REDUCING THE ENVIRONMENTAL IMPACT OF MISSIONS

EcoLOG

MANUAL

FIRST EDITION (2009)

MEDECINS SANS FRONTIERES

This manual provides a range of advice relating to eco-qualitative management of logistical procedures.
The alternatives, listed by theme, give real-life ways to integrate the ecological parameter into decision-making and technical orientations, while seeking to show the direct benefits which can be achieved as a result.

Reduce-Reuse-Recycle
+
Less-Better-Differently

Optimise the electricity consumption and **intensify** the use of renewable energy.

Identify the environmental impact of a technical choice, a product, a technology or a way of working and **adapt** the operational response in such a way as to reduce its effects

Etc.

Process waste in an optimum way

Choose the most "sustainable" materials possible (quality, wear over time, low pollution, etc.) and **reuse** materials as much as possible

Etc.

Control transport and supply chains

EcoLOG

Reduce as much as possible the consumption of polluting materials and products

Manage stocks (perishables and others) rigorously and **anticipate** in terms of expiry dates

Develop a complementary logic in technical choices (e.g. energy/building; energy/telecom, WatSan/energy, WatSan/construction etc.)

Etc.

Etc.

Find alternatives to **reduce** all types of consumption (energy, fuel, materials, etc.) and **avoid** waste

N.B. The EcoLog approach is principally based around impacts which can be verified in a material way (underground, ground, water, air pollution).
The Greenhouse Gas concept is only quoted as a reference.
However, it should be noted that every alternative that is proposed will have not only direct positive effects in terms of environmental protection in the field, but also by extension, indirect effects on CO_2 emissions and global warming (minimising).

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MEDECINS SANS FRONTIERES

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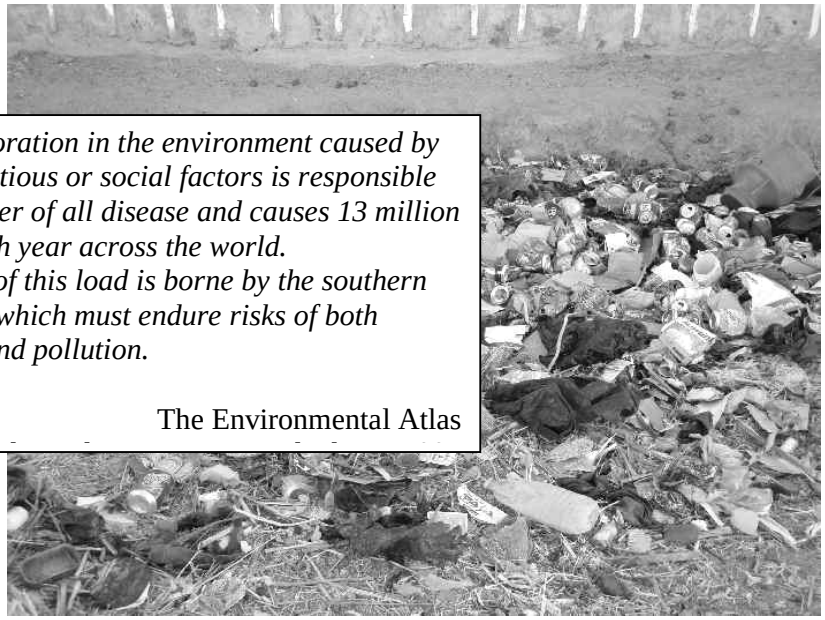
Preface



The deterioration in the environment caused by toxic, infectious or social factors is responsible for a quarter of all disease and causes 13 million deaths each year across the world.
The brunt of this load is borne by the southern countries, which must endure risks of both infection and pollution.

The Environmental Atlas

The logistical efforts rolled out in connection with MSF interventions - regardless of whether they are **programme oriented** or **support** oriented - are periodically called into question.

This can run along several lines, from the **relevance** of the logistical choices through to their **effectiveness** but also their **efficiency**, in other words, how well the resources developed are able to reach certain operational objectives.

Though in its basic meaning the term efficiency calls to mind issues of **financial profitability** ("an activity will be seen as being more efficient if it allows the same level of effectiveness to be achieved at a lower cost[1]"), it can also cover other broader concepts linked to the sound **use of resources**, whether they are human, information, material, financial and so on.

When we question MSF's sound use of resources, we can obviously not dissociate, in this analytical exercise, the concept of the use of **resources and their impact.**

Environmental conservation is a consideration which cannot be ignored when making decisions in the area of defining a programme, and the choice of logistical products to be used.

For **public health** reasons, MSF cannot in fact intervene in areas of low pollution while participating actively in the deterioration of the environment. This deterioration in the long term will have harmful consequences for health and the living conditions of beneficiaries.

[1] Leplat - 1989

We already know that the logistical activities such as transport, waste processing, electricity supply and many others are substantial sources of pollution in the field. To prevent this becoming a barrier to the optimum execution of our operations, it is fundamental that the environment be held as one of the **predominant factors in logistical choices**.

In addition to the support given to logisticians in the field in terms of environmental protection, this manual has a two-fold specific feature:

- For the first time, it integrates the **eco-logistical approach** into other concerns inherent to the development of operations at MSF. The objective targeted in the short term is - when the time comes to account for our work - the logistical department can **give a first-hand account of the environmental impact** of these choices, in the same way as it publishes accounts relating to its financial and human aspects.
- This is part of an initial **move towards an improvement strategy** in terms of reducing our environmental impact. With this in mind, this manual offers **research pathways to be explored** in the field or at the headquarters which will help to consolidate the eco-logistical approach presented here. This research must thus be the fruit of collective and individual reflection both in the MSF operational field and in head offices.

For all these reasons, I would like to thank Valérie Degauquier (IEC) for her work and the dynamism she showed throughout the creation of this document, along with all the people who worked on it.

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ECO-LOGISTICS: definition

By **eco-logistics,** we mean **"a procedure to reduce pollution and environmental damage generated by the performance of logistical and operational activities".**

The "eco" alternative concept must be based on aspects which are most respectful of the environment, in terms of:

- **management,**
- **behaviour,**
- **process adjustment,**
- **development of techniques.**

The **considerable volume of equipment and energy-based resources used by MSF** is required for the development of operations, but can in many cases, be **rationalised or thought about differently** so as to reduce its impact on the environment.

WHY

In addition to the **"health" and "effectiveness" issues,** this move in terms of **behavioural change** or **organisational mode** is also justified by the **socio-economic function** which a healthy environment represents for the beneficiary populations: a **conserved natural environment is a factor for subsistence and development at many levels**.

The benefits achieved can be **three-fold** (MSF-beneficiary populations-ecology) as regards the processing of **waste** and **water**, **energy** rationalisation, **timber** used for cooking and building and **chemical product** processing, the choice of **equipment**, organisation of **transport**, **housekeeping** of MSF infrastructures, of its **offices**, **stocks**, **hospitals** and **health centres**, etc.

Over and above the **ethical issue**, creating **relevant logistical alternatives** taking the environment and sustainable aspects into account can, in a number of cases, **contribute to optimising the operational response** (quality & practical aspects) but also generate **financial savings** in the medium term (see **"advantages"** heading).

Finally, by developing a more eco-responsible method of working, MSF can most likely exert a **stimulating influence**, both at **local** level and in terms of other **NGOs**.

HOW

MSF wishes to meet the challenge of ecological management of humanitarian aid and **reduce its ecological footprint in the field** specifically via the **gradual adjustment of its logistical and operational processes**. How can this be foreseen?

An inter-departmental approach

The eco-responsibility procedure must be approached **transversally** and not via single isolated sectors: **removing the divisions between the LOG and MED departments** in this respect and jointly managing environmental issues would allow **more consistent, promising effects**.

Common sense

These developments are desirable but must be foreseen in a way that will not **hinder MSF's operational ambitions.**

A significant **caveat**: the current ecological wave is as necessary as it is seductive but it is self-evident that in the humanitarian context, **no technical choices can be taken "lightly"**.
Consequently, the procedure must always be to **assess, with rigour and intelligence,** the **operational relevance**, the **effectiveness (security, solidity)** and the **efficiency** (cost effectiveness) that these more "eco-friendly" options present.
The **technical experts** in terms of Operational Centres must be consulted for **approval** of alternative options.

In practice

Just as for Security, the *EcoLOG* approach operates according to the initial principle that there is a level of **collective responsibility** and a level of **individual responsibility**, and that it is the duty of **every MSF employee** to take some of this responsibility.

The **management or technical alternatives** which are potentially applicable (see the *R&D* parts) may be **developed in partnership with field units and the departments in question** in terms of the Operational Centre and/or Purchasing Pools, or even possibly **between divisions**.

It is up to you as logisticians to **adapt the degree to which these proposals are implemented** depending on the various intervention backgrounds.

This compilation of practical recommendations will hopefully help you to **call into question some personal habits** while opening **new horizons in terms of your professional practices**.

This guide, which is a first in terms of MSF logistics, is designed to **evolve** and **be added to** as it is used and according to the feedback you provide.

