1. Introduction to the demonstration project

In the UN-HABITAT Sustainable Cities Programme’s City Consultation of 2000, the identified priority urban environmental issues of Colombo Core Area\(^1\) were solid waste management, water and sanitation. These issues have been recognized in the corporate plan: Colombo Metropolitan Regional Structure Plan (CMRSP, 1998-2000) and within the four key areas of the City Development Strategy (CDS, 2000). These key areas are social sector needs, enhancement of city economy, improving environmental infrastructure and amenities, and poverty reduction. Green Star Home’s objective to ‘improve health by reducing mosquito borne diseases’ has an integrated approach addressing the three issues mentioned above and using the SCP/EPM process as an implementation tool in achieving its objective.

Even though the fundamental services such as water supply, sewerage, drainage and solid waste disposal are provided to all citizen of Colombo it has its’ own shortcomings especially in limited services to the urban poor. Recent studies indicated that pipe-borne water connection is available only for about 51.5% of the houses in Colombo while the balance houses depend on stand posts, shallow wells, tube and river water for their water needs. In the case of low-income settlements a large majority with nearly 80% of population have to depend on communal water supply.\(^2\)

The sewerage network available in the city is severely inadequate to meet the current demand of the city population and covers only 80% of the city. In the balance areas people use septic tanks and pit latrines and directly discharge affluent into nearby canals and swampy lands. The city’s drainage system is not functioning satisfactorily. Poor maintenance, inadequacy and obstructions to the drainage system by encroachment etc. have contributed to inefficient functioning of the city’s drainage system. In addition the drainage system was built for only 200,000 population, while Colombo currently has a population of 800,000, which adds to the above problems.

The lands in low-income settlements were usually reservation lands owned by the service providers in the city. This made it impossible for the central and local government to improve the livelihood of urban poor. People managed their basic needs by themselves and in addition, there were no partnership approaches to address their health and other problems.

**Selected geographic area:** all municipal districts with greater attention placed in areas where a high incidence of Dengue has been reported in current and previous years.

The MC SCP core group decided to implement the project in 3 phases, each addressing a new area.

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\(^1\) Colombo Core Area includes Colombo Municipal Council (CMC), Dehiwala Mt. Lavinia (DMMC) and Sri Jayawardenapura Kotte Municipal Council (Kotte), the three demonstration cities.

\(^2\) Proposition paper on Water and Sanitation CMC, City Consultation 2000.
Phase 1 (start July 2001)
Concentrate on reducing Dengue mosquitoes breeding in fresh water collected adjacent to large green spaces in the city and mostly in the affluent areas: permanent residences and work places with garden space. Houses in each of the 6 districts (47 wards) were demarcated.

Phase 2 (start December 2001)
Moving on to 14 under-served areas. Under-served areas are mainly the marginalized land areas along the canal bank, railways or port reservation areas.

Phase 3 (start May 2002 – December 2004)
Continuation of phase 1 and 2 and replication to Colombo Core-area

Description of the issue

The issue of Dengue and other mosquito-borne diseases has become a major urban health problem in the city, mainly due to lack of appropriate collection and disposal of waste. This was the result of a study which was conducted by the Epidemiological Unit of the Public Health Department on the reported and suspected cases mosquito-borne diseases, and which found that a majority of these areas had uncollected garbage where rain water gets collected and mosquitoes bred. Furthermore, they were able to note that most of mosquitoes breeding places in and around the houses were due to lack of awareness among city dwellers about the mosquitoes and breeding habits. Also, the high-income owners owned a large proportion of lands in the city, which are virtual breeding grounds for Dengue mosquitoes. However it is the poor living along the canal banks, railways and port reservation land in small settlements that suffer most, as they are concentrated in small dwellings.

The bi-annual monsoon periods in April-June and September-November when heavy rains and the resultant floods can spread diseases, causes the municipality to spend a large amount of resources on medication and corrective actions.

In addition, it causes loss of productivity among city dwellers particularly among the urban poor, majority of whom are daily-wage earners, forcing them got in to the vicious cycle of poverty, which eventually destroys the poor environment causing more problems.

Each year mosquito-borne diseases (filariasis, Dengue and other virus diseases) in the city infect nearly five thousand to six thousand persons according to rough estimates. Hardly, 10% of these cases are reported to the health authorities.

Even though Dengue fever has existed in the city for over 35 years with major out breaks occurring periodically every 5 to 10 years, there have been no detailed records available to analyze the trends and other associated factors until the Epidemiological Unit of Public Health Department CMC was equipped with information sharing facilities through SCP which led better knowledge about the "Dengue" epidemics. In 1999, Colombo City experienced its recent reported epidemic of Dengue Fever and Dengue Hemorrhagic Fever with 105 numbers of cases and 10 deaths. Since then the number of suspected Dengue fever cases has continued to increase despite normal routine control measures. Diagram below depicts major “spikes” of cases recorded in 2000 and
2001 which were alarming increases in the number of cases despite the routine control measures during the North East and South West monsoon in November to January and May to August respectively.

