

# **Improving Municipal Wastewater Management in Coastal Cities**

**A UNESCO-IHE – UNEP/GPA capacity building partnership  
under the umbrella of the UN/DOALOS Train-Sea-Coast Programme**

## **Preliminary Evaluation Report**

**This is a report of the post training survey carried out on 286 alumni  
from 13 courses conducted from 2007 – 2009 – version 3**

**by**

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## Table of contents

Table of contents .....	ii
List of figures .....	iii
Introduction .....	4
Evaluation Findings.....	5
Section 1: Evaluation of the course .....	5
Objective Oriented Planning .....	5
Use of the Objective Oriented Planning tool.....	5
Stakeholder Participation in wastewater management projects .....	7
Technological approaches.....	8
Finance .....	10
Networking.....	12
Use of materials.....	12
Section 2: Achievements of the course .....	14
Policy guidelines/regulations .....	14
Courses on wastewater management initiated and conducted by trainees after the participating at the GPA wastewater management course.....	15
Wastewater management activities initiated/collaborated/influenced due to the knowledge obtained from the training .....	16
Participants' Plans .....	18
Obstacles expected in implementing the plans .....	20
Conclusions and recommendations.....	21
Annex .....	22
Annex 1: Sample of the Evaluation form .....	22
Annex 2: Courses evaluated.....	26

## List of figures

<b>Figure 1.</b> Participants who formulate, implement and evaluate projects in a structured manner. ....	6
<b>Figure 2.</b> Participants who use OOP in formulation, implementation and evaluation of wastewater management projects. ....	6
<b>Figure 3.</b> Participants who took into account the interests of various stakeholders.....	7
<b>Figure 4.</b> Participants who make a deliberate effort to involve various stakeholders and ensure they actively participate in project development. ....	7
<b>Figure 5.</b> Participants whose organisations paid attention to interests of stakeholders when dealing with wastewater management issues.....	8
<b>Figure 6.</b> Participants who consider technological solutions based on the approaches taught for wastewater management projects.....	9
<b>Figure 7.</b> Percentage of participants who considered potentials and constraints of technological solutions, and those who were guided by technological and environmental sustainability principles in project design. ....	9
<b>Figure 8.</b> Participants had experienced an increased awareness on alternative concepts and receptivity for sustainable wastewater management concepts in their organisation. ....	10
<b>Figure 9.</b> Participants who consider financial approaches based on user-pays principles and instruments that aim to reduce the production of wastewater. ....	11
<b>Figure 10.</b> Participants who had observed an increased awareness and acceptance of user-based financing to make wastewater management more sustainable in their organisations. ....	12
<b>Figure 11.</b> Participants who consulted with individuals and organisations they met at the training.....	13
<b>Figure 12.</b> Participants who used some of the material introduced during the training course. ....	13

## Introduction

Wastewater management in coastal cities has been identified as a priority for the United Nations Environment Programme's Global Programme of Action for the Protection of the Marine Environment from Land-based activities (UNEP/GPA). This comes in recognition that the major threats to the health, productivity and biodiversity of the marine environment results from human activities on land, in coastal areas, and further inland. The bulk of the world's population lives in coastal areas and their well-being and survival depend upon the health and well-being of the coastal systems, associated watersheds and drainage basins, and near-shore coastal waters.

To address the challenge of managing wastewater UNEP/GPA jointly with UNESCO-IHE Institute for water Education developed a training on "Improving Municipal Wastewater Management for coastal Cities" for municipal wastewater managers. The training was developed in the framework of the United Nation's Division for Ocean Affairs and the Law of the Sea (UN/DOALOS) Train-Sea-Coast (TSC) programme. The TSC Programme is part of TRAIN-X<sup>1</sup> UN capacity building initiative.

As the only UN programme addressing the interface between the freshwater and coastal environment, the training focuses on four elements<sup>2</sup>:

- Objective Oriented Planning (the project identification part of the project cycle),
- Innovative Technological and Financial Approaches,
- Stakeholder Involvement (benefits of stakeholder involvement and how to do it),
- Presentation Techniques and feasibility reporting,

Until August 2009, 72 training courses had been delivered since the first delivery in Tanzania in March 2003. A total of 1,800 experts from 67 countries were trained with the course conducted in seven languages. In 2007, UNEP incepted a USD 1.2M grant from the European Union Africa, Caribbean and Pacific Countries (EU ACP) Water Facility with USD 1M co-financing from the UNDP-GEF International Waters portfolio to coordinate 60 training courses in ACP countries. Until August 2009, 50 of these courses had been delivered. In mid 2009, questionnaires were sent out to 286 participants of the recent UNDP-GEF and EU funded training courses in ACP countries (Annex 2). This report is a synopsis of the responses from 16 % of the participant's contacted.

For smooth implementation of the programme, UNEP/GPA has coordinated the training jointly with other UN agencies, with substantial involvement of local academic institutions, local governments and Non Governmental Organisations. These organisations have taken great pride to organise the courses with detail and often on a very limited budget. The UN agencies include the UNESCO-IHE Institute for Water Education, United Nations Division for Ocean Affairs and the Law of the Seas (UN/DOALOS), United Nations Development Programme - Global Environment Facility (UNDP - GEF), GEF International Waters Learning Exchange and Resource Network (IW:LEARN), United Nations Environment Programme (UNEP) and UNEP - Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA).

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<sup>1</sup> The United Nations TRAIN-X Network comprised of eight training programmes implemented by UN organizations in different fields of specialization. All programmes share similar objective and approaches to training. Since its inception in 1992, [TRAIN-X](#) has been coordinated by UNDP.

<sup>2</sup> Further information on this can be found at <http://www.training.gpa.unep.org/content.html?id=14>

## Evaluation Findings

### Section 1: Evaluation of the course

This section of the report assesses the relevance and effectiveness of the course. The alumni were requested to rate statements presented to them by circling a number that had a pre-conceived ranking as follows:

1 = strongly Disagree;

2 = disagree;

3 = indifferent;

4 = agree;

5 = strongly agree

To increase clarity in the text of this report, use of the above terms will be put in quotes (e.g. 'agreed')

### Objective Oriented Planning

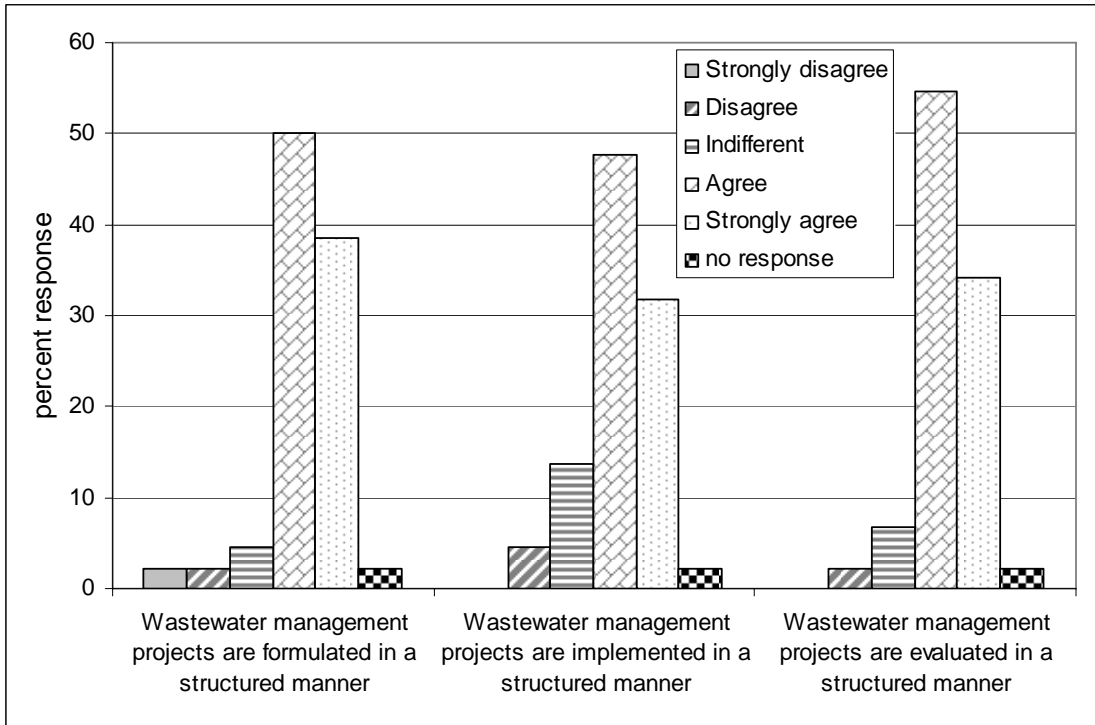
Objective Oriented Planning (OOP) is a general management tool that facilitates planning, execution and the evaluation of a project. It assumes that projects are instruments of change to a desirable situation. The objective of this module is to guide participants through the different steps of objective oriented planning. Knowledge of the tool familiarises the participants with the analysis of problems, objectives, options and stakeholders, enabling them improve the management of wastewater in their respective localities.

