

The SMART concept

An innovative Community Development Concept by Connect International and its partners

Foundation Connect International (CI) is a Dutch NGO that supports local NGO's to facilitate self-development in rural communities.

Nearly a decade of development and field testing by CI and our partner organizations has resulted in a concept that optimizes people's efforts to develop themselves:

the SMART concept.

SMART helps people to:

- Improve their physical health
- Improve their social and mental health
- Reduce poverty
- Improve the position of women

This document summarizes what the SMART concept entails, including the methods used for monitoring, evaluation and research.



The SMART concept in short

Key features:

- effective in remote rural communities that are often not reached by others
- community driven approach
- low cost, sustainable innovative technologies, produced with local skills and materials
- tackling *the* major killer diseases
- tackling major taboo problems
- combining community wide development with support of vulnerable groups within communities; thereby improving health, wealth and well-being of people, and reducing health and wealth inequalities within communities
- focus on and improvement of the position of women
- long-term sustainability through building social and organizational infrastructure in communities and working with local authorities and leaders

The SMART concept consists of four interrelated components:

- **Development**
- **Technologies**
- **Info**
- **Survey**

SMART Development is a process in which beneficiaries are facilitated to develop and improve their community, organizational structures, leadership and personal circumstances.

SMART Technologies are innovative low-cost facilities essential for the improvement of health and income, that are often 50 to 70% cheaper than conventional technologies and can be produced, operated and maintained with locally available skills and materials.

SMART Info and SMART Survey are new components that are still being tested. These systems enable organizations and communities to generate and effectively use structured information required for planning, budgetting, program improvement, assessing the level of success of the program and research.

The impact

Main impacts aimed for include:

- Diarrhoea reduction in <5 children with 40%.
- Mortality reduction in <5 children with 10%.
- Malnourishment reduction in <5 children with 15%.
- Increase in household income with 25 euro per year, available mainly to the female heads of households.
- Significant reduction in burdens among women and children claimed by 60% of women interviewed.

Costs

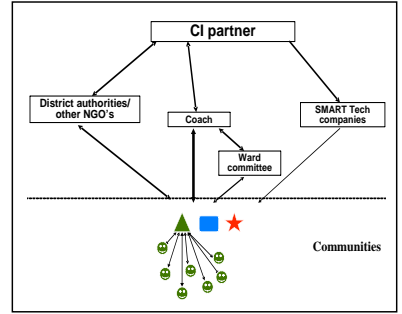
For **15 to 30 Euro/capita** the following structural improvements are realized:

1. drinking water, sanitation and irrigation (per 10 households one borehole or well with a rope pump, 10 household water filters, 10 pit latrines),
2. increased awareness regarding diseases, mental health and social relations (weekly promotional sessions per group of households, during three years), and
3. improved community organisation structures and leadership/governance (monthly training and coaching, during three years).

SMART Development

Stakeholders

Community coaches selected from community elected candidates coach and train the health committee (green triangle), other community committees (blue square) and leaders (red star) weekly to monthly, supported by other staff. They use a coach manual and fact sheets for subjects like diarrhoea, AIDS, irrigation, etc. They are intensively trained and coached. The beneficiaries (green dots) elect representatives that form the committees. The district authorities are a lead party in district development and provide knowledge and skills. Ideally they continue facilitating the developments when external funds end. The CI partners are assisted by expatriate staff who lived for more than 10 years in the project countries working in community development.



Features

- **Community driven.** Communities request for participation and are responsible for their own development. Everything they can do themselves is done by them.
- **Self-assessment.** If a community appears to be motivated, is located in the partner's operative area and in need of assistance, a self assessment is facilitated (Participatory Rural Appraisal and/or Appreciative Inquiry) in which community members identify their problems, needs, priorities and hopes and dreams for the future.
- **Training and coaching of village leaders.** Village leaders discuss and write down their role and tasks in a commitment protocol which they sign and present to the community. During 3 years they are regularly trained and coached.

Equity

When beneficiaries realize health improving facilities such as latrines and boreholes with rope pumps, and pay back loans in time, the program donates some of such facilities to vulnerable families and public institutions (e.g. schools, health posts). It is also promoted that beneficiaries allow vulnerable families to use or even partly own their facility without payment. This stimulates people to invest in such facilities while enabling vulnerable families to also own and have access to them.