The Public Health Department, Colombo Municipal Council was controlling the outbreaks of mosquito-borne diseases through emergency operations by paying attention to clear and spray roadside drains. Awareness creation was addressing Dengue fever only, although many other vector diseases exist. This has been the answer to the outbreaks of mosquito-borne diseases especially in the slums and shanties to prevent the on going outbreaks. Even though Colombo Council spends around SL Rs. five million for chemicals and another Rs. 15 million for wages and for recurrent expenditure annually in these activities, it was not possible to prevent bi-annual outbreak of mosquito-borne diseases in the city during the monsoon due to the sectoral approach to the problems.

Detailed analysis of reported 254 Dengue cases in the year 2000 showed that 88% (223) have been from such areas where garbage was not cleared properly. More than five years ago the incidence of Dengue cases was usually reported from urban upper classes only. The reason was that only they could afford the proper screening for Dengue anti-bodies, which only could confirm a diagnosis of Dengue. Lately most of the patients admitted to Government Hospitals have these facilities available for them. Today, as a result it is evident that the majority of patients, especially the children who are infected come from the urban slum and shanty areas.
Based on the above information, any attempt to reduce and finally eradicate the incidence of Dengue and other vector controlled diseases in the city will not be comprehensive unless concurrent action for solid waste and drainage management in large drains and canals go hand in hand with this social mobilization and education initiative.

The detailed analysis of the mosquito diseases pattern and the other contributing factors by the Epidemiological Unit of the Public Health Department had established that the outbreak of the mosquito borne diseases were as a result of the following reasons:

- No comprehensive approach to the root causes of the breading sites rather a fire fighting approach;
- Lesser public involvement due to lack of awareness about the mosquito breeding habits and the mode of diseases transmission;
- Limited private and public sector cooperation causing replication of works and poor resource management;
- Lack of responsibility with the stakeholders due no clear work plan.

2. Criteria used in identifying the demonstration project (by core group)

- Feasible: The outbreak of the mosquito borne disease especially the Dengue Fever were mainly due to lack of awareness among city dwellers and the responsible stakeholders, where it needs limited resources for the corrective actions.
- Realistic: the epidemics can be easily preventable reducing the mosquito breeding places.
- Burning Need: Each year the Dengue and the other mosquito borne diseases affects the city with increasing intensity and the council and other stakeholders including the city dwellers spend considerable amount of resources to curb the epidemics.
- Issue specific but at the same time tackling the broader issues of solid waste management and sanitation.
- Poverty alleviation: addressing health and socio-economic issues, with specific attention to women and youth.
• Increasing Stigma to the City Governance: Lack of comprehensive and coordinated preventive approach to the recurrent epidemics of the diseases had created lack of confidence in the departments of the councils.
• Implemented in specific limited and identified areas/houses in all districts of Colombo but with a strategy for replication citywide.
• The project's implementation is only ensured with participation of different stakeholders, especially collaboration of different council departments.

3. Identification of stakeholders and working group

The main concept and idea was presented to the Mayor and all departmental assistance and co-operation was agreed and requested. The Mayor himself is committed and has launched each of the project phases. The initial Core Group or Working Group, set up in July 2001 was the Public Health Department, SCP project manager, and the National Training Coordinator. The SCP facilitator gave a briefing to departments about the SCP/EPM process. They identified the stakeholders responsible for the root causes of the mosquito borne diseases, which form the members of the working group. The working group therefore expanded during the project phases as follows:

<table>
<thead>
<tr>
<th>Phase</th>
<th>Working Group members</th>
</tr>
</thead>
</table>
| Initial phase July 2001   | Municipal Commissioner  
                          Public Health Department:  
                          Chief Medical Officer of Health and SCP project manager  
                          Deputy Chief Medical Officer of Health (Environmental Health)  
                          Chief Public Education Officer  
                          Chief Public Health Inspector  
                          Public Health Inspectors  
                          Municipal Veterinary Department  
                          Health Curative Department  
                          Department of Indigenous Medicine  
                          SCP Project Assistant  
                          SCP National Training Coordinator  
                          Volunteers of the Public Health Department  
                          Representatives of Home Owners  
                          Volunteers of youth and children's organizations and Leo Clubs  
                          Private companies (as sponsors) |
| Second phase December 2001| The initial Working Group  
                          Director Solid Waste Management  
                          Director Water and Drainage  
                          District engineers in charge of drainage  
                          CMC volunteers  
                          CDC leaders from under-served areas  
                          Representatives of NGO Alliance Lanka  
                          Rotary International |
The Core Group or initial Working Group, which is the Public Health Department, is responsible for reviewing the progress and acts as a brainstorming and problem-solving center, which overcame constraints and difficulties raised by the field resource personnel. The Core Group is responsible for monitoring of the demonstration as well as documenting the lessons learnt. It is active the whole year around, while it becomes a full operating Working Group with all stakeholders during the monsoon, which is the Dengue campaign period.

