CONTRAST report on the fourth annual workshop, 2009

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CONTRAST

Report on the fourth annual workshop 5-9 October 2009

Kilifi Bay Beach Hotel, Kilifi, Kenya

CONTRAST - A multidisciplinary alliance to optimize schistosomiasis control and transmission surveillance in sub-Saharan Africa

The CONTRAST group in front of the Kilifi Bay Beach Hotel, Kilifi, Kenya

Report by
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European Union funded Specific Targeted Research or Innovation Project
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Organized by DBL as the project coordinator

Contents

Summary

The CONTRAST fourth annual meeting was held from 5-9 October 2009 at the Kilifi Bay Beach Hotel in Kilifi, Kenya.

The meeting was the fourth joint workshop for all partners involved in the European Union funded Specific Targeted Research or Innovation project having the full title: ***A multidisciplinary alliance to optimize schistosomiasis control and transmission surveillance in sub-Saharan Africa.***

The partners in CONTRAST are:

1. DBL – Centre for Health Research and Development (DBL), Denmark
2. Natural History Museum (NHM), United Kingdom
3. Swiss Tropical Institute (STI), Switzerland
4. Imperial College London (ICL), United Kingdom
5. Makerere University (MU), Uganda
6. University of Zambia (UNZA), Zambia
7. National Museums of Kenya (NMK), Kenya
8. Institut Sénégalais de Recherches Agricoles (ISRA), Sénégal
9. Programme Nationale de Lutte contre la Bilharziose et les Geohelminthes (PNLP), Niger
10. Centre for Schistosomiasis and Parasitology (CSP), Cameroon
11. MOH and Social Welfare, Helminth Control Programme (HCL), Zanzibar, Tanzania
12. National Institute for Medical Research, Mwanza Research Centre (NIMR)
13. Coris Bioconcept (CB), Belgium
14. Vector Control Division, MOH (VCD), Uganda

The workshop was organized jointly by the CONTRAST partner from Nairobi, National Museums of Kenya (NMK), and the Danish partner DBL, Faculty of Life Sciences, University of Copenhagen. A total of 36 participants attended the workshop, coming from all CONTRAST partner institutions except partner no. 13 (Coris Bioconcept). Partner 2, NHM, briefed on CORIS involvement during the past year. The gender balance for the workshop was 8 women and 28 men (only counting CONTRAST partners).

The meeting on the first day started with an official opening, featuring the CONTRAST executive committee, the host and two guest speakers; Dr. Idle Omar Farah, the Director General from NMK and Dr. Jacob Miaron, Permanent Secretary from Ministry of Cultural and Natural Heritage. Also attending the official opening and the first day's presentations were delegates from KEMRI, XXX and XXX.

Following the official opening the coordinator gave a status of the project work. This was followed by a scientific program, where presentations of results from each work package were given. Below is a table showing which WPs were presented. A full program can be found on page XXX of this report.

WP number	Objective number	Presentations
3	1 Molecular tools	4
4	1	3
5 and 6	1	1
7	1	2
8	1	2
10	2 parasite host relationships	4
11	2	4
12	1	1
14	3 GIS and spatial epidemiology	1
15	3	1
17	3	1
19	4, Social science approach	1
20	4	1
21	1	1
22	5, Dissemination and outreach	1
15 WPs presented	**All objectives covered**	**29 scientific presentation**

The following days the members of the participants worked on coordinating the activities within the individual work packages, making sure that the deliverables laid out in the CONTRAST project document are going to be met.

About CONTRAST

The project entitled *A multidisciplinary alliance to optimize schistosomiasis control and transmission surveillance in sub-Saharan Africa* (acronym: CONTRAST) received per September 2006 funding from the European Commission, Sixth Framework Programme: Specific Targeted Research or Innovation Project. The start of the 4-year project was October 1st, 2006.

