writing-up, collation and analysis of the data either on the same or day or the following morning.

The Asset Planning Workshop (APW) was held on 27 February, in the week following the completion of the data collection through the PAA. The preparation for the workshop involved analyzing the results of the RIA and PAA, and adjusting the list of invitees accordingly; determining the final structure of the workshop in terms of themes that arose prominently in the course of the participatory field-work (e.g. drainage and sewage, waste disposal, toilet facilities, alcoholism, diabetes and so on). We invited officials from the relevant government departments, the Chief Secretary of the Union Territory, the Minister for Social Welfare, are, as well as a proportionate number of people from UT and AN to participate in the workshop. During the workshop an Asset Action Plan was elaborated using the AP methodology.

Since the workshop, members of the IFP have been monitoring the outcome of the event and have maintained links both with UT and AN as well as officials in government departments concerned with the follow-up to the research.

d) Structure of the paper

By way of introducing the systematic presentation of the results of the study through its different components, the first part of the following section sets out the general context of urban governance and the urban environment and health services in Puducherry. This section concludes with a summary of why the urban environment and health in Puducherry presents a compelling case for study with asset planning methodology.

II – General context

- a) Urban governance in India and in the city of Puducherry in the context of rapid urbanization and economic growth.

The Union Territory (UTP) of Puducherry, a former French colony, comprises four districts viz., Puducherry, Karaikal, Mahé and Yanam. The total area of the Puducherry territory is 293 Sq. km, with a total population of 946,600 according to the 2011 provisional Census. One of the striking features of demographic change in the UTP is its rapid urbanization, even compared with the urbanizing trends of India as a whole and its established metropolitan centres. UTP's decadal demographic growth rate (2001-2011) is higher than the Indian average, 28.7% vs. 17.6%, and is increasing (during 1991-2001 the rate was 20.6%) in an opposite trend to urban India. In 2001, 67% of Puducherry's population lived in urban areas, compared to the India-wide proportion of 28%. Puducherry is located 160 kilometers south of Chennai, a major Indian metropolis with 8 million inhabitants, and 20 km north of Cuddalore, an industrial town of some 300,000 inhabitants. Puducherry lies within one of the most urbanized regions of India, Tamil Nadu, almost half the population of which live in urban areas. The majority of the urban poor population in Puducherry live in slums. 22.4% of the population are classified as Below Poverty Line, compared to an Indian average of 27.5% (2004-2005, Lakdawala Methodology, Planning Commission). According to the latest survey by the Slum Clearance Board in 2002, there were 180 slums in the Puducherry urban area: only 70 slums are 'notified',² while the remaining 110 slums are not notified or identified (Slum Clearance Board, 2002).

As a Union Territory with limited statehood in India's federal system, the UTP relies almost entirely on financial allocation from the Central Government under special grants for the maintenance of the Territory as well as for development programmes (MSE 2003). The financial situation of the current administration is strained and the precariousness of its dependence on Central Government financing constrains its capacity to keep pace with the needs of its increasingly densely populated urban area. The UTP is indebted and is taking additional loans to pay government employees and to deliver services. In the absence of initiatives to modify the structuring of the UTP administrative/political/financial arrangements, the quality and scope of investment in and delivery of basic services will be placed under still greater strain.

² In 2001, the Census of India, in accordance with UN-Habitat Slum Free City Millenium Goal Programmes, produced a specific report on slums, which, since that time, have been defined as : (i) "All specified areas in a town or city notified as "Slum" by State/Local Government and UTP Administration under any Act including a "Slum Act"; (ii) All areas recognized as "Slum" State/Local Government and UTP Administration, Housing Board and Slums Boards, which may have not been formally notified as slum under any act, (iii) A compact area of at least 300 population or about 60-70 households of poorly built congested tenements, in unhygienic environment usually with inadequate infrastructure and lacking in proper sanitary and drinking water facilities.

The Puducherry Planning and Research Department³ is in charge of the planning and allocation of finances under different components including urban development and poverty reduction. The remit of the department is to formulate the Annual and Five Year Plans of the State and to allocate scheme finances to various agencies and to monitor the implementation of those schemes.

The following schemes that concern urban development and urban policy/housing were formulated under the annual /five year plans for the period 2006-2011 and the plans for the current five year period (2012-2017) is yet to be released in the public domain.

Centrally sponsored schemes supplemented by the UTP:⁴

- Jawaharlal Nehru National Urban Renewal Mission (JNNURM)
- Urban Infrastructure and Governance (UIG)
- Urban Infrastructure Development Scheme for Small and Medium Town (UIDSSMT)
- Basic Services to Urban Poor (BSUP)
- Integrated Housing and Slum Development Programme (IHSDP)
- Programme Management Unit (Housing)
- National Urban Information System and the Rajiv Awas Yojana (RAY)
- Swarnajayanti Rozgar Yojana (SJRY)
- EWS/LIG Houses in Urban Areas
- Slipped back habitations and habitations with water quality problems addressed under Accelerated Rural Water Supply Programme (ARWSP)
- Assistance to urban poor families under seven point charter viz. land tenure, housing at affordable cost, water, sanitation, health, education and social security.

These various schemes are implemented in Puducherry territory through the TCPD (Town and Country Planning Department)⁵ as the nodal agency and via PWD (Public Works Department), Electricity Board, Slum Clearance Board, and Disaster Management Board as the main service providers and implementing departments.

The Puducherry urban agglomeration is governed by five municipalities,⁶ one of which is the Puducherry municipality.⁷ The municipalities are empowered to provide basic infrastructure services to the town's population.⁸ Prior to the introduction of PMA (Pondicherry Municipal Act), the Public Works Department (PWD) had been responsible for the design, implementation, operation and maintenance of infrastructure – a function that it continues to do till today. The Puducherry Municipal Corporation (PMC) shares the responsibility for squatter improvement / upgradation with the Puducherry Slum Clearance Board (PSCB) in

³ A planning board was created in 1976, to advise on the formulation of Development Plan / Schemes for the Territory.

⁴ <http://planningcommission.nic.in/plans/planrel/fiveyr/9th/vol2/v2c2-2.htm>, and http://urbanindia.nic.in/theministry/ministry_page.htm. Retrieved on 4 April 2012.

⁵ <http://tcpd.puducherry.gov.in/organisationstructure.html>. Retrieved on 2 April 2012).

⁶ The others are: Oulgaret municipality in the Puducherry region and the municipalities of Karaikal, Mahé and Yanam.

⁷ <http://www.pon.nic.in/citizen/municipality/MUNIPWHOLE.htm>. Retrieved on 3 April 2012

⁸ Defined in the Pondicherry Municipal Act 1973, which came into force on 26th January 1974.

agreement with the provision of basic infrastructure service to the squatter settlements under their respective jurisdiction. In general, analysis of the PMC finances suggests that two streams of funds are utilized for the improvement of squatter settlements: the normal municipal budget and the schemes for poverty reduction or urban development funded through central or state government special schemes. PMC's role in the context of poverty reduction is twofold namely (i) the implementation of centrally sponsored or state sponsored schemes and (ii) the provision of municipal services, particularly, waste management and facilitating the service provision to the squatter settlements under its jurisdiction.

Under the nodal agency TCPD, the Slum Clearance Board and PWD are the service providers for the implementation of the various urban infrastructure and poverty alleviation programs and schemes.

The Puducherry Slum Clearance Board is responsible for the improvement and development of squatter settlements in the city. The board was created under the Puducherry Slum Improvement and Clearance Act of 1956, which is modelled on the Central Act- the Slum Improvement and Clearance Act 1956. The Act was implemented to protect the property rights of particularly poor households in some of the union territories soon after independence.

The Slum Clearance Board schemes include the following:

- Perunthalivar Kamaraj Centenary Housing Scheme for Houseless Poor (PKCHS)
- The Puducherry Chief Minister's Sanitation Schemes (PCMSS)
- Slum Upgradation Programme (SUP)
- Valmiki Ambedkar Malin Basti Awas Yojana (VAMBAY)
- Jawaharlal Nehru Nation Urban Renewal Mission (JNURRM)
- Rajiv Gandhi Awas Yojana (RAY)

Puducherry Public Works Department is responsible for the design, construction and maintenance of water supply, sewerage and sanitation and roads, the maintenance of national and state highways, major district roads and other important roads in the region.

The experiences of poor groups in Indian cities and notably for Puducherry, point to their reliance on the municipal institutional terrain and elected representatives at different scales – notably the Members of the Legislative Assembly (MLAs) and councillors – in shaping investments and for securing scheme funds.

Besides, the MLAs also have discretionary funds allotted under the MLA and MP (Member of Parliament) constituency development funds.⁹ While often these funds are used for larger visible infrastructure projects like the construction of a public bus stand, because of the suspension of council for several years, the MLAs have emerged as the political link

⁹ The MLA has some funds (through schemes or certain channels based on demands), which can be allocated to improve the infrastructure and facilities within his constituency. For additional funds or for the specific utilization of the amount he should receive the approval of the Puducherry Assembly.

between citizens and the State. Often in many states, the MLAs have sitting power in the municipal standing committee meetings (Benjamin and Raman 2006 ok) and also influence investment options via the party terrain (Benjamin and Raman 2006).

b) Managing the urban environment and health in Puducherry

This summary will first of all outline the division of labour between different agencies for managing the urban environment and health. In Box 2 is a summary of evidence on the inadequacies of sanitation systems and associated health risks in the UTP (for further information on water supply, pollution and solid waste management in the UTP see the RIA). The third sub-section will be an outline the health services structure in the UTP. The section closes with a summary of why the urban environment and health presents a compelling case for research with AP methodology.

The responsibilities for managing the urban environment and health are split largely between four agencies: the Public Health Division of the Public Works Department, which oversees water supply, sewage, drainage and storm-water drain systems; the recently reconstituted Puducherry Pollution Control Committee is supposed to monitor air pollution and assess industrial pollution risks; the Puducherry Municipality is charged with waste disposal and conducts mosquito fumigation ('fogging') operations, upon request from councillors or the MLA; the Department of Health and Family Welfare Services and the Directorate of AYUSH (Ayurveda, Yoga, Unani, Siddha and Homeopathy, formerly Indian Systems of Medicine and Homeopathy), which provide wide-ranging health services throughout the UTP.