The national agencies have nominated high officials to the Working Group, which has made the task easier. The identified stakeholders together now have the right capacities and resources for the project, including linkages with other projects to prevent the replication of work and to get greater commitment for the Green Star Home Project. The project is particularly linked to the DFID programme, which mobilizes its activities initially in Dengue and Filariasis prone areas, and focus on socio-economic improvement of the low-income settlements.

4. Action plan

For the initial phase the Core Group set the below objectives and strategies. During this phase more stakeholders and objectives and actions were identified for addressing the environmental and socio-economic conditions of settlers as an integrated approach towards elimination of mosquito breeding places.

Overall Objectives of Green Star Home project:
1. Protection and promotion of public health by reduction and final eradication of Dengue and other vector controlled diseases.

2. To cut down the operational costs of public health in any city through participatory approaches, so interventions could be sustained throughout by the local authority with a fraction of the present costs of control of mosquito-borne diseases, especially, Dengue prevention and treatment.

3. To strengthen past approaches and experiences in participatory strategy and action planning and engage a new group of stakeholders in the city i.e. the residents, NGOs, CBOs, the private sector and the various development sectors.

4. To strengthen the recently established monitoring system as part of the ongoing EMIS data management mechanism so that all information required to measure the cost-effectiveness and long-term durability of the effort could thus be provided to attract CMC decision-makers to support the initiative through their regular budget.

5. To strengthen cross-sectoral coordination by bringing together not only all the stakeholders needed, in mosquito control work, but also those who are directly responsible for environmentally neglected areas in Colombo in to a Working Group, which could be used in the future for other environmental improvement work in the city.
<table>
<thead>
<tr>
<th>Phase</th>
<th>Objective</th>
<th>Strategies</th>
</tr>
</thead>
</table>
• The House-to-House inspections in the city building the capacity of the dwellers and the staff through learning by doing it.  
• Competitive awareness by awarding the Green Star Home Sticker and certifying that the house is environmentally friendly  
• Involving the responsible stakeholders showing their weaknesses and opportunities for better services.  
2. Service Approach:  
• Greater public and private involvement for rapid cleaning of breeding places  
• Providing services to remove the unwanted garbage and things from houses  
• Using more environmental friendly methods to the permanent breeding places  
• Cleaning the waterways to reduce the sources of mosquito breeding places.  
3. Legal Approach:  
• Legal actions are taken to reduce the breeding places in the houses  
4. Information Management:  
• Active surveillance: Medical Officer of Health responsible to actively find cases from private hospitals to identify the unreported mosquito borne diseases  
• Better information management in the regional office for greater understanding of the root causes.  
• House-to-House inspection creating the detailed information of the city with respect to the mosquito breeding and identifying the lack of responsibility of the different stakeholders. |
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Repetition of GSH home to home inspections in city (phase 1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Canal Bank Project improving environmental and socio-economic living conditions of low-income settlements residents</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Replication of above strategies under the Green Star Home and additional strategies under the Canal Bank project:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. Capacity Building and Community development</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Greater identification of problems and prioritization of issues with communities especially in underserved settlements.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Identification of solutions with communities to encourage a partnership of responsibilities.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• A special awareness campaign for the residents who live around the canal system and the marshes in the city with special emphasis on educating children.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Creation of community groups, women's groups, children's guilds etc. to develop positive attitudes and leadership to solve the problems.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Income generation for women.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Integrated basic services</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Improvement of Solid Waste Management in these areas,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Chemical spraying of marshes and large canals using new equipment,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Cleaning of Canals by the Sri Lanka Land Reclamation and Development Board (SLLRDB),</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Clearing of Large drains by the Colombo Municipal Council by using Jetters and Gully Emptiers and solving sewerage problems.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>At the start of the third phase, the Canal Bank Project was renamed in Green Settlements Programme</td>
</tr>
</tbody>
</table>
The objectives and strategies of the Green Star Home and Green Settlements Programme are supportive to the Colombo Metropolitan Regional Structure Plan (CMRSP, 1998-2000) and the CDS. Both in terms of supplying basic services in partnership with stakeholders, as well as supporting the set up of Community Development Councils and other community groups promoting social responsibility among citizens. Furthermore, this strategy is an improvement of the existing Dengue reduction programmes of the Public Health Department.

