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Campo Grande, MS, Brazil

Application of ecological sanitation and permaculture techniques: *food and water security for indigenous tribes and rural areas in Brazil*

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Paula L. Paulo
Location
Background
Kaiowa Tribe: situation overview

• Poverty
• Indians lost their identity (alcohol abuse, suicides)
• Dependency on government food distribution
• No river or water springs on their land
• Available water: FUNASA’s well (distributed by taps and laundry areas – doesn’t reach whole population)
• Poor soil
• Deforestation
Background
Kaiowa Tribe: situation overview

- Scenarios - water
  - Area where no water is provided
  - Area provided with taps
  - Area provided with laundry facilities
Background
Kaiowa Tribe: situation overview

- Scenarios - sewage
  - Open defecation - latrines
  - Funasa module (mostly not accepted)
Background

Kaiowa Tribe: situation overview

Challenge on project implementation:

young children and old people don’t speak Portuguese

Political conflicts within the tribe
Objectives

Main objective finding sustainable and accepted sanitation options, where FUNASA may financially help with implementation and the community itself can manage and improve their quality of life.

- To promote and transfer the use of simple technologies based on ecological sanitation and permaculture concepts.
- To provide sanitation, supporting the rational use of water and enabling the food production in indigenous and/or rural communities.
Objectives

• The project aims the capacity building of the population so that, when necessary, they can build, operate and manage the decentralised systems, strengthening their communities by promoting health and self-sufficiency on food production.
Methodology

• Research team visits the tribe 1 week/month (400 km)
• Meetings, surveys, workshops
• Educational training (school teachers) and special environmental education training on the complete system
• Systems construction and implementation
• Systems sampling, monitoring and maintenance
• Physico-chemical and bacteriological analyses of treated greywater and rainwater
• Parasitological tests: samples from arborloo pit and users.
Methodology

- workshop on construction techniques using bamboo
- construction of 2 rainwater harvesting systems
- construction of 20 arborloo-type toilets
- constructed wetland for treating the school kitchen greywater (followed by a vegetable garden)
- 2 banana tree circles treating the greywater produced in 2 communal laundry areas
- 1 low tech urinal in the school (connected to a flower garden + greywater).
Results - Rainwater
Results – banana tree circles (laundry area)
Results – constructed wetland
Results – vegetable garden (greywater)
Results – urinal, flower garden
Results - arborloo
Results - arborloo
## Results - arborloo

<table>
<thead>
<tr>
<th>Arborloo 1</th>
<th>Arborloo 2</th>
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</thead>
<tbody>
<tr>
<td><em>Ascaris lumbricoides</em> eggs</td>
<td><em>Iodamoeba</em> cysts</td>
</tr>
<tr>
<td><em>Hymenolepis nana</em> eggs</td>
<td><em>Escherichia coli</em> cysts</td>
</tr>
<tr>
<td><em>Ancylostoma duodenale</em> eggs</td>
<td><em>Ancylostoma duodenale</em> eggs</td>
</tr>
<tr>
<td><em>Strongyloides stercoralis</em> larvae</td>
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</tr>
</tbody>
</table>

Causes: bad hygiene habits, lack of infrastructure and basic sanitation and cultural habits

Ongoing work: samples - arborloo and users, questionnaires (health, habits, symptoms, etc.)

Survey: health care centre for indigenous people

Looking for evidences that education programme together with ecosan and permaculture techniques improved their health conditions (by the end of the project).
Conclusions

• Good acceptance on the chosen techniques, specially the arborloo toilet.
• Difficulties for the community to work as a group (household level activities presents better results).
• Difficulties with the maintenance of the toilets: appearance of flies and bad odour (non addition of ashes or saw dust).
• Hygienic condition of the toilets greatly improved after new visits to the houses.
• Achievements improved after educational training at school.
Conclusions

• For the success of the project implementation it is of paramount importance the educational work and population participation, which goes beyond the transfer of technology.
Thanks for the attention!