Box 2. Sanitation and contamination risks

- There is an inadequate provision of sanitation facilities in squatter settlements; hence most residents in these areas rely on nearby public toilets or resort to open defecation (Smith 2007).
- There is an extensive drainage network in the city. However, a number of these drains are open drains, into which sewage/sullage water is periodically released. The resulting pollution of water and soil poses health risks.
- Accounts of the extent of the underground drainage network (UGD) vary considerably: The Vision 2020 report claims that only 30% of the city is not connected to the UGD, (MSE 2003); the Comprehensive Development Plan prepared by Wilbur Smith (2007) suggests that more than 2/3rds of the city are not connected to the UGD. Further, there is evidence that where the network exists, still many households are not connected to it.
- In areas not covered by the sewage system, night soil is disposed into soak pits and drains. Effluent from septic tanks may be released into storm-water drains.
- Ground water is available fairly close to the surface, which increases the risk of contamination. The infiltration of polluted water into low-pressure water supply systems can contaminate drinking water and is frequently a source of gastrointestinal disorders.
- Ineffective solid waste collection and disposal exacerbates drain blockages, heightening the risks of contamination, localized flooding and stagnant pools and the spread of vector-borne diseases.
- Drainage and water supply systems in some parts of the city are vulnerable to severe weather stresses, associated with annual monsoon activity and also evidenced in the aftermath of the 31 December cyclone and the contamination of water supply pipes with sewerage.

Health-care delivery in India, according to the Indian Constitution, is primarily the responsibility of the constituent States and Union Territories. The Central Government has the responsibility to define policy, to develop an operational national framework, to regulate medical education and to provide supplementary financial resources.

In Puducherry there are two directorates governing health services – the Department of Health & Family Welfare Services (DH) and the Department of Ayurveda Yoga Unani Siddha and Homeopathy (AYUSH, formerly known as Indian Systems of Medicine & Homeopathy). The Department of Health oversees four departments (Public Health, Family Welfare, Immunization and the Employees State Insurance Scheme) and seven programmes, as well as the operation of a network of government hospitals and medical colleges.

Further, there is the Puducherry State Health Mission (PSHM), created in 2005 under the auspices of the Central Government's programme the National Rural Health Mission (NRHM). The PSHM is amalgamation of the previously existing Societies of Reproductive and Child Health (RCH), National Leprosy Eradication Programme (NLEP), Revised National Tuberculosis Programme (RNTCP), National Vector Borne Disease Control Programme (NVBDCP), National Programme for Control of Blindness (NPCB) and Integrated Disease Surveillance Programme (IDSP).

Puducherry provides health-care facilities for the city's residents and the wider region through state-supported and private hospitals and diagnostic centres, private practitioners and government-managed health centres. Puducherry claims to have the highest concentration of medical colleges per capita of any Indian territory. It benefits from a nationally recognized government hospital and medical research centre, JIPMER (Jawaharlal Institute of Postgraduate Medical Education and Research), which like all government facilities is free at point of contact. While JIPMER is located in the west of the city, the General Hospital (GH) is widely resorted to and is centrally located in downtown Puducherry. The city takes some pride in its health services and has the potential to consolidate its position as a regional health-service hub due to its concentration of services and their accessibility.

Local health services are delivered by Primary Health Centres (PHCs) and the Anganwadi (Hindi: 'courtyard shelter') centres that were initiated in India in 1975 under the Integrated Child Development Service (ICDS) in order to support child health and nutrition. Their remit has expanded considerably, and they are frequently the main link between health and government services and the urban/rural poor.

The PHCs are established and maintained by the State Governments under the Minimum Needs Programme (MNP) and Basic Minimum Services Programme (BMS). The PHCs in Puducherry district cover a population of about 700,000 (560,000 of whom urban and 229,000 rural). Over 2,172,000 patients use these facilities annually.

Anganwadi centers are the prime institutions which connect the poor to many government health and welfare services. The responsibilities of Anganwadi workers include the following:

1. Supplementary nutrition for infants and pregnant and lactating mothers

2. Health check-ups
3. Referral services
4. Immunization
5. Nutrition and health education
6. Non-formal pre-school education
7. The distribution of old age, widow and disability pension schemes

The principal beneficiaries of the ICDS Anganwadi scheme are: expectant mothers, nursing mothers, other women between 15 to 45 years, children between 0-6 years and adolescent girls. Acting as a primary channel for referral, Anganwadi workers have the responsibility to refer emergency cases, like cholera and dengue fever, to PHCs or Medical Officers. They should also detect disabilities in children and refer them to PHCs.

It is widely recognized that Puducherry's health services and health/socio-economic indicators compare very favourably with other territories, States and urban agglomerations in India. There are plenty of aggregated statistics on key health indicators that support this claim. In official documents, the Maternal Mortality Rate for Puducherry is the lowest in India, at 0.15 per 100,000 live births, as of data for 2011 (http://health.puducherry.gov.in/eleventh_five_year_plan_targets.htm, 2012), while the average India-wide is 254 per 100,000. In 2006, the Infant Mortality Rate in UTP is 25 deaths per 100,000 compared to 55 per 100,000 on average in India (Puducherry State Report, 2006). The UTP runs active programmes for the control of communicable diseases, like malaria, dengue fever, leprosy and TB. Under the new director of the Department of Health, Dr. V. Raman, there will be an intensification of interventions to address increasingly prominent non-communicable diseases, like diabetes.

Other achievements in health services are as follows:

Polio: as a result of polio immunization campaigns there has been no case of indigenous wild-type polio (i.e. not brought in to the UTP via migration, or induced by oral vaccination) in the UTP since 1998, while India as a whole was only declared as no longer polio endemic by the WHO in January of this year, 2012.

Filariasis: In the control of lymphatic filariasis, a parasitic caused by nematodes and transmitted by mosquitoes, the National Vector Borne Disease Control Programme achieved over 90% coverage in a mass drug administration drive during successive years in the 1990s.

Tuberculosis: with an annual Tuberculosis Detection Rate of 71% and a cure rate of 86% in 2010, the UTP achieved the national target set by the Revised National Tuberculosis Programme (RNTCP) for the fifth consecutive year, according to official accounts. However, non-compliance to treatment programmes and multi-drug resistance have become a significant issue.

c) The urban environment and health - implications for our study

The investigation of the linkages that people make between their health and the environments in which they live and work is an area that has not been studied before in

Puducherry. The use of AP participatory methodology is compelling for this theme in Puducherry for a number of reasons.

The above sections have shown that there are a tremendous variety of programmes and schemes that address the urban environment and health in the UTP. However, it should not be assumed that the urban poor living in informal settlements benefit equally from these services or that these services adequately address the needs of these populations, even within the relatively confined urban area of Puducherry city. There is also the need to go beyond aggregated statistics about health in the UTP since they tend to eclipse stratification and disparities from one locality to another and discourage the consideration of more locally meaningful and targeted interventions. Equally, the strain of rapid urbanization as well as the constraints imposed by the prevailing political-financial conditions in the UTP, exacerbated by the limits to locally responsive democratic institutions, create an urgency to understand the dimensions of vulnerability and the specific challenges to well-being that poorer populations face in daily life. As a consequence, the AP methodology may suit the purpose of drawing attention to creative planning initiatives that take into account people's own strategies to address problems defined in their own terms.

III - General characteristics of the communities where the Participatory Asset Appraisal (PAA) took place

In the introduction, we presented the reasons for selecting health and the lived environment in the Puducherry urban area. We also indicated the criteria by which the site for study was selected.

a) Reasons for choosing these settlements

The two settlements selected for the study had the following characteristics, which satisfied the criteria mentioned above in the Introduction:

- Lower income settlements status as “slums”
- Contiguous settlements, different sectors and historical, socio-economic and environmental characteristics
- Presence of issues concerning basic infrastructure and services
- Not untypical characteristics of slums compared to other areas within Union Territory, especially those near water bodies
- Kindly granted access to do the study by the MLA of Uppalam Constituency

b) Profile of the two settlements (Avvai Nagar and Udayar Thoppu)

Information on community characteristics were gathered in a basic form for the CP, and this was deepened during the PAA. The tools for gathering this information were implemented at the beginning of the PAA to establish the context at the outset and deepen our knowledge of it during fieldwork. In particular, the transect walk was carried out with community leaders and facilitators, on initial entry into the communities. The transect walk allowed for questions about the nature of the research to be posed communications between the researchers and people in the communities to gain as outsiders, but also provides information about the areas that have greater vulnerability to environment and health and offers the first indications about adaptation strategies in use.

We selected two adjacent sites. Udayar Thoppu (UT) is a recently identified slum, without effective and full legal and administrative recognition by the government, since it is seen as an encroachment of government land on the shores of a backwater. There is a heterogeneous community composition, both in terms of caste profile (mostly Backward Caste and Scheduled Caste) and place of birth and prior residence, from different localities within Puducherry and Tamil Nadu. This area began to be settled 35-40 years ago. Without a legal and administrative recognition of the settlement by the government, the provision of basic services isn't provided. They have no legal rights to approach the government to request infrastructure and other services (drainage, water supply, electricity connections) to be provided to their settlement. With the support of their MLA, however, as many as 75% now have land title for their house. Men are mostly employed as daily wage workers in the construction, painting or loading sectors. Women are mostly employed as domestic helpers or construction workers.

Avvai Nagar (AN) is a notified slum with a relatively homogeneous social profile (mostly classified as 'Scheduled Caste'¹⁰ (SC)). The community can claim for government services, support and extension of services (streets lighting, drainage, roads, electricity connections and so forth) since approximately 95% have land titles which were granted through specific legal mechanisms in 1974. There are approximately 105 households, mostly from SC community, originally from Puducherry's area. The man works as government employees (temporary or permanent), painters, carpenters, rickshaw drivers. The women works in beauty parlours, as teachers, or shop-workers and as sanitary workers (PMSPL: Pondicherry Municipal Services Private Limited).