CONTRAST is a multidisciplinary alliance bringing together key skills and expertise to generate new knowledge on biological, environmental and socio-economic factors relating to schistosomiasis in sub-Saharan Africa. The project will complement ongoing chemotherapy campaigns based on the drug praziquantel and deliver more effective strategies for long-term control of this debilitating disease. The project addresses the basic need of endemic countries to improve understanding of schistosomiasis transmission, in order to target, and make best use of limited resources for control.

CONTRAST will lead to better local control solutions that are more sustainable. Working with European partners (established Research Institutes and a representative from the commercial sector), a strong research node network across sub-Saharan Africa will: establish innovative molecular tools to characterize both snails and schistosomes, define the importance of host-parasite dynamics across different ecological and epidemiological settings, develop new spatial models for disease risk maps and prediction, encourage and assess novel local control interventions using a social science approach and ensure widespread dispersal and access to information. CONTRAST is committed to creating a new and much needed platform for integrated schistosomiasis control in Africa, which will be effective and sustainable at the local, national and regional level.

For project objectives 1-4, the CONTRAST project have established specific research nodes facilitating and coordinating the work, in close collaboration with the northern partners. The technology transfer from north to south during the CONTRAST project's lifetime, gives the African research nodes a strong backbone, and the plan is that the research nodes will continue as self sustaining centres after the CONTRAST project ends.

The location of the research nodes can be seen in the figure below.

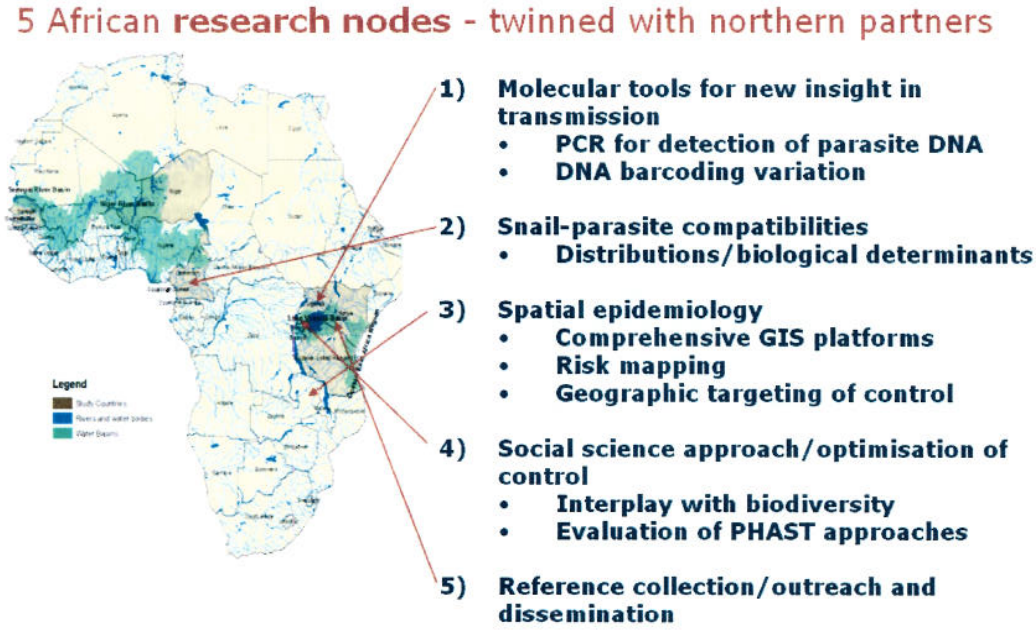

Figure 1. The location of the five research nodes in Africa.

The participants in each project objective are responsible for the research work and the related work packages, WPs (in total 23 WPs).

Objectives and Outputs

General objective of workshop

The overall objective of the workshop was to ensure that CONTRAST can continue as an effective and well organized project fitted for implementing it's objectives of optimizing schistosomiasis control in sub-Saharan Africa within the time frame of 4 years.

The specific objectives of the workshop were:

- To review the ongoing work in all CONTRAST research work packages
- To plan the work in the final year of CONTRAST so all deliverables can be met.
- To review each partner's project finances, assessing needs for adjustments.

