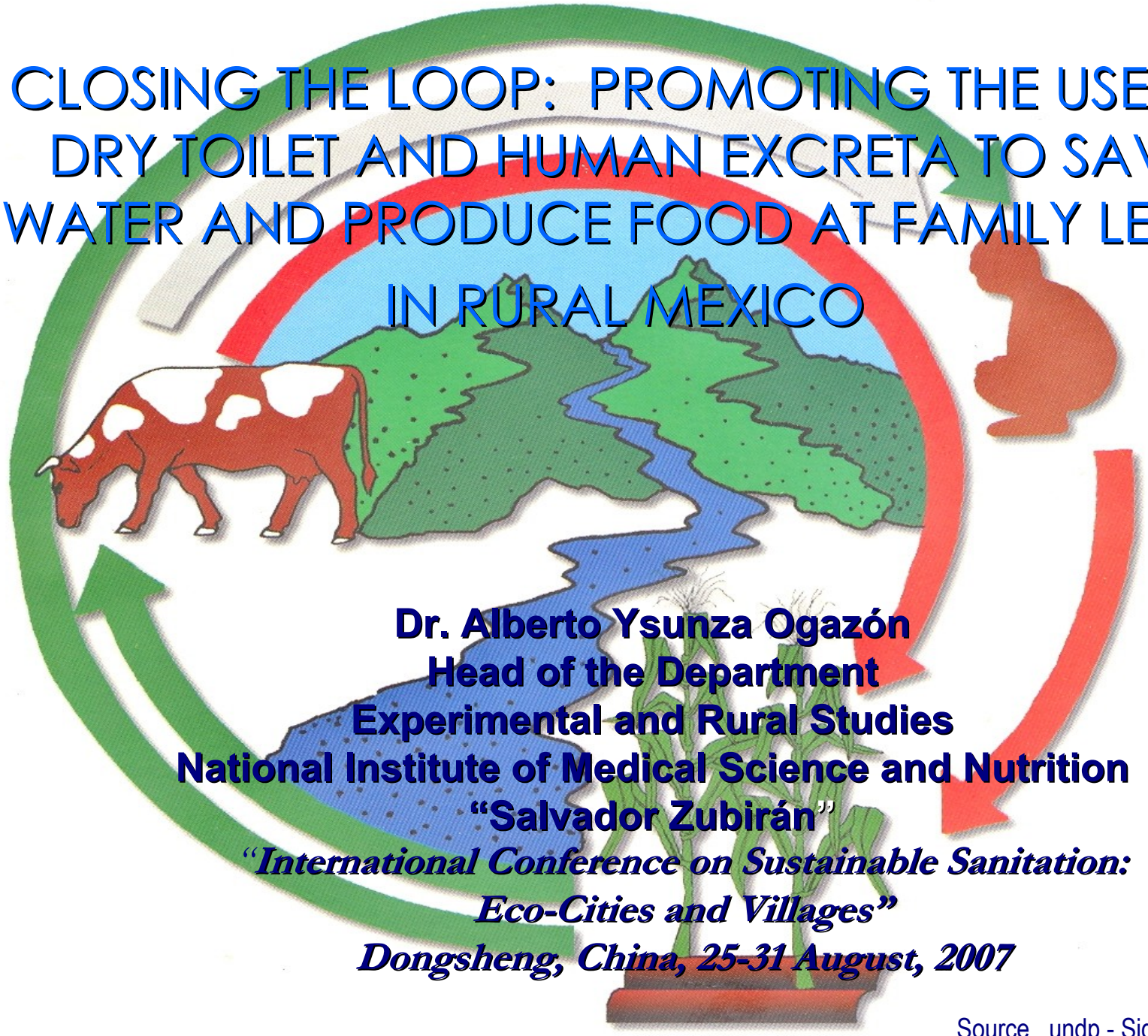
CLOSING THE LOOP: PROMOTING THE USE OF DRY TOILET AND HUMAN EXCRETA TO SAVE WATER AND PRODUCE FOOD AT FAMILY LEVEL IN RURAL MEXICO



