Annex 15: Example of completed Upload Form

This is an example of a completed technology record that has been copyedited and prepared for uploading. Note that, in addition to editing the copy, the copyeditor has stripped out any superfluous part of the template, added some html coding and highlighted certain elements, to enable the uploader to process the document as fast as possible.

Technology ID code	AHP0005		
Descriptive title of the technology	TSETSE CONTROL BY TRAPS: HOW TO ASSEMBLE AN NZI TRAP		
Category			
	All		
	Fishery and fish culture: Fishery and fish culture		
	Food and agricultural industries and post harvest technologies: Animal products		
	Food and agricultural industries and post harvest technologies: Crop and horticultural products		
	Food and agricultural industries and post harvest technologies: Forest and NTFP products		
	Natural resources management technologies: Natural resources management		
✓	Production technologies: Animal production		
	Production technologies: Crop and horticultural production, grassland		
	Production technologies: Forest and NTP (non timber forest products)		
Synopsis			
A set of simple step by step instructions is presented of how to assemble an Nzi trap for tsetse, adapted and tested for use in Kenya.			
Global farming system			
	Coastal artisanal fishing		
	Dualistic		
	Irrigated		
✓	Smallholder rainfed dry/cold		
	Smallholder rainfed highland		
	Smallholder rainfed humid		
	Urban based		
	Wetland rice based		
Where and when has the technology been validated?			**Supporting Evidence**
	Country	Year	
	Kenya	2001 - 2005	**TORR. S.J., VALE, G.A., HARGROVE, J.W., MORTON, J.F., MANGWIRO, T.N.C., VAN**

			MUNSTER, B., HALL, D.R., KINDNESS, H.M., KOVACIC, V., HABTEWOLD, T., ESTERHUIZEN, J., and FARMAN, D.I. (2005). Message in a bottle: disseminating tsetse control technologies. DFID Animal Health Programme, Final Technical Report, Project R7987. 111 pp. **MIHOK, S.** (2002). The development of a multipurpose trap (the Nzi) for tsetse and other biting flies. Bulletin of Entomological Research, 92(5):385-403.
	Also in use in other countries		www.nzitrap.com
Type of technology			**Supporting Evidence**
	Generates income within acceptable limits of risk		
	Improves efficient utilisation of scarce resources		
	Improves quality and nutritional value		
	Increases efficiency of farm input use		
	Increases employment opportunities		
	Increases farm production		
	Increases labour productivity		
	Increases shelf life and marketability		
	Maintains or increases biodiversity		
	Minimises the use of non-renewable resources		
	Prevents soil erosion and improves soil fertility		
	Reduces drudgery of work		
	Stabilise farm production at higher output level		
	Other (If the benefit to be selected is not on the list, you can specify a new one here. Add rows as needed)		
✓	Reduces transmission of livestock disease		TORR. S.J., VALE, G.A., HARGROVE, J.W., MORTON, J.F., MANGWIRO, T.N.C., VAN MUNSTER, B., HALL, D.R., KINDNESS, H.M., KOVACIC, V., HABTEWOLD, T., ESTERHUIZEN, J., and FARMAN, D.I. (2005).Message in a bottle: disseminating tsetse control technologies. DFID Animal Health Programme, Final Technical Report, Project R7987. 111 pp.

✓	Addresses farmers needs, priorities and management capabilities	As above
	Addresses gender issues and concerns	
	Considers socio-cultural norms and practices	
	Has no adverse environmental effects	
	Incorporates indigenous knowledge	
	Integrates crops, livestock, trees and fisheries	
	Other (If the characteristic to be selected is not on the list, you can specify a new one here)	
Factors underlying success		**Supporting Evidence Available**
✓	Access to inputs and resources	TORR. S.J., VALE, G.A., HARGROVE, J.W., MORTON, J.F., MANGWIRO, T.N.C., VAN MUNSTER, B., HALL, D.R., KINDNESS, H.M., KOVACIC, V., HABTEWOLD, T., ESTERHUIZEN, J., and FARMAN, D.I. (2005).Message in a bottle: disseminating tsetse control technologies. DFID Animal Health Programme, Final Technical Report, Project R7987. 111 pp.
	Farmer's capacity	
	Incentives, credit and markets	
✓	Infrastructure	As above
✓	Institutional support and outreach	As above
✓	Ownership by end users	As above
	Policy environment	
	Regulations	
	Other (Use this space if you want to explain any other detail about these factors and the adaptation of the technology. Add rows as needed)	

Detailed description of the technology (use 1000-1500 word limit as a guide)

Background
Tsetse flies (Glossina sp.) infest over 11 million sq km of Africa, and are vectors of Trypanosomosis (or Trypanosomiasis) in both man and domestic livestock. For example, it is estimated that tsetse occur over 7% of Zimbabwe and 60% of Tanzania and Trypanosomosis has an important negative impact on livestock production in these areas. In addition to the use of trypanocidal drugs, control, of Trypanosomosis has been tackled largely by control of the tsetse fly vector and a range of techniques are available, each with advantages and disadvantages. Methods include aerial spraying, sterile insect techniques, insecticide treated cattle, and odour bait traps and targets. Furthermore, it is generally considered that deployment of traps and/or targets that destroy a proportion of the tsetse

population will lead to a reduction in the incidence of trypanosomosis.

