Draft pre-proposals for follow-up of fenceline contrast study for phase 3

1(a) *Name of proposing person(s):*
   Ibo Zimmermann

1(b) *Title of project:*
   Influence of trampling on ecological support services

1(c) *Regional focus and limits:*
   On the farm Weiveld in central Namibia, where strategic trampling is being applied by the farmer.

1(d) *How the proposal would contribute to the 5 overarching themes of BIOTA:*
   This project would eventually contribute to the overarching theme of “Interventions for sustainable use of biodiversity and its management”, but in progress towards that would partly contribute towards “Understanding human use, value and impact in space and time”.

   There are a few farmers who have applied strategic trampling over certain parts of their rangeland to create a good seedbed that encourages grass establishment and/or speeds up the rate of conversion of standing dry grass material into mulch. However an apparently new innovation by one farmer is to apply strategic trampling that conserves soil moisture, by ensuring a broken soil surface before rain to improve infiltration, and more importantly, by reducing capillary evaporation from the soil after good rain has fallen. Variables, which the farmer takes into account when deciding on strategic trampling, include season, soil texture and organic matter content of the soil.

1(e) *Proposed co-operating partners:*
   Farmer
   Pedologist
   Microbiologist
   Modeller
   Graphic designer/artist

1(f) *Key questions:*
   What is the relationship between strategic trampling and improved water and mineral cycling, and establishment of grasses?
   Is strategic trampling a viable rangeland management tool that can be more widely adopted by Namibian farmers?

1(g) *Key activities:*
   Erect exclosures within camps of different soil texture that get trampled at different seasons, to compare soil and vegetation conditions in and outside.
   Measure soil moisture profiles before and after rain and strategically applied trampling events.
   Model the influences of trampling.
   Design and produce decision support systems and extension material.
2(a) **Name of proposing person(s):**
   Ibo Zimmermann

2(b) **Title of project:**
   *Influence of eco-friendly alternatives to poisons for parasite control*

2(c) **Regional focus and limits:**
   On Namibian farms where farmers are willing to test eco-friendly alternatives.

2(d) **How the proposal would contribute to the 5 overarching themes of BIOTA:**
   This project would eventually contribute to the overarching theme of “Interventions for sustainable use of biodiversity and its management”, but in progress towards that would partly contribute towards “Understanding human use, value and impact in space and time”.
   One of the negative impacts of farming on biodiversity is the increasing use of chemical veterinary remedies that are being promoted by extension services and in training sessions for communal and resettled farmers. Some examples are reduction or disappearance of tick feeding birds and dung beetles through use of acaricides and nematicides respectively. Ecological support services are also harmed as a result of such biodiversity loss, with the examples already mentioned harming the services of natural pest control and mineral cycling. This project will test some environmentally friendly alternatives to these veterinary remedies and promote those that are successful.

2(e) **Proposed co-operating partners:**
   Farmers
   Microbiologist
   Zoologist
   Graphic designer/artist

2(f) **Key questions:**
   To what extent does each of the eco-friendly treatments reduce pest loads, improve animal performance and enhance biodiversity?
   Are the tested eco-friendly treatments viable for Namibian farmers to adopt?

2(g) **Key activities:**
   Identify some farmers nearby observatories who are willing to try alternatives, while monitoring both the effectiveness of the treatment on both the abundance of previously harmed species and on parasite loads.
   Seek out and interview those farmers who have previously discontinued the use of some veterinary remedies.
   Design and produce extension material and monitoring guidelines.
3(a) **Name of proposing person(s):**
   Ibo Zimmermann

3(b) **Title of project:**
   Influence of charcoal as a soil amendment on ecological support services

3(c) **Regional focus and limits:**
   On Namibian farms where charcoal is produced from encroacher bushes and where farmers are willing to test its incorporation into the soil

3(d) **How the proposal would contribute to our 5 overarching themes of BIOTA:**
   This project would eventually contribute to the overarching theme of “Interventions for sustainable use of biodiversity and its management”, but in progress towards that would partly contribute towards “Understanding human use, value and impact in space and time”.
   The production of charcoal from encroacher bushes is increasing in Namibia but most of the charcoal is exported. This export not only requires high transport costs to be paid, but also removes valuable material from the ecosystem. Charcoal improves the water and nutrient holding capacities of soils, while providing a haven for beneficial microbes that feed on the oils remaining in the charcoal thanks to the low-temperature kilns used in Namibia. It may be costly to get charcoal into the soil, but this should eventually qualify for carbon credits through the Kyoto Protocol because of the increased carbon fixation achieved by it. Although a reasonable price is paid for large pieces of charcoal, the fines of less than 20mm diameter are rarely worth the transport costs, yet the fines are of a good size to add to the soil.