<table>
<thead>
<tr>
<th>Phase</th>
<th>Stakeholder</th>
<th>Responsibilities</th>
<th>Resources and implementation instruments assessed &amp; available</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Public Health Department</td>
<td>Leadership Working Group: coordination, stakeholder mobilization etc. Training staff and volunteers for house to house inspections Development of educational/awareness information materials Spraying chemicals Data collection and monitoring by visiting homes and hospitals</td>
<td>Personnel Legal instruments (fines) Policy (cabinet paper) Public awareness Capacity building Equipment Finance</td>
</tr>
<tr>
<td></td>
<td>SCP</td>
<td>Working Group assistance Training coordination</td>
<td>Personnel and Finance</td>
</tr>
<tr>
<td></td>
<td>Volunteers</td>
<td>House to House inspections</td>
<td>Time</td>
</tr>
<tr>
<td></td>
<td>Schools</td>
<td>Awareness creation</td>
<td>Time</td>
</tr>
<tr>
<td></td>
<td>Private companies</td>
<td>Sponsoring of educational materials</td>
<td>Finance</td>
</tr>
<tr>
<td>2</td>
<td>Solid waste mgt. department</td>
<td>Coordination solid waste collection</td>
<td>Personnel</td>
</tr>
<tr>
<td></td>
<td>Drainage department</td>
<td>Release blocked drains</td>
<td>Personnel, policy, equipment</td>
</tr>
<tr>
<td></td>
<td>IBMC</td>
<td>Training and awareness of youth Signboards to prevent garbage dumping</td>
<td>Trainers, personnel</td>
</tr>
<tr>
<td></td>
<td>CMC volunteers</td>
<td>House to house inspections</td>
<td>Time</td>
</tr>
<tr>
<td></td>
<td>CDC leaders</td>
<td>Coordinators community involvement</td>
<td>Time</td>
</tr>
</tbody>
</table>
NGO
Rotary
SLLRDA
UDA
Ports Authority
Government Railways
Private companies
3 Scouts

Formation women/youth group, environmental awareness
Training youth for replication project, fund raising
Cleaning Canal
City Planning
Land owners: clear the land
Land owners: storm water drainage
Sponsor educational materials
House to house inspections

Training, finance, Institutional development
People, finance
Personnel, policy, equipment
Personnel
Personnel
Finance
Time

The stakeholders identified together have the available capacity and resources for the implementation of the project. In this project the municipal council uses a combination of 2 important implementation instrument: public awareness (and competition element) & capacity building and legal instruments.

Budget

When looking at the budgets of phase I and II below, it shows the success CMC had in finding leveraged funds from private companies, NGOs and IBMC at the end of phase I. This means that they didn’t use the full budget allocation available by UN-HABITAT for phase II, and only a small part from the SCP budget from the municipal council.

An important role in finding external funds was played by the Rotary international as fundraiser who involved several private companies as sponsors, as well as the commitment and participation of the Mayor and the involvement of newspapers.

<table>
<thead>
<tr>
<th>In US $</th>
<th>Phase I</th>
<th>Phase II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colombo Municipal Council</td>
<td>5.900</td>
<td>1000</td>
</tr>
<tr>
<td>SCP UN-HABITAT/UNDP</td>
<td>3.645</td>
<td>2.500</td>
</tr>
<tr>
<td>Private Companies</td>
<td>250</td>
<td>6300</td>
</tr>
<tr>
<td>NGOs/IBMC</td>
<td>-</td>
<td>12000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>9795</strong></td>
<td><strong>21.800</strong></td>
</tr>
</tbody>
</table>
Monitoring indicators

Indicators for monitoring the progress as well as to be able to make a cost & benefit analysis were set for the Green Star Home project:

- Reduction of the incidence and fatality of Dengue.
- Percentage of homesteads that take keen interest in keeping their compound environmentally friendly.
- Enhanced knowledge and interest in Dengue prevention and urban environment by field level municipal functionaries, schools and religious organizations.
- Improved Knowledge, Attitude and Practice of environment-friendly homes by the residents revealed through a KAP survey of the affected areas.
- Comparative cost analysis between prevention and treatment of Dengue and other vector-borne diseases.

Results of these indicators are not yet clear. Indicators for the phase II, Green Settlements project are currently under development.

5. Implementation of the activities and monitoring

Phase I Green Star Home project

House to house inspection and awareness campaigns

In the demonstration Phase 1, a paper notice was sent out informing the public living in areas of selected wards a week before the commencement. This gave the homeowners time to clean their gardens and prepare for the Green Star Home field resource persons to visit their homes.

The Public Health Department trained the field resource persons and volunteers on the objectives and activities of the project, and developed all educational material.

The group of field resource persons consists of CMC's Medical Officers, Public Health Inspectors (PHIs), Overseers, field officers from engineering departments, Food inspectors, Dispensary staff, and Ayurvedic Dispensary staff, Nurses, Midwives along with volunteers from Youth and Children’s organizations. An area of 50 households was demarcated and assigned to a group of 3 field resource persons covering each area.

Around 200 of these groups of 3 persons ensured complete coverage in the selected wards. Each team had a CMC official/volunteer when they visit each household. They inspected the home and garden using the following 6 criteria:

- Debris or garbage hygienically stored
- No Mosquito breeding places found
- No overgrown rank vegetation
- No overgrown trees, bushes, hedges
- Tidy road frontage
Well maintained drains and gutters

Homes that satisfactory have applied the above criteria were issued a ‘Green Star Home’ sticker to be pasted on the gate or the front wall of the premises.