- **Establishing, training and coaching community committees.** Water and sanitation (watsan), health and other committees are elected by the community. They are trained and coached regularly during 3 years to fulfill their roles and develop into active and sustainable organizations.
- **Realizing SMART facilities.** Facilities (e.g. latrines, boreholes with rope pumps) are provided on a cash or cash/subsidy basis (part of the costs paid by several families) or a loan or loan/subsidy basis (revolving funds) to selected households (subsidy depends on capacity to pay). When a loan is paid back the committee realizes a new round of facilities purchasing them from companies or through self-production.
- **Promotion of physical, social and mental health.** Health promotion

committee members form teams, each team with one man and one woman, responsible for 10 to 20 households. The man meets every week with the male heads, the Woman with the females. During a meeting priority health and other subjects brought forward by the participants are discussed. The committee member facilitates the discussions and ensures that participants agree on follow up. Beside health improvements related to malaria, diarrhoea, clean water and other health related issues this has led to improvements like better communication between partners, decreases in household violence, drinking problems and dangerous polygamous relations, breaks through taboos, and recognition of mental health issues.

- **Micro projects.** Communities are assisted to realize other plans, e.g. construction and improvement of primary schools and health posts, implementation of agricultural and environmental projects, etc.



The water from SMART water points is often also used for irrigation, providing more diverse food and (female) income. (Chibombo, Zambia, 2006).

There is overall consensus that a combination of improved water supply, sanitation and hygiene is the most optimal and cost-effective solution to prevent disease. Esrey¹ demonstrated that:

- Pit latrines can reduce diarrhoea by 36% (Cholera by 66%) or more and worm infestations by 12-86%.
- Hand-washing with soap (or substitute) and water after contact with stools can reduce diarrhoeal disease by 35 - 48% or more. Eye and skin infections can also be reduced with more frequent face and body washing.
- Improved water supply generally reduces diarrhoea by 20%.

This was reconfirmed by Fewtrell (2004)² and Curtis (2003)³ with the suggestion that if anything Esrey underestimated the impact. Combining improvements in water, sanitation and hygiene leads to a stronger positive health impact than the sum of their single impacts.

Also the combination of participatory community development and health promotion leads to tremendous positive impacts on health⁴.

¹ Esrey SA et al. (1991). Effects of improved water supply and sanitation on ascariasis, diarrhoea, dracunculiasis, hookworm infection, schistosomiasis and trachoma. *Bulletin of the World Health Organization*, 69(5): 609-621.

² Fewtrell, L. and Colford, J.M. (2004). Water, sanitation and hygiene: Interventions and diarrhoea, a systematic review and meta-analysis. World Bank.

³ Cairncross, S. and Curtis, V. (2003). Effect of washing hands with soap on diarrhoea risk in the community; a systematic review. *Lancet* 3, 275-281.

⁴ E.g. Manandhar, D.S., et al (2004). Effect of a participatory intervention with women's groups on birth outcomes in Nepal: cluster-randomised controlled trial. *Lancet*, 364(9438), 970-979.

SMART Technologies

During the last 10 years low cost technologies produced with local skills and materials and that can easily and cheaply be maintained, have been identified and (further) developed by Practica Foundation and others, among others for:

- **Manual drilling**
- **Storage and recharge of groundwater**
- **Irrigation**
- **Pumping**
- **Household level water treatment**
- **Latrines**

Some of the technologies are described below⁵.



Stonehammer drilling is suitable for hard soils.

Manual drilling

Promising techniques are **Rota sludge, Stonehammer and Baptist drilling**. The rota-sludge and stonehammer methods function as follows:

- With a lever a metal pipe with drilling bit (made of used car springs) is moved up and down.
- Soil parts are crunched by the falling drillbit.
- With the upward movement water mixed with bentonite or cow dung (to increase the viscosity) lifts the soil particles up and out of the borehole.
- When the hole is ready a PVC casing and filter is placed in the borehole.

The methods originate from Bangladesh and have been further developed by Practica.



Rota sludge drilling in relatively soft soils in Njombe, Tanzania, can reach to 40 m. All labour is provided by beneficiaries. Three trained drillers supervise the drilling that takes 3 days on average.



Pumping

A SMART hand pump is the **rope pump**, made of simple low-cost materials like metal pipe, PVC pipes, rope and old car tyres. Its design can be adjusted to materials that are available locally. A rope pump is 5 to 10 times cheaper than traditional piston pumps.

Functioning

A rope rotates over a pulley wheel into a borehole or well. Down under the rope enters through a block into a PVC pipe. Pistons are attached to the rope that fit with a small clearance in the pump pipe and lift up the water when the pulley wheel is turned.