A general decline in the capacity and funding of national veterinary institutions means that communities affected by Trypanosomosis are forced to control the disease themselves. Consequently, community-based initiatives to control tsetse has become one of the major methods of controlling trypanosomosis. However, despite many attempts by various communities, the results have been generally disappointing and there are very few examples of sustained control of tsetse being achieved by a rural community without significant financial and technical support from donors and/or national governments. The causes of this failure are complex, but at least part of the problem is that rural communities, and the organisations that facilitate community-based tsetse control, do not have adequate access to information on how to apply tsetse control technologies. In addition, the poorest rural communities need access to cheaper and practical tsetse control technologies.

Tsetse Traps
A range of designs for tsetse traps were developed in the 1960's and earlier but these included a number of features that made them generally difficult or impractical to use. Many, for instance, were large, cumbersome, and difficult to transport. With the development of the biconical trap by Challier and Laveissière (1973) a trap became available that was relatively cheap, collapsible, so that many can be carried in a vehicle, and quickly and easily assembled (see in FAO, Use of Attractive Devices for Tsetse Survey and Control <<http://www.fao.org/AG/AGAInfo/programmes/en/paat/documents/manuals/vol4.html>>). The biconical trap is particularly effective for species of the palpalis group of tsetse including G. palpalis</> and G. tachinoides, and less so for other tsetse, but widely used for sampling.

Different species of tsetse occur under and are adapted for different environmental conditions. The best design of trap depends upon the species of tsetse fly and it is important to match the trap to the species. Following the development of the biconical trap, a range of different traps have been designed. For riverine species such as Glossina palpalis or G. fuscipes, the best traps are the biconical or pyramidal traps. For tsetse living in savanna habitats, e.g. G. morsitans and G. pallidipes, the best traps have been shown to depend on the locality, or where they are to be used. In East Africa, the Ngu or Nzi traps appear to be the best, whereas in southern Africa the Epsilon trap has produced better results. For G. brevipalpis, the H-trap is preferred whereas the Ngu and Epsilon traps have been used successfully to catch G. longipennis in Kenya and Somalia. More information on can be found at http://www.tsetse.org <<http://www.tsetse.org>> which has a number of useful sections, including answers to the following questions relevant to tsetse and trapping tsetse: <<http://www.nri.org/tsetse/FAQ/catch.html>>

- What is the best trap for tsetse?
- How many tsetse can a trap catch?
- Why are most traps coloured blue and black?
- Why do tsetse follow my car?
- Do I need to use attractants with a tsetse trap?
- What are the chemical properties of the attractants?
- How safe are the attractants to use?
- What other types of fly are caught by tsetse traps?
- Where is the best site for a trap?
- Should I treat the trap with insecticide?
- What are the problems with traps?
- What is a man fly-round?
- What is an ox fly-round?
- How can I catch tsetse that follow a car?
- How do I stop ants eating the catch?
- There are lots of different types of trap cage. Which is the best design?

- What type of netting should I use
- What sort of cloth should I use to make targets and traps?
- Most traps are black and blue. Is the particular shade of blue important?

Basic Principles of Tsetse Traps
Tsetse have a high metabolic rate and feed exclusively on vertebrate blood. Their survival therefore depends on detecting and encountering suitable hosts on which to feed. This principle can be exploited in the design of traps and targets which mimic key features of the normal host animals, attracting tsetse in such a way that they can then be captured or killed. With traps, the captured flies can be identified and counted, useful in sampling and monitoring tsetse populations. Tsetse targets simply use insecticide-treated surfaces to kill the tsetse by contact and are of little use in population sampling or monitoring. Both targets and traps are exposed to damage and stealing and these methods require active participation from rural communities.

As techniques for tsetse control, both traps and targets function by removing individuals from the tsetse population. Their efficiency depends on the length of time the devices remain operational, and the likelihood that an individual fly will encounter the device and be killed by it. The length of time each device remains operational depends on a number of factors including resistance to environmental damage (e.g. wind and/or damage by large animals), theft of all or part of the device, and component degradation (particularly colour fade, depletion of odour baits, and loss of insecticidal activity in the case of targets). The likelihood that an individual fly will encounter and be killed or captured by the device depends also on the number of traps or targets relative to the local abundance of tsetse, and on the particular foraging and dispersal behaviour of the target tsetse species. For more information see Kuzoe and Schofield (2004). <<http://www.who.int/tdr/publications/publications/pdf/tsetse_traps.pdf>>

Insecticide-treated traps can be used to control tsetse. The insecticide treatment means that the trap will still kill tsetse even if it is badly ripped. However, if the intention is only to kill tsetse then it is probably cheaper to use a simple insecticide-treated target for control and just use the traps for survey and monitoring purposes.