Below are the results collected during the PAA with the communities on site about the characteristics of their community and the time line-history (samples) of their settlement events.

The groups were asked to present the main elements and characteristics of their community/settlement. Depending on the group/gender/age, we collected slightly different elements. The variations of results are due mostly to their ability to give or not precise information and get an agreement within the group about it.

1) Tool: Matrix of community characteristics done in Avvai Nagar with a Mixed Group (age/gender) on 19.02.2012

Foundation	1974
Public Services	Water, Electricity.
Number of Houses	100
Number of Families	250
Population	780 (Male– 400, Female – 380)
Occupation	Daily wage worker (painter), housemaid.
Education	Mostly School going children. Few students went for Colleges.

2) - Tool: Matrix of community characteristics done in Udayar Thoppu with Community leaders on 19.02.2012

Foundation	40-45 years before
Total No. of houses	250-260 houses
Total no. of families	250-260
Population	1200-1300
Men	400
Women	500

¹⁰ An administrative classification of the population by caste.

Children	400
Caste/Ethnic composition	Two-third Scheduled Castes. Remaining belong to Goundar-Vanniar, Chettiar-Otter, Nadar-Cramni
Main source of income	Most of them are Coolies (daily wage labourers): women as maid servant, construction workers
Education	Elders are not educated and illiterates while the present generations are educated
Income	Rs. 100 per day Rs. 2000 per month
Land status	190 house have patta
Services	Power Supply, Water, Toilet

b.1) A history timeline of positive and negative aspects that have happened in both communities

The communities in Avvai Nagar and Udayar Thoppu reflected on the history of their settlement and indicated the moments which for them were either positive or negative as individual as well as member of the community.

Tool : Timeline – History : adolescent group in Avvai Nagar on 20.02.2012

Positive (+)	Year	Negative (-)
	2004	Tsunami
Free Cycle given to students by Government	2006	
Free Gas Cylinder	2010	
Differently Abled – Monthly assistance	2011	Thane Cyclone
Special buses for Students		Providing School books to students are delayed.
Scholarships for students		
MLA distributed free rice during cyclone		
Loan for House Construction		
Thane Cyclone Relief fund	2012	
Polio Vaccination		

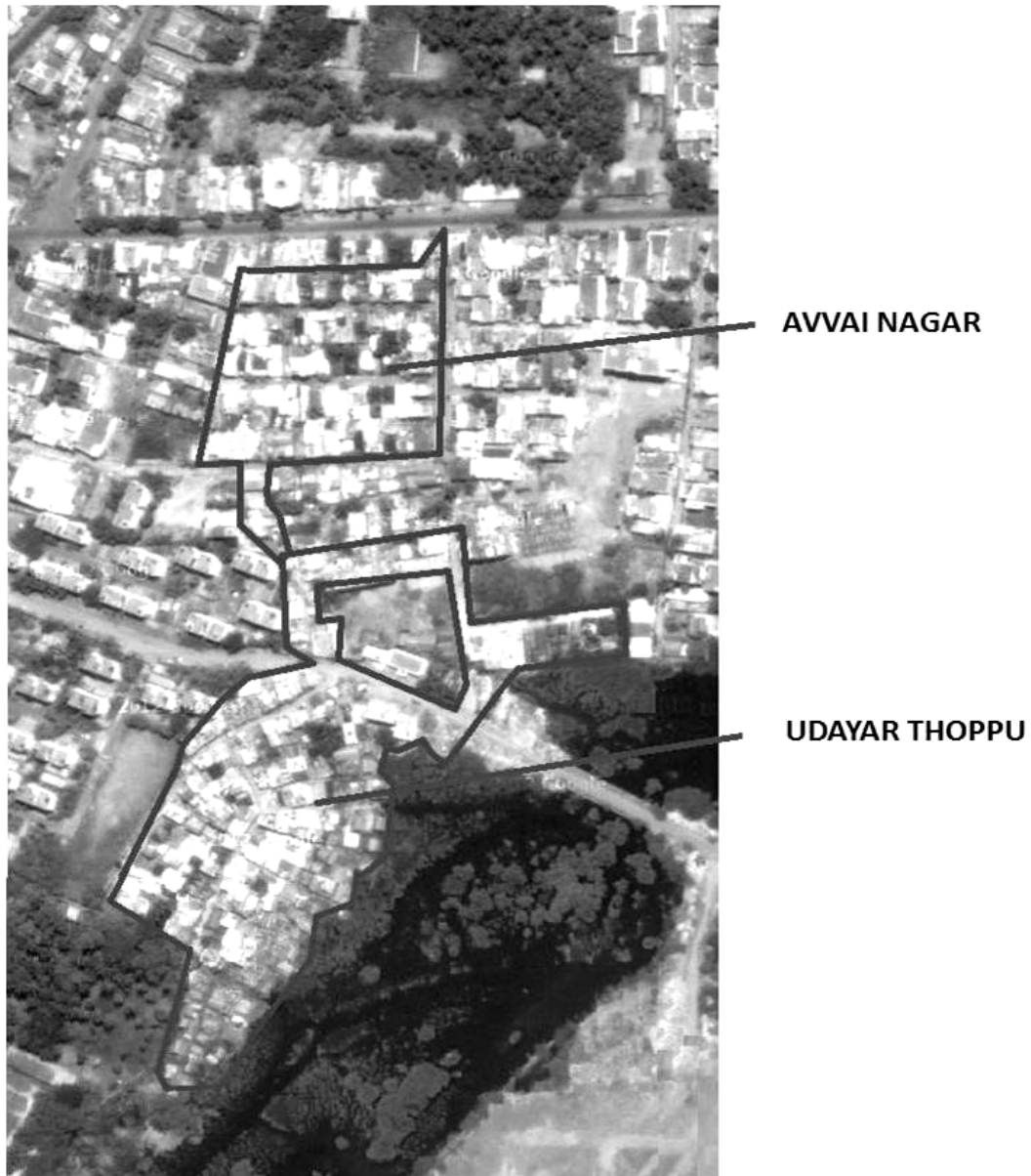
Quality rice provided in Ration shop		
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Tool 2: Timelines – History: Elder Group in Udayar Thoppu on 18.02.2012

1967-1972	Settled on this land
1992	Flood affected*
2001	Power supply
2004	Affected by tsunami*
2005	Constructed public toilets
2006	Started to build a temple
2009	Cement road was constructed
2011	Anganvadi and Community Centre
	Cyclone*

Indicator:*Negative

The results of these timelines show how people relate time and event, and associate events with positive or negative effects on their lives. In most cases, the support (material and facilities) granted by the government (from various departments) are viewed as positive. The timeline also alerts us to the regularity with which the ill-effects of severe weather and crises are recalled.



Map of the settlements Avvai Nagar and Udayar Thoppu, Puducherry. Source Google Map 2005

IV - The PAA process, tools used and a note on terms

The information collected during the PAA have been cross-checked with the details of the CP and the RIA. During the PAA, the main objective was to understand the linkages that people made between their lived environment and challenges to their health and well-being; which strategies they developed; and which institutions, internal or external agencies they valued and mobilized. The following themes related to the lived environment / health were pursued during the PAA:

- i. **Community characteristics:** Background identification of the communities' most salient and general characteristics.
- ii. **Lived environment and health related issues:** Identification of various environmental and health issues and understanding perceptions of regularity or exceptionality.
- iii. **Vulnerability to environment and health:** Identification of vulnerable groups, areas and assets, affected by environment and health.
- iv. **Asset adaptation to environment and health:** Identification of assets at household, and community level, and strategies and solutions of asset adaptation to lived environment and health.
- v. **Institutions supporting local adaptation:** Relevance of institutions based on their support to asset adaptation in the face of environment and health.

The investigation of the themes above involved the use of a variety of tools developed in AP methodology (Box 2).

Box 2. Tools for gathering information on environmental and health problems in the community

<i>Tool</i>	<i>Function</i>
Map of the neighbourhood	• Maps the spatial characteristics of the community, households, infrastructure facilities etc. • Maps the most important characteristics of the community, such as the physical limits of the neighbourhood, houses, paths, anganwadi, health centres and schools • Identifies vulnerable areas, or those areas affected by events related to lived environment, associated to health or not
Community history matrix	• Identifies important events in the history of the community and relevant community events through time related to environment and health
Timeline of the history of the	• During a period of time relevant for the history of the community, it identifies important events

neighbourhood	Identifies and locates through this history those events associated with environment and health
Listing and prioritizing	- List of environment and health issues affecting the lives of people in the community according to the perceptions of participants in focal groups - Allows identification of which ones have a greater impact through its prioritization
Listing and ranking of solutions and prioritizing	- List of solutions to environment and health issues affecting the lives of people in the community according to the perceptions of participants in focal groups - Allows identification of which ones have a greater impact through its prioritization

A note on terms used in the PAA

One of the fundamental concerns with AP methodology is to be able to take local people's voices and actions into account in a planning process. It was therefore imperative that we as researchers were sensitized to eliciting the idioms through which people expressed their concerns. It should be noted that all researchers involved in the focus groups of the PAA are native Tamil speakers and several of them are from the Puducherry region. Although our main concern in this research may be called environmental health,¹¹ or perhaps more appropriately 'health and the lived environment', we anticipated that the use of these terms as such in the PAA was not going to be appropriate. First, we had to be sensitive not to attempt to impose whatever views we hold of the body, health and illness on the communications of our interlocutors. We also had to consider how one would convey 'environment' in Tamil, since it is not a term in common use. Frequently conversation about the local conditions were disaggregated in conversation, along the lines of, for instance, garbage, sewage, toilets and their Tamil correlates (the fields of reference of these terms should not incidentally also be assumed to be straightforwardly consensual). For an

¹¹ The following definitions of environmental health are for general information. The WHO (1993) defined environmental health in the following terms: "comprises those aspects of human health, including quality of life, that are determined by physical, biological, social and psychosocial factors in the environment. It also, refers to the theory and practice of assessing, correcting, controlling, and preventing those factors in the environment that can potentially affect adversely the health of present and future generations". Noted public health researcher Larry Gordon is reported to have defined environmental health in the following terms in 1997: "Environmental health strives to link environmental quality of both the natural and built environments, with the level of public health and well being. Though lacking consensus in definition, environmental health addresses the interrelationship between human health and the environment. It has been described as the "the art and science of protecting against environmental factors that may adversely affect human health and environmental quality. Such factors include, but are not limited to air, food, and water contaminants; radiation; toxic chemicals; wastes; disease vectors; safety hazards; and habitat alterations". <http://www.geocities.ws/shalasya/enhdef.html#5> (Retrieved 4 April 2012).

encapsulating term correlated, at least in some measure, with environment, researchers used the Tamil term *ur*, meaning 'place' where one stays, or is settled, with both physical and social characteristics and associations.