Investment and maintenance

In Tanzania a rota-sludge drilled borehole of 27 m deep equipped with a rope pump costs 550 euro. Groups of 5 to 10 families purchase such water facilities, take care of maintenance and use it for household uses and irrigation. Having a water point nearby improves health, household income and reduces burdens of especially women. The group pays 100 euro in money and 100 euro in labour (leaving 350 euro for the donor to pay).

Irrigation

Rope pumps are suitable for small scale irrigation, especially where groundwater levels are 1 to 20 m deep. In combination with a water tank and low cost drip systems such as **Nica drip** or **Eazy drip** up to 0.5 Ha can be irrigated in 1 to 6 hours. In Zambia rope pumps are often mounted on existing hand dug wells. Farmers owning such wells pay back the entire loan for buying the pump in 6 to 12 months with the income from selling irrigated crops.



The riser pipe is lowered into the borehole



Villagers are trained in operation and maintenance of the pump



The rope pump is ready.



Borehole with rope pump at a school. (Njombe town, Tanzania, 2005).



A rope pump is used to irrigate Tomatoes. (Chibombo, Zambia, 2006).

⁵ For more information on SMART Technologies see **SMART Water Solutions** and **Smart Sanitation Solutions**, published by the NWP (Netherlands Water Partnership). See also www.nwp.nl or www.practicafoundation.nl.

Water treatment

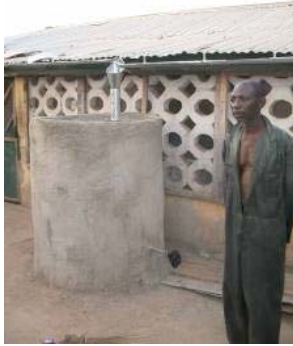
Where water quality is a problem water can be treated with POU (Point Of Use) options as **Chlorine**, **SODIS** (solar disinfection) or **ceramic water filters**. CI is testing a ceramic candle filter impregnated with Colloidal silver in 3 countries. This concept is based on the ceramic filters developed by the the organizations Basic water Needs and Potters For Peace. These filters produce water that complies with WHO norms regarding turbidity and harmful bacteria. Costs: 0.5 to 1 Euro/capita/year. Introduction is combined with training in use and hygiene aspects by the described community health committees.



Training the preparation of ceramic candle filters in Mozambique

Storage

If drilling becomes very expensive because of deep ground water or hard rock, rainwater storage maybe be an alternative. Options as **Austra Nica tanks** or **Reed cement tanks** cost 10 to 15 Euro per cubic meter. With this technology tanks of up to 120 cubic meters have been build with local skills. Required materials like bricks, cement and steel wire can be adjusted to the local available options.



A Reed cement tank made with 1 bag of cement and 1 kg of steel wire

The benefit of improved watsan

5-28US\$

for each invested dollar⁶

in terms of reduced costs for combatting diseases, increased income through for instance selling irrigated crops and additional economic activity where burdens and diseases have decreased.

Water recharge

In many regions in Africa the rainfall is 0,3 to 0,8 meter /year which should be enough to supply water for domestic use and irrigation. However, often 50 to 90% of this rain flows off to rivers and does not infiltrate into the ground due to erosion, compact topsoils, etc. Options to increase infiltration (use the groundwater as a storage) are **small dams**, **planting of trees or vetiver grass**.

In 3 African countries tests are being conducted with the **Tube recharge** system that combats lowering groundwater tables by infiltrating runoff and waste waters into the underground through perforated tubes, where possible at family level.

Latrines

Families are trained to construct a reinforced concrete slab for their **improved simple pit latrine** in a slab production centre set up in the community. A professional mason explains and supervises the people to construct the slabs. After 30 days when the slab is properly cured, the people take their slab home and put it on the pit they have dug (after the watsan committee has controlled the proper sizes of the pit and where required the implementation of a lining).

A household then constructs the superstructure with local materials (paid by the beneficiaries, usually partly subsidized). They also construct a simple tiptoe handwashing facility near the latrine (a condition set by the program). The health committee members explain the beneficiaries regularly to throw fire ashes in the pit and wash their hands with water and ashes after latrine use.



Husband and wife producing a latrine slab. (Ruaha village, Tanzania, 2006).



Tiptoe handwashing facility. (Njome, Tanzania, 2006).



A finalized pit latrine. (Buza village, Malawi, 2002).



Presentation of SMART Technologies at a farmers show. (Mbeya, Tanzania, 2006).

