

BushProof

Training in Water & Sanitation for Development & Emergencies



Fort Dauphin, Madagascar

Overview

The BushProof *Water & Sanitation for Development & Emergencies* training is a broad, intense 12-day course with a heavy practical bias, providing a rare opportunity to learn through both theoretical and hands-on practical sessions. The training is invaluable to both those who need more technical input for their work, as well as for those in management who find they have become more and more involved in water and/or sanitation programmes, but lack the basic technical and theoretical background.



Practical sessions

The training is intense and is given through a range of practical and theoretical sessions. While several theoretical courses are available, practical hands-on field experience is difficult to obtain. The BushProof training therefore focuses heavily on practical sessions, which include the following:

- Construction of hand-dug well in local village, including final pump installation
- Manual drilling
- Jetting
- Sieve analysis
- Measuring elevation
- Measuring water flow in pipes due to gravity and from pump
- Handpump operation
- Chlorine and alum jar tests
- Community mapping in a village
- Biosand filter construction
- Latrine slab construction (normal, dome)
- Water testing (chemical, physical, bacteriological)

Participants are expected to get involved with all practical sessions and should expect to get dirty!

Theoretical sessions

In addition to the practical sessions, the course will provide a broad overview of the theoretical aspects of water and sanitation projects. Theoretical issues are linked to real life field experiences of the facilitators throughout the course.



Teacher-student ratio

We will never have more than 15 participants per course, and therefore have a high teacher-student ratio, which we find is essential to allow individual feedback and tuition.

Language

The course will be conducted in English, but francophone participants can be accommodated if they have a reasonable grasp of spoken English since at least one BushProof course facilitator will speak French.



Dates

See website www.bushproof.com for details.

Location

Fort Dauphin, Madagascar, where you will find great beaches, lemurs (all year round) and whales that can be seen idling along the coast (for those coming in August/September).

Venue

The training will be held at the BushProof Training Centre (below), which is on a peninsula overlooking the sea in several directions. The centre has a wireless internet connection some of the time, but is never guaranteed.



How to book

Go to www.bushproof.com and click on Products > Training > Booking a Training. Here you will find booking procedures and application forms. Please contact us if you experience any difficulties.

Resources

Course handouts will accompany the course, as well as several resource CDs with a wealth of expertise in the form of documents and articles. A certificate will be presented to participants on completion of the training.

Course fees & duration

The duration of the course is 13 days (with 12 days taught). Course fees are shown below:

Early bird – application received more than 2 months prior to course	2,400 Euro
Standard – application received between 2 weeks and 2 months prior to course	2,500 Euro
Late snail – application received less than 2 weeks prior to course	2,600 Euro

Note: any organization booking 5 places can get a 6th place for free.



The course fee includes:

- Tuition, handouts, resource CDs, coffee breaks, lunch on training days and field visits.

The course fee does not include the following:

- International & domestic airfares, travel or medical insurance, visa, accommodation, breakfast / evening meal and taxi cost from the accommodation to the training centre every day.

An arrival guide to hotels in Fort Dauphin and Antananarivo will be sent to all applicants together with the invoice. This allows participants to choose and organize their own accommodation and includes telephone and email contacts. Please read this information carefully as it will contain all you need to know. However, BushProof will help participants if they are really having difficulties in arranging things, but note that we are primarily a training organization, not a logistical one.

Daily expenses (hotel, taxi, etc) will likely be in range of 20 To 50 Euro – further details are in the arrival guide.

Note: we also have to get a minimum attendance of 7 people to make the course viable, otherwise we may have to reschedule the course. Please confirm with us prior to paying for international flights.

Contact details

Telephone: +44 (7814) 788 846

Email: training@bushproof.com



Health advice

Prior to travel to Madagascar, please ensure that you are properly vaccinated and take relevant precautions. Visit your doctor before travelling.

Special notes:

- Make sure you are fully vaccinated. A yellow fever vaccination certificate is sometimes needed when entering the country.
- Malaria risk, predominantly in the malignant *falciparum* form, exists all year throughout the country and is highest in coastal areas. Resistance to chloroquine has been reported.
- *Chikungunya*, which is a similar virus to Dengue is hitting coastal Madagascar around the area of Tamatave (half way up the east coast). There is no vaccination against it, and the best way to prevent it is by preventing mosquito bites, even during the day (early morning, late afternoon) when the vector mosquito is especially active. Check out the following links for more information:

<http://www.hpa.org.uk/cdr/archives/2006/cdr1606.pdf>

<http://www.hpa.org.uk/cdr/archives/archive06/News/news1006.htm#chikungunya>

For advice on how to prevent insect bites:

<http://www.nathnac.org/pro/factsheets/iba.htm>

- *Bilharzia* (schistosomiasis) is present in fresh water. Although health advice is to avoid swimming and paddling in fresh water, during fieldwork it is sometimes unavoidable. Therefore if you have had contact with open fresh water during your visit, you should get an Elisa antibody test together with an antigen test 6 weeks or more after you return home (6 weeks, because if infected, the antibodies need to develop first and won't show on the test otherwise).
- *Dysenteries* and *diarrhoeal diseases* are common. Attention to what you eat, and perhaps more importantly to hygiene (e.g. washing hands) is therefore especially important).
- *Rabies* is present in Madagascar. Vaccination before arrival should be considered, since although Fort Dauphin is accessible from Tana by a daily flight, sometimes these flights are cancelled.

Visas

Visas are needed by all nationalities and can be obtained at Madagascar consulates prior to travel. Applications can be made to the consulates by post. You can check out this link for further information on locations of consulates:

<http://travel.excite.co.uk/travel/guides/africa/madagascar/ContactAddresses>

Equally, for most nationalities it is possible to obtain entry visas for 1 month at the airport on arrival, where often the queue is shorter than for those with visas.

International travel

Getting to Madagascar can be expensive. Please contact us if you are having difficulties, and we can recommend some options for you. Travel agents you can try:

www.travelocity.co.uk

Training schedule

Note: subject to change depending on field trips.

Day	No.	Time	Main subjects	Details
Monday		08.30 - 09.00	Introduction & welcome	Introduction to the course
	1	09.00 – 10.30	Environmental Health & Technical back up	Overview of disease causing organisms, infective doses, F-diagram. Book review & technical response services - where to look for information.
	2	11.00 – 12.30	Field hydrogeology & surveying 1	How groundwater works – overview of aquifer types, springs, etc. Porosity, permeability. Geology.
	3	14.00 – 15.30	Field hydrogeology & surveying 2	Watsan survey formats & practice: general watsan surveys, sanitary surveys, village mapping, overview of different methods to find groundwater.
	4	16.00 – 17.30	Field hydrogeology & surveying 3	Practical: how to use an Abney level. Field data collection and plotting elevation data.
Tuesday	5	09.00 – 10.30	Water flow in pipes & system curves	Hydraulic theory, pipe friction tables & system curves. Use of data from practical to create system curves for 2 pipe sizes.
	6	11.00 – 12.30	Motor pumps & pump choice 1	Different pump options. Choose a pump based on pump efficiency and power requirements that fits system curve from practical.
	7	14.00 – 15.30	Shallow water sources	Shallow water sources: hand-dug wells, riverbed wells, infiltration wells, infiltration galleries, sub-surface dams. Hand dug well rehabilitation. Discussion of Bill of Quantities, concreting guidelines, slab, rebar arrangement & apron.
	8	16.00 – 17.30	Handpump operation & maintenance 1	Handpumps or bucket system? VLOM introduced. Handpump sustainability explored. Review of types and operation: e.g. IMK2 & 3, Afridev, Canzee, rower, treadle, rope & washer. Advantages & disadvantages of types. Spare parts issues.
Wednesday	9, 10, 11, 12	09.00 – 17.30	Hand dug wells 1	Practical: hand dug well construction – trimming walls, rebar bending, in-situ lining, cutting ring, making curved blocks
Thursday	13	09.00 – 10.30	Coagulation, flocculation & sedimentation 1; Treatment methods for specific chemicals	Product types & effectiveness. Calculating 1% alum solution. Practical: jar test. Watermaker demonstration. Natural coagulants - <i>Moringa</i> demonstration.
	14	11.00 – 12.30	Treatment methods for specific chemicals	Treatment methods for removal of taste, colour, iron, manganese, fluoride & arsenic.
	15	14.00 – 15.30	Sand filtration 1	What are the differences between rapid & slow sand filters. Roughing filters. Theory behind filtration – mechanical & biological processes. Practical: sieve analysis to choose sand type according to uniformity coefficient & effective size. Field SSF water test data.

