



RESULTS ORIENTED MONITORING REPORT

Grant Contract Beneficiary: ***Sapienza University of Rome***

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Partner in the Action: ***Ardhi University Dar es Salaam***

Associate in the Action: ***Dar City Council***

Project title: ***Adapting to Climate Change in Coastal Dar es Salaam***

Project acronym: ***ACC Dar***

Contract number: ***2010/254-773***

Project duration: ***01/02/2011 – 31/01/2014***

Reporting period: ***From 30/06/2012 to 31/12/2012***

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Data contribution and reviews to the successful submission of this report have been provided by all the project team members





Individual commitment identification number:	2010/254-773
Title of the Action:	Adapting to Climate Change in Coastal Dar es Salaam
Name of Beneficiary:	DICEA Sapienza University of Rome
Name of Local Partner:	Ardhi University of Dar es Salaam (ARU)
Period Covered by this report	1 st of July 2012 – 31 st of December 2012

CONTRACTUAL & FINANCIAL ISSUES:

Expenditure ratio since start of the project:	57,35% in relation to the total cost of the action (as per art. 3.1 Grant Contract – BUDGET), all sources and contingencies included
Expenditure ratio since last payment (<, > 70%):	96,15% in relation to the second instalment of financing
Planned date of submission of next payment request:	1st of February 2014
<i>Issues Arising/Corrective Measures: What constraints/problems are currently being faced? What action has been taken, and by whom, to address these? What further action is required to support effective implementation, by whom and when?</i>	
<p>No relevant issues have arisen related to contractual and financial matters during the semester object of this report.</p> <p>The second instalment of the financing was received at the beginning of June 2012.</p> <p>The request for a budget addendum was discussed and submitted in November. It was justified by some few changes incurred during the project implementation.</p>	

EXECUTIVE SUMMARY:

<p>During the reporting period the development of the action did not encounter any relevant constraint. Main results and outputs are summarized here following.</p> <p>In <u>work package 1</u> “Improve Understanding in Adaptation”, the second participatory cycle through Forum Theatre technique was held in September in Kigamboni ward. More than 500 persons participated in the final events giving important feed-back on the impact of access to land on household adaptive strategies.</p> <p>In <u>work package 2</u> “Develop Methodologies for Designing Adaptation Initiatives”, three research teams are working in parallel. One team already developed and validated the methodology to monitor Land Cover changes, using remote sensing images (land cover maps and related working papers are published into the project web site). Its results are feeding into the work of the second team, who is performing the monitoring of coastal shallow watershed, to create scenarios on people’s vulnerability to seawater intrusion and identify priorities for adaptation. The third team is working on the methodology to ensure people’s participation in the goal</p>



formulation process, using back-casting scenario techniques. A preliminary framework of the whole workflow from land cover mapping and groundwater monitoring to goal formulation has been defined.

The results of this WP will be presented in the International Workshop foreseen in Rome on April 2013.

In work package 3 “Build the Capacity of Dar’s Municipalities”, the capacity-building strategy has been prepared. It includes 3 weeks of residential training during 6 months tutored on the job training aimed to develop the trainees’ capabilities for mainstreaming adaptation goals into their daily job. Trainees will present their proposals for adaptation during a city conference on June 2013. The target group for the capacity-building are 40 officers from urban development and environment management units within DCC, Dar’s Municipalities, Ruvu Basin Authority, DAWASA and DDCA. To date, the selection of trainees is still on-going while the selection of trainers has been completed and they are working at the preparation of the training materials.

The strong commitment and the availability of the local authorities at all institutional levels (DCC, Dar’s municipalities, community leaders and street leaders) remain an asset to secure project goals achievement.

CONTEXT (EXTERNAL FACTORS):

The development of the action did not encounter relevant constraints; there have not been changes in the project operating context during the reporting period. All the assumptions described in the log-frame have been fulfilled. In particular the following considerations should be relevant:

- The institutional commitment.

The institutional commitment remains a strong asset to facilitate the implementation of the project activities. The mtaa leaders provided invaluable assistance during the second cycle of participatory workshops with the local community. The DDCA officers facilitated the boreholes’ monthly monitoring activity . The interviews to complete the overview of the institutional framework and assess the training needs have been performed thanks to the willingness of the LGAs officers. The directors and department heads of DCC and of the three municipalities are collaborating actively with the selection of the participants to the next capacity-building activity.