Management

The CONTRAST Management Committee (MC) is responsible for the integration of information arising from the different lines of research. For a description of the CONTRAST MC, please refer to the workshop report from the Kick-Off workshop, Entebbe, Uganda 2-6 2006, or the CONTRAST project document.

The committee held three meetings during the workshop.
The minutes from the meeting will be published on the CONTRAST website.

Summary of reported activities during the workshop

Objective 1. Molecular tools for new insight into snail-schistosome transmission biology

Overview:

Work package	Start period	Progress	Status
1	1	Finished	On schedule
2	1	Finished	On schedule
3	1	Ongoing	On schedule
4	1	Finished	On schedule
5	2	Ongoing	On schedule
6	3	Ongoing	on schedule
7	1	Ongoing	3 month delay
8	1	Finished	On schedule

Within objective 1 work package 1 and 2 were finished during the first year, work package 4 and 8 finished during the third year of the project and reports were given at the Kilifi meeting. Below is summarized the work completed in the other WPs>

Work Package 3 *"Development of DNA sequence barcoding nomenclature for characterization of schistosomes and snails".*
WP 3 has the following objectives: 1) to determine specific DNA barcodes for schistosomes and snails host species from Cameroon, Niger, Senegal, Kenya, Tanzania, Uganda and Zambia referencing **WP 10-12.** 2) to develop less technologically demanding PCR assays for species identification (RFLP and species specific primers) to be implemented in laboratories with modest resources. 3) to conduct molecular phylogenetic and evolutionary analyses on the acquired DNA sequences and 4) to deposit DNA and voucher specimen collections for future reference at research node 5, referencing **WP 2.**

Work on **WP 3** has been ongoing since January 2007. The work package was implemented with participation from all partners except 3 and 13. Partners 1, 2 and 5 have primarily been involved in laboratory analysis, the rest in field activities. The work package is planned to run until the project ends.

Species specific DNA sequence barcodes for the schistosomes and intermediate host snails has been established for *Schistosoma mansoni*, *S. haematobium* and *S. bovis* and for several

Bulinus and *Biomphalaria* species and this will aid in future molecular based identification which is essential for fulfilling the objectives of several WP's.

Work has progressed to satisfaction for Development of PCR assays for species identification (RFLP and specific primers) which are less technologically demanding to be implemented in laboratories with modest resources (D5), but it is realised that technical issues stop further application of markers. For example 1) *Bulinus*: sequence variation is too variable for broad application but some opportunities remain for local population distinctions viz. *nasutus/contrasticus/globosus/ugandae*. 2) B*iomphalaria*: no sufficient variation to design confident PCR species markers, 3) *S mansoni*: sequence variation is too variable for broad application but there is a need to discriminate *S. mansoni* from putative hybrid schistosomes occurring in the stool/urine, 4) *S haematobium*: completed to satisfaction as a rapid typing system allows differentiation of type I & II lineages (with opportunities for further differentiation of Indian Ocean Area (IOA)). Diagnostic PCRs are also needed for differentiation of putative hybrids from central/south areas of Africa (viz. *leiperi*, *matthei*, *margrebowiei*) *(to be completed by Jan 2010)*

Work is ongoing for establishing DNA and voucher specimen collections as a taxonomic resource for future reference (D6) and samples are presently held in the UK and DBL and there has been sharing of samples with MU. NMK have also a small collection of material on FTA cards. This will expand upon final completion of the CONTRAST project.

Work Package 4 *"Development of rapid SNaPshotTM DNA barcodes for multi loci sequence typing (MLST) for schistosome and snails.*

DNA barcoded information has been gathered for several Schistosome and snail populations. Primary analysis has been carried out to design primers for rapid SNaPshotTM.

Very high genetic diversity has been found within and between *S. mansoni* populations from several geographical areas. In contrast very low genetic diversity has been found within and between *S. haematobium* populations from several geographical areas on mainland Africa. But *S. haematobium* on Zanzibar also shows high genetic diversity.