After the course, the survey sought to find out if the participants were increasingly formulating, implementing and evaluating their projects in a structured manner when dealing with wastewater management problems (Fig. 1). 50 % of the participants agreed that they increasingly ensured that projects are formulated in a structured manner. 39 % 'strongly agreed' to this. Only a total of 4 % were not formulating their projects in a structured manner. 48 % and 55 % of the participants 'agreed' that they implemented and evaluated their projects in a structured manner respectively. 32 % and 34 % 'strongly agreed' to increasingly implementing and evaluating their projects in a structured manner respectively.

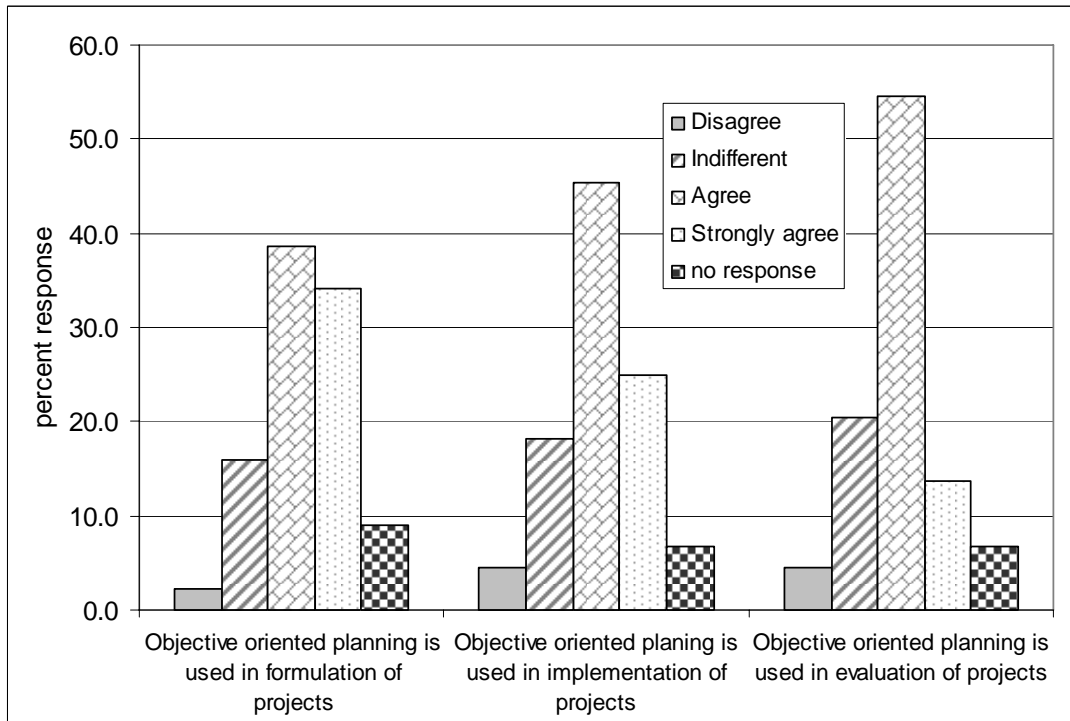
### Use of the Objective Oriented Planning tool

A survey of the use of the Objective Oriented Planning (OOP) tool in the formulation, implementation and evaluation of wastewater management projects by participants was also made. Only 2 % 'disagreed' that they did not use the tool (Fig. 2). Those who 'agreed' and 'strongly agreed' made up a total of 73 %. Those who 'agreed' and 'strongly agreed' to using OOP in implementing projects were 45 % and 25 % respectively while 56 % and 14 % 'agreed' and 'strongly agreed' respectively to using the tool in evaluation of projects.

The training programme was excellent and opened my eyes to the possibility of using treated wastewater for household and industrial activities. I suggest your training goes into communities for wider spread of this insightful training. *Prince Prempeh, Friends of Rivers and Water Bodies, Ghana.*



**Figure 1.** Participants who formulate, implement and evaluate projects in a structured manner.

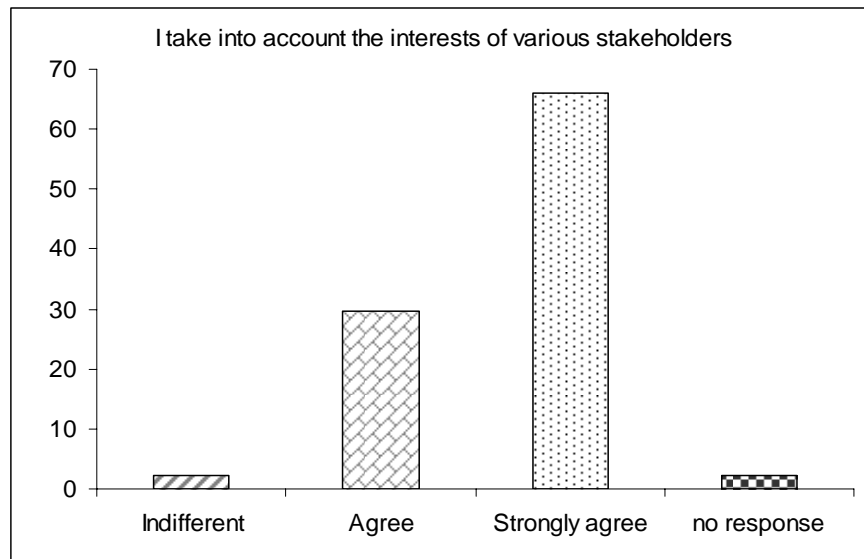


**Figure 2.** Participants who use OOP in formulation, implementation and evaluation of wastewater management projects.

### Stakeholder Participation in wastewater management projects

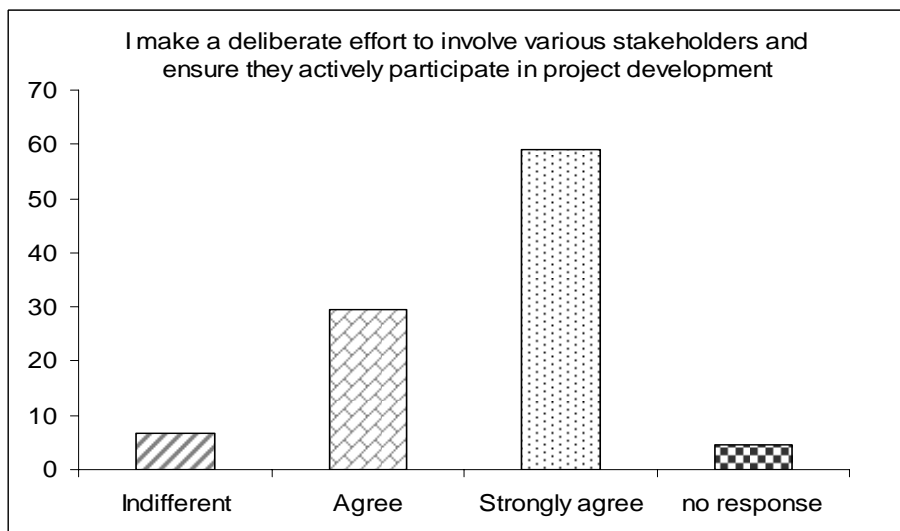
Active involvement of stakeholders (people or groups of people who are likely to affect or be affected by the outcome of a proposed project) is essential right from the project formulation stage. This is because the process involves consulting and sharing of information, ensuring that conflicts are avoided and the most creative solutions to problems are found driven by the shared common goal. It was therefore important to find out if the former course participants took a deliberate effort to ensure the involvement of stakeholders.

