

THT 281 Term paper 2006:

**EcoSan & city planning  
- Plans for a trial in southern Lebanon (2'nd ed.)**

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**Abstract**

In the south-western Mediterranean area, there is a very vulnerable environment, due to geographical, demographical and gopolitical factors. Especially water resources are disputed in the region. Palestinian refugees living in camps in Lebanon are among the most vulnerable groups in this situation, living with permanent improvised infrastructures, lacking the rights of citizens. This paper reports from the initial investigation on the conditions for a potential EcoSan trial in such a situation. One big environmental question in the region is how to deal with urbanization. This is also a big question in the global debate on city planning. The trial is planned to be part of an action research project to further develop the general theory of how to intervene as a city planner and infrastructure developer in urban slum areas, with a realistic relationship between limited budget and huge needs.

1. INTRODUCTION

This is a paper for the course on Appropriate Sanitation for the Developing World, at the Norwegian University of Life Sciences, Ås, 2006. But it is also a working paper planning for a possible trial on ecological sanitation as means of participatory urban design, that will hopefully take place in southern Lebanon.

Originally, the plan was to do the trial in a Palestinian refugee camp in Lebanon, and the paper is made according to that premise. However, we have now started to revise the plans for possible utilization in the post-war re-construction work in southern Lebanon. This is because the need is suddenly more acute in the villages than the camps, after Israel's July war 2006.

2nd Chpt. of the paper, "The Field", first gives a brief sketch of the present situation. The chapter first gives a general description on *regional* landscape ecology, then a general outline on *local* infrastructure and health issues in the camps.

3rd Chpt., "The Fertilizer", suggests some alternatives for action, first discussing the relevance of some ecological sanitation *technologies*, then presenting some principles of participatory design *techniques*.

4rd Chpt., "A view from above", relates the project to some general reflections on the philosophy of scientific research and urban design.

The project team is consisting of the following persons:

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*Helge Hiram Jensen*, Cand. Polit. sociologist, freelance curator for the National Museum of Art, Architecture and Design and research assistant at the University of Oslo.

## 2. THE FIELD

The site for implementation is planned to be a Palestinian refugee camp in Lebanon. This paper will first describe the regional landscape ecology (2.1), then the local infrastructure and health aspects (2.2).

However, the July war 2006 has made a more acute need in the southern Lebanese villages. Thus the team has started to investigate the possibilities of starting the work in such a village. But that is another story, that cannot yet be told (reported).

### 2.1 The Mediterranean area: Regional landscape ecology

The infrastructure for water and wastewater is a main determining factor for environmental health in Palestinian refugee camps. This is an extreme version of a much more general problem. Globally, "20% of the world's population still lack access to safe drinking water and 50% lack adequate sanitation" (Gardiner 2002).

The Mediterranean has a relatively diverse climate, from the temperate southern France, to the very arid Sahara shore. At most of the Mediterranean shores, the run-off of water and soil is relatively intense, due to the mountain ranges running relatively close to the shores. (Makhzoumi and Pungetti 1999, chpt. 2). All over the Mediterranean area there is a combination of water shortage and unsatisfactory wastewater handling, according to the Euro-Mediterranean Programme for Local Management (Loizidou 2005).

Lebanon, Palestine and Israel are situated along the south-western Mediterranean shore. The area has relatively more annual rainfall than the surrounding areas, but the density of inhabitants is extremely high, making a big pressure on the resources. A high level of military unrest also makes a considerable pressure on the regional ecology and environmental health, for example during the July war 2006 in Lebanon, where Israeli forces caused a huge oil spill along the shore, and left the fields of southern Lebanon polluted with cluster bombs. There are some very fertile landscapes in the region, for example the Beeka valley, which is part of the Great Rift Valley, caused by the rifting of the African and Arabian tectonic plates, that is running from Syria, through Beeka valley, the Dead Sea, Sinai and the Red Sea to Mozambique ([www.wikipedia.org](http://www.wikipedia.org)). Relating to the rift, there is a mountain system domineering parts of the region, making the soil vulnerable to run-off of water and fertilizers. Through the millennia, inhabitants in the Mediterranean area had developed traditional agriculture that was neatly tailored to fit into the regional vulnerable ecosystems (Makhzoumi and Pungetti 1999, pp. 23-34). But the rapid urbanization of the latter centuries, combined with military unrest, has caused a great degree of ecological instability, and an acute need for finding sustainable ways of life.