Referencing WP3 information, the following SNaPshot assays have been designed; 1) 4 SNPs within COI & and 5 SNPs within the ITS for *S. haematobium* group with possibilities for cross-application in *S. mansoni,* 2)4 SNPs within the COI for *Bulinus africanus* group species,

- which fulfils Deliverable 7 (A standardized SNaPshot^{TM} protocol for rapid DNA barcoding of biological specimens and generation of electronic database in WP2)

Work Package 5 *"Detection, identification and quantification of schistosome DNA in snails by Real-Time PCR assays.*

WP5 was implemented with the start of the second project period. It is scheduled to run for 30 months, ending in period 4.

Using the Dra 1 repeat a Real-Time PCR assay using multiplexed TaqMan® probes were developed for the detection of schistosome infections in snails. Several assays were run on the Real Time PCR machine at the NHM. Visits to the NHM by Aslak Jørgensen (DBL), Silvester Nyakaana (MU) and Allen Nalugwa (MU) has facilitated the transfer of this technology to MU.

The use of the Dra1 repeat Real-Time PCR assay for the detection of schistosome infections in snails is underway. There have been technical problems but work is on going to overcome these. The technology has been transferred the Makerere University Uganda where a Real-Time PCR machine has been established.

By this D8 is partially met with change of marker loci from multi-copy repeat to the IGS region. Two TaqMan probes have been designed and appear to function as planned. Further snail material needs to be examined and also from other WPs (e.g. WP21 and snails from WP10 (central Uganda)). Once probes are fully validated, MU need to implement qPCR applications to show that technology transfer has been completed. *This is expected to be achieved in the next 2 – 3 months*

Work Package 6 *"Use of oligochromatography: adaptation of Real-Time PCR assays to low technology laboratories.*
D9, the result of this workpackage has partially been met. Prototypes have been transferred to MU, existing IGS probe targets appear to function for *S haematobium* whilst for *S. mansoni* there is some non-specific cross reactions and need further optimisation.

In November 2008 Pascal Mertens from partner 13, CORIS, visited partner 2, NHM, to establish *in silico* suitability of the new DNA IGS targets for oligochoromatography. For a detailed report on the work in WP6, see Section 2.

Work Package 7 *"Characterisation of the (microsatellites) population structure of* Bulinus *over space and time.*
In **WP 7** the objectives were 1) to characterize and optimize microsatellite molecular markers for the molecular characterization of the population structure of the *Bulinus africanus* group species and to 2) determine the extent of genetic variation within each of the different *Bulinus* spp. populations in East Africa. Referencing. **WP 10-12**. In **WP 7** partners 1, 2, 5, 6, 7, 8, 9, 10, 11, 12 and 14 are involved. Laboratory analyses were done by Partners 2 and 5.

The duration of the work package is 36 months, work is scheduled to finish in the fourth project period. The deliverables have partially been reached, however a three month delay is expected (see below):

Existing *B africanus* group (*B. globosus*) microsats have been adapted and optimised for material in MU. A total of four loci has been demonstrated to function correctly across samples. (D 10) and the population genetic information for *Bulinus* across project working areas for WP14-17 (D 11)
Partially met, samples from Uganda have been analysed but more samples are needed from Kenya/Tanzania to complete a more comprehensive study. (S*amples from Kenya are expected to be obtained and fully analysed by 30th March 2010)*

Work Package 8 *"Characterization of the (microsatellite) population structure of* S. mansoni *parasites over space and time in relation to habitat, chemotherapeutic pressure, and human infection and morbidity levels.*
In **WP 8** the objectives are to reveal the population structure of *S. mansoni* over space and time in relation to different habitats and chemotherapeutic pressure. Following partners are involved in this work package: 2, 4, 5, 6, 7, 8, 9, 10, 11, 12 and 14. Substantial field collection has taken place in Uganda, Senegal and Niger and exciting results has been reached.