When asked if they took into consideration the interests of the various stakeholders 66 % 'strongly agreed' that they did (Fig. 3). It should be noted that none 'disagreed' to not considering the interests of stakeholders.



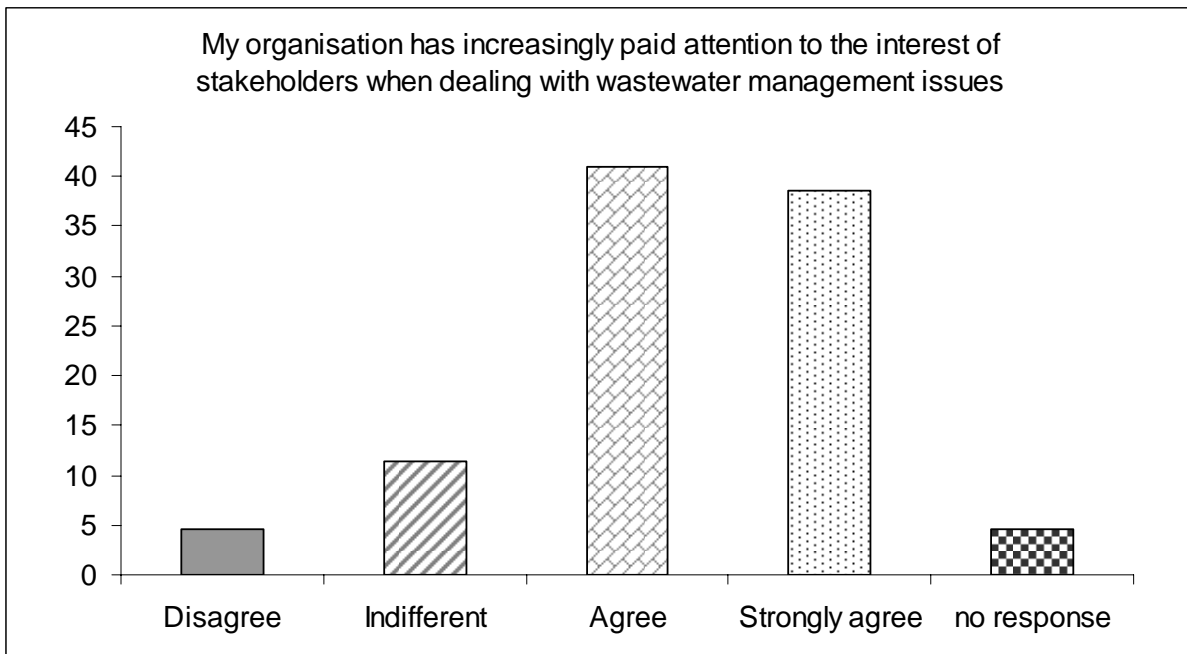
**Figure 3.** Participants who took into account the interests of various stakeholders.

59 % 'strongly agreed' that they made a deliberate effort to involve various stakeholders and ensure they actively participated in the development of the projects (Fig. 4).



**Figure 4.** Participants who make a deliberate effort to involve various stakeholders and ensure they actively participate in project development.

Compared to 39 % who 'strongly agreed' that their organisation had increasingly paid attention to interests of stakeholders when dealing with wastewater management issues, only 5 % 'disagreed' while 41 % 'agreed' with the statement (Fig. 5).



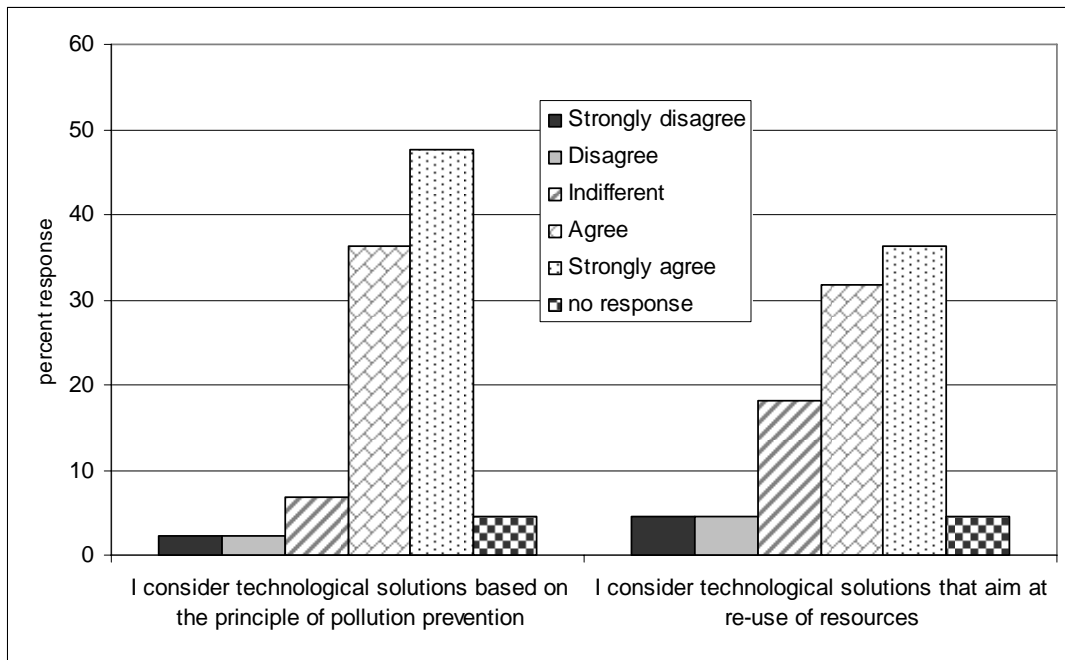
**Figure 5.** Participants whose organisations paid attention to interests of stakeholders when dealing with wastewater management issues.

### Technological approaches

The module on technological approaches gives participants an overview of conventional and innovative technological solutions available for wastewater management enabling them to make choices among the various technological alternatives available to address wastewater problems. Several approaches to developing technological solutions are introduced to the participants. The participants were interviewed on the use of these approaches.