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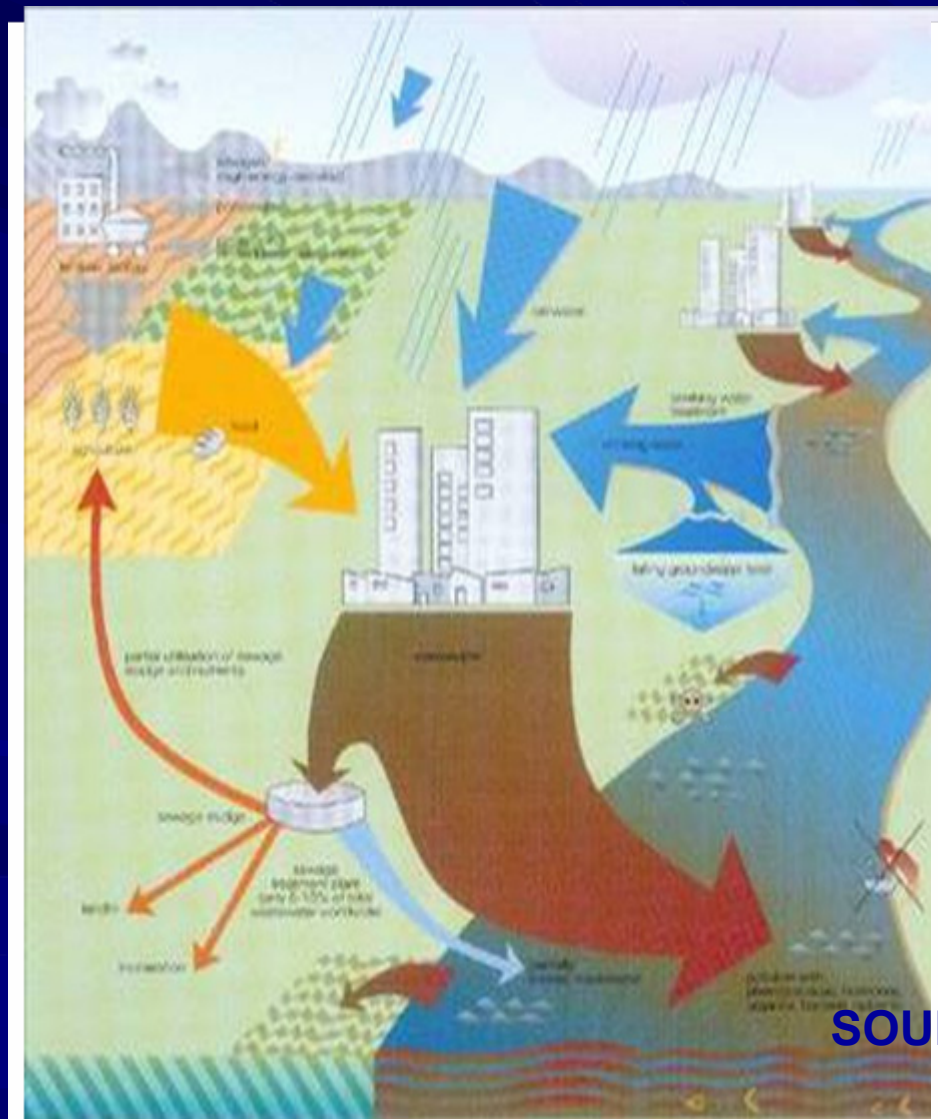
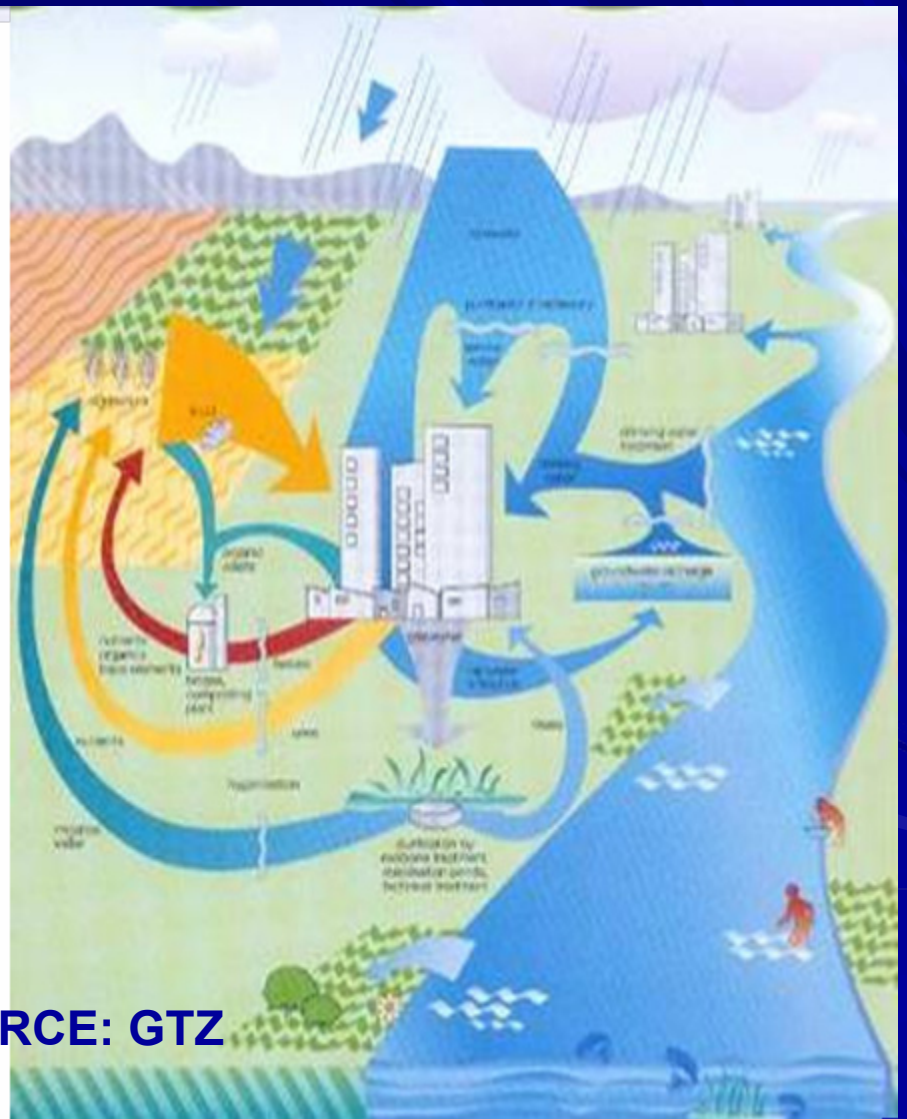
Source undp - Sida