CONTRAST general reviews of evolutionary applications in the design of, and/or morbidity monitoring and evaluation within large scale chemotherapy programmes have also been produced:

The elucidation of the potential impact of mass chemotherapy on the population genetic structure of the parasite host populations was partially met. All samples have been genotyped from two-time-point comparisons completed in Tanzania (*S. mansoni*) and analysed. Longitudinal follow-ups in Uganda & Niger have been examined and work is ongoing. In Kenya a two-time-point comparison has been undertaken and in the process of being examined. Analyses of stored material from Cameroon, Senegal and Zambia are pending. Tanzanian dataset paper submitted and awaiting referees reports.

For *S. haematobium* progress was delayed by technical problems (i.e. contamination) but these have now been resolved. Genotyping of samples from Niger is underway as well as in Kenya (Taveta) with potential material from Senegal and Cameroon scheduled. Initial sample development and analyses from Mali (non CONTRAST country) completed and paper nearing submission.

Identification of parasite genotypes and/or parasite genotype combination with potential of causing severe morbidity for targeted control are ongoing and initial analyses produced inconstant associations with genotypes and parasite infection intensities – further analyses are underway. Tests for potential associations with additional morbidity measures are pending.

D12 (Elucidation of the potential impact of mass chemotherapy on the population genetic structure of the parasite host populations) was like this partially met, all samples have been genotyped from two-time-point comparisons completed in Tanzania (*S mansoni*) and analysed, longitudinal follow-ups in Uganda & Niger have been examined and work is

ongoing. In Kenya a two-time-point comparison has been undertaken and in the process of being examined. There is potential for examination of material from Cameroon/Senegal/Zambia. *This is expected to be achieved within the next 3 months*

For *S. haematobium* progress has been marred by technical problems (i.e. contamination) but these have now been resolved. Genotyping of samples from Niger is underway as well as in Kenya (Taveta) with potential material from Senegal/Cameroon.

<u>Objective 2.</u> Characterisation of schistosome-snail relationships and transmission potential

Overview:

Work package	Start period	Progress	Status
9	1	Finished	On schedule
10	1	Ongoing	On schedule
11	1	Ongoing	On schedule
12	1	Ongoing	On schedule

WP 9 has been established, and is running as planned according to the host partner. Below is given the status of the remaining WPs:

Work Package 10 *"Dynamics of transmission and interactions between schistosomes in sub-Saharan Africa.*
WP 10 is a very comprehensive work package involving nine partners 2, 4, 6-11 and 14. It is the objectives to assess the competitive dynamics of schistosome species in mixed infection foci of *S. mansoni* and *S. haematobium* from study areas in Cameroon, Niger, Senegal, Kenya, Tanzania, Uganda and Zambia, and to provide biological material for molecular studies. Referencing **WP 3-8**. Also re-infection patterns at mixed infection loci following PZQ administration referencing **WP 12** will be determined.

As in the first period extensive field work has been carried out in period 2. Follow-up cohort studies, as well as research activities at new sites, have been conducted in Senegal, Niger, Cameroon, Uganda, Kenya and Zambia. Prevalence data in the study villages has been determined. Interesting preliminary results has already been obtained and will is expected to be disseminated before the end of the project.
As a spinoff of the work done on Zanzibar excellent results has been found for complimentary intestinal parasites: Facilitated by the CONTRAST programme, the existing research partnership between the Natural History Museum (NHM; London, UK) and the Helminth Control Team of Zanzibar has been expanded, with the Swiss Tropical Institute (STI; Basel, Switzerland) becoming a new partner. Joint activities pertain to epidemiological investigations and control interventions focusing on soil-transmitted helminthiasis with an emphasis on strongyloidiasis. Three papers has been published.

Work Package 11 *"Role of the different species of intermediate hosts in the transmission of schistosomiasis in sub-Saharan Africa."*
In **WP 11** it currently examined which role *Bulinus* and *Biomphalaria* species have in the transmission of schistosomiasis in project study areas referencing **WP 10**. Also this work package provides biological material for molecular studies, referencing **WPs 3-8**, and it is also the objective to determine factors that promote changes in schistosome-snail relationship referencing **WP 14**.