A - SUPPLY

Concerns supply at international (supply centres), regional & local level. Linked to the "EQUIPMENT" chapter

Freight management	Ecological impacts	Experts/references
No account taken of the ecological impact of the means of transport& frequent use of means of transport which consume a lot of fuel (cargo, lorries, etc.) *Sometimes: lack of forward planning for orders, therefore need to call on the most polluting delivery chains.*	Emissions of particles which are harmful to health (polluted air) (Scarcity of fossil fuel resources)	Purchasing Pool Supply Expert Supply Unit Field Supply Manager

	Kg CO2 / Tonne / Km	Average
Boat	0.015 - 0.030	0.0225
Aircraft	0.570 - 1.580	1.075
Car	0.168 - 1.86	1.014
Lorry	0.210 - 1.430	0.82

Alternative(s)

- As often as possible, favour the least-polluting modes of transport (train, boat) or transport companies which offer the least energy-consuming routes (on a case-by-case basis).
- As much as possible, limit the amount of urgent deliveries of equipment
- Manage and pool orders with as much forward-planning as possible to encourage supply by boat

R&D (HQ & Purchasing Pool):
Put pressure on suppliers for optimum packaging reducing space and weight + develop optimum packaging systems for equipment

Advantage(s)

- If routes are shorter, opportunity to reduce costs
- Easier and less costly supply management
- Reduced costs & reduced waste management

Stock control		**Ecological impacts**	**Experts/references**
Stock control is not optimum *Wastage (equipment not itemised, damaged, or out-of-date after being in storage for too long, or being of poor quality)*		More orders and more waste = general pollution (production, transportation, end-of-life)	Supply Expert
Alternative(s)	➢ Accurately monitor stocks / overview ➢ Optimise storage conditions (according to whether field context allows this) ➢ Be attentive as to perishable product expiry dates		
Advantage(s)	➢ Improved control, leading to easier management ➢ Fewer losses, leading to savings ➢ Less waste, leading to easier processing management		
Purchasing Management		**See heading C - EQUIPMENT**	

B - TRANSPORTS

The "goods and people transport" section is one of the most significant logistical families, in terms of volume of management, costs and also environmental impact. **This area must not be hindered by restrictions which are too constricting and which make some operations more difficult based on a flexible and high-performance "mobility" mechanism (particularly in remote areas). Yet it is absolutely possible to optimise operations (freight & travel) via more eco-responsible management.**		
Fuel consumption	**Ecological impacts**	**Experts/references**
	Particle emissions which are harmful to health (polluted air) (Scarcity of fossil fuel resources) Fuel supply = general pollution (production chain & transportation)	Mechanical Expert Technical Unit

Alternative(s)	➢ With security and priority being equal, opt for vehicles/aircraft which consume the least energy and are the least polluting (e.g. recent engines, propeller-driven aircraft, favour 4-stroke rather than 2-stroke engines) ➢ Limit the use of the vehicle fleet as much as possible ➢ Only include an air-conditioning system if really necessary (e.g. Baghdad 60°, trypano programmes with tsetse flies) or deactivate air-conditioning systems in vehicles which already have it (very high fuel consumption) ➢ Ensure rigorous vehicle maintenance ➢ Give drivers training about energy-saving mechanisms (flexible, adjusted driving, speed proportional to gears, cutting off the engine while waiting or stopped for a long time, inform them about not having to warm up the engine at the start of the day (apart from in cold regions)), etc. ➢ Appropriate fleet: no 4x4s in town (unless roads are made of mud which is not favourable to traditional suspension systems, e.g. Chad) ***R&D*** (LOG dep.): Standards relating to gas emissions are increasingly restrictive. Gas recycling and engine pollution removal systems exist (cf. ICRC). Check whether there is a technical or financial overload. *Restrictions* : more technical, and therefore requires better knowledge of equipment, more expensive (around €3000)

Advantage(s)	➢ Consumption reduction = <u>cost reduction</u> ➢ <u>Easier management</u> of fuel supply ➢ Clear air filter & clean fuel supply = 10% <u>less consumption</u> / tyres correctly inflated = 5% less consumption.

Frequent journeys	**Ecological impacts**	**Experts/references**
	See *fuel consumption* Mechanical wear (frequent repairs & maintenance) = additional production of waste	Mechanical Expert

Alternative(s)	➢ See *Fuel consumption alternatives* ➢ Improved performance of fleet dispatch management ➢ Improved planning for travelling ➢ Clearer communication about daily travel regarding all staff and drivers (provisions, external meetings, etc.) ➢ Avoid giving in to the easiest course of action even if the transport means are "close at hand": - try to car-share as much as possible - pooling: allocate / appoint vehicles by department (combination) Favour the use of town vehicles in situations where the 4x4 is not absolutely necessary.
Advantage(s)	➢ Clarity of organisation and communication = <u>easier</u> & <u>efficient</u> ➢ <u>Cost reduction</u> in repairs / maintenance of vehicle fleet ➢ <u>Improved communication</u> = more collective dynamic ➢ <u>Cost reduction</u> in vehicle purchases ➢ 20% consumption less: around 10-11 litres per 100 km (Land cruiser: 12.5-15/100 km). Cheaper parts; lighter, and therefore less consumption (and less production energy); cheaper to purchase

Fuel choice	**Ecological impacts**	**Experts/references**
	Poor quality fuel = overconsumption and faster engine clogging *Note* : a diesel vehicle will consume less, but its combustion is more polluting than petrol.	Mechanical Expert Technical Unit

Alternative(s)	➢ On purchase: use of quality detector strips + funnels to check retention (2 standard sizes) ➢ Storage: tank storage for decanting of purchased fuel into a drum ➢ Vehicle choice: Favour diesel vehicles for long journeys and petrol vehicles for short journeys (town)
Advantage(s)	➢ Optimum consumption = cost reductions ➢ Less engine clogging = lower costs & mechanical maintenance

Vehicle fleet: acquisitions, renewal, decommissioning	**Ecological impacts**	**Experts/references**
	Motor vehicle = pollution throughout the chain: production, transportation, use, maintenance, decommissioning/end of life. Repairs, maintenance = polluting transportation, waste production (parts, oil change, etc.) End of life = waste	Mechanical Expert Technical Unit

Alternative(s)	➢ Do not overestimate requirements in terms of number of vehicles ➢ Opt for the best possible quality/solidity ➢ Find the best compromise between maintenance/repair and decommissioning: a well-maintained vehicle will have higher resistance and will consume less, but a vehicle which is too old will be weaker and consume more energy, thus will pollute more. ➢ As regards decommissioning, note that if a vehicle is too old and too polluting for MSF, the logic will also apply to the use made by the next owner. The problem will thus only be put back, or worsened. Rather see locally if it is possible to call on the appropriate recycling channels (spare parts)
Advantage(s)	Vehicle resistance = financial savings & less reliant on the mechanical chain (wear)

Garage / maintenance / parts	Ecological impacts	Experts/references
	The activities conducted and materials used in a garage generate a multitude of polluting waste. **Drain oils**: contain heavy metals (lead, cadmium, nickel, arsenic), acids, phthalates, polycyclic aromatic hydrocarbons (PAH), etc. Impacts in terms of air (fumes), ground (spillage) and water (seepage). *Finasol* (degreasing agent for parts) = ground pollution + toxic for users	LogCo

Alternative(s)	➢ Rigorous organising of the overall operations of the garage space (shelving, stock control, waste disposal systems, etc.) ➢ Carry out regular maintenance (planning) ➢ If in doubt, ask several bodies for advice rather than starting a risky repair ➢ Store drain oils before disposal or re-use* (see INFRASTRUCTURES & INSTALLATIONS chapter - section on treating timber with used oils) in waterproof drums, on the ground on a flat surface, out of the sun. ➢ Install degreasing fountains (60L or 220L) ***R&D*** : (bio-technologies): create a processing system for used oils adapted to your specific field ➢ Store reserve parts out of the sun and away from heat sources (e.g. unsheltered containers) or bad weather ➢ Look for reliable recycling channels (used parts and bodywork) ensuring that the various processing stages are as pollution-free as possible. ➢ Batteries: if there is no specific processing channel, obtain a trade-in agreement with the seller/deliverer. ***R&D*** : set up a regional vehicle battery storage channel (intersections?) for return to Europe by container/boat. To be linked with return of batteries, accumulators, and other batteries (generators, etc.)
Advantage(s)	➢ Financial savings ➢ More effective mechanical chain ➢ Less pollution in work areas ➢ Less clean-up work when the project closes

Vehicle washing	**Ecological impacts**	**Experts/references**
	Water consumption = scarcity of a vital resource	LogCo
Alternative(s)	➢ Clean regularly (dust/sand) if possible without water (with a dry cloth) or with a minimal amount of water. ➢ Raise awareness about water consumption and favour the use of a bucket rather than a hose. ➢ Install rainwater recovery systems if in a rainy region.	
Advantage(s)	➢ For town water: financial savings if water is billed on the basis of actual consumption. ➢ If flat fee: no real advantage, but is justified ethically ➢ If water comes from electric pumps: lighter water supply chain, cost reductions since energy consumption is decreased.	
Parking	**Ecological impacts**	**Experts/references**
	Even when stationary, exposed vehicles are more prone to wear than protected vehicles. If the wear increases, then the maintenance chain (supply & waste) will pollute more.	LogCo
Alternative(s)	➢ If possible, park vehicles in the shade. If there is too much exposure to sunlight, consider using a local shade net or sun shade (platted stems) in order to avoid, in particular, drying-out of the tyre material.	
Advantage(s)	➢ Less wear = work savings (maintenance/repairs), reduced supply chain and financial savings	

C - EQUIPMENT

From an environmental point of view, this section concerns an overall chain going from the choice of equipment right up to its decommissioning at its final location, including its transportation, storage and usage & maintenance conditions. Minimising the ecological impacts will be seen most in terms of equipment type, selected depending on certain criteria:

Equipment with a "low environmental impact" is equipment

1. **= of which the conditions/production processes are as pollution-free as possible, using the fewest resources possible/ the largest quantity of renewable resources possible/ the fewest scarce or protected resources**
2. **= of which the manufacturing materials are as natural as possible**
3. **= of which the transport conditions are as pollution-free as possible**
4. **= of which operation requires the lowest possible use of polluting products**
5. **= of which use is essential**
6. **= of which the quality guarantees its solidity and therefore sustained use**
7. **= of which the repair or maintenance can be carried out in a geographical radius which is not too far from the place of use.**
8. **= which can be reused as much as possible**
9. **= which generates the lowest possible mass of non-biodegradable, non-recyclable or non-reusable waste**

In addition, the most sparing and appropriate/respectful use possible will increase its longevity, which will also have positive effects, both ecologically and operationally.