	16	16.00 – 17.30	Sand filtration 2	Practical: casting household slow sand filter.
Friday	17	09.00 – 10.30	Chlorination 1	Product types & effectiveness. Calculating 1% chlorine solution. Practical: making 1% solution & doing jar test - how to do in emergencies.
	18	11.00 – 12.30	Gravity flow water systems 1	How to design a simple gravity flow system.
	19	14.00 – 15.30	Spring protection	Spring protection techniques – various options. Construction guidelines.
	20	16.00 – 17.30	Sand filtration 3	Opening slow sand filter mould, finishing filter, filling with water & testing for leaks.
Saturday	21, 22	08.00 – 12.30	Gravity flow water systems 2; Motor pumps & pump choice 2	Practical: measuring real flow in pipes & comparing to theoretical calculations (gravity flow & system curves), jointing PVC & PE pipes.
	23, 24	14.00 – 17.30	Village mapping	Village mapping & mini-census in a village near Fort Dauphin in order to locate the hand-dug well site for the next training (optional).
Monday	25	09.00 – 10.30	Hygiene promotion	How to do it: village method, ToT workshop method. Teaching methods & materials. Monitoring. Hygiene baseline data & T-shirts. Importance of handwashing. Practical: different handwashing options.
	26	11.00 – 12.30		
	27	14.00 – 15.30	Rainwater collection & tanks	Catchments – domestic and village level. Collection system, guttering & storage tank options. How to improve village water ponds. How to calculate if climate is viable for rainwater collection scheme. Practical: calculating tank size and volume possible from training centre roof in Fort Dauphin.
	28	16.00 – 17.30		
Tuesday	29	09.00 – 10.30	Household Water Treatment	Options - slow sand filtration, ceramic filters, sedimentation, household RO systems, coagulation/flocculation. Container contamination studies. Practical: ceramic filter, SODIS demonstration, Sur Eau.
	30	11.00 – 12.30	Water testing 1	Water quality standards & Sphere. When to test water, what is most important to test for – core and secondary tests.
	31	14.00 – 15.30	Water testing 2	Practical water testing: collecting a sample and testing bacteriological & chemical parameters, including testing bacteria from SODIS demonstration.
	32	16.00 – 17.30	Sanitation options; Water testing 3	Types – e.g. family, communal, school latrines. General slab construction guidelines, sludge accumulation rates for latrines (and schools), general principle of traditional latrine vs VIP. Sanplat design. Rebar spacing. Dome slabs. Practical: latrine slab construction of standard and dome slabs. Reading water test results.
Wednesday	33	09.00 – 10.30		

	34	11.00 – 12.30	Emergency water & sanitation overview; Emergency sanitation	Overview of emergency watsan: what to do first & how to make a work plan. Sanitation options & scenarios including IDP/refugee scenarios. Defecation fields & trench latrines, communal latrines, family latrines, bathing facilities. Cleaning issues. Drainage issues. Practical calculation: how to build 700 latrines in 7 weeks – materials, staffing, budget.
	35	14.00 – 15.30		
	36	16.00 – 17.30	Solid Waste Management & vector control	SWM in refugee settings. Health Care Waste Management guidelines – standards necessary. Designs. Vector control overview. Practical: using sprayer.
Thursday	37	09.00 – 10.30	Emergency water supply	Water supply & treatment options & scenarios including IDP/refugee scenarios. Group work: to identify a solution for a given situation based on what was taught during the previous days. Supply, treatment, distribution. Kit list for Emergency Water Treatment & Supply kit for 10,000 people.
	38	11.00 – 12.30	Drilling 1: options	Drilling options – hand drilling, machine drilling, jetting, sludging.
	39	14.00 – 15.30	Coagulation, flocculation & sedimentation 2	Practical: visit to water treatment works in Fort Dauphin.
	40	16.00 – 17.30	Drilling 2: well jetting; Hand dug wells 2	Practical: jetting; Practical: HDW caissoning.
Friday	41	09.00 – 10.30	Drilling 3: gravel pack & pumping test	What to supervise in contracted boreholes. Overview of technical drilling methods using rotary mud flush drilling as example: Screen/ casing options, screen slot size, drillers log. Practical: how determine what kind of gravel pack needed from previous sieve analysis. Borehole development. Pumping tests – how to do & what information they give. Aquifer pumping test data sheet.
	42	11.00 – 12.30		
	43	14.00 – 15.30	Drilling 4: BushProof drilling	Practical: BushProof manual drilling.
	44	16.00 – 17.30	Sand filtration 4	Washing sand & gravel, filling slow sand filter with sand and gravel, maintenance instructions.
Saturday	45	09.00 – 10.30	Hand dug wells 3; Handpump operation & maintenance 2; Chlorination 2	Practical: installing slab, chlorinating well, installing handpump & training villagers in Canzee handpump maintenance
	46	11.00 – 12.30		
	47	14.00 – 15.30	Course evaluation	
	48	16.00	End of course.	