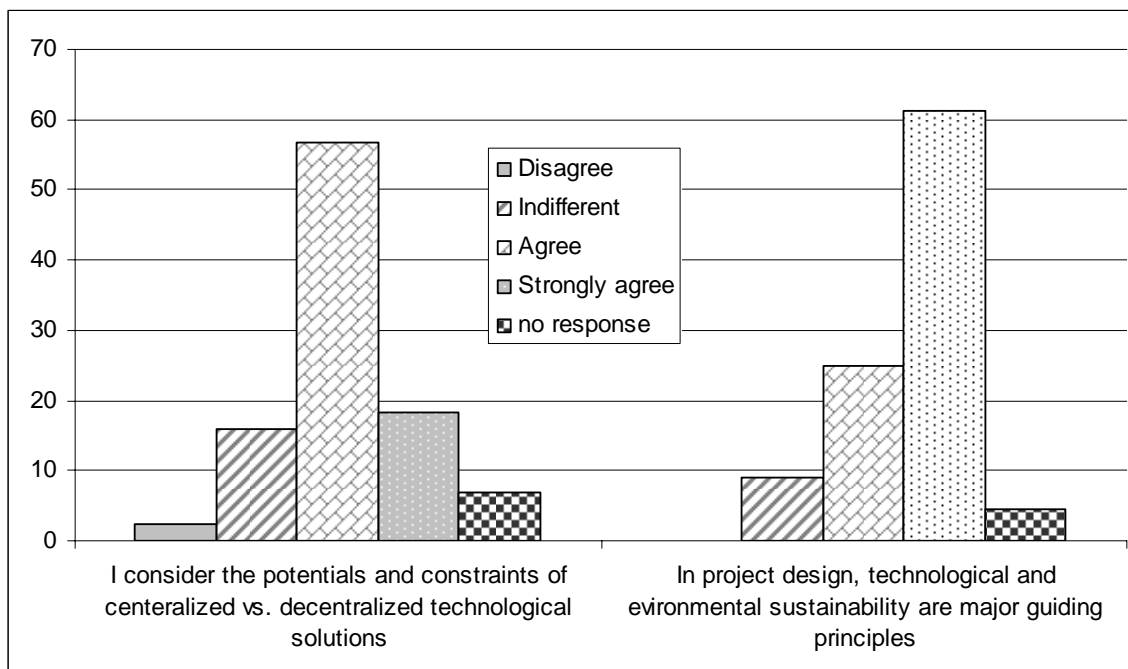
48 % of the respondents 'strongly agreed' that they considered technological solutions based on the principle of pollution prevention while 36 % considered technological solutions that aim at re-use of resources (Fig. 6). Only 2 % 'disagreed' that they considered solutions based on the principle of pollution prevention. 5 % also said they did not consider solutions that aimed at re-use of resources.





**Figure 6.** Participants who consider technological solutions based on the approaches taught for wastewater management projects.

57 % of the participants said they considered the potentials and constraints of centralised vs. decentralised solutions (Fig. 7). Only 2 % said they didn't consider this. 61 % of the participants 'strongly agreed' that they are guided by technological and environmental sustainability principles when designing their projects.



**Figure 7.** Percentage of participants who considered potentials and constraints of technological solutions, and those who were guided by technological and environmental sustainability principles in project design.

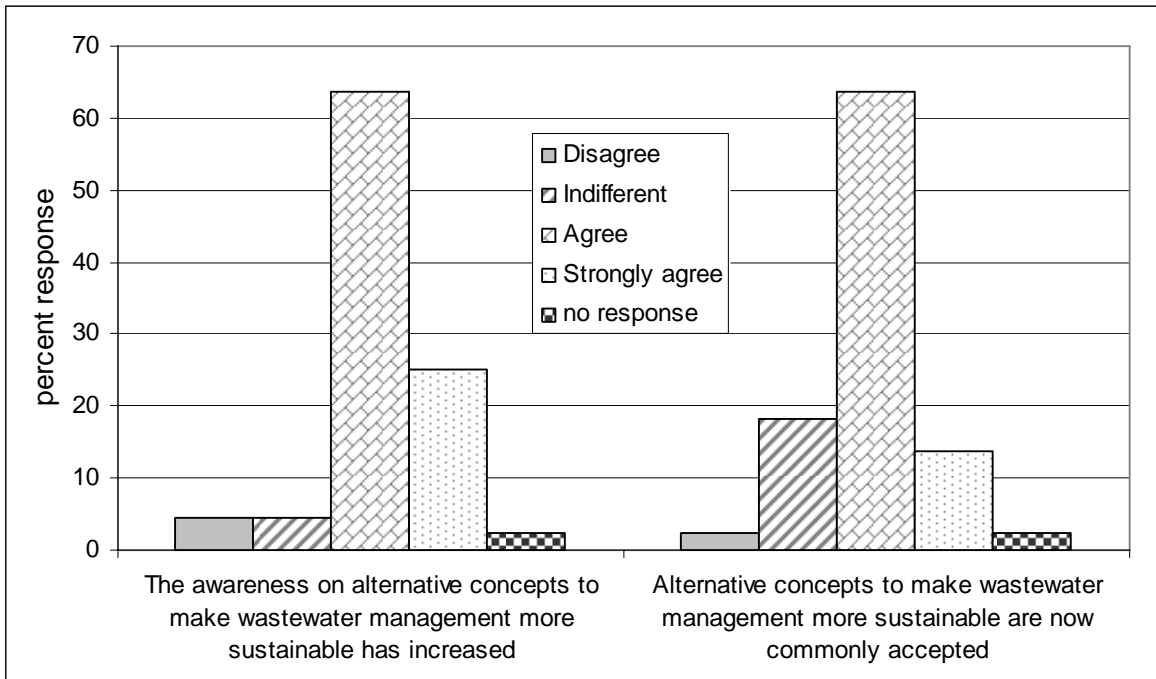
The evaluation sought to know if the participants had observed an increased awareness on alternative concepts to make wastewater management more sustainable and if they were more receptive to alternative concepts in making the management more sustainable.

Those who 'agreed' that the awareness on alternative concepts to make wastewater management more sustainable had increased were 64 % (Fig. 8). A similar percentage 'agreed' that concepts to make wastewater management more sustainable were commonly accepted in their organisation.

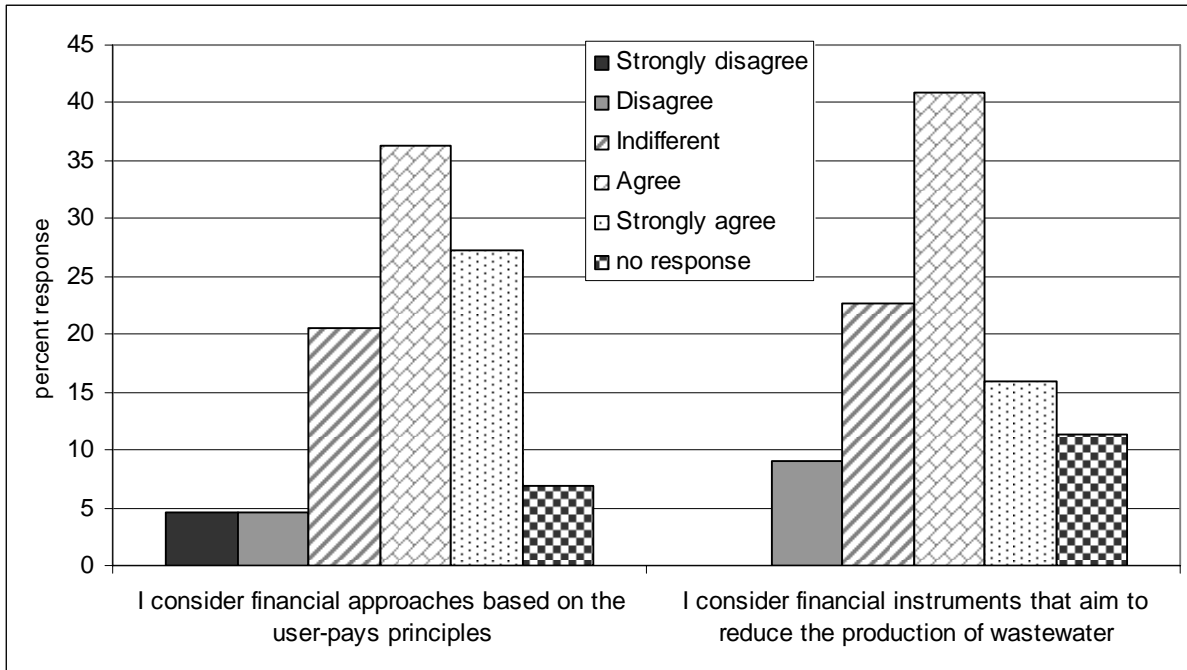
## Finance

The implementation of wastewater management solutions presents major financial challenges to concerned authorities. Participants to the wastewater management course are therefore introduced to the alternative financing mechanisms available for consideration when planning wastewater management projects. In developing solutions to wastewater problems, the participants were asked if they considered financial approaches based on the user-pays principles, and instruments that aimed at reducing the production of wastewater.