Choice of equipment 1	Ecological impacts	Experts/references
No account taken of production/manufacturing conditions	Chemical pollution (ground, air, water) Ecosystem destruction in some cases (e.g. paper, timber = deforestation, etc.)	Technicians and Purchasing Pool

Alternative(s)	➢ Favour items with a low environmental impact (see box) and eco-certified suppliers (ISO 14001, EMAS, etc.(or committed to a process of environmental awareness ➢ Favour suppliers who use renewable energy
Advantage(s)	➢ Better product quality *Restriction*: price premium at purchase but more resistant = savings in the medium term and streamlined supply chain + simplified logistics

Choice of equipment 2	**Ecological impacts**	**Experts/references**
Equipment does not fulfil requirements (additional restocking)	If the material is not suitable, = wastage and therefore pollution (production, transportation, waste)	Technicians and Purchasing Pool

Alternative(s)	➢ Clearly identify requirements and draw up a good technical definition ➢ Favour standard items which are used to provide safety in terms of equipment choice so as to - inter alia - make it longer-lasting (better support, part quality, etc.) ➢ Good performance regarding communication (field - technicians/Purchasing pool): when making non-standard orders, ask for a clear list of the various possible choices and for your part, communicate your needs with great accuracy so as to reduce the risk of sending out inappropriate equipment. ➢ Create an effective assessment system for the technical relevance of sent equipment and give technical feedback (to technical experts) to optimise future technical choices
Advantage(s)	➢ If purchases are better suited, financial gains and operational gains

Choice of equipment 3	**Ecological impacts**	**Experts/references**
No account taken of transportation method (from production site to field) and/or of material	Pollution	Technicians and Purchasing Pool
Alternative(s)	***When you cannot opt for standard items (import or cost restrictions, for example) then…*** ➢ Favour local production if it is high quality (standard specifications) with available technical support ➢ Identify suppliers offering the most reasonable journeys (location) with the lowest pollution (means of transport) for the transportation of their products. *Note*: in most cases, local supply does not mean local production. If possible, you must choose local equipment according to its place of production (e.g. Chinese imports in Africa = high ecological impact) ➢ Favour items whose material is bio-degradable, recyclable, reusable or quite simply more solid (e.g. *a higher-resistance plastic bottle can be reused several times, and have other uses*) ***R&D*** : make equipment from recovered materials (e.g. canvas for beds/stretchers can come from faulty tanks or the walls of some light buildings can be waterproofed with used plastic sheeting waste)	
Advantage(s)	➢ High quality local supply = practical advantage of closeness in the event of returning goods, and therefore saving time & money ➢ If materials can be reused by MSF: fewer purchases, and therefore financial advantages and reduced supply management ➢ Less waste	

D - INFRASTRUCTURES AND INSTALLATIONS

I - SITE & HEALTH STRUCTURES

1. Construction & rehabilitation

A construction project generates an environmental impact which varies according to its size and the techniques used. A fair number of natural procedures or those based on eco-building principles can be achieved in the field and can enhance the quality of the expected result. However, do remember that:

- ***Technical options will vary depending on the specific nature / complexity of each field context.***
- ***MSF seeks to make resistant and reliable medical structures (solidity/security). Their design and choice of materials must allow easy maintenance*.***

*"A building's maintenance quality is closely linked to how well the builder is used to working with the materials it is made of on the one hand, and the ability to replace faulty installations on the other. To this end, construction or rehabilitation projects developed by MSF aim - as far as possible - to rely on local skills and resources, long-lasting installations (renewable energy) and assemblies which do not have a significant effect on the environment." Extract from the OCB Construction Policy (currently under review)

- ***MSF can perform some experiments, as long as the implementation quality is certain, as well as a local capacity to ensure sustainability (or if MSF can fix any poorly executed construction features which may become apparent in the short or medium term)***

The integration of the ecological aspect in this area can be beneficial at many levels:

1. **A practical advantage in terms of building work. Local human resources in most cases know the more traditional techniques (use of natural materials). Training needs are reduced; team management and supply chain management are simplified.**
2. **The choice of more natural materials influences the pollution factor linked to its life cycle* (obtaining raw materials - transformation - distribution of final product - implementation - use - end of life)**
3. **The effect of some eco-building principles may reduce the building's energy consumption, or even improve the health and comfort of its occupants.**
4. **Use less industrial techniques with a maximum amount of local materials with a lower negative sanitary impact on the people making them and implementing them.**
5. **Construction work which uses traditional techniques is generally more "socially equitable", and its cost is well-matched to its qualities and performance.**

Below you will find some practical information and scopes for application which may be used in the field.

Choice/design of a Consruction/rehab project	Ecological impacts	Experts/references
	More than any other technical creation, Construction/rehab is part of a time-based sense of sustainability. It takes not only the time needed to build it, but it outlives the MSF project (forecast up to 20 years) and most of the time is taken over locally. Its actual lifespan will depend on local stability, how intensely it is used and the level of maintenance given to it. The ecological impact of pollution can be felt right along the manufacture/ transportation / implementation / use chain and in the longer term, in terms of its end-of-life (the more industrial the materials used, the less they will respect the environment)	Construction Expert
Alternative(s)	➢ Integrate the "post-project" perspective as much as possible in the design phase. ➢ Ensure that the building corresponds as much as possible to local socio-cultural norms (this will encourage its use during and after the project) ➢ Ensure that the building's maintenance will not be prohibitive in terms of local economic possibilities ***R&D*** : try out partnerships with organisations which specialise in advice or creation (e.g. the *Emergency Architects* Foundation www.emergencyarchitects.net which integrates sustainable development principles into its work and works together (subcontracting) with humanitarian NGOs).	
Advantage(s)	➢ Encourages local takeover (after MSF leaves) ➢ Useful project in the longer term	
***It should be noted that: a* "virtuous" life cycle for building material = made from renewable materials or those available in large quantities + low pollution & low energy consumption in transformation phases + non-polluting use + the least pollution possible during transportation + end-of-life with "cleanest" possible waste (maximum biodegradability or potential for recycling).**		

Choice of materials	Ecological impacts	Experts/references
Selection does not take account of the life cycle or concepts of "renewability"	***It should be noted that:*** **Energy cost by material: stone 50 kWh/m³ - sawed timber 350 kWh/m³ - concrete 700 kWh/m³ - brick 1,360 kWh/m³ - cement 1,750 kWh/m³ - PVC 24,700 kWh/m³ -steel 46,000 kWh/m³ - aluminium 141,500 kWh/m³** <u>Industrial Materials</u> = pollution throughout the life cycle <u>TIMBER</u> ***Advantages****: accessible / easy to use / multiple uses / hygienic qualities better than other materials (slower bacteriological development than on plastic, metal, for example).* ***Drawbacks****: low resistance to termites, worms, fungus, or other microscopic phagocytes / low resistance to fire / highly sought-after for domestic needs (cooking/heating, etc.)*	Construction Expert ***List of approved works:*** *La Terre est notre maison (The Earth is our home)* *Habitat naturel et écologique (Natural and ecological habitat)* Le Puit Canadien (The Canadian Well) – Brunon Herzog (Eyrolles) *La Conception bioclimatique (en neuf et en réhabilitation) (Bioclimatic Design (in new-builds and refurbishments))* – Samuel Courgey & Jean-Pierre Oliva (Terre Vivante)

	Environmental impacts due to the use of timber: Use= intensifies the issue of deforestation (photosynthesis regulation, endangers bio-diversity, fewer socio-economic and food-based resources Chemical treatment of timber = harmful fumes for health + reduced biodegradability + ground / underground pollution Impact not linked to building: combustion = health pollution (respiratory routes + deforestation) Fired bricks: use of timber = impact on deforestation + fumes harmful for health	*Climate responsive building (Appropriate building Construction in Tropical and Subtropical Regions)* – Paul Gut, Dieter Ackernecht (Skat) *The Barefoot architect (A Handbook for greenbuilding)* – Johan ven Lengen (Shelter) *La Casa Ecologica autosufficciente (para climas calido y tropical)* – Armando Deffis Caso (Arbol Editorial)
Alternative(s)	➢ Use traditional techniques which call on local resources and know-how. *Difficulty*: the local community could be fragmented in terms of traditional processes (at first glance, very positive about modern techniques). However, local contractors exist where workers use traditional practices (stone carving, mud building, etc.) ➢ In some regions, varieties of bamboo have suitable properties for building (lightness, resistance, elasticity, rapidly renewable, etc.) but !! They are less sustainable than timber and are less fire-resistant. ➢ Use recovered wood as much as possible and/or allow future reuse. ➢ If possible: order FSC-certified (Forest Standardship Council) timber – www.fsc.org) ➢ Treat timber (in the least chemical way possible) to give it a longer life	

