

# The Use of Participatory methods

Evaluation of aspects of  
Education for Sustainability in  
Science Education in Schools



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# What are participatory methods of evaluation?

- Reason, P. & Bradbury, H. 2001 *A Handbook of action research: participatory inquiry and practice*. London: Sage.
- Heron, J. 1996 *Co-operative inquiry: research into the human condition*. London: Sage.
- Fals-Borda, O & Rahman, M.A. 1991 *Action and knowledge: breaking the monopoly with PAR*. London Apex and Intermediate Technology Press
- Chambers, R. 1992 *Rural appraisal: rapid relaxed and participatory*. IDS Bulletin, 311.

# Considerations when using Participatory Methods

Assume that: -

- Practitioners understand the nature of their professional problems or needs.
- A group of practitioners collectively have most of the ideas and practical experience to solve their problems.
- Practitioners have few opportunities for reflection in their day to day work.
- Practitioners value the ideas and experience of other practitioners who work in the same context.

# The Role of the Evaluator when using Participatory approaches

The evaluator should: -

- not function as an expert
- take the role of facilitator
- encourage reflection
- provide additional inputs when requested or when the need is apparent

# The Advantages of using Participatory methods

1. They are relevant to the needs of the practitioners
2. They encourage teamwork and collaboration
3. They can lead to empowerment
4. They help to break down social and status barriers that may exist
5. They work well with groups of professionals who share the same or similar working contexts

# Problems with EfS in the Science Curriculum of Schools

- The curriculum is already overloaded
- Lack of clarity about sustainability
- Many of the major ideas are complex
- Concerns about indoctrination of students about EfS
- EfS is multidisciplinary
- Many of the major issues cause alarm and despondency
- The controversial nature of the issues
- Difficult to make this part of the curriculum coherent

# Some of the main outcomes from the research

- Identification of the contribution that science education can make to EfS within the whole curriculum
- The development of particular teaching methodologies
- Participatory methods leading to action research

# The Contribution of science education to EfS

- Learning new vocabulary and scientific explanations
- Seeking information from different sources
- Carrying out first-hand enquiries
- Making judgements about what constitutes evidence or opinion
- Communicating information
- Understanding the limitations of scientific knowledge
- Understanding that scientific knowledge is provisional

# Outline of an Action Research Project arising from participatory methods

Aims (what are we trying to achieve?)



Decision (how can we achieve it practically? Answer, base it on a waste management project)



Identification of resources and methodologies needed



Implementation including monitoring



Collection of results, analysis and outcomes



Evaluation against original aims

# Materials used in home and school

- Biodegradable

## Compost

Alternative controlled means.

Eg Sewage, use of animal or plant wastes as fertiliser.

- Non-biodegradable

NB most non-biodegradable materials that become waste require a large input of energy for extraction of raw materials or harvesting and subsequent manufacture

# Materials used in home and school

- Recyclable

(recycling results in less energy compared to manufacture from basic materials)