Responses received showed that the participants who 'agreed' and 'strongly agreed' to considering financial approaches based on the user-pays principles were 36 % and 27 % respectively (Fig. 9). Those who 'agreed' to considering financial instruments that aim to reduce the production of wastewater were 41 % while 16 % 'strongly agreed'.



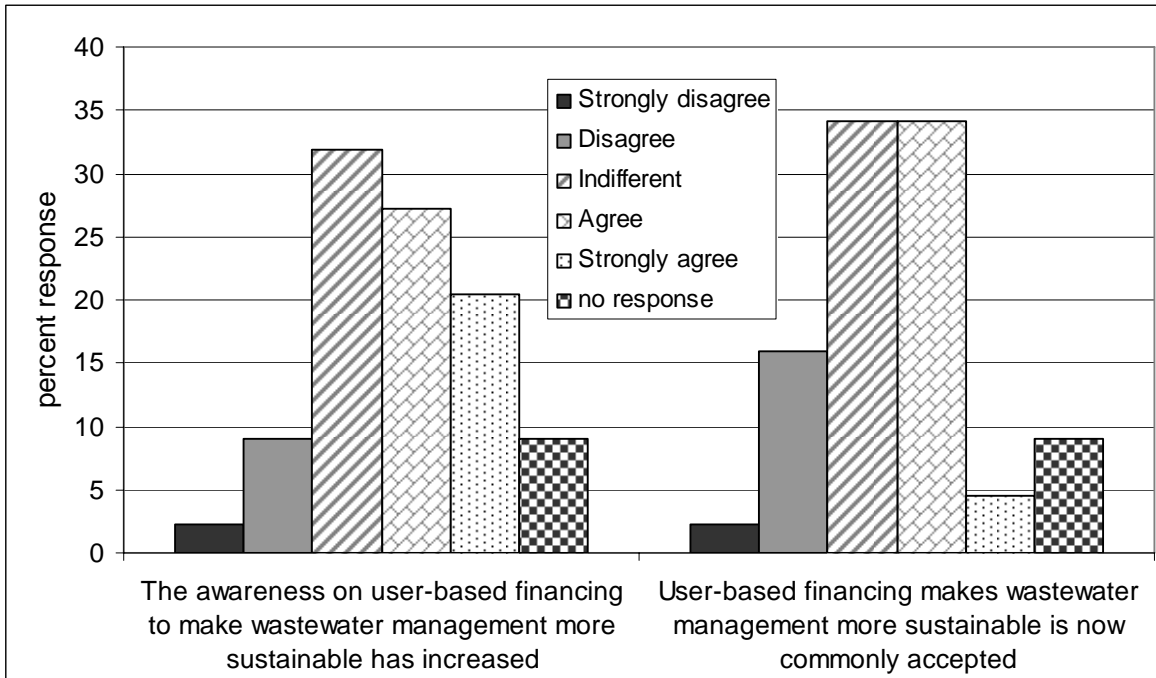
**Figure 8.** Participants had experienced an increased awareness on alternative concepts and receptivity for sustainable wastewater management concepts in their organisation.



**Figure 9.** Participants who consider financial approaches based on user-pays principles and instruments that aim to reduce the production of wastewater.

Beneficiaries of the course who 'agreed' to having witnessed an increase in awareness of user-based financing to make wastewater management more sustainable in their organisations were 27 % (Fig. 10). 32 % felt indifferent when asked if there had been an increase in the awareness while 20 % 'strongly agreed' to having observed it.

An indifference of 34 % was also observed among the respondents when questioned if the user-based financing to make wastewater management more sustainable was now commonly accepted in their organisations. A similar percentage 'agreed' that their organisations accepted it.



**Figure 10.** Participants who had observed an increased awareness and acceptance of user-based financing to make wastewater management more sustainable in their organisations.

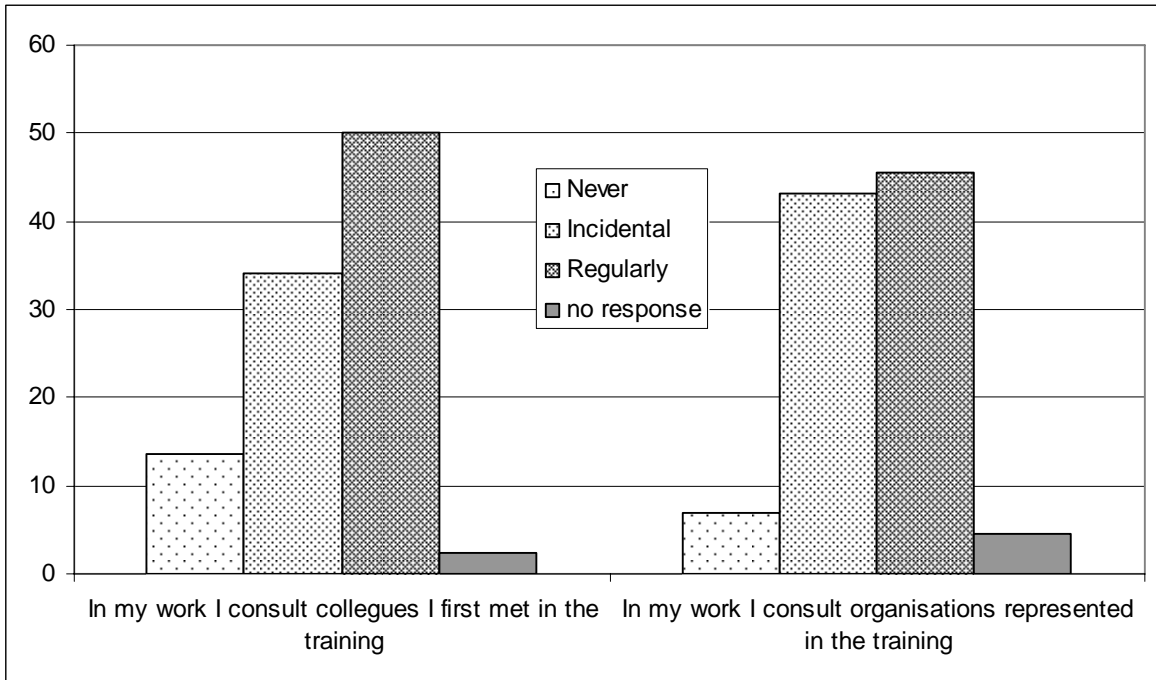
## Networking

One of the several benefits that come with the wastewater management training is the potential to form networks among the wastewater managers. This is important as among others, it allows for consultations and even collaboration in creating wastewater solutions in regions.