Alternative(s) continued	***It should be noted that:*** **Drain oils are very effective in treating timber and are an asset in terms of increasing the resistance of buildings, which is an environmental advantage. But you must absolutely take into account the fact that this is a product with a very high level of hydrocarbons and that inevitably it will give off toxic fumes. Consequently you should avoid using it inside buildings, or in medical constructions. Wait prior to use + ventilation.** ➢ Painting timber supports with lime wash, or whitewashing them completely is an excellent alternative for protection ***R&D*** : find ecological timber treatment products(locally manufactured?) ➢ Other natural materials of which use is encouraged/linked (if these can be used locally): - Stone/rock (inertness over time, solidity, easily used with attachment materials, aesthetics, etc.) *Drawback* :more time to work with it - requires specialist carving labour - Clay/unrefined earth (great inertness, easy handling) *Drawback*: less resistance if poorly insulated - risk of attracting animals (mice, insects) and therefore compromised hygiene - Whitewash (good insulation, protects walls and reflects sun's rays) *Qualities:* permeable to steam, impermeable to runoff water, elasticity, will adhere well regardless of support, adapts well to changes in temperature (even frost), allows masonry to breathe unlike cement, withstands damp, limits saltpetre advances, disinfects (bacteria), and becomes very resistant when dry. - wood wool / woodchip (good insulation, when mixed with wall materials) - **if local skill base only** : rather than fired bricks, favour mud bricks (unrefined earth) with a strengthening composite ("bio-concrete" or stabilised bricks) or those covered with natural coating so as to avoid premature deterioration (lime, local coating)

Temperature control		**Experts/references**
Concrete/cement walls & corrugated iron = buildings very sensitive to changes in temperature. *In hot regions, these materials are heat-conducting.*	Use of air-conditioning systems or heating consumes a lot of energy. The energy supplied to allow these to operate sometimes comes from generators = air pollution via the discharge of hydrocarbon particles. In cold regions, it is heating systems which are required.	
Alternative(s)	***Note:*** **the correct combination of the proposals below will depend on the climate conditions and resources available locally. Check with Construction Experts and related works.** ➢ Bioclimatic approach :(if new building): combine - The layout of the longest walls depending to the minimum sun exposure time if in a hot region, maximum if in a cold region. - Height of the location: higher if you are seeking heat and/or dryness, lower if you are seeking to feel refreshed. - also positioned depending on the natural external ventilation ➢ Internal ventilation (variable opening systems can be designed which can change with seasonal variations). *Drawback*: complex concept, not easy to manage without specific knowledge ➢ Bricks made of materials with low heat conductivity - high inertness - a degree of permeability to steam (e.g. stone, clay, bio-concrete, unrefined earth, etc.) ➢ Natural sun shades (seko, platted palm branches, worked reed stems, etc.) to be planted vertically at around 50 cm from the wall which is to be protected from the sun.	

Alternative(s) continued	➢ Roof sun shades if roof is made of corrugated iron (applied directly + solidly affixed) *Drawback:* requires regular maintenance (deterioration) - risk of attracting mosquitoes in humid regions (at least if the material is not dried). ➢ Shutters, shade nets or (mobile) protection walls outside (bear in mind that a curtain will not stop heat from entering, unless it is very damp and air can get through it) ➢ Trees/vegetation to create shade. *Drawback in hot regions:* possible mosquitoes *Drawback* in dry regions: applying water if the area has a scarce supply ➢ Whitewash (or white paint) on external walls (+ roof) to increase the reflection of sun rays (*caution: protective glasses are essential*) ➢ Wall insulation: a good number of structures (natural, or using recovered materials) are possible. See specialist manuals See also "Technical sheet about the manufacture of insulating walls using polystyrene chips found in supply boxes" available from the OCB Construction Expert ***R&D*** : Canadian well (principle of an underground duct opening onto the outside which regulates the temperature of the air exchanged via the influence of the average underground temperature) and semi-subterranean building to reduce the effect of the sun's rays - of particular interest for locations which must be kept at low temperature (e.g. Cherrati-Ethiopia Pharmacies / MSF OCB)
Advantage(s)	➢ Fin. savings & reduced supply chain ➢ More comfort in buildings (in particular temperatures)

Sanitation/ disposal of waste water	**Ecological impacts**	**Experts/references**
	Discharged liquids have an impact on hygiene and ground quality. In arid regions: domestic water goes to waste, as it is not recovered	Construction Expert WatSan Expert
Alternative(s)	***R&D*** : in association with WatSan, develop eco-sanitation systems ("eco-sanitation" information on Google)	
Advantage(s)	Broadening of the range of technical solutions according to given restrictions	
Specific areas	**Ecological impacts**	**Experts/references**
Kitchen **Water** **Vegetable gardens/gardens**	Scarcity of timber + smoke fumes Energy use Water consumption	
Alternative(s)	➢ Improved fireplace systems (see GTZ/ German Technical Cooperation)) = furnace which optimises timber combustion (less timber, more heat and a reduction in fumes) ➢ Solar water heaters (roof). Ideally, think about this or change the building to include this ➢ Link plantations to rainwater recovery systems	
Advantage(s)	➢ Timber savings = reduced supply chain and financial savings ➢ With a solar water heater: reduction in energy requirements (gas or electricity) ➢ Water savings	

2. Water, Hygiene, Sanitation

Since environmental and health quality are closely linked, WATSAN management is a fundamental link in order to limit the harmful impact of humanitarian activities in the field. Its protocols are "the best possible compromise" between neutralising risks (contamination, injuries, hygiene, etc.), field restrictions (lack of technical resources and time) and taking ecological issues into account. Respecting the rules laid out in the *Sanitary Technician* Manual as much as possible is a high-priority step.
Upstream, R&D within MSF can gradually make improvements in terms of water treatment, sanitation and hygiene. The alternative techniques market is widening and less-polluting solutions are being developed. Here, the main thing is to opt for procedures which have qualitative advantages (in terms of health prevention above all) and operational advantages (practical and financial aspects), which are equivalent to, or better than, current systems.
***It should be noted that*: socio-cultural aspects must be taken into account when reflecting on this (hindrance or benefit), as well as the concept of local takeover after the project (low technological complexity of procedures & light maintenance)**

Management of medical waste	Ecological impacts	Experts/references
	Incineration: emits toxic fumes + ash This ash is not pH-neutral and the waste bunker does not guarantee that the ground will not be contaminated in the long term, especially if there is a construction defect after MSF leaves (site management abandoned)	WatSan Expert
Alternative(s)	➢ Favour the use of Montfort dual combustion chambers ➢ Choose a location which limits as much as possible the release of fumes to occupied sites (buildings, homes, living spaces, etc.) ***R&D*** : (WatSan / LOG): Metallic Montfort (experiment underway)/ Urban area commercial incinerators / fume filtering system / higher performance incinerator / other decontamination or sterilisation techniques (micro-waves, etc.) / other waste processing techniques (grinding, recycling)	
Advantage(s)	➢ Fewer risks for the health of those undertaking waste management and patients on hospital sites	

Toxic substances	Ecological impacts	Experts/references
List of main substances in question: ***medical products (e.g. chemotherapy), laboratory products, development tanks & films, insecticides, cleaning - degreasing products for mechanical parts, battery acids, freon in refrigerator circuits, etc.***	The WATSAN unit suggests protocols in terms of toxic waste, but the situations in the field do not always allow these to be applied as they should. Failing a better solution, it is sometime the case that liquid substances are poured onto the ground and gas dispersed = ground pollution, water table pollution and air pollution.	
Alternative(s)	➢ Better use (respecting the dilutions recommended on the usage instructions) ➢ Maximum reduction of these products ➢ Better maintenance ***R&D***: for medical detergents (e.g. Surfanios), carry out a comparative study of the ecological impact (laboratory) between various products with similar properties and opt for the one whose effects are the least toxic on the environment (with equivalent anti-pathogenic characteristics) ***R&D***: develop neutralisation procedures (e.g. whitewash or micro-waves) ***R&D***: medical X-ray return system (archives & failed scans) - can be reclaimed in specific waste processing channels	
Advantage(s)	➢ Fewer risks for users' health ➢ Improved channel in terms of waste processing	

Sanitation	Ecological impacts	Experts/references
	If there are too many dry toilets = presence of nitrates When water is added, there is a weakening in the natural breakdown balance. Waste bunkers = anaerobic environment: 2 years to eliminate pathogens	WatSan Expert See *Eco-sanitation* on Google

Alternative(s)	Disperse materials as much as possible *Please note*: trenches = eco-sanitation ***R&D*** : widen eco-sanitation principles (dry toilets, principles of pathogen neutralisation via natural additives, etc.) *Worthy area of investigation*: refer to local practices in terms of public health and materials reclamation for fertilisers.
Advantage(s)	➢ Healthier working conditions ➢ Practical advantages in some cases

Out-of-date drugs	**Ecological impacts**	**Experts/references**
	Ground contamination (sanitary effects via risk of indirect chemical poisoning, eco-systems disrupted) Chemical & macro-biological pollution of the water table As regards the thorny issue of stocks of out-of-date drugs, MSF must take existing strict legislation into account, both internationally (WHO standards) and at European level (ban on repatriation of out-of-date drugs within Europe for example, REACH programme, etc.) as well as at local level (Public Health Ministries). Several solutions are recommended: very high temperature incineration (giant cement plant incinerators, which not all countries have), inertisation (grinding + mixing with lime), dilution and dissolving. However <u>all of these have an environmental risk</u>. (e.g. vaccines = living pathogenic material). Mention must also be made of encapsulation which runs the risk of leaking.	