- Community involvement.

Success in community involvement in the project activities has been demonstrated by their strong and active participation at the five forum theatre events. Almost 500 people have attended the events allowing the project team to obtain a wide range of information about “people CC adaptation options and strategies and their link with the issue of the access to land”.

MANAGEMENT (INTERNAL FACTORS):

Internal project management and coordination



No changes incurred in the internal project management and coordination issues. The Project Coordination Team has met several times in Dar es Salaam during the semester.

The joint Working Groups under WP1 and WP2 have carried out the activities with the achievements described in the next paragraphs. Their results have been evaluated by the Project Coordinator and the Local Coordinator; their interim reporting as well as their meetings in Dar es Salaam have been supported and monitored by the Project Manager.

The internal communication flow between the two partners and among the working group members has been on almost weekly basis; exchange of documents took place mainly by email and uploading them in the reserved area of the project web site.

Internal monitoring of the project activities has been carried out by the Project Manager through analysis of documentation and meetings with the project staff.

Specific objective and results relevance and innovative activities

Project specific objectives and results remained relevant. Achievements have been reached as described in the next two chapters and the table of the indicators annexed to this report has been updated.

As in the previous semester the innovative activity deserving to be mentioned is the methodology used also in the second cycle of the participatory activity: the “Participatory Theatre (PT)” through the “Theatre of the Oppressed (TO)” tool. Also in this second cycle, the results in terms of people involvement and of findings useful to validate and increase the research related the WP 1 have been beyond expectations. The methodology will be part of the training programme in the future capacity-building activity with the aim to transfer it to the LGAs officers.

Work plan

The only one change in the project work plan has been the postponement of the whole Working Package 3. As a consequence, the residential training and the mid-term conference will take place in the next semester.

PROGRESS IN ACHIEVING OBJECTIVES:

Progress towards the specific objectives during the reporting period could be summarized as following.

- The activities under WP1 are devoted to the purpose of increasing knowledge on people’s adaptive capacity and related LGSs’ awareness and action.

The results from the analysis of data collected during the first year were adjusted and consolidated following discussion held during the first international forum in June 2012. Moreover, by combining data from the household survey with 2011 land cover classification, a better understanding of adaptive capacity distribution across Dar’s coastal plain has been achieved.

Findings in terms of autonomous adaptation strategies have been explored further through the second participatory cycle held in August-September 2012. People’s participation allowed a better understanding of the impact of access to land on



household adaptive strategies.

- The activities under WP2 are addressed to the specific objective of developing methodologies for integrating adaptation activities into strategies and plans for UDEM in coastal unplanned and underserviced settlements.

Progress achieved to date includes the validation of the land cover map of Dar region previously developed from Landsat and Spot images. An on-site survey of 100 randomly chosen locations was performed and its results were combined with reference data selected through the photo interpretation of a set of 500 points. Accuracy was assessed for both Landsat and Spot images' classifications, the former resulting more suitable than the latter.

Changes in land cover between 2002 and 2011 have been analysed in order to improve knowledge of peri-urban dynamics across Dar's coastal plain. Moreover, an estimate of household density by land cover class is under calculation for year 2011, using data from the household survey. Those analysis are crucial to understand the relation between land cover change and seawater intrusion and to develop future scenarios on boreholes' salinization, combining trends in urban sprawl with predicted CC effects on local climate parameters. The choice to focus attention on groundwater condition was made last year as it resulted to be a major issue for the target population's vulnerability to CC.

The monitoring of coastal shallow watershed condition is also progressing and its completion is foreseen by January 2013. However the analysis of data from the first campaigns has already started to ensure that a preliminary interpretation of the seawater intrusion phenomenon in Dar's coastal plain will be available on-time to feed into the training program under WP3.

Meanwhile, a methodology to create scenarios on people's vulnerability to seawater intrusion and identify priorities for adaptation is under development. It draws upon previous assessment of present vulnerability in Kinondoni municipality and updated review of the literature on scenario techniques.