A total of ten partners are involved: 1, 2, 6-12 and 14. The laboratory studies will primarily take place at partner 10 at the snail-parasite relationship research node in Yaoundé, but because of restriction in shipment of infective material between different countries in Africa, some experiments will also take place at other partner institutions. As reported in the first report preliminary results of the malacological surveys and cercarial shedding were found. However, the compatibility studies have still not been carried out satisfactory. This is also a very delicate and difficult exercise, and requires much hands-on training. This problem has being addressed and further malacological surveys are scheduled. Work in WP11 is scheduled to end after the third project period.

Work Package 12 *"To develop novel mathematical predictive models of schistosomiasis transmission under different selective pressures.*

WP 12 has finalised the compiling existing data from other WP 8 and WP 10 and has furthermore completed the necessary literature survey.

An initial dataset of *Schistosoma mansoni*, *Schistosoma haematobium* and mixed infections has been completed and analysed (see WP 8), the further samples are continually added to the dataset. Using these preliminary dataset an initial (deterministic) model has been developed.

Stochastic simulation models using a resampling approach are under development using the modelling software *'R'*. Microsatellite data from two schools in Tanzania (from **WP8**) have been entered into *'R'* and the data have been cleaned. The impact of intensity and sample size on measures of genetic diversity has been explored. Preliminary modelling work has coded algorithms to calculate two commonly used measures of genetic diversity, Allelic Richness, and Expected Heterozygosity to help overcome these issues.

<u>Objective 3.</u> Spatial epidemiology for schistosomiasis risk mapping and prediction

Overview:

Work package	Start period	Progress	Status
13	1	Finished	On schedule
14	1	Ongoing	Delayed
15	1	Ongoing	Slightly Delayed
16	2	Ongoing	On schedule

17	2	Ongoing	Delayed

WP 13 has been established, and is running as planned according to the host partner. Below is given the status of the remaining WPs:

Work Package 14 *"Creation of comprehensive GIS databases for selected study areas."*
In **WP 14** the main objective is for the GIS research node to establish a historical and active data base and map including all geo-referenced prevalence and snail data in the regions involved in CONTRAST. The database will consist of demographic, environmental, malacological, parasitological and socio-economic covariates for selected study areas, referencing **WP 10-12 and WP 19-21**.

Data base of climate and environmental data has been established and is being updated. Already 351 GB worth of land surface temperature and normalised difference vegetation (NDVI) has been archived.

A contrast comprehensive database has been established with support from DBL and STI in a sql format which shall also work as an open source database of schistosomiasis covering the whole of Africa. So far all Contrast Schistosomiasis data is being entered and historical data from Africa is being sought and entered.

Land surface temperature data at 1KM has been downloaded for the whole Sub-Saharan Africa and has been archived at the GIS Research node, Normalised Difference Vegetation Index at km resolution will be acquired from partner 3, STI before December, 2009. NDVI.

Data gaps are continuously being updated from contrast partners into the contrast database which has now become a continuous process.The work in **WP 14** was scheduled to be finished in 2008. This was delayed but the database is now ready for launching, which will happen late 2009. This will be an open access database and will mark an exceptional contribution to disease control and help for surveillance of transmission of schistosomiasis. **So far we have data collected over 7000 locations extracted from published and unpublished sources. The conversion of the database from ACCESS to MySQL have been completed and the database is going to be open access soon**

During the work in this work packages it has been demonstrated how to utilize Google Earth in CONTRAST.

Partners 1,3 and 6 are involved in **WP 14**.

Work Package 15 *"Development of Bayesian spatial models for risk factor analysis and mapping of high-risk areas."*

Work has been implemented in this work package and a study is ongoing based on West African data and another one based on Ugandan data. The progress in this work package has been slightly delayed because of slower construction of the data bas (WP 14) than expected.
Surveys from West Africa contacted from 2000 onwards were analysed using Bayesian geostatistical models for identify the most important climatic and environmental

determinants of the disease distribution. The models developed were used to obtain smooth *S. haematobium* and *S. Mansoni* risk surfaces. The analysis will be repeated as more survey data have been acquired. To facilitate the fitting of the geostatistical models we developed methodology to approximate the underlying spatial process from a subset of locations. In addition we developed methodology based on shared component models for estimating the geographical distribution and burden of coinfection risk from data arising from independent surveys screening for single infections as opposed to a single survey screening individuals for multiple infections. The later work was carried out on simulated data assuming different degree of disease dependence as well on real data on S. Mansoni and hookworm coinfection from Cote d'Ivoire.
One scientific paper from this work has been submitted for publication.