Alternative(s)	➢ As a priority: take local legislation into account. Otherwise, MSF methods (see *Sanitary Technician Manual - Ch. III, IV, V, VI*) <u>Respecting the rules = limiting the risks</u> *!! Erroneous management of out-of-date drugs can also bring about thefts with a risk of local selling-on which is very harmful for public health. Destruction must be monitored until the end and correctly documented in terms of the storage of any residual items.* ➢ Act as much as possible upstream: order proportionately to requirements and manage stock* rigorously and therefore limiting losses (good storage conditions) and allowing action to be taken prior to the expiry date (donation, transfer, etc.) * LOG/MED cooperation essential ***R&D***: explore drug repatriation possibilities for out-of-date drugs for processing in countries with the appropriate technological channels
Advantage(s)	➢ Positive image of MSF remains intact ➢ Improved stock control = simplified waste management

Making water drinkable	**Ecological impacts**	**Experts/references**
	High quantities of chlorine = harmful effects on the eco-system, and indeed on the health of those who drink it (it should be noted that the risk of negative effects is lower than the non-elimination of bacteria) *Aluminium sulphate* or *ferrous chloride (coagulating substances):* mud extracted from water is disposed of on the ground, and has a high chemical load, which can have damaging effects on the local eco-system and the water table, and consequently on health	

Alternative(s)	***R&D***: adapt water purification systems using membrane filtration (or activated carbon) to the restrictions of MSF missions ***R&D***: test out pumping systems linked with integrated membrane filtration ***R&D***: water purification systems using UV rays ***R&D***: test out more ecological water analysis methods which do not use harmful chemical products (existing)
Advantage(s)	➢ Fewer toxic substances = lower costs and less harmful waste

Water supply	**Ecological impacts**	**Experts/references**
	See ELECTRICITY SUPPLY	

Alternative(s)	***R&D***: pump systems powered by solar energy or mini-wind turbine
Advantage(s)	➢ Reduction in energy consumption = financial savings and reduced supply chain & waste management (batteries)

3. Electricity supply and cold chains

Along with the *Transport/Travel* section, and the *Waste Management* section, the *Electricity Supply* section is one of the most significant environmental impacts of MSF activities. Electricity is an essential source when accompanying interventions. Local grids are often inaccessible, unstable or even insufficient in terms of flow for operational requirements. The most common response currently is the generator, which is practical but whose fuel consumption is very high especially when used continuously over long periods. Fuel combustion, battery usage, noise pollution and the waste they represent at end-of-life are all factors which justify the importance of rationalising their use, reducing their consumption and widening the installation of systems which use renewable energy (R&D).
"Energy" aspects interact with almost all other technical families.
<u>Eco-advice:</u> increase R&D and HR budgets in the ENERGY department so as to implement the extension of techniques based around renewable energy and reducing consumption.

Consumption	**Ecological impacts**	**Experts/references**
	Production of (non-renewable) electricity = pollution (production, transportation)	Energy expert
Alternative(s)	Reduce consumption as much as possible. *How?* ➢ When designing electricity supply systems, find the best possible fit between production and consumption, in other terms, find optimum combinations between sources and their satisfactory planning/ organisation according to requirements. ➢ Encourage rigorous overall management and self-management / individual responsibility ➢ Very clear communication (for example posters) in MSF offices & infrastructures regarding the importance of saving energy ➢ Systematically turn off lights when you leave the room ➢ Avoid using lighting during the day if this is not really necessary ➢ Limit the use of devices which consume a lot of energy (especially if these are powered by generators) ➢ Opt for electrical devices which have optimum consumption (AAA) (standards + local supply if possible) ➢ Quick activation of device standby function (computers, copiers, etc.)	
Advantage(s)	➢ Reduced consumption = <u>financial savings</u>	

Generators	**Ecological impacts**	**Experts/references**
	Emission of harmful particles Batteries = source of pollution (acids & heavy metals) and metallic waste Noise pollution Impact in terms of the production & transport	Energy expert

	(supply) chain for generators	
Alternative(s)	➢ Calibrate generators as much as possible depending on the electricity requirements ➢ Favour high-quality, jellified batteries ➢ Design the generator size in terms of timetable, and not total power required (simultaneous requirements) and therefore plan/distribute consumption requirements so as to reduce consumption peaks. (e.g. ensure autoclaves are operated at the very beginning of the day, and only switch on the air-conditioning afterwards. ➢ Contact the Energy expert <u>with accurate figures</u> so he/she can help you to identify the best solution (the most appropriate generator(s) for your needs) ➢ Ensure good ventilation of the locations where generators are stored (if blanketing is avoided, the generators" efficiency and sustainability are increased) ***R&D*** : Test out generator boosters/invertors (allows the generator size to be reduced, and allows the generator to function permanently at full-charge = better efficiency, and stops the generator when consumption is too low, and uses the charged batteries. *Drawback:* risk of electromagnetic wave emission, which may disrupt nearby telecommunications devices ***R&D*** : On the market, look for generator types with optimum qualities, combining - the lowest rate of pollution (combustion) - the lowest energy consumption (fuel) - the most solid (sustainability) ***R&D***: Test out alternative generators (consume less energy) ***R&D***: Heat recovery system for heat produced by the generator cooling system for the production of hot water ***R&D*** : Heat recovery of exhaust gases to heat domestic water (laundry, kitchen, showers, etc.)	
Advantage(s)	➢ Reduced consumption = <u>financial savings and lighter supply/waste chain</u> ➢ For the invertor: smaller generators, and therefore less expensive and generator lifespan increased threefold	

Electrical installations	**Ecological impacts**	**Experts/references**
inside - outside	Identical to Consumption section (see above)	Energy expert

Alternative(s)

- Avoid using neon lights. Their power factor is non-advantageous, they contain mercury (more than low consumption bulbs), are more fragile and impossible to repatriate.
- If systems are already installed with neon lights: purchase higher quality (maximum sustainability) so as to alleviate the problem in terms of waste
- Develop lighting systems which use LED bulbs (no harmful products, very long lifespan, very low energy consumption)
- Fit low-consumption bulbs (see standard types below).

NOTE: : these bulbs contain mercury, and these are polluting factors at end-of-life or if broken. Ideally, install a return channel for processing in specialist structures. *You must* check whether the transport of mercury is allowed, or else install an authorised channel.

- Install the most fragmented systems possible (e.g. independent management of rooms to light) *Drawback*: individual absent-mindedness is of no consequence when management is centralised.

R&D: if major installations, integrate the three-phase system to allow Day/Night/24-hour management. *Drawback*: more complex system which requires a higher level of knowledge! Danger if handled incorrectly.

R&D : test out the installation of battery banks (2-volt) of optimum size (note: do not modify the configuration during its lifetime)

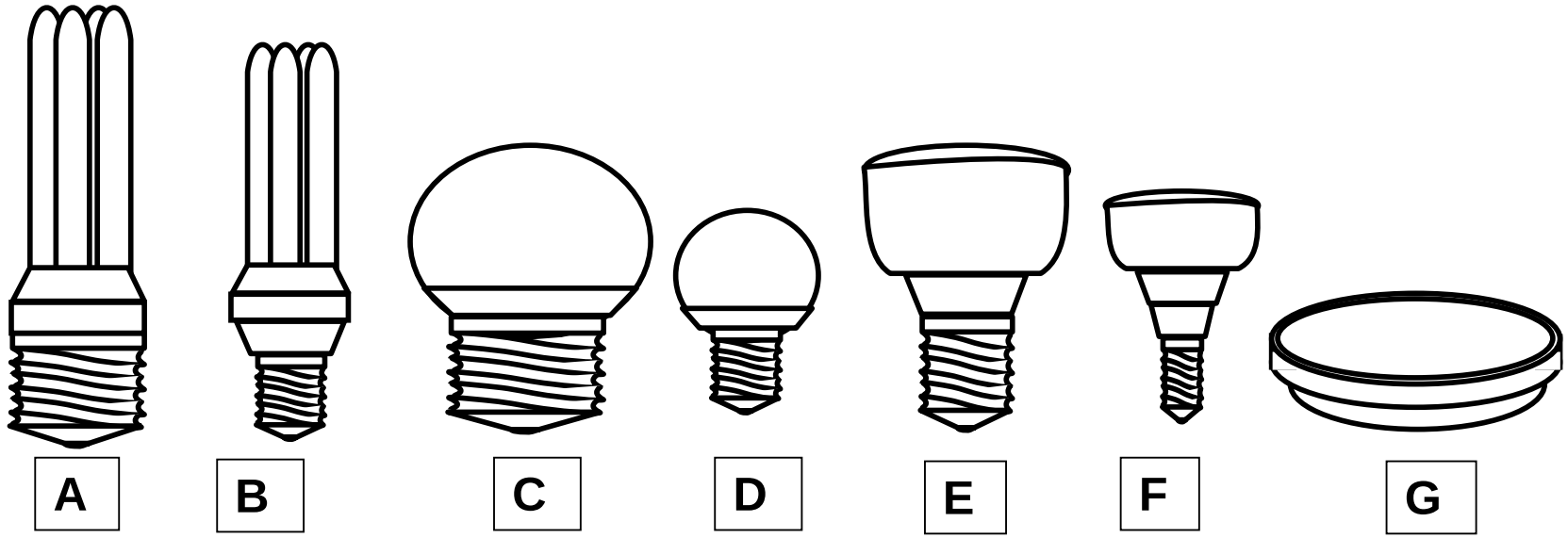
R&D : in sunny regions: solar panel systems for expatriate houses + offices, direct power supply (during the day) to avoid the use of batteries (to be used in combination with sound-proofed generators)

R&D: install mini-wind turbines (for example, the Greenpeace *~Energy Ball*) in windy regions for electrical power (day & night)

R&D : Solar water heater

R&D : implement a system to bring low-consumption bulbs (and batteries) back to Europe for appropriate processing.