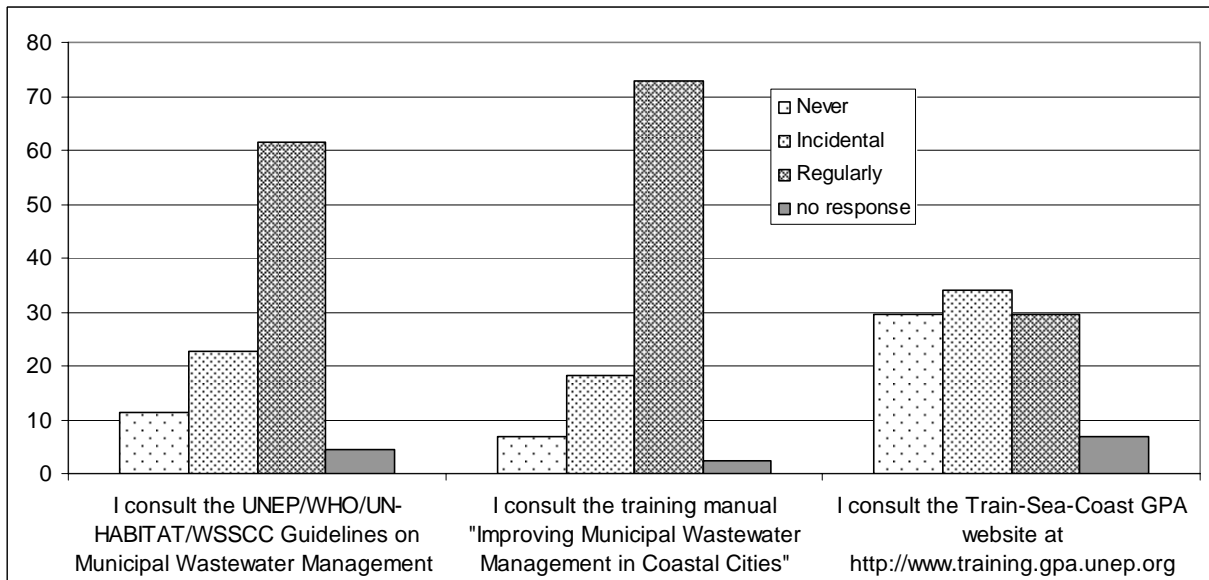
Former participants of the course who regularly consulted with colleagues they had met on the course were 50 % (Fig. 11). Those who consulted with organisations represented during their training were 45 %. Only 14 % and 7 % indicated that they never consulted with the colleagues met or organisations represented at their course respectively.

## Use of materials

During the wastewater management training course, participants are introduced to a number of resource materials including the UNEP/WHO/UN-HABITAT/WSSCC Guidelines on Municipal Wastewater Management, the Training Manual “Improving Municipal Wastewater Management in Coastal Cities and the Train-Sea-Coast GPA website. During this evaluation, those who indicated that they regularly used the UNEP/WHO/UN-HABITAT/WSSCC Guidelines on Municipal Wastewater Management were 61 % (Fig. 12). 73 % regularly used the Training Manual “Improving Municipal Wastewater Management in Coastal Cities while 30 % regularly used the Train-Sea-Coast GPA website. 34 % incidentally used the website.



**Figure 11.** Participants who consulted with individuals and organisations they met at the training.



**Figure 12.** Participants who used some of the material introduced during the training course.

I have not yet implemented fully all of the knowledge gained on the course but have certainly benefited from the practical experiences from the workshop sessions and industry networking opportunity. *Linda Dudley, Barbados.*

## Section 2: Achievements of the course

The objective of the course '*Improving Municipal Wastewater Management in Coastal Cities*' is to support low income countries in developing and implementing sustained actions to prevent, reduce, control and/or eliminate coastal and marine degradation from municipal wastewater. This is achieved through strengthening the capacities of wastewater managers at the municipal level to implement the UNEP/WHO/UN-Habitat/WSSCC *Guidelines on Municipal Wastewater Management*. To ensure that this has been achieved, an assessment of initiatives that the course participants have introduced and/or contributed to as a result of the training they received from the course is necessary. In this survey, the trainees were found to have been actively involved in several wastewater management related initiatives after the course. Below are some of these initiatives.

### Note:

\* = shows organisation from which the course's trainee informed us of the initiative.

## Policy guidelines/regulations

1. Guidelines for monitoring Wastewater Discharge from Hotels within the Kumasi Metropolis Initiated by: Environmental Protection Agency (EPA), Kumasi, Ghana Water Company and Biogas Engineering Limited (BEL)\*, Kumasi. The process of developing the guidelines is ongoing.
2. Policy on the management of contaminated lands. Being developed by Chemicals Control and Management Centre\* of the Environmental Protection Agency, Accra, Ghana. The policy is being developed and training materials on the same will be incorporated.
3. Establishment of a joint venture of a central treatment plant for industries under a public private partnership scheme. Initiated by the Lagos State Environmental Protection Agency\*, Nigeria. The process is ongoing.
4. A feasibility study on the conversion of pig waste to biogas & fertilizers. A study by the Fadama development project\*. The study was initiated in 2008 and is till ongoing.
5. Guidelines for waste water management have been captured in the National Environmental Sanitation Policy which is under review (in 2009). This has been influenced by the Sekondi-Takoradi Metro Assembly, Waste Management Department\*, Ghana.

## **Courses on wastewater management initiated and conducted by trainees after the participating at the GPA wastewater management course**

1. Course module developed on solid waste and wastewater management at the degree courses in Marine Sciences at the School of Marine and Coastal Sciences. This is a third year course module at the university initiated by a trainee at the Eduardo Mondlane University\*, School of Marine and Coastal Sciences.
2. Training of District Assemblies in the Central and Western regions of Ghana. Conducted by the Chemicals Control and Management Centre, Environmental Protection Agency\*, Accra, Ghana in 2008 in Takoradi, Ghana.
3. Training information on wastewater management incorporated in a Master of Philosophy (MPhil.) course on Urban Waste Management at the School of Nuclear and Allied Sciences, University of Ghana/Ghana Atomic Energy Commission Kwabenya. This was during the Second Semester of the course between February – May 2009. This was initiated by the Chemicals Control and Management Centre, Environmental Protection Agency\*, Accra, Ghana.
4. Community facilitators training on Environmental health, Solid waste & wastewater management. The training was conducted in Lindi and Kilwa Districts in Tanzania in May and June, 2009 by COBIHESA\* - Community Based Initiative in Health, Water and Sanitation, Tanzania.
5. Training on health, safety & environment for wastewater operatives within the municipality of Mombasa. The course was conducted in Mombasa in June 2009 by the Coast development authority\*, Kenya.
6. Training on innovative techniques on wastewater management targeting managers. Course conducted in Mombasa in August 2009 by the Coast development authority\*, Kenya.
7. Education awareness workshops on wastewater management targeting the community through Community Based Organisations (CBOs). Workshops were conducted in Mombasa & Malindi in August and October 2009 by the Coast development authority\*, Kenya.
8. Objective Oriented Planning course in water management. The course was conducted at the University of Technology, Kingston, Jamaica in December 2009 with contribution from the Rural Water Supply Ltd.\*, Kingston, Jamaica.
9. Training on the use/design of constructed wetlands in Suriname, Paramaribo, together with the National Women's Movement Suriname. Initiated by the Anton de Kom universiteit\* of Suriname.
10. A training that sought to protect the natural environment through pollution prevention which included training in garbage disposal and waste water disposal. The project was funded by UNDP Global Environment Fund, Small Grants Programme and was carried out in the community of Mile Gully (St. Mary), Jamaica by the Ministry of Water & Housing\* (Rural Water Programme).