V - Main results of the PAA

There were five main results of the PAA, each of which is discussed in turn.

- a. People have knowledge about the environmental hazards and diseases/ illnesses that affect them

We found that the communities in Avvai Nagar and Udayar Thoppu have a good knowledge about how the environment and different illnesses affect their health and well-being. This is an important finding, since it challenges the assumption that people living in squatter settlements are 'ignorant' of the causes of ill-health, or of the complex interrelationships between environmental conditions and health/well-being.

a.1. Consolidated tables of environmental hazards and health problems

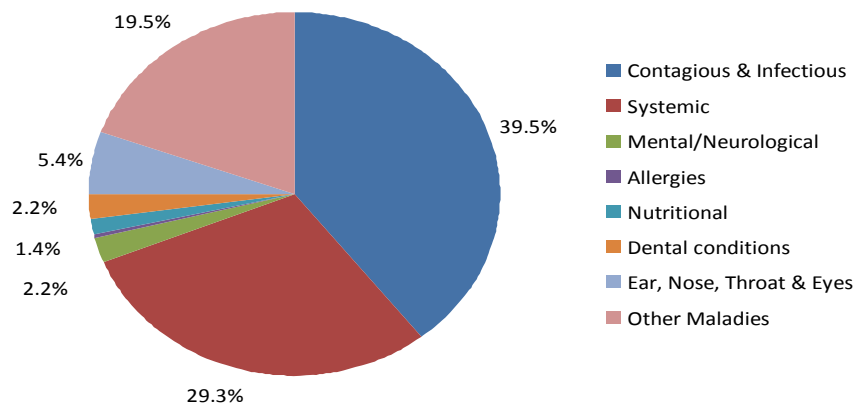
Table : Consolidated matrix of main Environmental Hazards in Udayar Thoppu (UT) and Avvai Nagar (AN)

Problems/hazards	UT	AN
Inadequate services & Infrastructure	48%	61%
- Lack of safe water/contaminated water	9%	27%
- Drainage system/gutters/canal/back water	26%	9%
- Lack of sanitation: toilet facilities/sewage	7%	0%
- Power cuts/electric cables too low	0%	6%
- Waste disposal/garbage throwing	7%	19%
Air Pollution	3%	4%
- Burning of garbage, plastics and tyres	3%	4%
Presence of Animals/Insects	46%	30%
- Mosquitoes, flies and other insects	39%	25%
- Goats, cows, hens, dogs and cats	0%	2%
- Snakes and rats	7%	3%
Depletion of Natural Resources	2%	5%
- Cutting trees	2%	5%
Total	100%	100%

In this table we can see the various kinds of burdens which people in UT and AN associated with their physical environment and related services. The presence of a sewage canal running through part of UT and the adjacency of UT to the backwater may explain the greater concern there with these features, compared to AN. In AN, it is significant, however, that concerns with the quality of water supply ranked high in a 'notified' slum with, supposedly, clear access to the Public Works Department for monitoring and rectification.

The lack of public toilets was evidently a particularly significant issue for UT alone, while both localities, again with greater weighting in UT, considered the presence of mosquitoes, insects and other animals as a major problem.

Fig. Consolidated health problems in Udayar Thoppu and Avvai Nagar



The chart above grouped health problems according to certain general characteristics – communicability, location in the body (either related to particular organs or system-wide) and other criteria. Although this grouping follows a broadly biomedical typology (which was necessary for communicating our findings at the workshop to a range of participants), it is very important to recognize that we stayed as close to the Tamil/English terms which the people in the communities used to talk about their health and illnesses and did not impose our definitions or terminologies upon what they communicated. It is worth noting that, since this was not an ethnographic study, which would have been able to go deeper into the ways that people ‘practise’ their conditions in every day life, there are limits to how far the conceptual and practical dimensions of illness can be investigated using this methodology.

A further significant element illustrated in this chart is the relatively large segment ‘Other maladies’, accounting for nearly a fifth of people’s health concerns. It is clear that for many complaints (anxieties, fatigue, pains, headaches, weakness, insect bites ...) people do not seek help from mainstream medical services, and such complaints can therefore never be accounted for in health statistics. The challenges to health and well-being for people in these settlements cannot be reduced to well-known disease categories. The data pushes us to be aware of specific kinds of vulnerability produced through an ongoing many-dimensional process shaped within the lived environment.

a.2. We used the “Listing and ranking” tool in order to understand how people graded the severity of health problems.

Table: Listing and ranking of health problems, group of women in Avvai Nagar, on 20.02.2012

Health Problems	Priority	Total	Rank				
Joint pain				III	III	6	I
Diabetes					III	3	
Problem with uterus and ovary							
Blood pressure							
Headache		III				3	
Cough	II	I	III			6	I
Chest congestion	III		II			5	II
Sneezing			I			1	
Body pain							
Dysentery							
Fever					III	3	
Vomiting				I	I	2	
Breast cancer							
White discharge/vaginal discharge		II		I	III	6	I
Vaginal blood discharge	I			II		3	
Thyroid				II	II	4	III
Tooth ache							

In this table, it is significant that this women's group identified respiratory conditions among the foremost problems. Respiratory conditions often disproportionately affect poorer populations, and especially women, whether on account of poor housing and ventilation, and exposure to indoor and outdoor air pollution. Also of note is the priority of 'white discharge', a complaint which is frequently met with in the literature on women's health in South Asia.

- b. There is a continuous erosion of people's health and well-being. This is a layering and compounding process shaped by location, seasonality, age and gender, access to services, conditions of the lived environment and social practices.

This is the main finding of our research and it is expanded below with illustrations. The tools used in AP methodology allowed us to generate a wealth of data from across the social spectrum of the settlements studied. A substantial amount of data was graphic, and in that respect it allowed for a greater range of expression than if we had simply documented speech and utterances. The data encouraged the insight that there is a low-level, continuous erosion of people's well-being, brought about through the compounding of several factors, some of which might, when considered alone be thought of as relatively minor or insignificant, and yet when they occur together, they can place major strain within the household and the locality. It was striking to find how people are affected in different intensities in the same settlement according to several dimensions. The evidence for this is highlighted below (b.1. – b.5.) where we indicate the importance of place, seasonality, age, gender, availability of access to basic services, social practices. The multiple interplay of

factors that challenge well-being are also brought out through the causal flow tools which map perceptions of cause and consequence in section (c) that follows on from (b) below.

b.1. The importance of place/location

“We are unable to eat because of the strong smell from the nearby drains” and “Post Thane cyclone, the drain has not yet be cleaned, if it is cleaned then the foul smell reduce and it will be ok for us to work” (Small business group, 20th February 2012 at Udayar Thoppu).



Neighbourhood maps:

Neighbourhood maps are an excellent tool to encourage participation and start working with different focus groups. They helped to visualise those areas especially vulnerable to environmental health problems within a locality at the general level, and more specific impacts by sector.



Map of the neighbourhood of Udayar Thoppu

Source: Women (married) group, Udayar Thoppu, Puducherry, 20th February 2012.

The map above was drawn in Udayar Thoppu, Puducherry, by a group of married women. It shows the different sectors that form the neighbourhood, some important places, such as streets, a community hall, public toilet, temple and grocery shop, as well as those areas that they identified as having the worst environmental conditions which would affect their health: the backwater swamp, the public toilets and pools of stagnant water in the gutters.

b.2) - The importance of seasonality

“Every full moon day and when there is no moon, sea water enters inside the living areas from the backwaters” (Participant in mixed focus group, Udayar Thoppu, 18th February 2012).

Timelines can provide considerable information not only of relevant events for the history of the neighbourhood, but also about the episodic character of environmental and health problems. In Udayar Thoppu, a group of 10 adult men drew a map of their neighbourhood and parallel to this, the main health issues which they identified with particular years in the past ten years.

1) Table : Timeline (10 years) for health problems

2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Malaria	Typhoid, Vomiting and Headache	Mosquitoes-fever		Filaria	Filaria and chikan - gunya	Fever		Hand pain, Fever and Headache	

Source: Elderly group, Udayar Thoppu, Puducherry, 18th February 2012.