Illustration	Low-consumption bulbs: operate for about 15,000 hours thus low renewal rate = Cost savings, reduced supply chain, lower maintenance.



Long -	**Long**	**Round -**	**Round**	**Spotlight**	**Projector**	**Flat -**	**Flat**
E 27	E 14	E 27	E 14	E 27	E 14	HG 57	
7- 23 W	5 - 18 W	7- 23 W	5 - 18 W	7- 23 W	7- 23 W	9 - 23 W	

E.G.: PLIGFLCWA23 =>	BULB, FLUO COMPACT, white, E27, long, 23 W, 230 V

Batteries	**Ecological impacts**	**Experts/references**
	Sulphuric acid Heavy metals (lead) Pollution impact in terms of manufacture / transportation / End-of-life End-of-life: note that the level of sulphuric acid is low but it is the lead sulphate concentration which is very high.	
Alternative(s)	➢ Favour good quality batteries (see nominal lifespan depending on the number of cycles) *Drawback*: more expensive for short missions (project closure before battery end-of-life) ➢ Choose a battery in line with the use to be made of it (e.g. do not use start-up batteries for back-up systems) ➢ Favour jellified batteries (which cannot be "emptied") ➢ Liquid electrolyte batteries: inform fully about the environmental risks of draining acid onto the ground!!! The same thing goes for its use as a weed killer in vegetable gardens, etc. (lead in vegetables) ➢ Reassign "worn down" batteries to less intensive tasks (before self-discharge status or risk of short circuits) ***R&D*** : develop a partnership with a European recycler and create a return system for accumulators/batteries/boat batteries (for example inter-sections) Look into: use of this transaction for value-adding by MSF Integrate the return cost into the battery/accumulator purchase budget etc.	
Advantage(s)	➢ Fewer batteries or higher-performance batteries = reduced supply chain and financial savings	

Batteries - accumulators	**Ecological impacts**	**Experts/references**
	The same thing as for the ecological impacts of Batteries	
Alternative(s)	➢ Use as much equipment as possible which does not use batteries (e.g. solar lamps, electromagnetic turbine torches, etc.) ➢ Rechargeable batteries: useful for devices requiring very regular battery consumption *Drawback*: lower energy charge than that of other zinc batteries, and therefore loss of efficiency in some cases. In addition, requires very stable current for recharge, or else poor yield ***R&D***: same thing as for Batteries (return & partnership for appropriate processing)	
Advantage(s)	➢ Fewer batteries = financial savings and simplified waste management	

Cooling circuits	**Ecological impacts**	**Experts/references**
	Electrical consumption = pollution impact in terms of production/transportation Mercury thermometers = chemical pollution at end of life Older fridges contain CFCs (toxic).	
Alternative(s)	➢ Reduce requirements by optimising heat transfer (see Energy expert) ➢ Reinforce heat insulation ➢ Encourage the discharge of calories produced by capacitors ➢ Open fridges as sparingly as possible ➢ Place fridges in insulated places (insulation/building and not extensively used) ***R&D***: creation of a discharge duct at the back of the premises (building or container) or mini Canadian well system (regulation via contact with average underground temperature)	
Advantage(s)	➢ Reduced consumption = fin. savings + lighter maintenance & supply chain	

4. Food distribution

NUT programmes generate a sizeable volume of material, and often their equivalent in waste. Without affecting the nutritional requirements priority, some prevention/waste management policies could alleviate the negative impact on the environment.
It should be noted that in addition to the packaging issue, there is the issue of plastic bags given out for the transportation of products (see INFRASTRUCTURES) which is very characteristic here and needs to be solved.

Plumpy Nut Packaging	Ecological impacts	Experts/references
Non-biodegradable bags	Ground pollution - cattle swallow them - water table potentially contaminated when they break down Non-systematic waste management thus uncontrolled ecological impact Bags burned by beneficiaries (waste or starter for fire) = emission of toxic fumes[2] Empty bags break down in the wild or in dumps = pollution	

Alternative(s)	➢ Schedule an incinerator (Montfort or modified drum) near distribution centres and organise bag return schemes ➢ Collect used bags and request a return to distribution centres for appropriate processing (WatSan Incinerators) ➢ Implement a procedure to persuade beneficiaries to collect empty bags and return them to Distribution Centres. Via appropriate awareness-raising, word of which can be spread via field teams, it is possible to condition beneficiaries so as to promote this practice. ***R&D*** **:** produce a reusable bag (e.g. made of fabric) for product transportation.
Advantage(s)	➢ Healthier work environment

[2] * According tothe packaging makers (2 certified by Nutriset), *Plumpy Nut* bags can be destroyed by combustion with no toxic effects in terms of fumes.
From an "eco" point of view, any waste combustion, particularly that of materials based on chemical compounds, generates emissions (CO2, dioxins, etc.) which are harmful to the environment and consequently to health.

	➢ Positive image of humanitarian aid	
Plumpy Doz Packaging	**Ecological impacts**	**Experts/references**
	No biodegradable components (for product conservation/protection reasons), but less problematic than bags from an environmental standpoint	
Alternative(s)	➢ Can be reused (recycling which does not use energy) In various countries, they are used as measurers, containers, spice pots, etc. They are even sometimes found (empty) on sale in local markets. They can be returned by patients to be used in other programmes ***R&D*** **:** produce a reusable bag (e.g. made of fabric) for product transportation.	
Advantage(s)	➢ Healthier work environment ➢ Positive image of humanitarian aid	
Stock	**Ecological impacts**	**Experts/references**
	Losses in terms of food supplements are frequent and generate both a major moral unease and just as many harmful environmental effects through the resulting destruction processes.	
Alternative(s)	➢ Ensure optimum storage conditions to avoid deterioration of nutritional benefits (Harmful dampness, particularly for flours - conditions which encourage the development of poplar borers) ➢ Ensure rigorous monitoring of expiry dates, and find solutions in advance of said dates.	
Advantage(s)	➢ reduced supply chain ➢ Positive image of humanitarian aid	

5. Distribution of non-food items

The ecological issue in terms of equipment distribution (shelters & NFI) in a crisis situation is largely similar to that of the supply chain (see EQUIPMENT + TRAVEL chapters). The implications are multiple and broach issues of the (environmental) quality of the production of articles chosen, their transportation method, the direct consequences of their use and finally the degree of pollution at end-of-life (waste). Here, you must include a sustainability parameter as much as possible (which guarantees maximum product use) and opt for materials which have the least harmful effect possible on the environment. For the most part, these are measures to take upstream, when selecting standards (Operational Centres & Purchasing Pools), but field logisticians could also exert an influence in this respect when identifying requirements, and in connection with supply on the local market (kits).

Shelter distribution	**Ecological impacts**	**Experts/references**
	Transportation (often a bulky operation using air transport) = air pollution	
Alternative(s)	*Extract from the MSF Guideline on "Shelters"* ➢ Carry out an initial assessment of the way of life of the population affected, traditional materials and habitat, weather conditions and potential risks and adapt your choice according to the results of this assessment. Favour shelters made with local materials by refugees... over pre-fabricated, "tent" type shelters. ➢ However, in areas particularly affected by deforestation, the use of prefabricated shelters has an environmental advantage.	
Advantage(s)	➢ For better-adapted shelters: reduced supply chain and financial savings	
Prefabricated shelters	**Ecological impacts**	**Experts/references**
	Industrial production: air/ground/underground pollution during manufacture (particularly for synthetic materials) Polluting waste	

Alternative(s)	➢ Opt for shelters which are the best fit between quality (resistance), least weight and least volume (relative analysis of the various components - no standard answer). ➢ Opt for family rather than individual shelters (more optimum proportion of manufactured materials) ➢ Opt for shelters which can have the maximum number of "second lives", either being used directly or in terms of recycling their component parts. ***R&D* :** temporary tents/shelters which can be turned into semi-permanent shelters (see Shelter Centre UK project) ***R&D* :** with resistance qualities being equal. research/develop the type of plastic sheeting which most limits the use of environmentally harmful substances in its manufacturing processes.
Advantage(s)	➢ Reduced supply chain - cost reduction for transportation (transport optimisation) ➢ Less waste management, fin. savings if recovered for other uses.

Plastic Sheeting	**Ecological impacts**	**Experts/references**
	Industrial manufacture. non-biodegradable waste Limited lifespan in terms of use but not in terms of its deterioration	

Alternative(s)	➢ Re-use previously used plastic sheeting as much as possible ➢ Only incinerate at very high temperature (1,200 °C) so as to limit toxic emissions and reduce remaining volume.
Advantage(s)	➢ Reduced supply chain - cost reduction for transportation (transport optimisation) ➢ Less waste management, fin. savings if recovered for other uses

Kits & distribution	**Ecological impacts**	**Experts/references**
	Ditto Wastage if products are not appropriate	
Alternative(s)	➢ When selecting articles, do not think solely about their functionality in terms of emergency requirements, but also in terms of their possible future use ➢ In order to most effectively encourage the use of articles and to avoid wastage, make choices which fit with local uses ***R&D***: Research fair trade/ecological articles (natural materials, or else reusable/recyclable, or biodegradable)	
Advantage(s)	➢ More comfort for beneficiaries ➢ Extended longevity of emergency aid effects	

II - MSF FACILITIES (OFFICES, WAREHOUSES, HOUSES, etc.)