## **Wastewater management activities initiated/collaborated/influenced due to the knowledge obtained from the training**

1. Feasibility study to establish a composting plant on Kwame Nkrumah University of Science and Technology Campus (Final Year BSc Eng. Student Project). Done in collaboration with Biogas Engineering Limited (BEL)\*, Kumasi, Ghana.
2. Evaluation of the Energy Potential and Bio-fertilizing Effect of the Guinness Ghana Ltd Biogas Plant for Treating Wastewater (2 Final Year BSc Eng. Student Projects). Influenced by the Biogas Engineering Limited (BEL)\*, Kumasi, Ghana.
3. Energy generation from Anaerobic Wastewater Treatment System: Case study – Korle Lagoon, (Final Year BSc Eng. Student Project). Influenced by Biogas Engineering Limited (BEL)\*, Accra, Ghana.
4. Awareness campaigns in the use of natural resources and importance of mangrove ecosystem at the Eduardo Mondlane University\*, School of Marine and Coastal Sciences. Ilha, Mozambique.
5. Construction of demonstrative biodigester with students at the School of Marine and coastal Sciences of the Eduardo Mondlane University\*, School of Marine and Coastal Sciences. Quelimane, Mozambique.
6. Construction of drainage ditches in the Bairrios of litine and Esteu City Council of the City of the Island\* of Mozambique, Moçambique.
7. Nevis Air and Sea Port Authority (NASPA) treatment plant. Environmental Health Services Division\*, St. Kitts and Nevis. St. Kitts and Nevis, Charlestown bayfront.
8. Nevis Air and Sea Port Authority (NASPA) treatment System. Environmental Health Services Division, St. Kitts and Nevis. St. Kitts and Nevis, Vance W Amory International.
9. Accra Sewage Treatment Plant using UASB (Upflow Anaerobic Sludge Bed ) system to be rehabilitated using innovative technologies in line with course materials. Influenced by the Chemicals Control and Management Centre, Environmental Protection Agency\*, Accra, Ghana.
10. Sensitization meeting to local leaders on waste water management at Lindi and kilwa districts. Lindi Region, Tanzania. Initiated by COBIHESA\*-Community Based Initiative in Health, Water and Sanitation, Tanzania.
11. Public sensitization campaign through Call in Radio Programme on waste water management in the Southern Regions, Tanzania. Initiated by COBIHESA\*-Community Based Initiative in Health, Water and Sanitation, Tanzania.
12. Vigilante groups against institutional discharge of untreated waste set up in the Mpara community of Lindi Region, Tanzania. Initiated by COBIHESA\*-Community Based Initiative in Health, Water and Sanitation, Tanzania.



13. PhD research on the use of constructed wetlands for the treatment of agricultural runoff in Commewijne district, Suriname. This was done at the Anton de Kom Universiteit\*, Suriname, in collaboration with the University of Ghent, Belgium.
14. Sensitization and awareness campaigns against erection of structures on sewer wayleave in collaboration with stakeholders. This was done in the West mainland, of Mombasa, Kenya by the Coast Development Authority\*.
15. Rehabilitation of wastewater collection and treatment facilities on the West mainland of Mombasa, Kenya by the Coast Development Authority\*.
16. Requisition of modern appropriate laboratory equipments under coast region water & sanitation services improvement program funded by the French Development Agency (AFD) at the Kipevu treatment site, Mombasa, Kenya. Requisition done by the Coast Development Authority\*.
17. The Rural Water Project (RWP) in the Ministry of Water and Housing has started the process of building sanitation solutions in partnership with funding agencies. The RWP has also allotted a sum in its budget for addressing sanitation problems in the respective communities in Jamaica (i.e. St. Thomas, St. Mary, Clarendon, and St. Elizabeth). This was initiated by the Rural Water Programme of the Ministry of Water & Housing\*.
18. Establishment of Drains maintenance unit in Sekondi, Ghana. This was done by the Sekondi -Takoradi Metro Assembly, Waste Management Department\*, Ghana.

## **Participants' Plans**

To help direct future training needs and/or support from GPA, it was vital to find out what the participants were planning to do in their organisations as a result of attending the training. Some of the issues that were prominently sited as prime issues for action included:

### Farming activities

Farmers and activities related to farming came into the limelight. In one case for example, wastewater was found to be a nuisance due to lack of drainage facilities in the respective places. A plan to create awareness in effective management of wastewater from aquaculture farms was proposed. The participant proposed making the wastewater available to vegetable crop farmers for irrigation and as a source of fertilizer would provide a good solution to this.

In another case, pesticide use by farmers was found to be a problem that needed attention. The solution proposed was to prepare and offer an intensive training for farmers on the use of approved pesticides in correct quantities. This was foreseen to help in the reduction of nutrient pollution from pesticides that go into water bodies down stream.

### Wastewater treatment

Choice of water treatment solutions, location and financing was another broad topic that came into light. One proposal made was to introduce other innovative approaches of wastewater management in informal settlements. This was going to oversee a healthier environment since the biggest percentage of the population in the said location live in informal settlements.

One participant proposed to lobby water providers to consider low cost ways of managing wastewater from the water systems constructed. This would see more efficient ways of utilising treated water and a reduction in the pollution of water ways by waste water.

The strategic location of a water treatment plants in order to improve the management of wastewater was also proposed in one location. One participant thought of the possibility of promoting the recycling of waste from the treatment plants.

Related to the recycling, one participant is planning to recover energy and nutrients for utilisation in wastewater treatment systems by involving more anaerobic wastewater treatment technologies.

Another proposition involves constructing a wetland to complement existing lagoons in order to further purify the wastewater and re-use it in irrigating a proposed botanical forest. The final treated wastewater will be more polished with reduced nutrients which would otherwise pollute the nearby river and the proposed botanical forest will change the aesthetic value of the university sewage treatments site.

### Education, awareness and advocacy

The subject of training came out strongly in the proposed ideas. This included an advocacy component. Among

- Advocacy and awareness raising to communities along the coast of Mtwara-Mikindani on waste management. This led to an improved environmental health and good waste management in the area

- Use of the TSC wastewater management course resource materials for more training programmes. This would sensitise more professionals on the guidelines for wastewater management.
- Giving lectures to colleagues, new employers and administration staff in the organisation on the topic of wastewater management in order to ensure more involvement of people in the organisation including the top management.
- Improving the content of the training in wastewater management to develop participatory action of the people involved and governments concerned taking into account the sustainable management of wastewater.
- Organise training sessions for persons involved or likely to be involved in the water/wastewater industry.
- Educate more people about the possibility of using waste water in home and office as result of effective treatment. This would reduce overreliance on traditional water sources.
- Educate people on the knowledge acquired from the wastewater course. This will help them change their behaviour on the misuse of water. It could also lead to ideas on the need and how to treat effluent discharges.

### Stakeholder Involvement

The desire to engage stakeholders more in issues of wastewater management was as well seen in the issues that the participants were planning to address.

One of the proposals included engaging the coastal towns to improve upon waste management by involving major stakeholders in order ensure a coordinated effort in waste management. This closely resembled another proposing to guide stakeholders on best practices and ensure they comply with recommended wastewater management guidelines. The guiding is expected to increase and ensure proper maintenance and training of individuals working in the wastewater management sector.

Another idea involves helping farmers prevent/reduce pesticide pollution to groundwater sources. This would be in addition to treating available wastewater through the construction of a wetland system in order to increase availability of usable water through recycling.

### Oil pollution and other wastes

Under this theme, there is an intention to increase surveillance on ships regarding emptying of ballast water and waste management onboard.

There is also a proposal to prevent pollution of coastal water by the mismanagement of used oil. This will improve aesthetics apart from minimising pollution of coastal water bodies from the spent oil.

## **Obstacles expected in implementing the plans**

Participants were able to identify some of the obstacles they are likely to face when implementing the ideas they have. They are as follows:

- a. The methodology of working out a cost-effective evaluation, transportation and delivery system, from the aquaculture pond to the farm.
- b. Slow/lack of acceptability of the idea by target communities.
- c. Difficulty/lack of monitoring and enforcement of ideas implemented.
- d. Lack of support from head office.
- e. Lack of funding resources to enable implementation of the ideas.
- f. Lack of necessary facilities e.g. lab equipment for water analysis.
- g. Change in government/leadership which may jeopardise the continuity of the project.
- h. Time constraints to implement the project.
- i. Lack of relevant information and guidance.