1.1 The present paper forms part of an ongoing project closely related to **Primary Health Care** and based on **ecological principles** and **sustainable development** where the conditons of **human health** depend on having a **healthy ecosystem**





SOURCE: GTZ

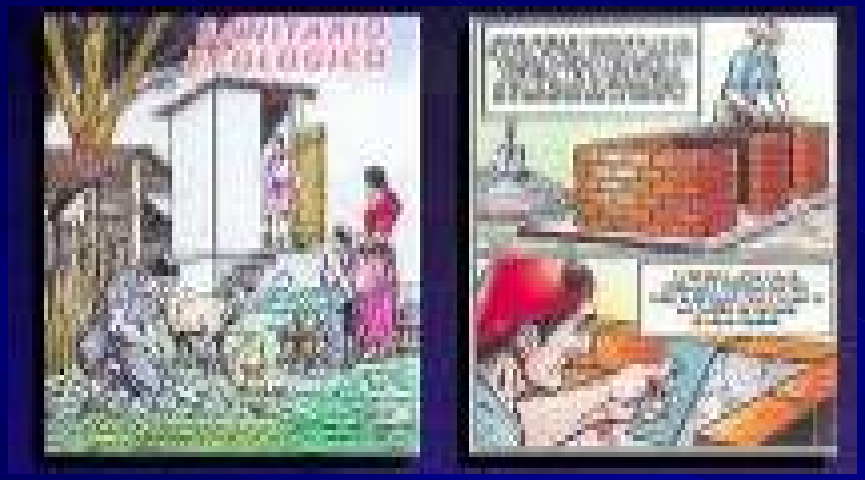
1.2 The project's location corresponds to highly marginalized area on the pacific ocean in the state of Oaxaca of the Mexican Republic

1. 3 Mexico's Water Crisis

- Water represents one of the greatest challenges for the country:
- Food supply sovereignty National security
- 12 million mexicans lack of potable water.
- External debt is not just monetary, but in water as well.
- Availability of water has decreased sixty percent per inhabitant.
- Etc.