A wide range of possible improvements exist in terms of infrastructures and their associated activities. These improvements are modest when viewed singly, but when integrated into every project, the overall positive impact will be significant

1. Offices

Choice of buildings	**Ecological impacts**	**Experts/references**
	See ecological impacts in CONSTRUCTION, ENERGY, TRANSPORT	
Alternative(s)	➢ Choose premises to occupy in terms of the following criteria: - Most effective position (to reduce travel) - Solidity of the building and installations - Best possible insulation (thick walls, low sun exposure in hot countries, maximum exposure in cold countries, etc.) ➢ When possible, favour premises which are connected to the local water and electricity network	
Advantage(s)	➢ Shorter travel =<u>time savings</u> ➢ <u>Less fuel consumption</u> &<u>less wear on vehicles</u> = fin. savings ➢ Solidity = <u>savings at all levels</u> (work, equipment, finances) ➢ Effective insulation = <u>more comfort</u> and <u>fewer energy requirements</u>	
Electrical installations	**Ecological impacts**	**Experts/references**
	See ecological impacts in ELECTRICITY SUPPLY	Energy expert
Alternative(s)	➢ If possible, transform/adapt the electrical network so as to structurally reduce electrical consumption	
Advantage(s)	➢ <u>Financial savings</u>	

Air-conditioning	**Ecological impacts**	**Experts/references**
	See ecological impacts in ELECTRICITY SUPPLY	Energy expert
Alternative(s)	➢ Create as much natural ventilation as possible ➢ Hang damp fabric in window openings (wet cooling of incoming air)	
Advantage(s)	➢ Energy savings = financial savings	
Heating system	**Ecological impacts**	**Experts/references**
	Electric heating: see ecological impacts in ELECTRICITY SUPPLY Wood heating: impact on deforestation and emission of harmful fumes in enclosed spaces	
Alternative(s)	➢ Use the principles of the "passive" house (insulation, bio-climatic impetus, appropriate ventilation. etc.) to limit heating requirements (see BUILDING-REHABILITATION) ➢ In the case of electric heating, opt for supply from renewable energy sources ➢ Avoid heat loss as much as possible ➢ If wood heating, couple heating combustion with cooking tasks. *Reminder* : external removal system (chimney, duct, etc.) is essential ➢ In cold regions: ensure the generator premises is adjoined to the building to be heated (recovery of operating generator heat)	
Advantage(s)	➢ Energy savings = financial savings ➢ Lower timber requirements means a reduced supply chain	

2. Housekeeping

Water consumption	Ecological impacts	Experts/references
Water – also for accommodation purposes - is one of MSF's main concerns.	Wastage due to leaks (poor condition of pipes and plumbing)	
Alternative(s)	➢ Repair the leaks ➢ Use high-quality plumbing material	
Advantage(s)	➢ More hygienic on premises	
Domestic appliances	**Ecological impacts**	**Experts/references**
	see ecological impacts in ELECTRICITY SUPPLY	Energy expert
Alternative(s)	➢ Opt for appliances with low energy consumption (A++). At the outset there is a price premium to pay, but as the energy cost reduces, there is a return on investment in the medium term. ➢ Opt for long-lasting appliances which are <u>higher quality</u> but also more expensive at purchase. But their resistance will guarantee more effective, broader use over time ➢ Inform staff dealing with housekeeping about how to use the appliances (appliance protection)	
Advantage(s)	➢ <u>Financial savings</u> ➢ <u>If longevity increases</u>, reuse is possible ➢ <u>Simplification</u> of the <u>maintenance</u> and <u>supply</u> chains ➢ <u>Less waste management</u> in the end	

Office supplies / Furniture	**Ecological impacts**	**Experts/references**
	See ecological impacts of EQUIPMENT	LogCo, Field supply log, carpenter
Alternative(s)	➢ For wooden furniture, monitor its solidity/longevity (braces), but avoid using "heavy" wood excessively (carpentry). If possible, also use recovered material to make new items	
Advantage(s)	➢ Financial savings ➢ Reduced supply chain	
Maintenance products	**Ecological impacts**	**Experts/references**
	See ecological impacts of WATER, HYGIENE, SANITATION	LogCo, Field supply log, WatSan Expert
Alternative(s)	➢ Reduce detergent consumption and raise national staff awareness about its most appropriate use possible ➢ If possible, obtain non-phosphate detergents on the local market or those with a minimum level of toxic or non-biodegradable substances ➢ The Purchasing Pool can add a few boxes of "eco" detergent products into containers sent by boat ➢ Promote the use of bicarbonate of soda (natural raw material which is natural and harmless to the environment - neutralises acidity - dissolves grease/sugars - scours surfaces - whitens linen - garden fungicide, etc.) and vinegar. ***R&D*** (WatSan + Purchasing Pool): Test out enzyme-based detergents See supply sites & ethical domestic appliances (e.g. www.eco-sapiens.com, www.greenbazar.be)	
Advantage(s)	➢ Surrounding air is less polluted, so working conditions respect health more	

Cooking	**Ecological impacts**	**Experts/references**
	Wood burning cooking: impact on deforestation + emission of harmful fumes in enclosed spaces Electric cooking: consumption of electrical energy	
Alternative(s)	➢ Improved fireplaces (optimised wood burning) and solar ovens (see GTZ or the UN which promote and distribute these alternatives locally) ➢ Favour the use of natural gas over electrical surface elements	
Advantage(s)	➢ Reduction in timber needs = <u>reduced supply chain</u> ➢ <u>Financial savings</u> (gas is often cheaper than electricity)	
Domestic housekeeping	**Ecological impacts**	**Experts/references**
Shopping, cooking, cleaning, etc.	Various pollution impacts	
Alternative(s)	➢ The reduction in environmental impact may come principally from the type of equipment & products made available to staff ➢ To raise awareness generally among staff, pin up a few directives in houses and offices which promote respect for the environment in everyday life (e.g. using less water or energy, reducing waste production, minimal use of detergents and insecticides, less travel) ***R&D***: <u>clothes detergents</u>: introduce the use of the "bio-washball" (ball with around a 10 cm diameter containing ceramic grains which, thanks to the release of negative ions during washing, replaces detergent) or "magic balls" (small and hard 4 cm diameter balls which reduce detergent & softener needs using the principle of beating the clothes in the drum)	
Advantage(s)	<u>Financial savings</u>	

Plastic bags	**Ecological impacts**	**Experts/references**
	Everyday use of plastic bags (non-biodegradable) is an issue of international proportion. They are distributed daily and fly off into the wild because of their extreme lightness. If they get lost in the wild: impact on the eco-system, ground pollution, danger for cattle which grazes on the ground, water pollution If burned (domestic incineration): toxic emissions *It should be noted that: some developing countries are beginning to prohibit them, but until this becomes standard practice, self discipline is required to limit their use as much as possible.*	
Alternative(s)	➢ Reuse ***R&D***: Develop prototypes for reusable bags made for example of fabric (have them made locally if it is a long-term project) and distribute several of them to all staff for MSF & housekeeping use (shopping, small equipment transport, etc.)	
Advantage(s)	Less <u>waste management</u>	
Domestic waste	**Ecological impacts**	**Experts/references**
	The best waste is waste which does not occur… <u>Burned/incinerated waste</u>: toxic emissions and the production of dioxin (due to chemical compounds) ***!! The wild incineration of a kilogram of household waste pollutes as much as the processing of ten tons of waste in a specialist plant***	

	Non-burnable waste taken to dumps: sanitation risk, ground contamination and water table contamination Non-burnable buried in the bush: ground pollution, pollution of the eco-system and the water table	

Alternative(s)	➢ As far as possible, limit the consumption of goods which generate non-biodegradable or non-recyclable waste ➢ Favour local waste management and recycling channels. The ideal solution is to have access to a major incinerator ➢ *If there are no efficient incinerators:* set up sorting systems: 1. **Organic waste** can be composted (see information on Google or composting manuals) to be used as fertiliser for vegetable gardens or gardens, and also as food for pigs, hens, goats, etc. ***R&D*** : biomethanisation procedure adapted to "mobile" projects *drawback*: rigorous (training is essential for maintenance) and regular handling (monitoring), otherwise there is a potential risk of explosion. 2. For **burnable waste**, favour the installation of MONFORT incinerators which have dual combustion chambers on projects 3. Ensure that **non-burnable waste** does not end up at uncontrolled dumps, the proximity of which represents a risk to inhabitants' health
Advantage(s)	➢ Prevention = simplified waste management

Equipment waste	**Ecological impacts**	**Experts/references**
	Pollution	

Alternative	➢ Check whether there are recycling or recovery chains locally for equipment at end-of-life
Advantage(s)	➢ Lighter waste control

E - INFORMATION AND COMMUNICATION

Since administrative management is occupying an increasingly fundamental role in projects, IT requirements are constantly growing. IT means an increase in energy supplies, which represents in itself an environmental impact. End-of-life IT equipment represents a problem in terms of waste processing. Printing equipment is also a burden in terms of ecological footprint (ink, paper consumption, spent cartridges, etc.)
More generally speaking, although administrative activity does not produce a major environmental impact in the field, managing some tasks in a more eco-responsible way can nevertheless only contribute to an overall reduction in the size of missions' ecological footprint.
Finally, the main environmental impacts of telecommunication supports can be listed as follows: transportation, energy requirements (generally "independent" supply), end-of-life. The golden rule is thus to ensure as much as possible that they last a long time, that they are used with prudence and that they are not abused. Also, faulty or end-of-life equipment should be sent to those sites which are able to repair/recycle them with the most effective environmental performance possible.