When the premises did not comply with the required standards then the Municipality under the Mosquito Borne Diseases Regulations to clean the noted areas issued a notice. The following week the officers carried out their inspections and if the criteria were still not met then a case was filed against the home/land owner to appear in courts.

The homeowners were therefore more informed of the Dengue epidemic and tried to maintain their gardens and premises better than their neighbours. This introduced healthy competitiveness and encouraged participation through involvement in the Project. In addition the project created awareness about the mosquito breeding habits and affordable prevention strategies. Leaflets, handbills and announcement speakers were used to initiate the campaign.

The publicity newspapers gave to the project created public interest and residents requested to be included in the inspection, mainly in order to get the ‘Green Star Sticker’. Furthermore it also attracted other stakeholders, e.g. private companies interested as part of their social responsibility.

Integrated in the project were special lectures and awareness campaigns, which were held in schools. In some schools children were asked to destroy the mosquito breeding places and enter such places in a book and get the parents to sign, as an assignment. For teachers in charge of Health and Environment clubs in schools seminars were organized on the issue.

**Chemical spraying and canal cleaning**

In addition to awareness campaigns the Public Health Department sprayed chemicals in and around garbage dumps and neglected bare lands. Fogging was also done covering the underground drains, and marshes. The SLLRDB did the canal cleaning of St. Sebastian canal. The SLLRDB had stopped dredging the canals where communities dumped their garbage. Through the SCP Working Groups, and the cabinet proposal forwarded for dredging the canals, the SLLRDB will resume this again, but only there, where the community is committed not to dump garbage. Until that time the Public Health Department sprays chemicals.

**Monitoring**

Monitoring and sustainability of this project was maintained by Public Health Inspectors visiting each of the homes with the ‘Green Star Home’ Sticker on rotation to inspect its standards are maintained as well as to check if home issued with notices have complied with the required standards. Furthermore the Medical Officers of Health were requested to follow up on activities and strengthen the inspection procedure. The deputy Chief Medical Officers of Health monitored field activities. Data of covered and re-inspected houses were sent to the Epidemiology Unit where statistics were keyed in. New Dengue cases were monitored and immediate action was taken to prevent the spread of disease. All hospitals were visited for information on new cases.
Phase II Green Star Home and Green Settlement Project

Initially in phase I it was difficult to build the understanding and involvement of the Public Health department staff, and especially other departments of CMC but following the demonstration project the inter-CMC departmental coordination was stronger in Phase 2, the Green Settlements project. The group of stakeholders in phase II expanded with participation of National Agencies, NGOs and private companies.

In addition to the Green Star Home activities which primarily focuses on individual premises as described above, phase II in addition included the Green Settlement Project addressing the environmental issues causing health problems and therefore requiring the participation of the community.

Activity 1: set up and strengthening of community groups

Existing Community Development Councils (CDC) and community groups were revitalised and Children’s Guilds and Women’s groups were formed. With the CDCs community action planning was done, using the SCP tool book as guidance in this, so they were taught to identify problems, prioritize issues and identify solutions for the problems in their own settlement. Community leaders were able to address the responsible CMC district officer for issues identified. The priority issue was Solid Waste Management.

NGO Alliance Lanka formulated Women’s groups in Dematagoda and St. Sebastian canal area to mainly organize proper garbage disposal as well as were involved in income generation work.

The IBMC implements training for youth on leadership skills, which involves the creation of new positive attitudes amongst youth toward the development of their settlement and themselves. The children will be future leaders in these areas and will have better capacity to identify and solve problems in their settlements.
Activity 2: Awareness campaign addressing mosquito borne diseases and waste disposal

The awareness campaign focused its attention on the under-served settlements lining the marshes and canals. Hand bills posters and leaflets, developed by Public Health Department, were distributed among the residents to educate them about the proper waste disposal and mosquito borne diseases. This ‘consolidation phase’ of Green Star Home project was closely monitored with small questionnaires and was being carried out with the private sector and public sector organizations taking part in it.

Activity 3: Solid waste management

The CDC in the Working Group requested the CMC Solid waste management department to coordinate the regular and time scheduled collection of garbage with the solid waste company to prevent dumping of garbage in the canal. Children are involved in this awareness creation and discuss with their parents about the need to properly dispose garbage. The IBMC put signboards to prevent waste dumping.

Activity 4: Chemical/bacterial spraying of marshes and canals

At present most of the canals in the city are blocked by heaps of garbage dumped into them. Until the community stops dumping garbage in the canal, the Public Health Department sprays the marshes and canals with chemicals Abate and Baytex. St. Sebastian canal was sprayed with Bacillus Sphericus, a bacteria, which got rid of the mosquito larvae without affecting the other organisms in the water. Preliminary studies indicate that up to a 70% reduction in "larvae content per dip" was achieved.