3(e) **Proposed co-operating partners:**
   Farmers
   Pedologist
   Microbiologist
   Zoologist
   Graphic designer/artist

3(f) **Key questions:**
   What is the relationship between charcoal incorporation into the soil and improved water and mineral cycling?
   What influence do inoculants and other amendments have on the influence of charcoal on water and mineral cycling, and on quality and production of plants?
   Is charcoal incorporation into the soil a viable agronomic and rangeland management tool that can be more widely adopted by Namibian farmers?

3(g) **Key activities:**
   Identify farmers who are willing to sieve the charcoal at their farms, and incorporate the fines into the soil, both on rangeland and on crop fields, and in combination with other amendments and inoculants.
   Measure a variety of responses, in comparison with untreated controls.
   Design and produce extension material.
4(a) **Name of proposing person(s):**
   Ibo Zimmermann

4(b) **Title of project:**
   Integrated watershed planning for livelihood support and biodiversity

4(c) **Regional focus and limits:**
   On neighbouring Namibian farms where all the farmers are willing to participate in the joint planning exercise. One option could include the Narais and Duruchaus observatories. Another could include one of the Claratal observatories within the Auas-Oanob conservancy.

4(d) **How the proposal would contribute to our 5 overarching themes of BIOTA:**
   This project would contribute to the theme of “Interventions for sustainable use of biodiversity and its management”, holistically at the landscape level.

4(e) **Proposed co-operating partners:**
   Farmers
   Sociologist
   Economist
   Land-use planner
   Graphic designer/artist
   Landscape ecologist
   Pedologist
   Hydrologist
   Microbiologist
   Zoologist
   Restoration specialist

4(f) **Key questions:**
   What are the unifying objectives of the farmers in the watershed?
   What is the ranking of threats to those objectives in the watershed?
   Where are the critical control sites in the landscape?
   How can joint management of the watershed best be achieved?

4(g) **Key activities:**
   Undertake a complete planning exercise by an integrated team of scientists in partnership with some willing farmers of a watershed housing an observatory.
   Analyse problem trees to differentiate between symptoms and causes of environmental problems, in order to prioritise solutions.
   Identify critical control sites in the landscape for priority restoration.
   Produce a diversity of costed options for the farmers to choose from.
   Take existing infrastructure into account, but include some options for retrofitting into more appropriate layout, such as relocating water points to less sensitive sites and strategic realignment of fences.
   Note all the farmer responses, both verbal and active.
   Design and produce extension material and monitoring guidelines.
5(a) **Name of proposing person(s):**
   Ibo Zimmermann

5(b) **Title of project:**
   Influence of fire and firebreaks on ecological support services

5(c) **Regional focus and limits:**
   On the farm Otjikongo in central Namibia, where moveable electric fencing is used to graze firebreaks before strategic patchy fires are applied by the farmer, whose objectives include the restoration of biodiversity.

5(d) **How the proposal would contribute to the 5 overarching themes of BIOTA:**
   This project would eventually contribute to the overarching theme of “Interventions for sustainable use of biodiversity and its management”, but in progress towards that would partly contribute towards “Understanding human use, value and impact in space and time”.
   The control of lightning induced fires over the past decades is widely considered to be a major contributing cause of bush encroachment that has devastated much of central Namibia. A few farmers are trying to apply fire to portions of their farms at strategic seasons to re-create the better rangeland conditions that existed before. These situations provide opportunities for the effectiveness of their management to be assessed. In the case of a farmer who also applies grazing in strips around patches of rangeland designated for prescribed burning, the opportunity furthermore exists to measure the impact of the intense grazing on some of the ecological support services.

5(e) **Proposed co-operating partners:**
   Farmer
   Pedologist
   Microbiologist
   Modeller
   Graphic designer/artist

5(f) **Key questions:**
   What is the relationship between fire and response of plants and the cycling of water and minerals?
   What is the relationship between animal impact and response of plants and the cycling of water and minerals in the firebreaks?
   Is prescribed burning after grazing of firebreaks a viable rangeland management tool that can be more widely adopted by farmers in Namibia’s Thornbush Savanna?

5(g) **Key activities:**
   Measure rangeland conditions before and after animal impact and prescribed burning, and compare subsequent conditions under fire, animal impact and control.
   Model the influences of fire and animal impact.
   Design and produce decision support systems and extension material.