⁶ WHO, 2004

SMART Info

<p>SMART Info is a management information and accountability tool for <u>planning, budgeting, monitoring of activities (process), evaluation of results (output), and reporting</u>, which is being tested and further developed by CI. Included are activity (process and input) and result (output) indicators that form a basis for the actual monitoring done.</p> <p>Automatically generated standard reports provide different levels of detail (below one example). The reports are suitable for management purposes at different levels and for accountability to beneficiaries, authorities, donors and other stakeholders.</p>	1	New borehole with rope pump
	1.1	Yield is at least 0,125 l/s
	1.2	HACH test executed one to three months after completion of the water point is negative (meaning that there is no bacteriological contamination).
	1.3	pH and EC are acceptable and there are no visible sediments
	1.4	Proper drainage
	1.5	Borehole is properly protected against contamination and surface water entrance
	1.6	People use the water from the point for their drinking water during all seasons and never obtain drinking water from contaminated sources
	1.7	People use the water from the point for washing themselves during all seasons and never obtain water for washing themselves from contaminated sources
	1.8	People use the water from the point for all or most other household uses during all seasons and never obtain water for other household uses from contaminated sources
	1.9	
	1.10	
	1.11	Depth borehole (m)
	1.12	Depth water table (m)
	1.13	Yield (l/s)
	1.14	No. of persons who regularly get water for their household uses (including drinking water) from the water point
1.15	Land irrigated with water from the borehole (if there was already irrigation before the water point was realized include only the land irrigated in addition to the land irrigated before) (m2)	
A part of the evaluation (output) indicators for the Program Result "Groundwater points"		

One of the formats for progress reporting to donors

Program code	TMSHI	Program level achievements & problems	Beneficiary stories	Hyperlinks to foto's and films
Program name	TAZAMO Tanzania			
Program country	Tanzania			
Impl. organization	SHIPO			
Start year	2006			
Start month	1			
Inflation factor	1,04			
Currency	EUR			
Report year	2006			
Report month	6			

Result	Finance					Activities				Output				Explanations		
	Realized expenditure		Planned expenditure		Total budget	Progr planned (%)	Progr. realized (%)	Quality (%)	Monitoring intens.	Progr planned (%)	Progr realized (%)	Quality (%)	Utilization (%)	Achievements	Problems	Plans
	Euro	%	Euro	%	Euro											
TMSHIAB - Program research	356	20	270	14	1.822	16	18	95	1,4	18	17	93	93			
TMSHICA - SMART Tech groundw. points	1.039	14	901	12	7.138	15	16	94	0,4	12	14	91	89			
TMSHIBA - Community development	5.689	58	4.890	50	9.745	54	57	89	6,5	61	62	90	89			

In the above report detailed data are automatically summarized to a one page overview.

- Realized expenditures can be compared with planned expenditures, in currency and as percentages compared to the total budget.
- Progress of activities is presented as a percentage of total completion of all activities (both the planning and the actually realized progress). The average quality of the activities executed depends on quality scores provided by fieldworkers who monitor the activities (with 100% being the best quality). Monitoring intensity shows how often activities under the Result have been monitored.
- For the realized output progress (planned and realized), average quality and utilization percentages are provided. For instance, the quality of finalized rope pumps depends among others on the extent to which boreholes produce sufficient and sufficiently clean water. The utilization score depends on the extent to which the facilities are used by the beneficiaries.
- Furthermore, textual explanations regarding achievements, problems and plans can be given, and beneficiary stories and hyperlinks to photos and films.

SMART Survey

SMART Survey is a tool for collection and analysis of baseline information, research and impact assessment which is being developed and tested by CI. It consists of a household survey that is conducted at the start, during and at the end of program activities in about 5% of the households in a community. The data are entered in a software program producing output that is used by the involved communities (to identify household level problems and progress with solving the problems), implementing partner organizations (to identify a program baseline and assess program achievements) and other stakeholders such as donors and researchers (to identify the level of success of the program and execute research).

Unique

A unique feature of SMART Survey is the combination of a generic set up producing standard overviews that can be compared with those of other organizations and the possibility to fully customize the survey to local circumstances.

TVEE
Form

Characteristics

- Standard subjects are formulated.
- Per subject up to five questions can be formulated with each 5 standard answers that always go from bad (score 1) to good (score 4), and score 5 for 'no answers'. The turning point from bad to (just) good is between score 2 and 3. The questions and the answers can be fully customized to local circumstances while still being able to compare the outcome with the outcome of surveys conducted in other areas where other questions were used.
- Standard Tables provide for each subject an average score and a percentage representing the number of answers with score 1 or 2 compared to the total number of answers under that subject (see the example Table below).
- The Tables provide summary figures of the situation before, during and after the program, making it possible to determine time trends.