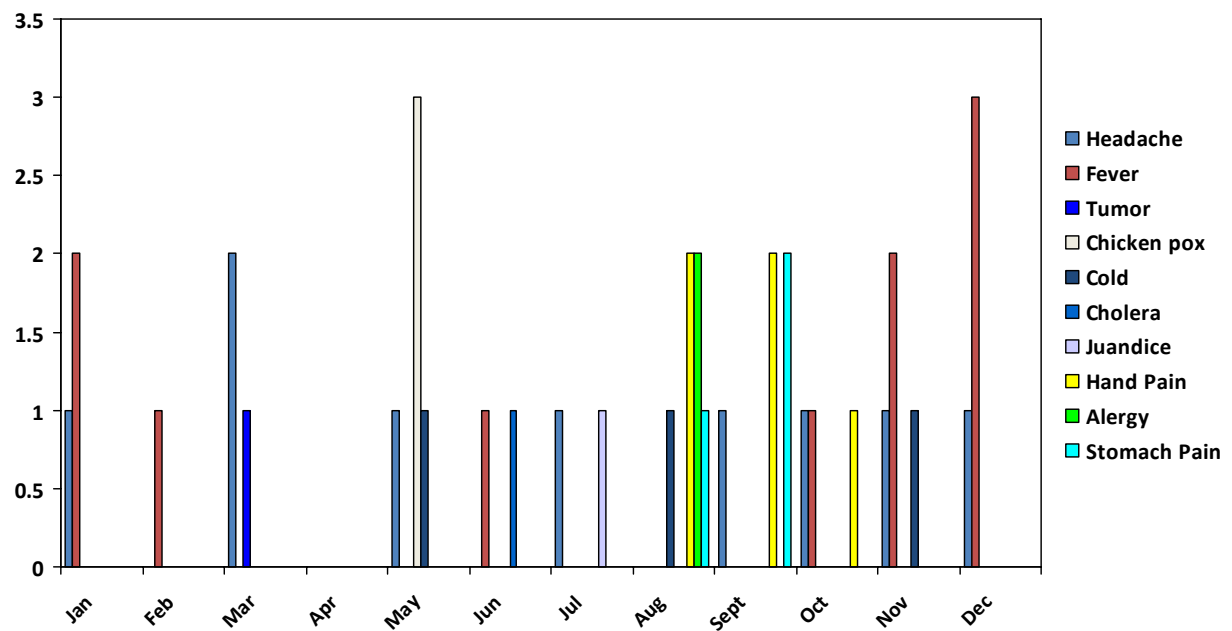
2) Table: Timelines (1 year) for health problems

Jan	February	March	April	May	June	July	August	Sept	Oct	Nov
Fever, Cold	Dysentery	Fever	Eye pain & Eye wounds	Chicken Pox	Cholera	Jaundice				Cold

Source: Children and adolescent girls group, Udayar Thoppu, 18th February 2012.

The graph below is consolidated from the timelines, like the one above, of four focus groups. It highlights the seasonal peaks that people associate with particular ailments. Some conditions are seen to be present throughout the year, such as headaches, while others have a very distinctive seasonal pattern, like tumors/swellings, fever and chickenpox. The problem

of hand pain is an instance of a seasonal occupational complaint; it was generated from the business group, who work with coir.



Source: Four focus groups in Udayar Thoppu (Married women; Small business; Adolescent women; Young men).

b.3) The importance of age and gender



Source: Drawing by children focus group in Udayar Thoppu

“We play in the backwater and get injuries and leg pain. So our parents take care of us. So they can’t go to work” (Children’s group, Udayar Thoppu, 18th February 2012).

The importance of looking specifically at age and gender is to attend to the differentiation of environmental and health impacts on daily life. It was evident in the focus group data that people encounter and use space differently with varied consequences. In the above quote the children in an Udayar Thoppu focus group spoke of the specific dangers that the backwater held for them, as a play area, and the ramifications of their suffering injury and pain for their family’s economic life.

In the following quote, the absence of toilet facilities has consequences specifically for women and girls: stress, and the health risks posed by open defecation.

One woman said “We don’t have a public toilet in our area though some people have [toilets] in their houses, others, poor people, find it very difficult, especially women and girls. If we want to go to the toilet we have to walk some distance for open defecation. It causes so many health problems”

(Women Self Help Group, Udayar Thoppu, 22th February 2012).

b.4) The importance of access and availability of basic services and infrastructure

The availability and access to infrastructure and basic services in terms of safe and regular water supply, the existence and maintenance of gutters, drainage and sewage networks, toilet facilities, garbage collection, electricity connectivity and supply, and health services, were raised as concerns for residents in UT and AN, albeit with quite significant variations in terms of priority problems (as noted regarding the consolidated table on environmental problems above).

We have already noted in examples above that the implications of the absence or poor maintenance of basic infrastructure and services (drains, sewage canals, toilets), can be different according to one’s age, gender and the precise locations where one lives and works, as well as the time of year.



Guttering in Avvai Nagar

The quality of household guttering was a major problem in both UT and AN, posing numerous health risks, as noted in the section III above. Open drains are liable to blockage due to many reasons, including inadequate waste management and heavy rains.

For residents in Avvai Nagar, the notified slum, the implications of the sewage canal, running through Udayar Thoppu, were less relevant than the quality of other, ‘fluid’: water and electricity.



Drinking water connection to a household, Avvai Nagar

Issues about quality of the water and the regularity of service were raised. A group of women in Avvai Nagar stated:

“The drinking water contains some rust particles, white particles and dirt while they fetch water from their pipes at their respective homes. The water is always yellow in colour” (Women’s group Avvai Nagar)

The PWD is responsible for maintaining a good quality water supply. The Electricity Board is charged with ensuring quality electrical connectivity installations, at a minimum height. In

Udayar Thoppu, where electrical connections were acquired through the mediation of the MLA, people spoke of the dangers of the wiring.

“Low electric cables lead to the risk of death, and many of the people who constructed the houses and also electricity workers suffered electric shocks”, (Mixed Group, Udayar Thoppu, 19th February 2012).



The quality and regularity of electrical connections were issues in UT (left) and AN (right)

The absence, or inadequacy, of municipal garbage collection was a major issue for people in both localities. What people did with their waste was the subject of criticism, as shown in the following statements from community leaders and a group of adolescents, where the interplay of factors that create problematic situations for health and well-being are again in evidence:

“The waste from vegetables shops and chicken shops are openly dumped near the community so it produces more mosquitoes” (Community leaders, Avvai Nagar, 21th February 2012).

“In my street the people throw garbage in the drainage path. So the drainage water stagnates on the street which produces more mosquitoes”. “Some people burn garbage especially plastics on the street, so the smoke comes inside the house” (Adolescent Group, Avvai Nagar, 20th February 2012).

b.5) The importance of social practices

We have been making the case in the foregoing discussion that there is an everyday erosion of people's well-being, and numerous factors contribute to this process. These factors are shaped in the lived environment and encompass the physical, social, economic and political.

Regular and excessive alcohol consumption was one of the dimensions of daily life that appeared prominently as both consequence and cause of tension and vulnerability, depending on whom we spoke with. The benefits of doing focus groups among a wide range of participants were that numerous positions on alcohol consumption could be taken into account.

In a focus group with children and adolescents, one adolescent said: "Due to alcoholism there was a conflict with my father and mother and I am not able to concentrate on education" (Children and Adolescents Group, Udayar Thoppu, 18th February 2012). Other consequences of alcohol consumption were raised by a group of men in Udayar Thoppu. These men said that getting into the habit of drinking alcohol led to financial crisis and family conflict (Men's Group, Udayar Thoppu, 19th February 2012). Within the same group it was also possible to recognize that the consumption of alcohol manifested as a way of dealing with illness. "We prefer going to the wine shop to take alcohol for cold and fever rather than going to the physician". Participants in the same group complained about not being treated with respect at the Government Hospital and complained that medicines given them often "lead to ulcer and pain". Although the consumption of alcohol appeared inevitable, "taking alcohol is the thing which [we] could not avoid.", others voiced their desire to see alcohol outlets shut down: "Can somebody stop selling alcohol?". The issue of the easy availability of alcohol in the vicinity was raised often in many groups. It was one of the 'health' problems that participants from AN and UT wanted to be addressed in the workshop as a priority. The solution which these participants highlighted was social and individualistic: to mobilize community support and the role of community leaders in pressuring drinkers to modify their behaviour, for 'cultivating good habits'. This kind of solution, however well-intentioned, does not take into account the ways that alcohol consumption is embedded on several levels in the fabric of life in these settlements. One also has to consider the role of alcohol in the making of Udayar Thoppu: the MLA for Uppalam constituency (for Udayar Thoppu and Avvai Nagar), Mr. Anbalaghan, made significant wealth and gained prominence from being involved in the alcohol market.

c) People are able to make the linkages between these elements especially to identify the causes and consequences

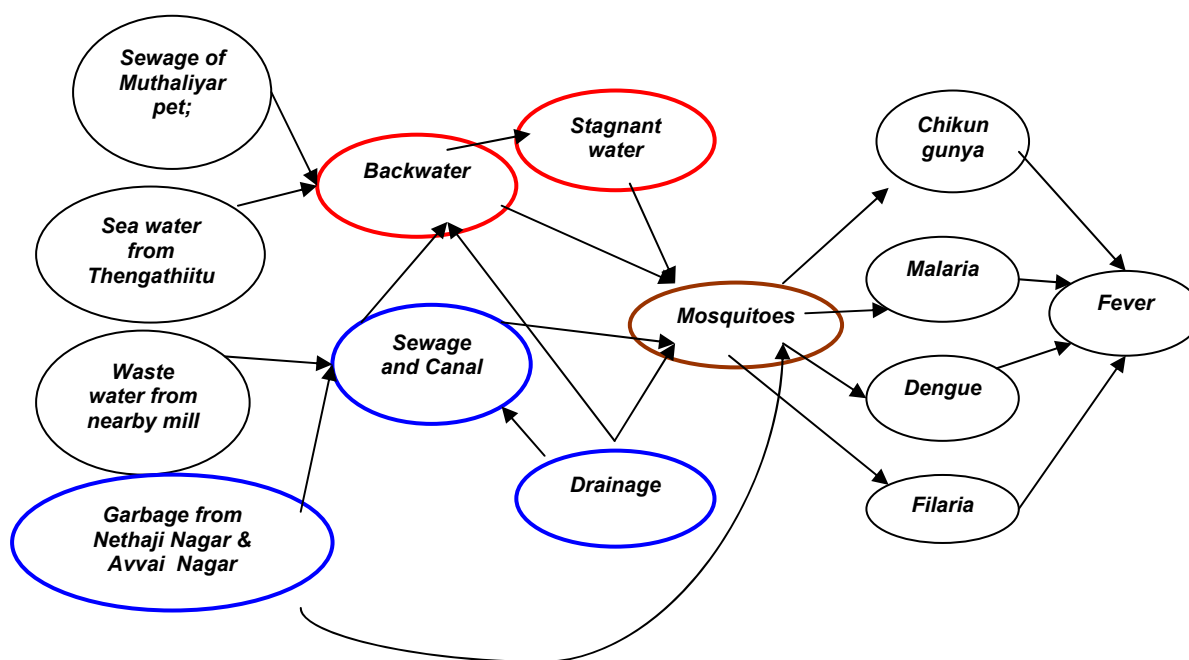
Causal flow diagrams of linking the lived environment / health

Causal flows proved to be an immensely useful tool for allowing people to represent the complex interactions between many factors in their lived environment and their assets. Three examples are given below.