metals glass plastic paper/card  
clothing and fabrics

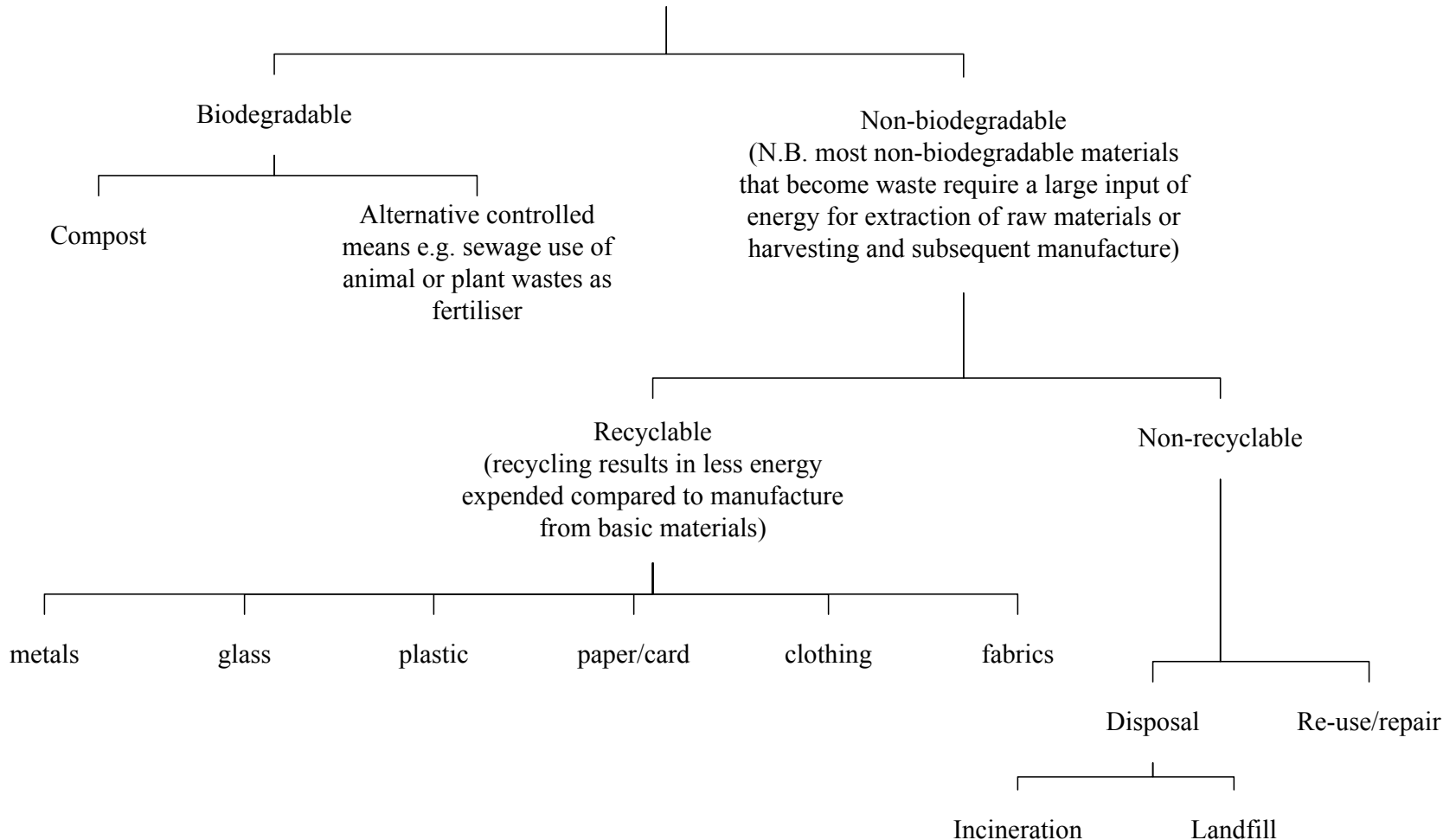
- Non-recyclable

Disposal Re-use/repair

Incineration Landfill

# More detail of waste management opportunities

Materials used in the home and school



## The results of monitoring the relative amounts of each type of material collected

	<b>Paper and cardboard</b>	<b>Glass (bottles and jars)</b>	<b>Metal (aluminium and steel cans)</b>	<b>Plastic (bottles)</b>
<b>Week 1</b>	<b>57</b>	<b>17</b>	<b>17</b>	<b>10</b>
<b>Week 2</b>	<b>61</b>	<b>12</b>	<b>18</b>	<b>9</b>
<b>Week 3</b>	<b>60</b>	<b>13</b>	<b>18</b>	<b>10</b>
<b>Week 4</b>	<b>53</b>	<b>15</b>	<b>16</b>	<b>15</b>
<b>Average</b>	<b>57.75</b>	<b>14.25</b>	<b>17.25</b>	<b>11</b>

Results are expressed as a percentage of the weekly collection by weight

Percentages are rounded up or down to the nearest whole number and therefore may not equal 100%

The overall weight of materials in week 4, when most materials were collected, was 11.5% more than in week 2, when least was collected.

# Environmental Impacts

## Local

Safety (eg glass bottles, dangerous chemicals)

Water pollution (eg oil or chemicals)

Air pollution (particles and chemicals from incineration)

Soil pollution (from landfill)

Subsidence and erosion from landfill

Aesthetic from discarded paper, plastics and other materials

# Environmental Impacts

## Regional

Water and air pollution becomes regional problems as pollutants carried in air and water currents.

Transporting waste materials for disposal causes air pollution and leads to global warming.