The surveyors executing the surveys are health workers living in the communities who do the work voluntarily. They are trained to select per question the most appropriate standard answer based on the answer provided by the person interviewed and their own observations.

1	Toilet facilities	Score 1 - very poor	Score 2 - poor	Score 3 - reasonable	Score 4 - good	Score 5 - No answer
1.1	Toilet type used by the family. Observe yourself.	Open defecation	Traditional latrine, not very good	Latrine with concrete slab or other slab that can be cleaned	VIP latrine or other high level toilet type	No answer
1.2	Is the toilet and its direct surroundings dirty, fly invested, and/or smelling bad? Observe yourself.	Dirty, many flies and/or smelling bad	Not very clean, some flies and/or some smells	Reasonably clean	Clean	No answer
1.3	Is there a hand washing facility near the toilet? Observe yourself	No	Yes but without water, soap or ashes	Yes, but with water only	Yes, with water and soap or ashes	No answer
1.4	How often does the toilet need to be rebuilt? (or: "How many years was the former toilet used?")	Every year	Every two years	Every 3 to 4 years	Remains in tact longer than 4 years	No answer
1.5	Are there other problems with the toilet facilities? Ask and observe	Yes, quite bad problems	Yes there are some problems	There are not many and not very serious problems	There are no problems	No answer
2	Toilet use	Score 1 - very poor	Score 2 - poor	Score 3 - reasonable	Score 4 - good	Score 5 - No answer
2.1	What is done with stools of babies / young children? Let the person answer	Left in or around the house	Thrown out of compound or on farmland	Buried near the house or placed on waste pile / in waste pit	Thrown in toilet	No answer

Example of questions and answers formulated for the first and part of the second standard subject for a program in Tanzania.

No.	Subject	All households together						Household size					
		1559		1342		957		367		380		271	
		Before		During		After		Before		During		After	
Average	%<=2	Average	%<=2	Average	%<=2	Average	%<=2	Average	%<=2	Average	%<=2		
1	Toilet facilities	2.5	57	3.7	10	3.3	12	2.6	16	2.6	13	2.4	33
3	Dr. w. sources - rainy s.	3,3	4	3,6	12	3,6	3	1,7	34	1,8	36	1,8	75
5	Who collects the water	1,9	84	3,0	13	3,0	16	2,1	44	2,7	22	2,9	16
6	Drinking w. storage cap.	3,5	2	3,9	2	4,0	1	2,0	58	2,5	36	3,3	15
7	Drinking water use	3,4	2	3,7	12	3,7	11	3,3	14	3,3	12	3,3	10
10	Personal hygiene	3,0	37	3,0	11	3,0	9	3,0	19	2,7	17	3,0	14
11	Malaria	3,0	16	3,0	12	3,0	13	2,3	62	2,0	73	2,4	19
13	Diarrhoea	3,3	8	3,3	9	3,3	7	2,2	66	2,1	84	2,7	19
16	Disabilities	2,0	75	2,1	81	2,5	29	4,0	1	4,0	1	3,9	2
17	Nutrition	2,8	38	2,8	19	2,8	14	3,5	4	4,0	0	3,5	3
19	HIV/AIDS and STD's	3,5	12	3,5	11	3,5	11	2,9	14	3,3	15	3,0	17
20	Vaccinations	3,0	14	3,0	13	3,0	10	1,8	88	2,6	28	3,0	17
21	Mortality in <5 children	3,5	2	3,5	3	3,5	2	3,5	15	4,0	0	3,5	3
23	Delivery	3,0	12	3,0	9	3,0	9	1,9	65	2,6	18	3,0	17
24	Use of health facilities	3,0	8	3,0	9	3,0	9	1,2	96	3,0	17	3,0	17
26	Social health	3,6	2	3,6	3	3,6	1	2,8	12	3,1	14	3,8	4
30	Belongings/ economics	3,3	8	3,3	7	3,3	7	2,8	26	3,0	16	2,8	18
31	Female income	3,3	9	3,3	7	3,3	5	3,0	14	3,3	12	3,0	12
34	House hygiene	2,7	14	2,7	15	2,7	12	2,8	13	3,0	11	3,1	10
	Total Average	3,1	31	3,1	19	3,1	13	2,7	33	3,0	24	3,1	17

Example of some parts of a Table providing summary information from household surveys for all interviewed households together and the first part for the cross cutting topic 'Household size' (here only with the category '2 or less'). The worst scores are marked red.