...both the organisation where I work and the government, at large, don't seem to show any interest in adopting and implementing any of the waste water management techniques. *An alumnus from Nigeria.*

## Conclusions and recommendations

The course evaluation shows that the modules provided participants with knowledge and skills that they were able to apply in their work. From the comments received, the overall feeling is that the course needs to reach more players in the wastewater sector. Therefore this report recommends that the course be continued to cover not only more managers in the countries already covered, but also expand its reach in countries not covered yet. This will ensure that more people are informed and are able to make informed decisions regarding wastewater management. For this to be effective, the following should be done:

1. There is a need for a modified version of the course that targets senior management and policy makers concerned with wastewater management. Former participants indicated that there was an immense lack of political will, which in turn affected decision making at the senior management level, hampering efforts by the trainees to implement what they had learnt on the course.
2. A workshop tool for sensitising stakeholders on the ground i.e. local communities needs to be developed. This will be beneficial to trainees of the course in their attempt to sensitise the local communities on wastewater management issues and make it easier for their proposed interventions to be understood and discussed by all stakeholders from an informed point of view. This will ease the decision making process and improve chances of acceptability of interventions by local communities.
3. Farmers are another group that came up severally in the responses by participants. It is also recommended that a tool to educate this special group in regard to waste production and wastewater management is developed. This will help direct trainees on how to sensitise farmers who may form a sizeable number of stakeholders in places where wastewater management interventions are proposed.

Among weaknesses of the course, participants pointed out that it was devoid of sufficient practical examples and data on wastewater management solutions that have been implemented before under the guidance of the course materials. This left participants feeling the course was more theoretical than practical. It is therefore recommended that:

1. UNEP considers embarking on a practical phase of the wastewater course, where it will support practical implementation of wastewater management projects in partnership with governments, agencies and funding organisations. The implementation should be strictly guided by the modules on the course. Lack of financial resources was mentioned as a major problem by the participants in their attempt to implement proposed wastewater management solutions. This will therefore provide part of the solution to countries/regions that will be selected for support.
2. The practical implementation of the projects should go along with with documentation of best practices of implemented projects, not forgetting challenges faced in the process. The documentation should also include passed policies and laws influenced and/or contributed to by participants as a result of attending the course. This will form important documentation not only for use as course material but also for reference by all players interested in the wastewater management sector.

## Annex

### Annex 1: Sample of the Evaluation form

#### IMPROVING MUNICIPAL WASTEWATER MANAGEMENT IN COASTAL CITIES

##### Post Training Evaluation

Dear Course Alumni,

This evaluation is designed to evaluate the impact the training course “Improving Municipal Wastewater Management in Coastal Cities” has had on your individual performance and on your organisation. Kindly fill and send it back to us as soon as you can. Thank you very much for your co-operation.

#### Section 1

Name and contacts:  <i>(please include current phone number and email address)</i>
Course attended: <i>(place, month/year)</i>
Organisation:  <i>(Kindly also indicate if: municipal, research institution, educational institution, etc.)</i>
Country:

#### Section 2:

For the following questions, please indicate your response by circling the appropriate number:  
(1=strongly Disagree; 2=disagree; 3=indifferent; 4=agree; 5=strongly agree).

#### Objective Oriented Planning

In dealing with wastewater management problems, I increasingly ensure that projects are:

	1	2	3	4	5
formulated in a structured manner					
implemented in a structured manner					
evaluated in a structured manner					

In my organisation objective Oriented Planning is now commonly used for

	1	2	3	4	5
Formulation of projects					
Implementation of projects					
Evaluation of Projects					

#### Stakeholder Participation in wastewater management projects:

	1	2	3	4	5
I take into account the interests of various stakeholders					
I make a deliberate effort to involve various stakeholders and ensure they actively participate in the development of the project					
My organisation has increasingly paid attention to interests of the stakeholders when dealing with wastewater management issues					
My organisation has more systematically involved stakeholders in addressing wastewater issues					

**Technological approaches**

In developing technological solutions to wastewater problems,

	1	2	3	4	5
I consider approaches based on the principle of pollution prevention					
I consider approaches that aim at re-use of resources					
I consider the potentials and constraints of centralised vs. decentralised solutions					
In project design, technological & environmental sustainability are major guiding principles					

In my organisation:

	1	2	3	4	5
The awareness on alternative concepts to make wastewater management more sustainable has increased					
Alternative concepts to make wastewater management more sustainable are now commonly accepted					

**Finance**

In developing solutions to wastewater problems,

	1	2	3	4	5
I consider financial approaches based on the user-pays principles					
I consider financial instruments that aim to reduce the production of wastewater					
In Project design, financing operation & maintenance on user-based principles are major guiding principles					

In my organization:

	1	2	3	4	5
The awareness on user-based financing to make wastewater management more sustainable has increased					
user-based financing to make wastewater management more sustainable is now commonly accepted					
Awareness about financial instruments to reduce the production of wastewater has increased					
Financial instruments to reduce the production of wastewater are now commonly Accepted					

In the following questions, please tick the box that closely reflects your opinion.

**Networking:**

In my work, I now consult:

	Regularly	Incidental	Never
With my colleagues, who I first met in the training			
With other organisations represented in the training			

**Use of materials:**

In my work, I consult

	<b>Regularly</b>	<b>Incidental</b>	<b>Never</b>
The UNEP/WHO/UN-HABITAT/WSSCC Guidelines on Municipal Wastewater Management			
The Training Manual "Improving Municipal Wastewater Management in Coastal Cities"			
The Train-Sea-Coast GPA website at <a href="http://www.training.gpa.unep.org">http://www.training.gpa.unep.org</a>			

**Section 3:**

The training has guided us to develop/revise the following policy guidelines/regulations

<b>Policy</b>	<b>Year developed/revised</b>

Guided by your approach/guidelines/standards, we have replicated or are planning the following similar training activities on wastewater management:

<b>Training</b>	<b>Location</b> <i>(Country and locality)</i>	<b>Date</b> <i>(month/year)</i>



We have initiated/collaborated/influenced the following wastewater management activities due to the knowledge obtained from the training;  
 (Please include any local projects, waste management plants, advocacy and awareness campaigns etc.)

<b>Activity</b>	<b>Location</b> (Country and locality)	<b>Date</b> (month/year)

**Section 4:**

<b>What are you planning to do differently in your organisation as a result of this training?</b>	<b>Who do you intend to involve? (If anyone)</b> Inside/ outside your organisation	<b>What will the changed situation look like?</b>	<b>How will you get support for the change?</b>	<b>Any obstacles (&amp; ideas for overcoming them)</b>	<b>When will you do this? (and include date when done)</b>

Please feel free to make additional comments below:

## Annex 2: Courses evaluated

<b>Courses evaluated</b>	<b>ACP Course number</b>	<b>Number of participants sampled</b>
Paramaribo, Suriname I, July 2007	ACP course 1	22
Beira, Mozambique II, July 2007	ACP course 2	11
Ilha de Mocambique, Mozambique III, August 2007	ACP course 3	4
Kingston, Jamaica I, March 2008	ACP course 4	24
Nairobi, Kenya I, April 2008	ACP course 5,	33
Bridgetown, Barbados I, April 2008	ACP course 6,	28
Accra, Ghana I, May 2008	ACP course 7,	30
Mombasa, Kenya II, July 2008	ACP course 8,	21
Sekondi - Takoradi, Ghana II, July 2008	ACP course 9,	22
Kumasi, Ghana III, July 2008	ACP course 10,	21
Calabar, Nigeria I, September 2008	ACP course 14,	23
Port Harcourt, Nigeria II, October 2008	ACP course 15,	23
Lagos, Nigeria III, December 2008	ACP course 20,	24
<b>Total</b>	<b>13</b>	<b>286</b>