2.1 EcoSan integrated project: Objective 1

To elaborate and evaluate the educational material produced to promote the construction, use and maintenance of the dry toilets: (EcoSan, Lübeck, 2003)



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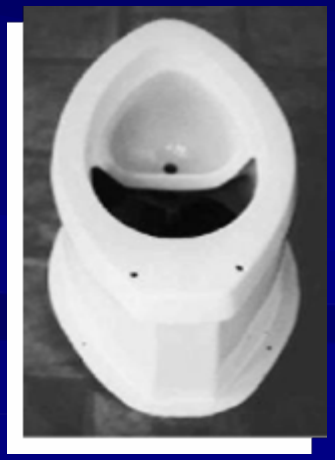


Diverted urine toilet video

Poster

2.2 Objective 2.

To measure the impact on health and nutrition at community level comparing beneficiary families vs non benficiary families (i.e. better nutrition among preschool and school children in beneficiary families) (EcoSan, Durban, 2005)

2.3 OBJECTIVE 3.

Community perception of the use,management and disposal of human excreta. (Tampere, IDTC, 2006)

2.4 Present paper objective 4, (Dongsheng, ICSS, 2007)

To increase the availability of food grown at family level with recycled human excreta.

3.1 Three beneficiary communities where chosen to create an experimental community orchards (57 families) .

3.2 Three different interactive workshops were implemented in each community:

1. “Closing the loop through the dry toilets and human excreta”.

2. “How to implement a community orchard.”

3. “Use and abuse of agrochemicals”

3.3 Nutrients and microbiological analysis were done to the humanure (DT compost) in the samples used in the three different community orchards.

3.4 Different edible plants were grown in **4 different parcels** of each community orchards,

- Just humanure
- humanure + soil
- Just local soil

3.5 Different humanure mixtures were done:

3.6 Plants were irrigated with water and diluted urine

4. 1. Results on Interactive Workshops

- Participants understood clearly the EcoSAn concept of **“Closing the loop”.**
- Participants learn the ecological benefits of **organic vs. chemical fertilizes.**
- Human excreta is seen not as a **waste** but as a **natural resources** for growing food.
- A human excreta **do not contaminate water and soil**.
- Participants were aware that humanure can be handled **safetly with no risk.**

4.2 Humanure agrochemical analysis of three samples from each community

Determination	Normal Standard	Sample 1	Sample 2	Sample 3	Method used
Ph	6.8-7.2	10.14	9.07	8.98	Relation 1:2 Power size
organic stuff %	1.81-2.4	2.872	1.680	21.659	Walkey and Black
% Total Nitrogen	0.096-0.126	0.143	0.084	1.083	Microkjendalh
Phosphorous mg/kg	15-30 ppm	163.50	124.20	258.000	Olsen
Interchanged cations Meq/100 g	Na+ K +0.3-0.6 Ca++5.10 Mg++1,3-3.0	8.015 31.26 19.094 8.129	1.536 10.021 29.458 12.701	3.485 11.102 28.790 4.918	NH4OacIN
Cooper mg/kg Iron mg/kg Zinc mg/kg Manganesium mg/kg	>4.5 >2.0 >1.0 >1.0	3.987 16.787 8.628 6.647	1.566 8.145 0.914 5.555	0.644 X 4.700 3.800	DTPAIN
% sand % clay % limo		49,74 12.16 38.00	51.84 10.16 38.00	XX XX XX	Bouyouccus

Source: Instituto Tecnológico Agropecuario de Oaxaca

4. 3 Humanure microbiological determination: :Free of pathogens

Source: Instituto Nacional de Ciencias Médicas y Nutrición.

4.4 Results for the experimental use of humanure, local soil, urine and water in each community

Products	Parcel 1	Parcel 2	Parcel 3	Parcel 4
Just local soil	Yes	Yes	No	No
Humanure and local soil	No	No	I. Just humanure II. Mixed 7:3 III. Mixed 5:5 IV. Mixed 1:10	I. Just humanure II. Mixed 7.3 III. Mixed 5.5 IV. Mixed 1:10
Just water	Daily	Daily	Daily	Daily
Diluted urine 1:5		Every 15 days		Every 15 days