1. Administration

Paper consumption	Ecological impacts	Experts/references
	Impact of paper production = deforestation + chemical pollution (bleaching agents, etc.) Dioxin production if burned (waste)	Technician and Purchasing Pool, Supply log
Alternative(s)	➢ Only print if absolutely necessary, and if possible using the "2 pages per A4 side" printing function ➢ Order printers with the double-sided function ➢ Use recycled or non-chorine bleached paper or those from sustainably managed forests. *Important*: opt for good quality paper, otherwise there are jamming problems, and store the paper in the least damp rooms.	
Alternative(s) continued	➢ Optimise page layouts (avoid blank space, big lettering, etc.) ➢ Use the non-printed side of documents ready to be thrown out as scrap paper (position and feed "scrap	

	paper" reserve trays in every coordination office)	
Advantage(s)	➢ Reduced costs & reduced supply chain in terms of paper purchase ➢ Less voluminous archives ➢ Lighter management of waste to burn	
Reporting, archiving	**Ecological impacts**	**Experts/references**
	Paper consumption (ecological impact: see above)	
Alternative(s)	➢ Be concise when designing reports (drafting and page layout) ➢ Favour electrical versions rather than paper ones. Only print out what is strictly necessary, on double sided and/or with 2 pages per A4 side.	
Advantage(s)	➢ Time and space savings ➢ Reduced paper consumption = reduced supply chain + financial savings	
Office consumables	**Ecological impacts**	**Experts/references**
	Waste	
Alternative(s)	➢ Most cost-effective management possible of consumables	
Advantage(s)	➢ Reduced costs ➢ Less waste	
Meetings	**Ecological impacts**	**Experts/references**
	Travel = pollution + vehicle wear Meetings = source of energy consumption	
Alternative(s)	➢ Choose the most appropriate location (geographically speaking) so as to limit travel	

	➢ Video-conference and teleconference ➢ Favour the organisation of routine meetings in naturally-lit rooms.
Advantage(s)	➢ Cost reduction in terms of fuel and vehicle wear ➢ Reduced electricity consumption (lighting)

2. Communication supports

Office equipment (Printer, copier, ..)	Ecological impacts	Experts/references
	Significant electricity consumption "Magnetic" pollution produced by (non-noticeable) effects on your body, and thus on your health and well-being If electricity is supplied via generators: emission of harmful particles	Technician and Purchasing Pool, IT unit, LogCo
Alternative(s)	➢ Use appliances as sparingly as possible ➢ Invest in appliances with automatic (quick) standby function. ➢ Use renewable energy systems (see ENERGY chapter) for energy requirements ➢ Opt for appliances which use the least energy ("Green" IT) ➢ The limiting of electrical consumption in this way may not make a major impact, but nevertheless, not leaving appliances turned on when you are not using them remains the number one common-sense gesture to avoid unnecessary energy use ➢ When budgets allow it, favour flat screens (consume less energy)	

Advantage(s)	➢ Longer life for appliances = reduced supply chain + financial savings

	➢ Less wear, and therefore less maintenance/fewer repairs = financial savings	
Printers	**Ecological impacts**	**Experts/references**
	Cartridges = polluting waste (non-burnable) Ink = chemical substances which are toxic for the environment and health	IT unit
Alternative(s)	➢ Order printers with double-sided printing function ➢ Only print out exactly what you need and select the "fast draft" or "normal" print quality (nothing above this) ***R&D***: Organise the return of large HP cartridges in a standardised way (e.g. hand freight, etc.) or combined with containers holding batteries/accumulators, low consumption bulbs, used X-rays, etc. ***R&D***: Find high-quality rechargeable cartridges on the market - note: handle with care to avoid damaging the equipment with volatile ink ***R&D***: The same thing goes for vegetable ink?	
Advantage(s)	➢ Paper savings ➢ Improved waste management	
Faulty equipment	**Ecological impacts**	**Experts/references**
	Waste = pollution	
Alternative(s)	➢ Return the equipment to the Operational Centre for the appropriate processing at end of life, and/or reuse of some parts	
Advantage(s)	➢ Decongestion of premises	
Protection of equipment	**Ecological impacts**	**Experts/references**
	Waste = pollution	

Alternative(s)	Ensures the longest life for equipment thanks to: ➢ good system maintenance ➢ stabilisers/protectors to combat any event which may damage them (lightning, voltage regulation, dampness, flooding, excess heat, etc.)
Advantage(s)	Equipment longevity = ➢ Financial savings ➢ Reduced supply chain ➢ Simplified waste management

Accumulators, batteries	**Ecological impacts**	**Experts/references**
(VHF/UHF handset - Computers - Mini-M - AA batteries (IPod, cameras - etc.)	See ELECTRICITY SUPPLY	

Alternative(s)	➢ See ELECTRICITY SUPPLY Alternatives ➢ While we await the arrival of an official handling channel for the recycling of batteries/accumulators, the most ecological advice currently is to return them to the OC with hand freight. *Note*: customs checks are increasingly restrictive ***R&D***: see ELECTRICITY SUPPLY: recycling channel with recovery which helps MSF, for example.
Advantage(s)	➢ Decongestion of premises ➢ Possible recovery via some European transferees

F - EMERGENCIES / OPENING / CLOSURE OF A PROJECT

The objective here is to integrate a degree of environmental concern into the overall management procedure of these three situations. In emergency situations, the concept of speed is paramount, but this does not mean that technical choices cannot include a "sustainability" aspect at some point or another.
When a project or a coordination base is opened, it is important to assess the local situation in this respect so as to oversee technical decisions in the most eco-responsible way.
When a mission closes, highly planned and well-structured actions must be carried out so as to "clean" projects up as ecologically as possible, along with the entire infrastructure on which they are based. This also entails the clearest possible transmission of the user guide (operations, maintenance) for said infrastructures in the event of local takeover.

Emergency	**Ecological impacts**	**Experts/references**
Choice of equipment	See EQUIPMENT	
Alternative(s)	➢ Do not hesitate to integrate a potential "long-term" concept into technical choices *Drawback*: possible price premium	
Advantage(s)	➢ If the intervention is extended, the equipment can still be used, meaning supply and cost reductions	

Opening	**Ecological impacts**	**Experts/references**
Environmental inventory of the local/national background	Overall ecological footprint	
Alternative(s)	➢ Carry out an environmental study *see grid on following page* of the background in which a mission/project is set up and adapt the logistical proceedings accordingly (e.g. if deforestation is a problem in the country, use the least possible timber.) If local channels exist for waste removal, use them. If there is a drought, manage water requirements accordingly. Etc. ➢ Make technical and strategic choices taking into account sustainable development aspects as much as possible (environment & socio-economic) and the prospect of future local takeover (post-project)	
Advantage(s)	➢ Thorough mapping at a project's start-up will directly act as a guide for good decision-making in terms of a lighter ecological footprint.	

Environmental inventory: CONTEXTUAL GRID	
LOCATION / REGION / COUNTRY:	
Geographical location	**Recessed territory? Near the sea? Mountains? Agricultural area? Forests, etc?**
Climate type	**Type of climate? frequency of seasons/monsoons/etc.? average temperatures?**
Local resources	**Timber? water? building materials?**
Local infrastructures	**Drainage systems? industrial incinerator? waste removal?**
Supplies, local market	**Local production? imports?**
Legal background	**National laws as regards the environment?**
Local practices	**Waste? water? building? hygiene & sanitation? etc?**
Cultural landmarks/taboos	**Relationship with nature? sanitation?**

Closure	**Ecological impacts**	**Experts/references**
What you leave behind	➢ Damage to the environmental space belonging to beneficiary populations	
Alternative(s)	➢ Ensure that no detrimental waste is left behind as an "inheritance" ➢ Transmit the equipment designed to remain at the location in such a way that the use made of it is as sustainable and environmentally sound as possible	
Advantage(s)	➢ Image of responsibility towards beneficiaries is strengthened	

Atypical alternatives

Infrastructures

Vegetable garden and tukul (hut) made of natural materials +

Chicken Coop (Iriba-Chad Compound)

Unrefined earth building (Iridimi / Iriba-Chad)

Goatskin and wood furniture (Chad)

Energy (Housekeeping)

Solar kettles (Tulum Camps - Chad)

Humorous alternatives

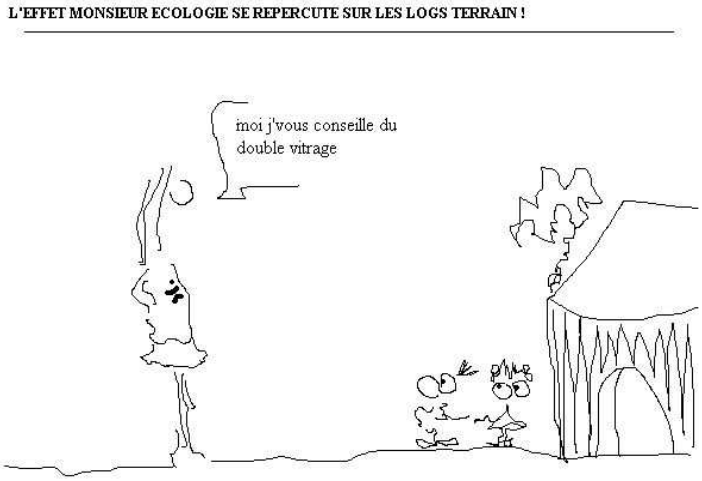
Sanitation

Can recycling (Iriba-Chad)

Transport

"Soft" mobility (Iriba-Chad)

Buildings insulation



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Humanity is defined not by what it creates, but by what it chooses not to destroy

Edward Osborne-Wilson