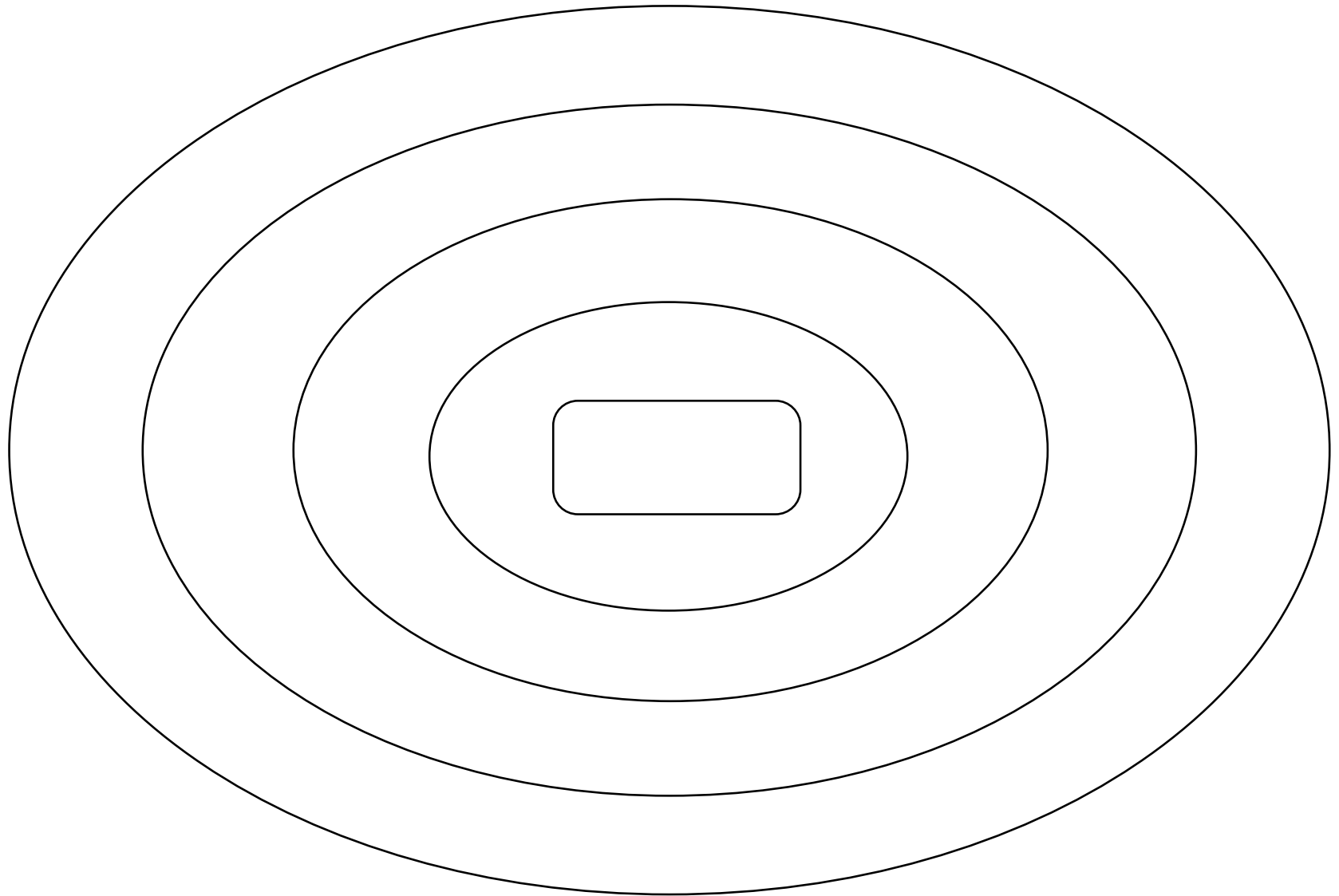
# Environmental Impacts

## Global

Lack of recycling, re-use and repair means that more materials are needed at primary sources, in distant environments. Requiring more extraction and harvesting. Thus more energy require, depletion of resources and removal of habitats.

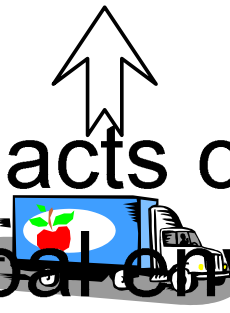
Also, the requirement for more manufacture of goods, leading to the need for more energy and creating more pollution.

# The issues related to sustainability identified by a group of teachers



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Impacts on the wider/  
global environment



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Impacts on the local  
community

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# The Benefits of Participatory Action Research methods

- More likely to address the needs of practitioners
- Can result in practitioner empowerment
- Has a strong motivating effect on those involved
- Breaks down barriers between researchers and practitioners
- Encourages practitioners to evaluate and reflect on practice