“The situation of the sewerage system is extremely critical” in Palestine (Loizidou 2005). Still, “some significant achievements in wastewater issue have been accomplished since the establishment of the Palestinian National Authority” (ibid. 2005). But the Palestinian refugee camps abroad are mainly lacking connection national infrastructure, physically and organizationally. The UNRWA are serving most of the services in a very local context, and even if the EU have granted a considerable sum of money to their Mediterranean neighbors in the camps, the UNRWA need to make acute priorities that sometimes are not sustainable in the long run. For example Alfawar refugee camp had new sewage infrastructure for 5000 people build in 2002, The sewer was piped one km away, where it was discharged without treatment, giving a big risk to pollute the ground water (Winblad 2002). Extreme environmental needs, combined with lack of finances and limited territory, make such operations quite understandable. This situation should fit well for introducing participatory ecological sanitation design solutions.

## 2.2 The settlements: Local infrastructure and health contiditons

The settlements called Palestinan refugee camps have become so permanent that they have less in common with most refugee camps then with typical slum areas of most urban settlements. The camps, including water and sewage systems, were not originally constructed to be permanent. Unfortunately, the geopolitical situation has not allowed the refugees to go back to Palestine.

There have not been enough finances for proper tending and developing build structures in the camps, and Lebanese Government has shown little willingness to secure the well-being of Palestinian refugees. The Lebanese camps for Palestinian refugees are administered by the United Nations, through the regional organ UNRWA. The basic infrastructure as well as services like education and health are tended by the UNRWA.

Resent research (Table 1 shows that many inhabitants have improvised their own technical solutions for water and sewer (Zeidan 1999). About 4% of Palestinian households in Lebanon use improvised community sewer systems exclusively, 11% are connected to the government sewer system, 57% are connected to UNRWA systems (Blome Jacobsen 2004).

Table 1: Sewerage service providers in Palestinian camps and communities in Leba-non in, per cent, according to survey done by Fafo Institute for Applied Internati-onal Studies in 1999. (Source: Blome Jacobsen 2004: 5)

<u>Sewer system provider</u>	<u>per cent</u>
UNRWA only provider	57%
Lebanese government provides	11%
Popular commitees provides	04%
Multiple providers	14%
No sewerage facilities provided	14%
<i>Total</i>	<i>100%</i>

In 1999, PhD Ali M Zeidan, Environmental Engineer from the Beirut-based company Khatib & Alami, concluded that:

“The provision of safe and adequate water supply as well as proper waste disposal will reduce the water-born diseases. The water pipes which were laid before more than 50 years, are exposed to contamination from nearby ditches and sewers, and they need replacement.” (Zeidan 1999)

UNRWA has put a special effort in constructing, maintaining and developing infrastructure for water, sewer and drainage. In 1993 a Special Environmental Health Programme (SEHP) was established in Gaza, administering this work in all the Palestinian refugee camps. Several big improving projects were done, with founding from the European Union and 271 small-scale self-help camp improvement projects were done (UNRWA 2003: 87). The camps at the Gaza strip and in Lebanon have had higher priority, because of more urgent need. UNRWA is working under quite complicated conditions, because of financial shortcomings, military intervention, unfortunate legal status in the host countries, and high rate of population growth. Therefore:

The ratio of Agency health staff per 10,000 population remains well below comparable national figures in the region, while the sanitation labour force in the refugee camps falls far short of the need.“ (www.un.org/unrwa 10.02.2006)

Relative to the situation, UNRWA has made impressive achievements:

According to WHO analysis of the finances of health care systems world-wide (...) UNRWA's annual health spending compare with the very low-income country ranks, whereas programme achievements place it closer to those of middle-income countries. (UNRWA 2003, quoting WHO 2003)

Still the UNRWA sum up the present situation in the Medium Term Plan (MTP) 2005-2009 like this:

“Indicators that once documented the Agency's success in health, education, relief, social services and other sectors are now in decline.” (UNRWA 2005: 2)

UNRWA's Medium Term Plan 2005-2009 presents the strategies for systematic and evidence-based planning. The planning methodology is based on inter-sectoral cooperation and systematic survey monitoring systems through the Palestinian Research Unit in Geneva's Graduate Institute of Development Studies (IUED).

The strategic objectives are clearly defined, and show a priority to upgrading of camp housing and infrastructure. In the budget, “Camp development” is mentioned as a central means for obtaining two out of four objectives. Objective I (70% of total MTP budget) camp development is the second most expensive entry in the budget. Under Objective 2 (25% of the budget) camp development is clearly the most expensive entry (UNRWA 2005). There has been established an urban development unit for coordinating the refugee camp infrastructure and housing development (UNRWA 2005: 33).

Other relevant priorities in the Medium Term Plan 2005-2006 are: (a) general health system, (b) general education, (c) community based social services, (d) the Micro-finance and Micro-enterprise Programme (MMP), and (e) Community Based Organizations (CBOs).

Through inter-sectoral co-operation, spatial planning and other priorities may stimulate each other in “positive cycles”. As shown by UNDP such a cycle between economy stimulation and welfare is quite often efficient to create economic growth and independence (UNDP 1996). Economic conditions in the camps are not satisfying, due to little economic integration between camp economies and national economies. Therefore, the camp economy is to a large extent dependent on financial development aid, especially from the North and West.

### 3. THE FERTILIZER

As mentioned, Palestinian refugees abroad are living at alien land: the host authorities have been hesitating to include the refugee communities in the national infrastructure, physically and organizationally. Most of the infrastructure in Palestinian refugee camps is built and maintained by the UNRWA, sometimes even by the citizens themselves (Zeidan 1999; Blome Jacobsen 2004). Such a situation may be especially well fit for the combination of (A) ecological sanitation technology (EcoSan) and (B) participatory design techniques.

Ecological principles enable local circuits of matter and energy, which may also fit the closed geographical situation, especially in an area with high security risks due to military unrest, that quite often destroys civil infrastructure, causing even higher health risks.

Participatory design is building on the already existing local resources and structures, empowering the locals with educating tailored technical know-how and organizational skills. This may fit with the UNRWA-people and local self-help groups maintaining local infrastructure independently of the host governments. In short, economizing and re-cycling natural resources promote higher competence and circulation in the local economy.

#### 3.1 Ecological sanitation technologies

Human biological waste may be literally re-cycled through a closed local circuit of consumption and production of nutrition. The technology creates small and closed eco-systems. According to the Norwegian University of Live Sciences, EcoSan is used in development of spaceship technology. (<http://www.umb.no/research/ecosan/>, read 10.02.2006). The technology is based on advanced research, but the practical solutions are relatively simple.

*(3.1.1) Some earlier experiences.* The Palestinian Hydrology Group (PHG) has developed an EcoSan system specially designed for the specific climatic and cultural environment of the region. In three villages at Hebron, they have tested a technology based on urine separation and dry pathogen destruction in excreta. The desiccated faeces is a good soil conditioner, while urine when mixed with water is an excellent soil fertilizer, being rich in nitrogen, phosphorous and potassium

([www.phg.org/projects/dry/dry.html](http://www.phg.org/projects/dry/dry.html), read 10.02.2006). The case of the Hebron EcoSan experiment shows that, when the technology is handled correctly, a system of urine separating dry composting toilets may work satisfactory and without smell or flies (Winblad 2002). The HDG concludes that "The implementation of this technology is still in its infancy in Palestine, and much still remains to be learned". The PHG plan to produce clear guidelines and health training of the villagers ([www.phg.org](http://www.phg.org), *ibid.*).