An International Workshop to evaluate the methodology for developing vulnerability scenarios will be held in Rome on April 2013.

How to ensure people's participation in the goal formulation process is the challenge at stake now. The idea is to use theatre forum combined with back-casting scenario technique to identify locally relevant goals for adaptation to future borehole salinization. A preliminary framework of the whole workflow from land cover mapping and groundwater monitoring to goal formulation has been defined.

- The methodologies and tools developed under WP1 and WP2 are oriented toward the WP3 objective of building the capacity of Dar's local authorities for the design of community based adaptation initiatives as part of the implementation of the NAPA action of the United Republic of Tanzania.

The activities under WP3 specifically aim to enhance the capacities of Dar es Salaam's Local Authorities in understanding CC issues related to Dar's coastal plain and peri-urban livelihood systems; in identifying effective measures for



supporting the coastal peri-urban inhabitants in their efforts to adapt to CC; and, in integrating them into existing urban development and environmental management strategies and plans.

The capacity-building strategy has been developed to meet the LGAs' needs assessed in the previous semester. The capacity-building process, the method for the selection of participants, the delivery method for the training and the main topics of the programme have been decided through consultation with department heads from DCC, Dar's Municipalities, Ruvu Basin Authority, DAWASA, DDCA and some other relevant stakeholders.

PROGRESS IN ACHIEVING RESULTS:

Progress towards the first expected result, a better understanding of actual and practical ways of addressing CC adaptation in coastal areas of Dar es Salaam, is summarized here following.

The second cycle of the Participatory Theatre for exploring the links between autonomous adaptive strategies and the issue of the access to land has been carried out by Sapienza and Ardhi University staff in Dar between 27th of August and 9th of September 2012 in Kigamboni area. A first workshop, involving about 27 people living in this area, explored stories related to land issues creating a space for discussion about possible options to overcome problems people experienced in their daily life. In a second workshop, a local group of artists was trained on the Forum Theatre technique and a play was prepared drawing upon the discussion held in the first workshop. In the third phase, five public Forum Theatre sessions were organized where the artists performed the play while two students from Ardhi University and an expert from Sapienza University facilitated the discussion. Almost 500 inhabitants of Kigamboni ward attended those events.

A working paper about methodology and results of the whole participatory activity is under elaboration.

The second result foreseen by the project is the enhanced development of methodologies for supporting inhabitants of coastal unplanned and underserved settlements in their efforts to adapt to CC. Major developments are described here below.

The methodology for the semi-automatic classification of Land Cover, using remote sensing images has been developed by Sapienza University. It allows to monitor Land Cover changes in Dar's settlements. The developed methodology is very affordable, because it is based on the use of free satellite images (i.e. Landsat provided by USGS and SPOT provided by ESA). Land Cover maps of Dar es Salaam have been produced in relation to the years 2002, 2004, 2007, 2009 and 2011 and they are already accessible on the project website. Furthermore, the Land Cover map accuracy has been assessed through photo interpretation and field survey, demonstrating the reliability of the methodology. Several working papers have been published describing the methodology phases, from image classification to Land Cover validation.



The third working paper about the methodology and the results, “Development of a Methodology for Land Cover Classification Validation”, has been elaborated and as soon as possible will be uploaded on the project web site.

A preliminary framework of the methodology for exploring CC vulnerability scenarios has been developed.

The analysis of the salinization processes in Dar es Salaam coastal aquifer, which involves the assessment of the temporal evolution of piezometric level, electrical conductivity and groundwater chemistry, is proceeding along with the progress in the groundwater monitoring activities. Two major monitoring campaigns (“long term activity”), involving the whole boreholes network, have been carried out in June 2012 (after the “long rainy season”), and in November/December 2012 (before the “short rainy season”). Moreover, two minor monitoring campaigns (“monthly activity”), involving a sub-group of boreholes, have been executed in September 2012 and October 2012.

Some already consolidated approaches for mainstreaming have been identified. During the next semester one of them will be chosen for mainstreaming adaptation to CC at local level.