Example 1.

Figure 1 is a consolidated causal flow diagram generated from three focus groups in Udayar Thoppu. The participants identified the inadequacy of infrastructure and services relating to the management of water and waste as major factors implicated in fever. This diagram allowed participants to represent connections between several different dimensions of their lived environment and fever.

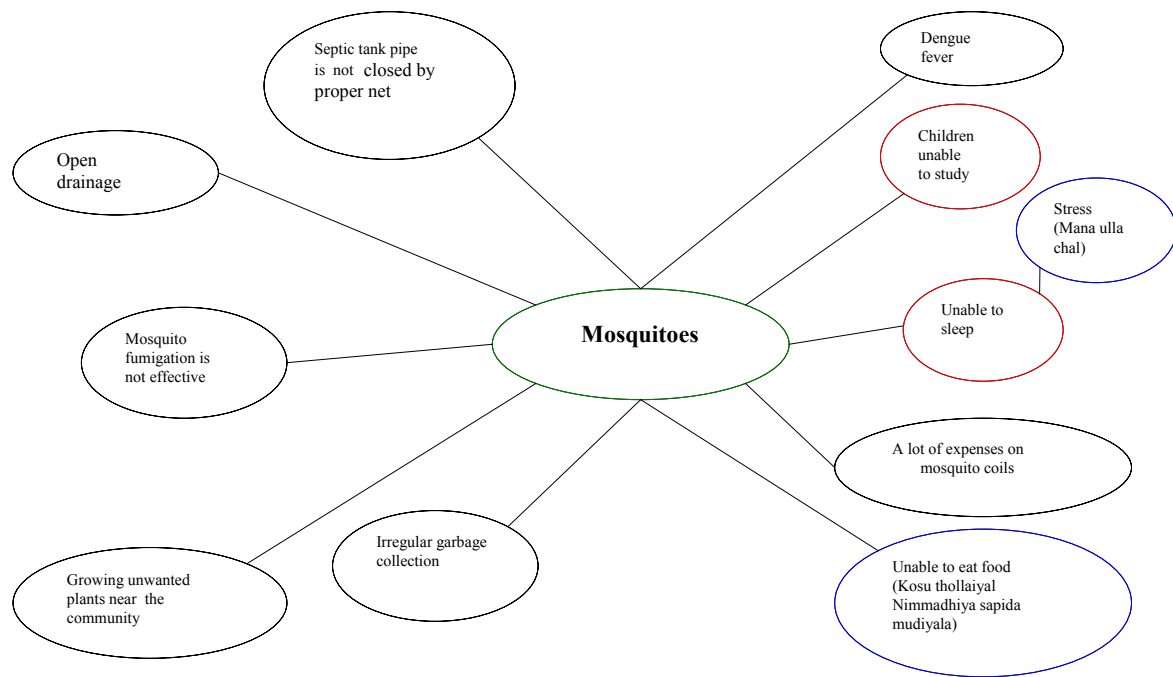
Figure 1. Consolidated causal flow diagram from three groups in Udayar Thoppu 18-20th February 2012



Example 2.

This causal flow diagram was produced by local leaders in Avvai Nagar, focusing on the problem of mosquitoes in their locality, what conditions allow them to proliferate, and what kinds of impacts they have on people's assets.

Figure 2. Causal flow diagram of the causes and consequences of the mosquito problem according to local leaders in Avvai Nagar, 22nd February 2012



This causal flow clearly shows how a different range of infrastructure and service elements and practices are of concern for mosquito proliferation in Avvai Nagar, vis-à-vis Udayar Thoppu. Unlike UT, AN is not adjacent to the backwater and sewage canal; waste from Nethaji Nagar is not dumped there; it has drains; it has municipal services, however limited; there are septic tanks for sewage disposal. The drains are, however, open and liable to blockage. The septic tanks are not adequately maintained. The municipality is fulfilling its obligations, but only in part - garbage collection (in this time by PMSPL) is not regular, allowing for accumulations. Mosquito fumigation is done, but everyone, including officials, recognized that its value is very limited in controlling mosquito populations.

d)- People are already carrying asset adaptation strategies to face environmental hazards and health problems. What strategies and solutions they have to adapt their assets at the individual and household level (children, youth, grown ups and elderly) at neighborhood/community level.

One of the most critical components of PAA relates to the identification of asset adaptation strategies at household, community level, and their associated sources of resilience. This was undertaken in two stages; first, listings and rankings identified the assets considered most important by different groups; and second, matrices assisted in elaborating strategies and potential and actual solutions to adapt assets to particular environmental and health issues. In this part of the PAA, the following questions were addressed, taking into account the language used by the community:

- In relation to environment and health, what do people do?
- What do they do in their houses, in the community?
- What proposals do they come up with solutions to protect themselves?

It is important to recognize that responses or interventions cannot be ‘large scale’ or ‘highly visible’, but rather a range of small and modest activities designed to build resilience against, or respond to, the onset of an existing problem or process.

Tool : Identifying assets and asset adaptation

Tool	Function
Asset adaptation matrices	• Identify strategies put in place by communities to adapt to environment and health issues • Identify some proposed solutions
Listing and prioritization of solutions	• Identifies proposals of solutions against effects on health caused by environment • Allows people to identify those proposals that they consider a priority

Several tools can be useful in this stage, including listings and rankings and matrices. The examples below provide illustrations of those considered most useful to identify issues relating to sources of asset adaptation.

Asset adaptation matrices:

This tool helped to identify the different adaptation strategies put in place by the community to address issues related to environment and health hazards at household, neighbourhood/ community levels. The table identifies the consolidated main strategies undertaken by the members from Udayar Thoppu at the household level and neighbourhood level as neighbours in relation to environmental hazards. Among them, anti-mosquito fumigation, repellents, cleaning the sewage canal and cleaning the water, especially against the drainage canal, stand out.

Table : Adaptation strategies to face environmental hazards

Environmental problem	Strategies at individual/household level	Strategies at street/ neighbourhood level
Mosquitoes	• Mosquito coils/repellents • Anti –mosquitoes fumigation • Repel mosquitoes with smoke • Mosquito net • Storing vessels properly • Closed drainage system • Disposal of garbage • Using Neem leaves	• Mosquito coils/repellents • Anti –mosquito fumigation
Drainage/Canal/Gutters	• Spraying phenyl • Cleaning the sewage canal • Cleaning the water with	☐ Cleaning the sewage canal ☐ Cleaning the water

	bleaching powder	
	• Spraying of insecticides	
Water contamination	• Boiling the water • Buying mineral water	
Toilet facilities	• Open defecation and pay and use public toilet	

Source: Focus groups in Udayar Thoppu

Both listing and matrices allow us to identify relevant information about asset adaptation. These are used to identify actual strategies to address the environment and health issues.

Listings and prioritizations of proposed solutions:

Another way to identify solutions was through listings and prioritizations of proposed solutions by the community. During the use of this tool, it was important to facilitate the proposal of specific solutions that went beyond the most general ones mentioned at the beginning. An example of a listing and prioritization of solutions was given by the women (Christian community) group in relation to protecting their health through adapting some solutions at the household level in the neighbourhood.

Table: Listing and ranking of solutions to environmental problems in Udayar Thoppu

Environmental Problems	Solutions	Ranking of solutions	Outcome
Mosquito	Fumigate with neem leaves	II I I I III I I = 10	3
	Mosquito coil	III III III III I III = 16	2
	Mosquito net	I II I I I = 6	4
	Protect from garbage entering the house	III III III III III III = 18	1
Water Contamination	Drink boiled water	I III III I III I = 12	1
	Drink mineral water	III I I III I I = 10	2
Gutter	Clean with bleach powder (in front of the house)	II III II III III II = 15	2
	Sweep away stagnant water	III III III III III III = 18	1

Source: Women (Christian community) group in Udayar Thoppu, Puducherry, 20th February, 2012

Another example of solutions was provided by a women focus group in Udayar Thoppu addressing health problems caused by environmental conditions. They identified as a solution to visit the Primary Health Centre, Government Hospital and private medical practitioners to get treatment for all health-related problems. In this case, based on a priority solution, the group came up with a general plan to carry out this solution.

Table: Listing and ranking of solutions to health problems in Udayar Thoppu

Health	Solutions	Ranking of solutions	Outcome
TB	Go to Hospital, (GH, PHC)	8	2
	Regularly take Medicine prescribed by the doctor	12	1
	Should not spit in public places	12	1
	We should cover our mouth when we cough	8	2
Fever	Go to Hospital	10	2
	Private Doctor	3	4
	Boil the water	12	1
	Steaming	5	3
Menstrual Problem	Consult the Doctor	12	1
	Treatment	12	1

Source: Women group in Udayar Thoppu, Puducherry, 18th February 2012

e) - People identify a range of institutions working with the community and helping them to build resilience to environmental / health issues

Tool 3: Matrix of solutions and helping institutions

Problems in the lived environment	What households are doing to address the problem?	What the community is doing to address the problem	Supporting Institutions	How they are helping
No Public Toilet	Some of them use their own toilet	-	-	-
	Going in open place (Udayar Thoppu)			
	Using public toilet in near by area (Udayar Thoppu)			
Mosquitoes	Generating smoke to kill mosquitoes	Burning garbage	PWD	Mosquito repellents
	Mosquito coils, "Allout" mosquito repellent			
	Using mosquito killer electric bat.			
Street dogs problem	Keep the doors locked	-	-	-
	Beat them			

Diabetics	Food / diet	-	General Hospital	Tablets
Contaminated Water	Drink boiled water	Using bleach Powder	-	-
Drainage Smell	Phenyl	-	Municipality	Mosquito fumigation

An observation about people's channels of access to institutions

The local leaders said “we usually complain to MLA and he contacts the municipality or PMSS and if the problem is not solved we complain to the [Municipal] Commissioner and the Health Department. Sometimes the officials solve our problems. If they don't solve the problems we will find our own individual solution and not collective solution. Because some people may cooperate with us and some not”.