Another relevant EcoSan trial is the constructed wetlands in Haran-Al-Awamied, Syria. In this case, not only urine and faeces were processed, but also greywater and rainwater (GTZ: data sheet for ecosan projects, no. 015). The wastewater was filtered through constructed wetlands, then re-used for irrigation. Compared with the trial of PHG, this one integrates more flows into the closed local loop, by utilizing greywater and rainwater in addition to faeces and urine.

One initial plan could be to design a solution combining the PHG's experiences with *toilet systems* with the Haran-Al-Awamied experiences with *treatment systems*. For making

such a treatment system, it is highly relevant to take in regard the technical laboratory experiments done Fadi Suliman by at UMB, to investigate some basic mechanisms of water-flows in constructed wetlands, especially in arid and semi-arid areas (Suliman 2006). These experiments were carried out on the background of practical experiences from Palestinian wastewater systems. Thus, the research is specially designed for our kind of case.

The evaluation of PHGs Hebron pilot project concludes that the next step should be to implement EcoSan systems in a large scale (Winblad 2002: 14). We hope that this will be done. The project that we are planning, could potentially be one part of such a coordinated campaign.

*(3.1.2) Financial sustainability.* The PHG conclude that even if their experiment proves the possibility of ecologically and socially sustainable EcoSan, they have not reached financial sustainability (Winblad 2002: 11). The report on the dry EcoSan project in Hebron remarks:

The project is ecologically and socially sustainable. If we compare investment and running costs with potential savings on water and cesspit-emptying charges, this is also economically sustainable. But with a direct subsidy per household of the equivalent of USD 550-750 the project has no financial sustainability. (Winblad 2002: 13).

In the case of Hebron, the material standard was higher than absolutely necessary, and “many of the participating households definitely do not belong to the poorest half of West Bank society”. This is justified because the demonstration project “intend(s) to show that ecosan can offer a service standard equivalent to that of flushsan. It is therefore essential that ecosan is not labeled a second-rate solution only suitable for the poor” (Winblad 2002: 10-11). This has now been successfully demonstrated by PHG. The time might have come to apply solutions that are affordable for the least well-off families, according to UNRWA’s Objective II, “to address the needs of vulnerable refugees”.

However, Scandinavian EcoSan literature indicates that urine separation can be obtained without costly hardware (Kärman 2004; Etnier and Jenssen 1997). That is most important to make the solutions economically sustainable in the refugee camps. The solutions chosen in the case of Haran-Al-Awamied were economically dependent on generous gifts from external institutions. That might be a drawback with this kind of solution. But when considering economic sustainability, a purely financial regard give different results from a socio-economic regard

*3.2.2 Socio-economic sustainability.* When considering economic sustainability, a purely financial regard give different results from a socio-economic regard. “(T)he investment costs for ecosan is far below that of any conventional sanitation system. Besides, the ecosan provides two valuable products: fertilizer and soil conditioner.” (Winblad 2002: 11). The comparison between EcoSan and conventional sanitation has to take into consideration how the two different technologies functions in relation to externalities, both ecologically and economically.

Our project proposal has one main interest in participatory integrated planning techniques for empowerment, which fit well with UNRWA’s Objective III, “to maximize the economic potential of refugees”. To create sustainable solutions, it is crucial to obtain local competence and organization. We expect that it might be possible to stimulate the already existing informal entrepreneurial activities, by training locals as “field experts” (human capital) and building local networks (social capital).

The socio-economic gain of EcoSan technology is bigger when related closely to agricultural production. Since the extent of urban agriculture is an unknown variable, it is hard to evaluate the relevance of the PHGs experiences on socio-economic gain and financial expenses. The Faculty of Agricultural and Food Sciences at the American University in Beirut writes that urban agriculture is widespread in the Middle East and North Africa region, yet “Its lack of recognition means lack of policy, extension, resources, input and other supports.” ([www.ecosystems.org/urbanagriculture/](http://www.ecosystems.org/urbanagriculture/), read 10.02.2006). Most likely, there exist urban agriculture in Palestinian camps in Lebanon that are not registered or mapped. Still it is hard to predict how much is to be found, since there is so “little space available to engage in agricultural activities” (Blome Jacobsen 2004).