Activity 5: Clearing of canals and release of blocked drains

The CMC has contracted out cleaning of blocked smaller canals and large drains. CDCs have received capacity building on how to monitor these. The SLLRDB had agreed during phase I to clean the remaining of the canals in phase II, but due to lack of funds they haven't done it yet.

The CMC Public Health Department and Water and Drainage Division have a unit, which releases the blockages, and prevent water stagnation in the large drains in the city.

Activity 6: Clearing of reservation lands of Port and Railway authorities

In the Working Group the Port and Railway authorities have taken action in cooperation with CMC to clear their reservations lands and improve the storm water drainage.

Monitoring

The data collected through home and site visits as explained above are keyed into the computer and used for monitoring. Information is being shared between various stakeholders for strengthening capacity. The EMIS unit, initially set up under the Sustainable Cities Programme, was used by the Public Health Department to generate EMIS files and maps to assist in the ongoing monitoring and periodic evaluations. These file and mapping not only help identify risk–prone areas of the city needing special and
focused attention but also help compare the costs, social impacts and peoples’ perceptions of the efforts. Unfortunately the EMIS is not being used anymore and the Public Health Department therefore at the moment uses another data system to document the project, and needs to strengthen this component of the project.

It has been able to disseminate its documentation to other cities, for upscaling and for publicity and political support.

6. Physical impact of the demonstration project

*Physical improvements*

- Most of the government and private sector organizations and the residents cleaned up their premises. Bare lands got cleaned, garbage collection improved in the city, schools got rid of unwanted material form their external environment, water collecting plants were removed, ponds and water-baths were cleaned regularly.

![Sebastian canal after cleaning](image)

- Number of Dengue cases decreased. While comparing the reported cases of Colombo city with the rest of Colombo district, it clearly shows the effect of Green Star Home Project 2001 (First Phase). In August 2001 there is a significant decrease of the rates between Colombo City and the rest of the district when compared with the difference at the start of the project due to the immediate impact. Towards the end of the year, while Colombo stabilized the situation, in other areas a marked increase could be seen.
The reported cases of Dengue in the year 2002 were compared to the previous year cases of each area and it was found that the City of Colombo had only a negative percentage of increase, whereas others cities in Sri Lanka had nearly doubled their previous number of cases. The projected cases for the year 2002 in the City of Colombo were calculated by the mean percentage of increase of Dengue cases in other adjoining areas.

The apparent increase in the cases during the month of May to June 2002 was also due to the increase reporting of cases from private hospitals where the Public Health Inspector does a daily collection of information about the Dengue patients, which was not done in previous years. That is also why in analyzing, a comparison needs to be made with other areas as well.

- Increased effectiveness of coordination, which have led to decrease of Dengue cases.
  The three rounds saw that these volunteers inspected 23085 premises. Only 4337 households were issued with the Green Star Environmental friendly home sticker. 2194 Notices under the Mosquito-borne Diseases Regulations were issued. 377 persons were taken to courts for disregarding this Notice and for continuing to have breeding places in their premises.
Service expansion

While implementing the initial phase I of Green Star Home, it was planned to expand the phase II to a Green Settlements programme as described above to address basic environmental services as a strategy to reduce mosquito borne diseases. Services were then expanded to canal cleaning, drainage, water supply, solid waste management issues and community development.

The programme Healthy Schools initiated in January 2003 and funded by WHO is a direct result of the SCP Green Star Home project. During the Green Star Home project, the Public Health Department found that most of the Dengue cases come from the schools. As Dengue mosquito is a day biter, children contracted the disease from schools. Healthy Schools programme was started to get rid of mosquito breeding places. Gradually they introduced other components such as inside classroom environment, social and psychological environment as components when they realized that standards in schools have deteriorated in all fronts and Dengue in schools is only one manifestation of that situation.

Social improvements

- Most of the settlements are sandwiched between large land parcels, which belong to the high-income group. Due to the increased density of the population in under serviced settlements they were more prone to the attacks by the mosquitoes than the owners of large land parcels which were responsible for Dengue mosquito breeding. Citizens started to inform the Public Health Department about unkempt gardens in the vicinity of their dwellings and also took action to clean their premises. One major improvement was that they stopped placing tyres on the roof of their houses, which they used to stop the roof sheets being blown away by the wind. Tyres are the most popular breeding ground for mosquitoes as they are black in colour.

- Capacity building activities under the Green Settlements programme have built the confidence and social position of children and women especially. They are now
involved in action planning for the community and creating awareness on solid waste management of other residents.

Attitudinal change of citizens to local government and visa versa

The fact that municipal staff is actually physically going to the citizen’s homes and into the neighborhood and by involving them through awareness creation has changed the attitude of residents. In fact residents requested to be included in the programme. Especially in phase II attitude change is evident, as it is the first time that municipal staff is involving them in planning and improving their own environment.

Through the house to house inspections and through the awareness raising workshop meetings of Public Health Department, most of the staff were very enthusiastic and for the majority it was a new experience away from their routine work. Many learned about the disease and nuances of the ways it spreads and quite proud of what they were doing in the community.