Some of the participants were reluctant to share their concerns and problems with the researchers about the channels of access to institutions, as this would implicate their MLA. Their concern not to hurt his 'feelings' reveals something about the political vulnerability which people in informal or semi-formal settlements face where regular access to government departments is not possible without mediation. The failure of urban local bodies on many levels to provide services in the particular political-economy of Puducherry exacerbates this dependence.

f) - Listing of all institutions mentioned during PAA (inside, outside and boundary)

i. Examples of institutional mapping

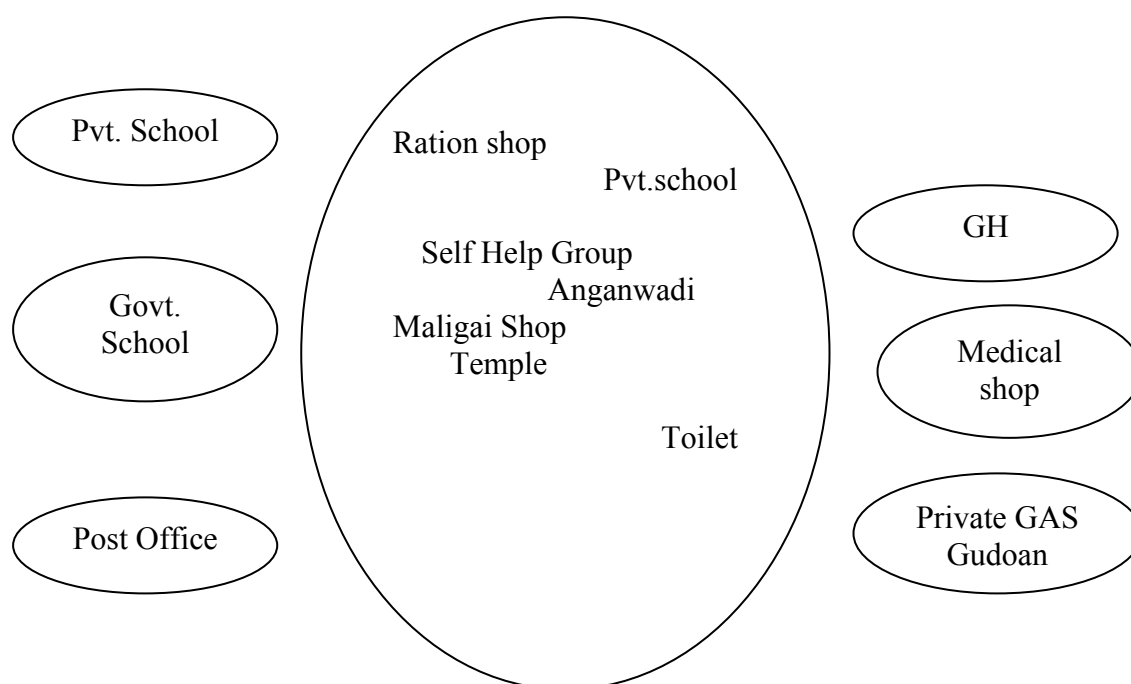
Tool 7 used: Institutional mapping

Institutions within the area	Institutions outside the area
Milk booth	Medical
Photo studio	Hospital
Temple	Government School
Community Hall	Voluntariat NGO
Toilet	Primary Health Centre
Anganwadi	Ration Shop
Shop	G.H.
	Post Office
	Market
	Bus stand
	Auto stand
	Playground

Source : Mixed Group on 19th February 2012 at Udayar Thoppu

g) The most important institutions (formal and informal, outside and inside) working for health and the environment (consolidated and by community)

ii. Matrices



Source : women Christian group on 20th February 2012, Udayar Thoppu

VI - Asset Planning Workshop – process and results

The process of carrying out the CP, RIA and the PAA was critical, as indicated in the introduction to this paper, for the effective organization of the Asset Planning Workshop (APW) and the prospect of producing a workable AAP as an outcome. During the CP and RIA exercises, IFP researchers contacted and interacted with governmental and non-governmental agencies whose operations address basic infrastructure and health services in the Union Territory of Puducherry. Understanding the structures of governance and the various roles and responsibilities of the agencies in the UTP was essential in this regard. The following findings from the CP and the RIA stand out for their implications for the APW process:

I. Urban governance and capabilities of local bodies – the extensive role of the MLA in addressing local concerns. It was important to understand that the channels of access connecting people in the UT settlement to infrastructure services are mediated through *thalaivar* ('local leaders') and the MLA; no direct access for non-notified slums to government agencies (PWD, Municipality, Electricity Board and so on).

- necessary to obtain support from *thalaivar* and MLA for the workshop and to involve them in the proceedings;
- necessary to select a venue for APW in the MLA's constituency.

II. Urban governance and capabilities of urban local bodies – the limited role of the Municipality. In spite of the 74th Constitutional Amendment, which was supposed to grant greater budgetary and executive control to Municipalities and Urban Local Bodies, the Municipality in UTP has limited capabilities. It oversees mosquito fumigation and waste disposal. The latter is an area that successive Puducherry administrations have struggled to manage adequately. Current practices are in contravention to the Municipal Solid Waste (Management & Handling Rules, 2000).

- heightened political importance of waste disposal and potential significance of the problem of waste in daily life as well as the strategies that people in the UTP have developed to deal with waste.

III. Knowledge of urban governance, financing and service delivery

- important to recognize the role of nodal agencies and their partners for managing and delivering Central Government schemes and policies and to ensure their participation in the APW (notably TCPD, PWD, Slum Clearance Board, National Rural Health Mission).

IV. Hierarchies of government administration and protocols

- recognition of the need to invite higher level officials (to Ministerial level), even if they would not turn up in person and would delegate a representative to attend, as well as lower level officials with daily experience of ground-level conditions.

V. Knowledge of how disease outbreaks are reported for timely and appropriate interventions from the authorities

- recognition of the importance of effective anganwadi services for the early reporting of disease outbreaks in the locality to government health agencies: Primary Health Centres and staff at the Central Government funded National Vector-Borne Disease Control Programme.

a) Program of the workshop

The one day workshop was organised according to the following stages:

- i. Identification of the research themes, methodology and associated tools to facilitate the APW:
- ii. Preparation of logistics (including selection of community and institutional representatives to participate in APW, as well as the venue of the workshop itself).
- iii. Formal inauguration of APW
- iv. Guidelines about the procedures to follow during the APW
- v. Presentation of PAA and RIA results
 - a. Ranking of major phenomena related to environmental health and its impact on the assets of the poor according to the results of the PAA
 - b. Identification of the main strategies and solutions for asset adaptation against environmental health phenomena PAA
 - c. Institutional information of the RIA and PAA
- vi. Elaboration of the AAP in (Avvai Nagar and Udayar Thoppu) Puducherry in each of the assigned groups

a.1. Research themes, methodology and associated tools to facilitate the APW

The identification of the themes and methodology with their associated tools is a process that must be agreed by the coordinating team with sufficient time before the APW, to be able to prepare local researchers to become facilitators during this event, and also to make the necessary adjustments to guarantee its proper development and the fulfilment of its objective: the production of the AAP.

Priority themes for the APW. (Avvai Nagar & Udayar Thoppu, Puducherry)

Themes	Sub-themes
1. Environmental issues	• Garbage • Backwater and Drainage
2. Infrastructure/Facilities	• Sewage canal • Public toilets
3. Health problems	• Diabetes • Alcoholism
4. Services	• Water (quality and contamination of water) • Electricity (Periodicity of service and low cables)

Based on these main themes, local facilitators were distributed in 4 groups and the coordinating team from the IFP/University of Manchester designed the facilitation tools for each one of them, keeping in mind the particularities of their themes and sub-themes, but also maintaining a common structure for all groups. Each group used as working input and for discussion the main vulnerabilities identified during the analysis stage of the PAA

information, in relation to each research theme of the APW. This helped the workshop to become more focused on the building of solutions as response to such vulnerabilities than on examining in greater detail environmental health problems affecting people in (Avvai Nagar and Udayar Thoppu) Puducherry.