The Nzi trap for Tsetse
"Nzi" is one of the Swahili words for fly. The Nzi trap was developed in Kenya for savanna species of tsetse such as *Glossina pallidipes*. It is also a very effective trap for stable flies (*Stomoxys* spp.) and horseflies (*Tabanidae*).

The Nzi trap is a simple, safe and economical cloth trap for the capture of biting flies (tsetse flies, horse flies, deer flies, stable flies). It was developed by Steve Mihok at ICIPE in Kenya as an environment-friendly alternative to the use of insecticides, following many years of research on appropriate and sustainable technology for African farmers. It is a passive killing device that works through the attraction of flies to large blue and black objects. Flies simply die from exposure after entering into an innovative configuration of cloth and netting.

The trap is made from simple shapes for economy, and for ease of assembly. The layout is triangular with all pieces cut to the width of the material (e.g. one metre or one yard). The trap walls are formed by a square piece of netting at the back and by two black cloth rectangles at the sides. The body is closed at the top front by a vertical blue shelf. Two blue rectangular "wings" extend out at an angle from the front. A trapezoidal piece of netting extends horizontally half-way into the body from the bottom of the blue shelf. The top is closed by a "cone", made by cutting a wedge out of a square piece of netting and sewing up the sides (a tetrahedron results: a 4-sided shape with equal triangular sides). This is illustrated in a PowerPoint presentation, “Nzi_Schematic.ppt” [93 KB] <<http://www.nzitrap.com/Nzi_trap/Making/Nzi_Schematic.ppt>>. Step by step instructions on cutting the trap sections from material, and sewing these to make the finished trap are presented in a PowerPoint presentation “StepbyStep.ppt” [232 KB] available for download at

<<http://www.nzitrap.com/Nzi_trap/Making/Sewing.htm>>.

Assembling the Nzi trap

1. <<nzi01.jpg>> Slide show on using an Nzi trap
2. <<nzi02.gif>> Pieces required for a Nzi trap
3. <<nzi03.gif>> Pieces required for a Nzi trap (continued)
4. <<nzi04.jpg>> The Nzi trap uses four wooden poles
5. <<nzi05.jpg>> You will need to cut these yourself
6. <<nzi06.jpg>> Hammer four nails into the top of the centre post
7. <<nzi07.jpg>> Having made your four poles....
8. <<nzi08.jpg>>...next clear the site of vegetation
9. <<nzi09.jpg>> Hammer the centre pole into the ground.
10. <<nzi10.jpg>> Fit the trap cone over the centre pole.
11. <<nzi11.jpg>> Stretch the rest of the trap out....
12. <<nzi12.jpg>> ....so you can estimate where to put the other three poles
13. <<nzi13.jpg>> Hammer the poles into the ground.
14. <<nzi14.jpg>> Attach the trap to the first pole with wire.
15. <<nzi15.jpg>> Do the same with the second corner.
16. <<nzi16.jpg>> And with the third.
17. <<nzi17.jpg>> The trap cone is supported on the nails in the centre post.
18. <<nzi18.jpg>> Fit a plastic bag to the top of the cone.
19. <<nzi19.jpg>> And there you have it!!.

These step by step instructions are also included in a PowerPoint presentation “Using the Nzi trap**”**, available in two parts: part 1 [740 KB], <<nzi_trap_pt1.ppt>>, and part 2 [863 KB]<<nzi_trap_pt2.ppt>>.

References and further reading

<<R7173_FTR.pdf>> TORR, S.J., KINDNESS, H.M., OBSOMER V., HARGROVE, J.W., MANGWIRO, T.N.C., VAN MUNSTER, B., KULANGA, C., MBESSERE, E.L., SCHOONMAN L., SAMATA, A., HEILE, H., and OSIR, E.O. (2004). Cattle management practices in tsetse-affected areas. DFID Animal Health Programme, Final Technical Report, Project R7173. 105 pp.

<<R7987_FTR.pdf>> TORR. S.J., VALE, G.A., HARGROVE, J.W., MORTON, J.F,. MANGWIRO, T.N.C., VAN MUNSTER, B., HALL, D.R., KINDNESS, H.M., KOVACIC, V., HABTEWOLD, T., ESTERHUIZEN, J., and FARMAN, D.I. (2005).Message in a bottle: disseminating tsetse control technologies. DFID Animal Health Programme, Final Technical Report, Project R7987. 111 pp.