4.5 PARCELS PRODUCTION

I: Just humanuire

II. Humanure and soil (7:3)

III. Humanure and soil (5:5)

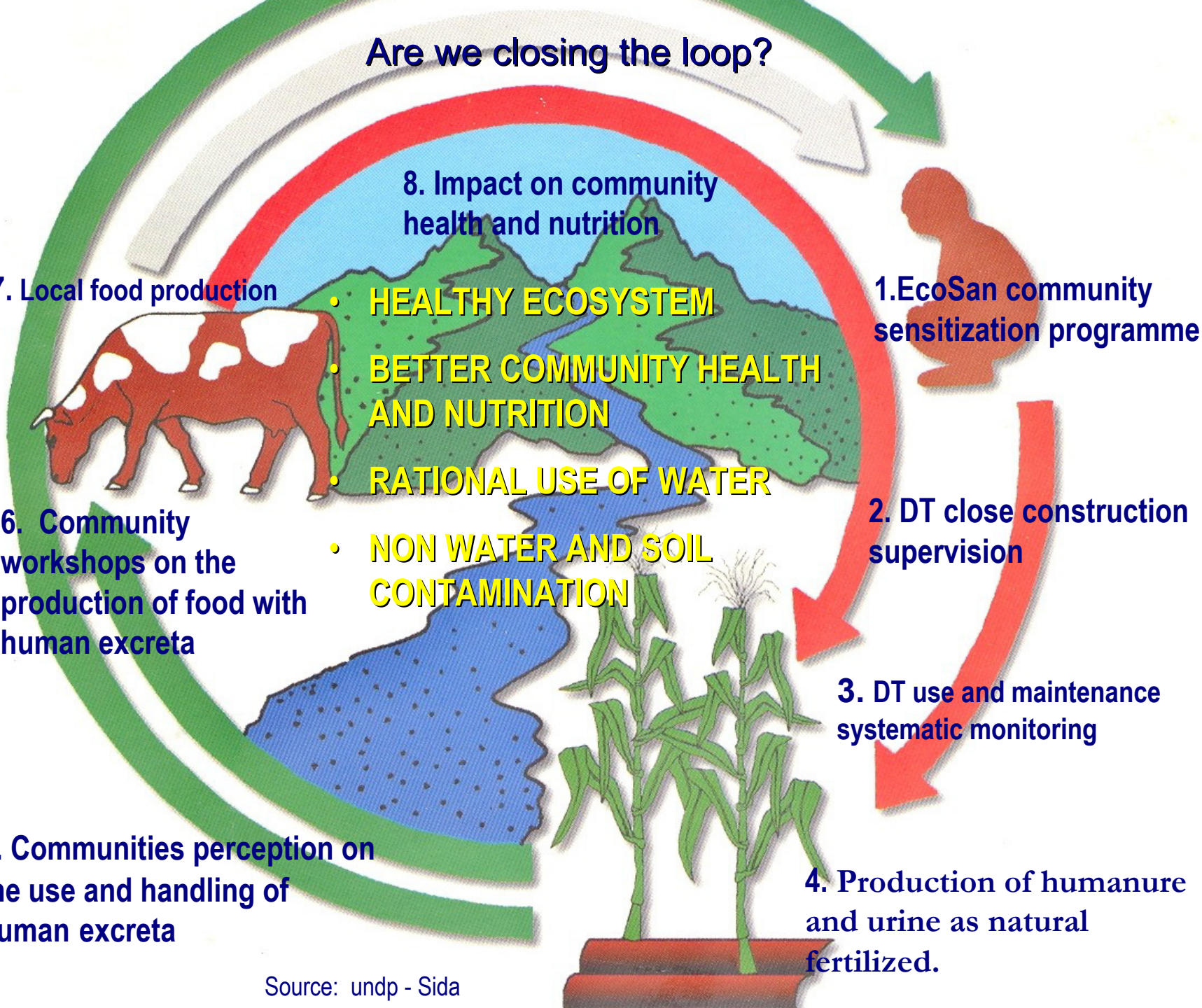
IV Humanure and soil (1:10)

4.6 PARCELS PRODUCTION.

IV, Humanure-soil (1:10) and diluted urine (1:5),

4.7 Closing the loop with DT…Good appetite!!

Are we closing the loop?



Source: undp - Sida

5.1. Conclusions:

1. Our integral DT project documents that it is perfectly possible to "**close the loop**" in a sequence process.
2. The correct use of DT **promotes**:
   * the **rational use of water** in a context of world water crisis.
   * The **safety use of human excreta** to avoid water and soil contamination and all it's health consequences.
   * **The production of local food** for the improvement of community nutrition.
3. **The replicability** of our experience is definetely possible; nevertheless there is an absolute need to previous the implement and **educational programme** oriented to the protection of the environment, that may ensure the interactive community participation.