Economic benefits

The economical benefits for the year 2002 and onwards for households, municipality and government will be presented below. As the project is still under development and implementation, this might not be the final calculation, but it does give a first impression of cost & benefit occurred for different stakeholders. This has been illustrated in the table below.

Households
The average number of days that people are sick of Dengue fever and can’t work is about 10 days. This means for a worker with an average income of 250 rupees a day a loss of 2500 rupees (26 US$). Furthermore there was a 56% reduction of mosquito coil, so we might assume that this indicates that people spent less of their salaries to prevention. A mosquito coil is about 6 rupees and used per day per household. This means for households a yearly saving of 2.190 rupees on mosquito coil.

Colombo Municipality
The costs of the municipality before the project were the chemical spraying, fogging, collection of containers of fresh water, transportation and personnel. The project has investment costs which are partly borne by the municipality and which concern increased spraying of canals, which costs them 10 mln rupees. Costs for the programme, which are on awareness creation, mobilization volunteers, training etc. will be an annual budget post of about 700.000 rupees. The costs of spraying the canals are new costs and high. Until the canals are clean again the municipality will do the spraying. It is anticipated that at the end of phase III of the programme spraying will not be necessary anymore. So basically the cost savings of the municipality, without taking into account the investments, are 1 mln rupees on spraying and fresh water collection. If you deduct from this the annual programme costs you have an annual saving of approx. 300.000 rupees (3.100 US$).

Central Government
Hospital costs of government hospitals are borne by the central government. Private hospitals, due to variation of costs are not taken into account in the cost & benefit calculation. The number of patients as indicated above came down from 330 to 276 in
2002. Average they stay 10 days in hospital and therefore the government saved 2.7 mln rupees (28.125 US$$) per year.

**SLLRDB**
They usually cleaned the canal annually, which cost them 45 mln rupees. It is anticipated that this is an investment and that at the end of phase III of the project the community will maintain the canals. This means for them a saving of 45 mln rupees (46.875 US$$) per year.

<table>
<thead>
<tr>
<th>Costs before in Rupees</th>
<th>Costs After</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CMC</strong></td>
<td></td>
</tr>
<tr>
<td>Chemicals/spraying, fogging</td>
<td>1.5 mln (no spraying of canals)</td>
</tr>
<tr>
<td>Collection of containers fresh</td>
<td>300,000</td>
</tr>
<tr>
<td>water</td>
<td></td>
</tr>
<tr>
<td>Staff working overtime</td>
<td>Approx. Rs. 2.0 mln</td>
</tr>
<tr>
<td>Transportation</td>
<td>Rs. 2.0 mln</td>
</tr>
<tr>
<td><strong>Costs</strong></td>
<td>5.800,000</td>
</tr>
<tr>
<td>Government</td>
<td></td>
</tr>
<tr>
<td>Hospital treatment (costs nr.</td>
<td>@ Rs.5000 per day for 10 days for 330 patients</td>
</tr>
<tr>
<td>Beds)</td>
<td></td>
</tr>
<tr>
<td><strong>SLLRDB</strong></td>
<td></td>
</tr>
<tr>
<td>Cleaning the canal</td>
<td>45 mln</td>
</tr>
<tr>
<td><strong>Costs</strong></td>
<td>45,000,000</td>
</tr>
<tr>
<td><strong>Benefits/savings</strong></td>
<td></td>
</tr>
<tr>
<td>CMC</td>
<td></td>
</tr>
<tr>
<td>Spraying, fresh water collection etc.</td>
<td>1 mln rupees (10.417 US$$)</td>
</tr>
<tr>
<td>Hospital costs</td>
<td>2.7 mln rupees (28.125 US$$)</td>
</tr>
<tr>
<td>Cleaning the canal</td>
<td>45 mln rupees (46.875 US$$) eventually</td>
</tr>
</tbody>
</table>

* The SLLRDB used to clean the canals at an enormous cost. Now CMC plan to get the people to stop dumping garbage into the canal through the Green Settlements project. So eventually there will be a saving of Rs 45-75 mln annually.

**Until the garbage problem of the canal is resolved it will use chemicals worth around Rs. 10 mln annually.**
Households | Sick leave & prevention | 47,000 rupees (48 US$)

7. Institutional impact & changes for municipalities

*Interdepartmental coordination*
Especially during phase II the coordination between the 4 departments improved. Even though the Heads of Department meeting is only on a quarterly year base the departments are addressing each other directly and through the Working Group meetings. Interdepartmental coordination helped the Heads to understand that collaboration in activities is mutually beneficial at a time when the staff strengths are low, and the technical capacities need strengthening using each others resources.

There is no coordination mechanism as yet in CMC for working with external stakeholders, but because of the involvement of departments and staff, links were made with other programmes. In particularly it has coordinated with the DFID programme, which mobilizes its activities initially in Dengue and Filariasis prone areas, and focuses on socio-economic improvement of the low-income settlements.