The project team has done some initial research to find out which refugee camp that has more space for urban agriculture, and thus can utilize the mentioned EcoSan technologies more efficiently. The AUB community health teams have been working in the following camps:

- Burj el Barajneh: one of the bigger Palestinian refugee camps. Very densely populated, urban agriculture relatively rare, compared with other urban areas in the region.
- Ein el Hilweh: the biggest of all the Palestinian refugee camps. Quite densely populated, but urban agriculture is widespread, and there may also be possibilities to make synergies with a neighbouring eco farm.

(Interview with Jihad Makhoul at AUB by Jala Makhzoumi, 17'th of May, 2006)

### 3.2 Participatory design techniques

Ecological technical solutions have to be used and maintained properly in their local context to be sustainable in the long run. Therefore, participation by the users and the local community is integral in contemporary development work (UN: Agenda 21, part III). In design, this means that the designer “plays the role of 'facilitator' in problem solving processes” (Arce 2004). She should design means for locally defined ends, and make the technical solutions possible to be upheld with locally existing resources.

*(3.2.1) End user acceptance.* The design solutions of the hardware have to be good-looking and well-functioning enough to obtain user acceptance and even prestige. That is a job for a good product designer, working in an integrated planning process together with the engineer as well as the end users.

In EcoSan development, the local acceptance is sometimes a problem. In the Hebron case it was not (Winblad 2002). PHG implemented the project “with the full participation of the target communities”:

Earlier research by the PHG, especially in water supply and sanitation projects, proved community participation to be a major factor in the sustainability of these services. ([www.phg.org/projects/dry/dry.html](http://www.phg.org/projects/dry/dry.html), read 10.02.2006)

*(3.2.2) Utilize local experiences.* Scientific expertese has to be combined with local experiences, to create solutions that are fit for a specific cultural and natural setting. The most efficient way to obtain such a synergy, is through a participatory approach, involving all relevant expert groups and stake holders. Agricultural developers have had parallel experiences, realizing that

the most efficient way to make locally tailored solutions was to include local knowledge of the users in the planning process, combining it with scientific expertise (Chambers 1983). This was the start of the Rapid Rural Appraisal (RRA), later used as city-planning method under the name Participatory Learning and Action (PLA). The method has been further developed through water management work in the Middle East region, by the four-year programme called Euro-Med Participatory Water Resources Scenarios (EMPOWERS):

EMPOWERS strongly advocates and implements an approach of Stakeholder Dialogue and Concerted Action (SDCA), with the assumption that stakeholder involvement leads to improved use and management of water resources. To this end, the project is developing a participatory planning cycle for Integrated Water Resources Management (IWRM). (EMPOWERS 2005)

This family of techniques is promoting community empowerment, to obtain independence from development aid. A study on self-organizing in urban poor areas in Buenos Aires and Rio de Janeiro concludes that such systems, when working well, may function as replacement-economies, "Ersatzökonomien" (Lanz 2004). The industrial designer Bruce Mau writes: "The Third World consists of entrepreneurs who struggle to build informal urban environments by hand (...) Imagine the effect if these homes and businesses were accounted for!" (Mau 2004: URB41). According to the UNDP, direct popular participation is crucial to be able of attending the Millennium Development Goals (UNDP 2003: 127, 133).

### **3.3 Summing up**

This would fit well with the strategic priorities of UNRWA, who define one main challenge as this:

Water sanitation and environmental conditions are poor, particularly in Gaza, the West Bank and Lebanon (UNRWA 2005: 23)

Therefore, an expected result of UNRWAs policy is:

Reduction in environmental hazards and contributing to sustainable development in refugee camps by upgrading camp water and sanitation infrastructure in close cooperation with local municipalities (UNRWA 2005: 26).