As regards the third project result “Enhanced capacities of Dar's municipalities in understanding CC issues, designing adaptation activities and integrating them in their UDEM strategies and plans” during the reporting period the capacity-building strategy has been decided. In particular, the objectives and the methodology for the whole action have been designed. The delivery methods, location and the contents for the residential training has been designed on the basis of the results of the needs assessment conducted last semester. The training director and the trainers have been selected and a draft of the contents for each training module has been developed. The addressees of the capacity-building are from the local government authorities and water utility and water resources management organizations who are dealing with issues pertinent to climate change adaptation and environmental planning and management. Their selection already started (at the state of the art the participants selected are from Ilala Municipality, Ruvu Basin Authority and Temeke Municipality).

Dissemination of the activities and of its results:

- The project web site <http://www.planning4adaptation.eu> has been updated with the latest materials in its section “Dissemination”
- The project activities and the first results have been disseminated by the project team participating in some national and international events, and presenting articles for publication:
 - Ricci L. “Vulnerability and Adaptive Capacity in Peri-urban Areas: Investigating Autonomous Adaptation in Dar es Salaam. Presented at the 26th Annual Congress of the Association of European Schools of Planning (AESOP), Ankara, TK, 11-15 July 2012.
 - Faldi G., Rossi M., Sappa G. “Anthropogenic and climate change effect on



- seawater intrusion in Dar Es Salaam coastal aquifer”. Presented at the 39th Congress of the International Association of Hydrogeology (IAH), Niagara Falls, CA, September 2012.
- Macchi S. “Cambiamento climatico, narrazioni e progetti di adattamento”. In: CRIOS. Critica degli ordinamenti spaziali, vol. 4, p. 75-87, ISSN: 2279-8986, November 2012.
 - Macchi S. “Pianificare l'adattamento al cambiamento climatico: questioni aperte per la ricerca nelle città sub-sahariane. CONTESTI. Città, Territori, Progetti. Vol. 1-2, p. 109-114, ISSN: 2035-5300, November 2012.
 - AA.VV. “Development of a Methodology for Land Cover Classification in Dar es Salaam using SPOT Imagery”. Submitted to ESA Earthnet (<https://earth.esa.int>) in November 2012.
 - Philip Mwakyusa, from DCC, presented the project during the workshop on “Resilient Cities” in the framework of the 6th World Urban Forum, Naples, September 2012.
- Working papers related to the activities 1.3, 2.2 and 3.1 are under elaboration.
 - Maps of land cover classification and the data base of the 6000 households survey have been uploaded for the public within the web site.
 - Project brochure were distributed during the 6th World Urban Forum, held in Naples in September 2012.

EU visibility has been ensured for each of the above mentioned dissemination activities following the rules of the “Communication and Visibility Manual for European Union External Actions” (EuropeAid, 2010)

PROGRESS IN CROSS-CUTTING ISSUES:

The action pays special attention mainly to three cross-cutting objectives: environmental protection, promotion of gender equality and equal opportunities and good governance.

- As regards the environmental issues, the whole action is based on the purpose of ensuring the environmental sustainability of adaptive measures and strategies. The target groups of the action are those living in coastal unplanned and underserviced settlements whose livelihood is strictly depending on natural resources. By drawing on people’s daily experience, the action ends up in identifying the environmental processes that are in a critical condition and in valuing good practices of natural resources management. Furthermore the protection of natural resources is one of core elements of the “vulnerability” concept. These premises are mainstreamed into all the analysis and methodologies under development. Findings related to environmental issues are spread across the working papers already available at www.planning4adaptation.eu
- Women’s concern about CC impacts as well as gender aspects of adaptation have



been taken into account as a fundamental piece of knowledge. Equal participation of men and women in the Forum Theatre events has been ensured.

Women hold prominent positions in the action management (i.e. Project Coordinator, Project Manager, research staff member of the working groups).

- DCC and municipalities' involvement in the project is essential to facilitate the implementation of the project activities and to ensure the action to be consistent with their strategies and the local institutional framework.

Their availability, commitment and willingness to collaborate is especially crucial in this phase of the project, to carry out effectively the capacity-building process.

ISSUES FACED/CORRECTIVE MEASURES:

What constraints/problems are currently being faced? What action has been taken, and by whom, to address these? What further action is required to support effective implementation, by whom and when?