Work Package 16 *"Predicting infection risk in ecological zones similar to those of the study area"*

The work on this work package was just started before end of the reporting period. Much data for this has been gathered and the development is promising, but like the previous work package the implementation has been staggered by slower creation of the database than expected and the fact that the responsible researcher is on maturnity leave..

Work Package 17 *"Construct integrated infection risk maps for schistosomiasis and other vector-borne diseases of socioeconomic importance in sub-Saharan Africa."*
The work in this Wp has been delaye but has now started.

<u>Objective 4.</u> Social sciences approaches to better understand and encourage local control interventions

Overview:

Work package	Start period	Progress	Status
18	1	Finished	On schedule
19	1	Ongoing	On schedule
20	1	Ongoing	On schedule
21	1	Ongoing	On schedule

WP 18 has been established, and is running as planned according to the host partner.
Below is given the status of the remaining WPs:

Work Package 19 *"Knowledge, attitudes and practices towards schistosomiasis control, and dynamics of socio-economic status."*
Work in WP 19 can be divided into three main parts:

- A baseline KAP study was conducted and completed in the field study area. Data analysis is on-going and some preliminary findings are available.
- Furthermore the baseline study on observations of human-water contact activities was conducted and completed. Data analysis is on-going and preliminary findings are available
- Baseline study on the dynamics of people's socio-economic status was conducted and completed. Analysis is on-going and is yet to be completed.

Work Package 20 *"Evaluation of "Participatory Hygiene and Sanitation Transformation" (PHAST) approach."*
Five training workshops on PHAST strategy facilitated by 18 Community-Owned Resource People (CORPs) have so far been completed involving 750 members of the community. The intervention and process evaluation is in its seventh month and will go on until March 2009.

- Further development, pre-testing, fine-tuning and adoption of PHAST strategy and materials were done.
- Participatory Hygiene and Sanitation Transformation (PHAST) strategy (an intervention) was introduced for implementation in one community population in Ukerewe district.

A malacological and parasitological field work was carried out in the PHAST and KAP areas, containing people from partner 1, 2 and 7.

Work Package 21 *"Role of snail biodiversity in management of schistosomiasis and use of refractory snails to block schistosome transmission for biological control."*

In order to do the necessary experiment for this work package snail breeding facilities were established in March 2008 at Fort Jesus in Mombasa. Collection and set-up of the first snail colonies were done in May, 2008 and currently 5 species are set up in tanks for breeding. Detailed protocol for implementation of WP 21 was done August, 2008. Field collection will began January 2009, and continued September 2009 in Taveta area South Eastern Kenya. Infection experiment will begin early 2010..

<u>Objective 5.</u> Outreach and dissemination facility established

Overview:

Work package	Start period	Progress	Status
22	1	Ongoing	On schedule

Work Package 22 *"Outreach and dissemination of knowledge."*
The objectives of **WP 22** are

1) to promote outreach and dissemination of knowledge between participants, different level stakeholders and end-users using a combination of WWW, electronic and hard copy materials,
2) to promote publication of scientific results at the highest level and
3) to disseminate actively and promote results amongst health decision making structures.

The website inaugurated during the first project is still running successfully (http://www.eu-contrast.eu). The site is frequently used by both CONTRAST partners and external visitors. The site has received about 200.000 hits during period 3, coming from over 4000 visits.

The gives CONTRAST partners access to information from all the activities of the project, gives the European Commission permanent update on state of progress, and provides access to information to the general public.

Detailed programme

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