HARGROVE, J.W & LANGLEY, P.A. (1990). Sterilizing tsetse in the field - a successful trial. *Bulletin of Entomological Research* 80, 397-403.

CHALLIER A, LAVEISSIERE, C. (1973). Un nouveau piège pour la capture des glossines (*Glossina* : Diptera, Muscidae): description et essais sur le terrain. *Cahiers ORSTOM Série Entomologie Médical et Parasitologie,* 11: 251-262.

BOUYER, J., KABORE, I., STACHURSKI. F., and DESQUESNES, M. (2005). Le piégeage des insectes vecteurs. Santé animale en Afrique de l'Ouest, Recommandations Techniques, CIRDES/CIRAD 20.

MIHOK, S. (2002). The development of a multipurpose trap (the Nzi) for tsetse and other biting flies. Bulletin of Entomological Research, 92(5):385-403.

DESQUESNES, M., DIA, M.L., ACAPOVI, G., and YONI, W. (2005). Les vecteurs mécaniques des trypanosomoses animales; généralités, morphologie, biologie, impacts et contrôle. Identification des espèces les plus abondantes en Afrique de l'Ouest. 70 pages. Edition CIRDES BP454 Bobo-Dioulasso, Burkina Faso.

e-Resources

http://www.tsetse.org Tsetse.org. Programmes and information to assist in the planning and implementation of tsetse control operations. Web site created by Steve Torr, Glyn Vale and David Hall as an output of research Project R7173 funded by the Animal Health Programme of the UK Department for International Development (DFID).

http://www.nzitrap.com/. BITING FLIES - The NZI Trap. A simple, environment-friendly trap as an alternative to the use of insecticides.

Files which can be downloaded from www.nzitrap.com include:

- Nzi_Schematic.ppt <<http://www.nzitrap.com/Nzi_trap/Making/Nzi_Schematic.ppt>>
- StepbyStep.ppt <<http://www.nzitrap.com/Nzi_trap/Making/Sewing.htm>>

FAO. Training Manual for Tsetse Control Personnel, Volume 4: Use of Attractive Devices for Tsetse Survey and Control. Information Resources and Training Manuals, Agriculture Department, Animal Production and Health Division. FAO, Rome.
http://www.fao.org/AG/AGAInfo/programmes/en/paat/documents/manuals/vol4.html

KUZOE, F.A.S. and SCHOFIELD, C.J. (2004). *Strategic Review of Traps and Targets for Tsetse and African Trypanosomiasis Control.* Special Programme for Research and Training in Tropical Diseases (TDR), World Health Organization. TDR/IDE/TRY/05.1.
http://www.who.int/tdr/publications/publications/pdf/tsetse_traps.pdf

COOPER, J. and DOBSON H. (1993). Aerial spraying for Tsetse fly control: A handbook of aerial spray calibration and monitoring for the sequential aerosol technique. 33 pp. Natural Resources Institute (NRI), University of Greenwich, UK.
http://www.research4development.info/projectsAndProgrammes.asp?OutputID=64901

Information on traps for riverine species of tsetse can be found at www.cirdes.org (Centre International de Recherche-Développement sur l'Elevage en zone Subhumide

Source(s) used to compile this record

TORR, S.J., KINDNESS, H.M., OBSOMER, V., HARGROVE, J.W., MANGWIRO, T. N. C., VAN MUNSTER, B., KULANGA, C., MBESSERE, E.L., SCHOONMAN, L., SAMATA, A., HEILE, H., and OSIR, E.O. (2004). Cattle management practices in tsetse-affected areas. DFID Animal Health Programme, Final Technical Report, Project R7173. 105 pp.

TORR. S.J., VALE, G.A., HARGROVE, J.W., MORTON, J.F,. MANGWIRO, T.N.C., VAN MUNSTER, B., HALL, D.R., KINDNESS, H.M., KOVACIC, V., HABTEWOLD, T., ESTERHUIZEN, J., and FARMAN, D.I. (2005). Message in a bottle: disseminating tsetse control technologies. DFID Animal Health Programme, Final Technical Report, Project R7987. 111 pp.

TORR, S.J. (2003). Using the Nzi trap. [PowerPoint]. Natural Resources Institute (NRI), University of

Greenwich, UK.

FAO. Training Manual for Tsetse Control Personnel, Volume 4: Use of Attractive Devices for Tsetse Survey and Control. Information Resources and Training Manuals, Agriculture Department, Animal Production and Health Division. FAO, Rome.

KUZOE, F.A.S. and SCHOFIELD, C.J. (2004). *Strategic Review of Traps and Targets for Tsetse and African Trypanosomiasis Control.* Special Programme for Research and Training in Tropical Diseases (TDR), World Health Organization. TDR/IDE/TRY/05.1.