Due to the bad conditions of some boreholes in terms of accessibility, lack of pumps or broken pumps, the number of the selected boreholes for the monitoring network has been reduced from 90 to 79, nevertheless maintaining the same uniformity in spatial distribution.

The effective involvement of the LGAs and the selection of the trainees took a long time. As a consequence the capacity building programme has been rescheduled. The first residential training will start in the next semester and the midterm conference will take place at the end of the whole training with the aim to present to the public the proposals of adaptation initiatives elaborated by the trainees.

VALID COMMUNICATION PLAN: YES NO

ANNEX: RESULTS TRACKING TABLE

RESULTS-TRACKING TABLE

Summarise state of progress since the start of the project towards delivering the action expected results.

Compare progress against plans, using log-frame indicators as appropriate.

State whether original OVIs are not applicable any longer and suggest most appropriate SMART indicators.

Result Description	Result Indicator (OVI)	Target	Performance Rating (Red, Yellow, Green)	Progress/Arising Issues	Action Required by the which implementing partner/s
1.1 Livelihoods of population dependent on natural resources and their concern for CC investigated	N. households questionnaire administered/ Households questionnaire validated in the data entry	6000/5885	Traffic Light		
	N. people involved in the Data Analysis training course	26	Traffic Light		
	N. Data Analysis Methodologies implemented	3	Traffic Light		
1.2 Dar's institutional activities related to CC investigated	N. officers participating in the kick off meeting	10	Traffic Light		



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	N. officers interviewed	48	Traffic Light		
1.3 Local options of autonomous adaptation and raise awareness on CC explored	N. people involved in the feasibility study	28	Traffic Light		
	Participatory cycles realized	2	Traffic Light		
	N. people involved in the participatory cycles	At least 100 people for each cycle	Traffic Light	Almost 400 people involved in the first participatory cycle held in March 2012. Almost 500 people involved in the second cycle held in September 2012	
1.4 1st International Workshop organized	N. Background papers	2	Traffic Light		

	N. papers presented	4	Traffic Light		
	N. people attending the workshop	10 researchers from each university partner country (Tanzania and Italy); 3 seniors from EU universities; and 3 seniors from EAC/SADC universities	Traffic Light	4 senior researchers from EU universities and 2 from EAC/SADC universities	
2.1 Methodologies for monitoring changes in peri-urban settlements developed	N. methodologies developed for monitoring Land Cover changes	1	Traffic Light	2 (two similar methodologies, respectively for LANDSAT images and SPOT images)	
	N. LANDSAT images acquired/ N. LANDSAT classifications/ N. LANDSAT images processed	5 images acquired / 5 classifications/ 5 images processed (period 2002-2010)	Traffic Light		
	N. Landscape Metrics Indices calculated for Land Cover change analysis	8	Traffic Light		

	N. people involved in the training short course on land cover classification and landscape metrics analysis	20	Traffic Light	It will be provided in the 5 th semester	SAPIENZA
	N. methodologies developed for Land Cover validation	1	Traffic Light		
2.2 Methodologies for exploring CC vulnerability scenarios, as regards seawater intrusion phenomenon, developed	N. methodologies for conducting groundwater monitoring campaigns in Dar's coastal plain/ N. georeferenced boreholes / N. boreholes selected for the monitoring network	1 methodology/ 133 georeferenced boreholes/ 90 boreholes selected for the monitoring network	Traffic Light		
	N. groundwater monitoring campaign conducted	1	Traffic Light	The survey activity has started in June 2012. 2 major monitoring campaigns (long term activity) have been carried out. 2 minor monitoring campaigns (monthly activity) have been carried out. 2 further minor monitoring campaigns have been planned	SAPIENZA is leader of the activity ARU is responsible for monitoring