Furthermore as a direct result of SCP and the Green Star Home project in particular, the Partnership Promotion Programme (PPP) recently has been initiated by the Mayor in which the NGOs are invited to take part in working for the benefit of the urban poor in 5 chosen areas:

1) Social development of Women and children
2) Management of the Environment
3) Public Utilities
4) Development of the Economy
5) Health and Nutrition

The PPP Secretariat has been set up under the Chief Medical Officer of Health. Already around 8 proposals have been forwarded, mostly on improvement of the environment in the canal bank area through the participation and leadership of women. The Council has institutionalized this system where the Council comes in to a partnership with the NGO by providing funds for such work and NGO carries out the work.

*Bye laws and other legislative instruments*
The Mosquito-Borne Diseases Regulations had been prepared under the Quarantine and Prevention of Diseases Ordinance in Sri Lanka. But the CMC was the first and only organization using it and now has highlighted the laws to other municipalities to tackle the problem. The municipality has until now taken 778 people to court for disregarding the notice to destroy breeding places.

*City and department strategy*
The Public Health Department has institutionalized the Green Star Home project in its routine work, by improving the strategy existing to address Dengue epidemics.
Previously the policy of the Public Health Department was an ad hoc response on epidemics, the Green Star Home project introduced a strategic approach to this problem.

Improving of the canal banks in the Green Settlement project has not been included in the City Development Strategy (2000) and only now the Engineering department is including the canal system in their strategy on storm water management.

The Green Star Home has been integrated in the Municipal budget. The CMC as counterpart funding to SCP has allocated 5,000 US$ annually for demonstration projects.

**Capacity building strategy**

Although the Public Health Department has a training unit, apart from the CMC training unit, there is no structural training programme. The programme on youth leadership skills has been integrated into the programme of the CMC training programme.

**Policy towards private sector**

In the 1990s, the health sector in Sri Lanka never worked with the private sector organizations believing that the private sector had a hidden agenda. The CMC with the Green Star Home project was the first to get rid of that notion and work with the private sector, using the SCP approach of stakeholder identification, working group process and partnership building.

The Ministry of Health has taken the principles of Green Star Home project into its policy and is now advocating participation of NGOs, National Agencies and private companies to cooperate in the control of Dengue. The Secretary of the Ministry of Health declared at the National Dengue Task Force Meeting held on 7th August 2003 that all Dengue control programmes should be carried out with the participation of NGOs and the private sector.

**Mechanisms for responding to citizens needs**

The Council has taken a proactive stance towards the citizen’s needs at last. SCP demonstration projects strengthen mechanisms as City Watch, the Housing and Community Development Council (HCDC) and Standing Committees, which already have taken steps in responding to citizen.

**8. Lessons learnt for replication and up scaling**

- The demonstration project is a good example of partnership building. Especially in involving the private sector, by calling upon their social responsibility, CMC was very successful. Media coverage was also organized. Important has been to identify the right stakeholders who have resources available either by themselves, or like the rotary club mobilizes funds on behalf of municipality. The SCP approach has been used to facilitate.

- The importance of data gathering has been pointed out in the project, to be able to identify the breeding places and analyze trends in Dengue. Problem for most municipalities is the lack of staff and funding. But the alternative is to train volunteers, school children and university students etc. who could do the house to house
inspection and gather information. In addition though you need a good data system. In Colombo they started with the SCP EMIS but unfortunately due to changes, this is not used at the moment although the AsiaUrbs GIS system is in place. This is a missed opportunity and could have improved setting indicators, monitoring and measuring impact. In other municipalities under the SCP EMIS facilities and training are given to staff. They could use the Green Star Home as a first example in working with a data system.

- The project shows a time process of integrating different services, starting with the Green Star Home focused on mosquito breeding places towards expanding services to address the roots of the issue.

- Green Star Home programme should start earlier. In 2003 CMC started it just before the rains which resulted in a 30-35% drop (latest) in Dengue cases this year. From next year they will start before the Sinhala New Year as traditionally people clean up their houses and gardens before the New Year in April.

- The approach by some of the residents in high income areas to the volunteers. Most do not open the houses to the volunteers, which means that CMC have to send their officers on another day, which costs time and money. Different groups of citizens need different approaches, and this is something to take into account while preparing training for staff and volunteers.

- The programme was also an opportunity to bring the municipal staff closer to the people, even the Mayor participated in the campaigns, this has built mutual understanding between citizens and municipal staff.

9. Examples of replication and up scaling

Colombo City
This demonstration will be up scaled into ‘Green Communities’ soon, where residents of a street or a small area will be encouraged to form into neighbourhood committees and improve the environment in their area.

Matara
In some areas school children are used to go from house to house to inspect the houses for mosquito breeding places. Example. Matara, a city in the southern province, which used the legal information and the information on Green Star Homes, programme for their anti-Dengue programme. They too have done house to house inspections. There has been no outbreak since then in Matara.