Tools for the different stages of the APW in Puducherry

Tool	Function
Strategies/Solutions matrix	• Identify proposals for solutions against main asset vulnerabilities in each of the 4 research themes • Prioritize those proposals • Select the 3 proposals prioritized
Weighting and viability matrix	• Mark each of the three prioritized proposals according to the following criteria: - Urgency - Cost - Technical feasibility - Institutional practices - Social impact - other legal issues • Prioritize the proposals with the highest marks in relation to such criteria
Matrix on Asset Action Plan	• With the two proposals prioritized according to their marks based on the criteria, an Asset Action Plan is elaborated based on answers to the following questions: - What must be done? - When? - Who? community, district and others

b) Preparation of the workshop and participant selection

b.1. The process of identifying the representatives:

During the PAA, we started asking the people that came to the focus groups to identify some of the existing leaders, and also other persons that might represent them at the APW. We also identified leaders of Self-Help groups in both UT and AN, especially women, and also, in Avvai Nagar, temple committee members (leaders). The facilitators from the settlements that had helped us to arrange the focus groups also identified key persons and finally, the MLA Anbalaghan (representing both settlements) also identified and suggested around five leaders. In total around 50 participants were identified from the community level. In addition to this institutions working on health and environmental issues were contacted during the RIA and were identified as potential participants for the workshop. Around 20 institution representatives were identified for participation in the Asset Planning Workshop

(APW). Formal invitations were placed personally to each of the people identified including the MLA for their participation in the APW.

b.2. Formal inauguration of the APW

Since the APW involved representatives of public and private institutions, it was important for the participants as well as people from UT and AN to know about their presence in the workshop and their joint work in the thematic groups through an inauguration act in the presence of the Chief Secretary, Tmt. M. Sathiyavathy. There were however no formal introductions of people from the communities or of institutional representatives. But an introduction about the project and the institutions undertaking this project was given by the Director, IFP. In addition each participant was requested to register their name, their position, and organisation or sector in the register placed next to the entrance of the workshop plenary room during the duration of the event.

b.3. Presentation of PAA and RIA results

The PAA and RIA provided workshop participants with an overview of existing vulnerabilities, adaptation strategies and institutional responses to environmental health issues. Hence, potential household and community assets, as well as institutional solutions, were identified and could be used for the preparation of solutions which will be created and prioritised by the different stakeholders during the APW. The PAA and RIA results were presented by the supervisor of the project from the IFP with the help of a research assistant from the IFP who paraphrased the presentation in Tamil.

b.4. Guidelines for the functioning of the APW

Once the official inauguration act had finalised, a member of the coordinating team from the IFP proceeded to explain the methodological aspects of the workshop, some rules regarding participation and respect for different opinions, as well as the importance of achieving consensus. After the presentation of the results is completed, participants are invited to go to their groups with their respective facilitators to the place/table assigned to them.

b.5. Composition of the people who participated in the workshop

The representatives should reflect diverse characteristics using the same criteria followed by the PAA (age, gender, territory, economic activity, interest, etc.). A maximum of 4 of these representatives should be from the community, and the rest people from the different institutions as well as other agencies/sectors making up the composition of the group in Puducherry (see table below). Given the importance of carrying out the APW exercise, researchers organised the use of the workshop hall as a space for a plenary and different place for the 4 groups to work.

Although exercise participants from public and private institutions ideally should not exceed a third of all participants, to guarantee that a majority are community inhabitants, this percentage was altered during the APW in Puducherry. People from the institutions attended, including representatives from the municipality, different departments, NGOs, from regional representatives, and from local private enterprises. All of these institutions were convened according to the requirement criteria of the APW in relation to technical knowledge, management of specific data about the projects, and support provided, as well as their power to take decisions during the APW. Thus, 22 representatives from the communities and 24 representatives from different institutions participated in the Asset Planning Workshop.

Composition of participants in the Asset Planning Workshop (APW) in Puducherry

APW participants	Number and gender	Department/Sectors	# Numbers
From the communities UT and AN	22 (13 women and 9 men)	Avvai Nagar	13
		Udayar Thoppu	9
From public institutions	16 (11 men and 5 women)	Welfare	3
		Health	3
		Education	3
		Municipality	3
		Public Works	2
		Town & Country Planning	1
		Police	1
From private enterprises	8 (3 men and 5 women)	NGOs	7
		Business	1
Total	46		46

c) Main results by work group

The facilitators of each thematic group, together with the participants selected for each group, sat around their respective tables. The session started with a quick introduction of the people who are participating in the group and the PAA results on environmental health issues, as collected and analysed in relation to each of the 4 themes: environmental issues - garbage and drainage; facilities/infrastructure – sewage canal and public toilet; health problems – diabetes and alcoholism; and services – water and electricity.

With this input, each group started a process of discussion and reflection to be able to formulate proposals for solutions. To achieve this, a solutions matrix was used, and the participants in each group began to prioritize solutions.

Solutions matrix

This matrix provided a framework for the discussion of proposed solutions for the vulnerabilities found in each of the working themes. First participants were asked to identify a range of possible solutions for the issue at hand. Some solutions were already provided in the results of the PAA. An example of the ranking of solutions is given below for the thematic group working on garbage.

Strategies/solutions matrix on vulnerability to garbage, Puducherry, India, 27th February 2012

Garbage	Ranking		Prioritizing
Create awareness	III III III III III III III	21	I
Put the garbage in the dust bin at household level	I I II I II I II	10	II
Convert and use the garbage as manure	III II I II	8	III
Dust bin in the street	III I	4	
Save the plastic garbage and sell it	II I I	4	
Collecting plastic garbage with the assistance of SHG	III I	4	
Segregate the garbage	II	2	
Handover the garbage to the PMSPL ¹²	II	2	
Put the plastic covers in a separate bag at every home	II	2	
Collect the garbage and handover it to the farmer	II	2	
Planting saplings (plants)	I	1	

Source: Environmental group, representatives from the communities, and from public and private institutions

Matrix on weighting and viability of proposals

This matrix served to analyse those proposals that were prioritized on the basis of their viability, regarding criteria such as their urgency, cost, technical feasibility, institutional practices, social impact and any other legal issues. For example, the environmental group prioritized as first proposal “Create awareness” that had received the most votes as in the previous exercise, based mainly on cost, and also because it was a requisite for other interventions.

Matrix on weighing and viability of proposals, based on vulnerability to garbage, Puducherry, India, 27th February 2012

¹² Pondicherry Municipal Services Private Limited is a joint venture between Puducherry Urban Development Agency (PUDA) and private company Kivar Environ. It is implicated with widespread violations of Municipal Solid Waste (Management & Handling) Rules, 2000.

Criteria	Creating Awareness	Put the garbage in the dust bin at household level	Convert and use the garbage as manure
Urgency	3	1	2
Cost	3	2	1
Technical Feasibility	3	1	2
Institutional Feasibility	3	2	1
Social Impact	3	2	1
Others (Legal)	3	2	1
Total	18	10	8
Prioritization	I	II	III

Source: Environmental group, representatives from the community, and from public and private institutions

Once each group has identified proposals, prioritized them according to their viability, participants together with the facilitator, start to build an Action Plan to carry out these proposals.

Action Plan matrix

This matrix serves to identify the main actions of this proposal, the times and people responsible. As illustrated by the work done by the environmental group - garbage, all groups generated an initial compromise with this AAP, including all actors from different sectors who had any responsibility in the community/neighbourhood, such as public institutions, NGOs present in the area, leaders and other inhabitants of Avvai Nagar and Udayar Thoppu, Puducherry.

Once each one of the 4 thematic groups completed these matrices, each one of them chose one or two representatives to present the results of their group in a plenary. The plenary session generated suggestions and comments, which were fed into the results for the elaboration of the AAP.

Action Plan matrix on vulnerability to garbage, Puducherry, India, 27th February 2012

Priority: Strategies/Solutions	What must be done? Activities	By Whom? Responsibility				When? Time line, from ...
		Community	MLA / Councilor	Municipality/ govt. dept.	other institutions	
Garbage						
Creating awareness	Mobilization of people	Community leaders			SHG, NGOs	March, 2012
	Cooperation from the community and officials		MLA	Municipality		
	Organizing and conducting awareness programs (short films, street play, seminar, rally, mock parliament etc.)	Community leaders & community people			SHG, Ecoventure (NGO),	March, 2012
Put the garbage in the dustbin at household level	Purchasing dustbin	Community people	MLA and MP fund	Municipality	CSR activities by industry & company	March, 2012
	Creating awareness	Community people	MLA		NGOs	March, 2012
	Exposure visit to understand about garbage collection	Community leaders & community people	Request MLA for financial assistance		SHG, NGOs	April, 2012
	Collection of garbage and handing over to the concerned authorities	Community leaders & community people		Municipality	SHG, NGOs	From March 2012
Convert and use garbage as manure	Segregation of garbage into bio-degradable and non-degradable elements	Community people		Municipality		From March 2012
	Seek technical assistance for understanding the process			Agricultural Dept and Municipality	NGOs	April 2012
	Identification of place	Community leaders	Councillor & MLA	Municipality		April 2012
	Exposure visit to understand the process	Community leaders	Request MLA for financial assistance		NGOs	April 2012
	Use segregated garbage as manure for self use or for commercial purposes	Community people			NGOs	After 6 months

VII - Recommendations on mainstreaming asset planning

The mainstreaming and dissemination of the research can assume many forms. A priority is the return of information and results of the study to the communities where the research was conducted, as well as to the relevant government and other bodies. Researchers from the IFP are continuing to follow up results of the research with the parties involved. The capabilities to mainstream the research in a variety of ways are aligned with the many gains that have accrued through conducting this research. The gains are not only apparent for the IFP, although this was the first time that the IFP has conducted applied research in Puducherry, through which it has forged new and beneficial relationships. The gains are apparent on many levels, in terms of the generation of new knowledge, capacity building with new research skills, the extension and deepening of relations between academic, governmental, community and non-governmental sectors, and, additionally, the prospect of conducting further research of this kind.

New relationships have been created with various government departments in the Territory and existing relationships have been expanded in new directions. It should be noted that the workshop was a unique event at which residents of informal settlements were engaged with discussions on issues in their localities with government personnel. Furthermore, it also represented a singular occasion at which people across caste lines were in discussion together about issues of common concern, and the good feeling that this generated was relayed back to researchers at the workshop. Regarding responses from high level officials who took part in the workshop, we have been told that they would like to see work of this kind to continue and extended to other policy domains. The subject of waste tackled in our study through a participatory methodology has also attracted much attention at the highest level.

In addition, this is also the first time that the IFP has established working relations with the Department of Social Work at the University of Pondicherry. Students from the Department of Social Work were trained in new skills in participatory research and they benefited greatly from working within a structured programme, meaningfully engaged with local peoples and institutions and with clear objectives. The head of the Department took part in the training and expressed sincere interest in incorporating AP research training and experience in future programmes at the University, especially developing programmes engaged with urban contexts. As such the study represents a significant development in local capacity building in different elements of research, from urban participatory focus group research to orchestrating a productive workshop.

Furthermore, as a consequence of carrying out the RIA, PAA and workshop, new knowledge about the policy domains and institutional frameworks in Puducherry concerning the urban environment and health have been created, and this can serve as the basis for subsequent research and engagement.

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