				for January 2013 and February 2013. 1 short term monitoring activity (weekly campaign) has been planned for January/February 2013.	
	N. methodologies for the analysis of seawater intrusion / N. maps produced	1 methodology / 9 maps (SWL maps, EC maps, Seawater intrusion maps for 1997, 2002, 2012)	Traffic Light	The methodology for the analysis of the seawater intrusion has been defined and the evaluation of the evolution of the phenomenon is started.	SAPIENZA
	N. methodologies for exploring vulnerability scenarios under climate change / Number of scenarios explored	1 methodology 3 scenarios explored	Traffic Light	The methodology for exploring vulnerability scenarios under CC has been partially defined. The chosen methodology may be subject to variation in relation to the results achieved in the seawater intrusion analysis. The scenarios will be built once the survey activity has finished	SAPIENZA & ARU
	N. methodologies for investigating Land Cover Change correlation with Climate Change	1	Traffic Light	The scenarios will be built once the survey activity has finished	SAPIENZA & ARU
2.3 Methodology for designing community based adaptation initiatives developed	N. of methodologies for designing community based adaptation initiatives Toolkit for the design methodology	1 methodology 200 copies	Traffic Light	The methodology is under development The toolkit will collect the	SAPIENZA & ARU

				methodologies from 2.1 and 2.2	
2.4 2nd International Workshop organized	N. Background papers	2	Traffic Light	2 working papers are now under development	SAPIENZA & ARU
	N. papers presented	4	Traffic Light		SAPIENZA & ARU
	N. people attending the workshop	10 researchers from universities of each partner country (Tanzania and Italy); 3 seniors from EU universities; and 3 seniors from EAC/SADC universities	Traffic Light		SAPIENZA & ARU
3.1 Capacity building strategy prepared	N. Need assessment report of the training needs of municipal staff	1 need assessment	Traffic Light		
	N. Officers involved in the need assessment	At least 40	Traffic Light	50	
	N. capacity-building action plan	1	Traffic Light		
3.2 Training programme developed and implemented	N. learning curricula / N. evaluation procedures	2 learning curricula / 1 evaluation procedure	Traffic Light	A draft version of the learning curricula has been submitted to the DCC for feedback	ARU & SAPIENZA



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	N. Training resource book	1	Traffic Light	Background material has been prepared for the training modules	ARU & SAPIENZA
	N. Officers involved in the training	20	Traffic Light	At the moment the selection process of the target is still in progress.	ARU & SAPIENZA
3.3 Mid term International Conference organized	N. submitted papers	12	Traffic Light		ARU & SAPIENZA
	N. People attending the Conference	100	Traffic Light		ARU & SAPIENZA
	N. Press release	At least 2	Traffic Light		ARU & SAPIENZA
3.4 Dar's municipalities supported in designing adaptation initiatives	N. Adaptation initiatives designed	At least 4	Traffic Light		ARU & SAPIENZA
3.5 3rd International Workshop organized	N. Background papers	2	Traffic Light		SAPIENZA & ARU
	N. papers presented	4	Traffic Light		SAPIENZA & ARU
	N. people attending the workshop	10 researchers from universities of each partner country (Tanzania and Italy); 3 seniors from EU	Traffic Light		SAPIENZA & ARU

		universities; and 3 seniors from EAC/SADC universities			
Dissemination results	N. scientific papers submitted to academic journals	At least 2 related to the result 1.1; At least 1 related to the result 1.2; At least 3 related to the result 2.1; At least 3 related to the result 2.2	Traffic Light	Draft working papers are ready; Draft working papers are ready; Some draft are under development It will start in the 5th semester	SAPIENZA & ARU
	N. evaluation reports	6 (2 evaluation reports for each international workshop)	Traffic Light	2 evaluation report already produced for the 1 st international workshop	SAPIENZA & ARU
	N. Proceedings (international workshop and conference)	4 proceedings (1 for each international workshop and 1 for the international conference)	Traffic Light	Proceedings of the first international workshop are under preparation	SAPIENZA & ARU
	N. Booklets reporting on designed adaptation initiatives	500 copies	Traffic Light		SAPIENZA & ARU
	N. Posters on the identified adaptation initiative	100 copies	Traffic Light		SAPIENZA & ARU



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	N. Web sites	1 web site with a public and a reserved area	Traffic Light	Updating of the contents during the whole project	SAPIENZA
	N. Newsletters	10 (three-monthly based)	Traffic Light	Newsletter will be sent during the whole project	SAPIENZA
	N. Promotional material kit	1 brochure + 1 bag + 1 CD Rom	Traffic Light	Pen-drive has been produced instead of CD Rom. Also t-shirt and posters have been produced for dissemination and visibility during participatory cycles	