In the planning system, UNRWA is aiming at developments in "governance and stakeholder relations" of management (UNRWA 2005: 15). UNRWA's priorities fit perfectly with implementing EcoSan. PHG and EMPOWERS have made valuable region-specific experiences, that we wish to further develop site-specifically in an interplay between the experience of the end users and the expertise of the international expert environment.

## 4. A VIEW FROM ABOVE

The Israeli wall on Palestinian soil and the Tower of Babel has one thing in common. Classicist architecture and modernist planning were arts and technologies of control. Not only was big quantities of matter shaped to impress. Also the social relations were supposed to be designed. The perspective of architectural drawings is an abstraction, a construct, a u-topia. Thus, there is a close connection between design and utopia. Utopian projects can be the struggle for a fertile patch of soil, a paira-deiza in persian. But utopian projects can also be a total vision for total domination of nature and culture. As the myth of Babel shows, the total planning must fail. Still, designing the build environment is a very powerful means of control, even mass violence, as exemplified with the Israeli wall on Palestinian soil (Weizman 2002, Valdés 2006).

### 4.1 Research strategy

We will not map and analyze what people are doing to organize vital functions under extreme conditions – such a “neutral” knowledge could be used not only for construction purposes, but is as useful to impose destruction. Rather, we have to do design the research to specially promote the purpose we have chosen, namely construction. These considerations are most relevant in an area where the Israeli occupation force is controlling Palestine land by bulldozers and walls.

Therefore, the main focus of our research will not be a “neutral” description of the self grown structures in themselves, our focus will be the methods used by spatial planners to do fruitful planning and design work in relation to such structures that grow independently of planning. We focus on methods for constructive dialog, not for mapping and control.

### 4.2 Landscape and urban design

Contemporary city growth is taking place mainly in metropolitan slum areas: improvised structures are growing at an uncontrollable rate, out of the sheer economic necessity of human beings. The wild growth is too fast to be herded through the means of classical city planning. This offers acute tasks for planners with a goal to promote health and economic growth, and/or to prevent crime and social unrest.

Contemporary spatial planning needs to further develop the tools and methods to handle such situations. At the same time, the problems of improvised build environments like slums and refugee camps may be acute and extreme versions of more universal problems of planning: How to navigate in the real complexity of social, biological and energy systems? In a time when we can buy functionalistic furniture in antiquity stores, Le Courbusier's grand plans may easily be perceived with a nostalgic nuance. It has become difficult for spatial planners to keep a belief in the omnipotence of Plan. New planning and political science no longer theorize government, but "governance", which is co-governing in networks including actors from civil society and the commercial sector. The star-architect Rem Koolhaas says enthusiastically "YES" written with the symbols yen-euro-dollar, to global capitalism, but also to direct action against global corporate power (Koolhaas 2004: 94-103, 241). In Oslo, the former leader of the architect association Ole Møystad, is also working as a catalyst for communication between different private entrepreneurs and the planning authorities. The planning authorities try to listen to both the owners of small shops and the art world, who express totally conflicting attitudes towards liberalization of street art. The Berliner art scene is making festivals of "AnArchitektur" build by amateurs (Fezer and Heyden 2004). Globally and locally, there is a strong tendency among

spatial planners towards work as if she was a gardener, herding structures that grow and develop partly independent of the pre-designed plan. The paradigm for planning is changing globally (Hall 2002).

In this context, the emerging "landscape urbanism" paradigm and the participatory design techniques (PLA) may be quite useful approaches.

Our project will study an extreme situation, with a general methodological relevance. How can planners, from the product designer to the urbanist, do anything to develop structures that are integral to secure life and health under extreme poor and improvised conditions, in a way that is rapid, share the investments between several communities, and create local systems that can maintain themselves? In such situations, cost effectiveness and community empowerment are two aspects of the same solution.

We wish to obtain growth in the knowledge about how the planner can navigate in self-grown urban environments. This, we operationalize as: *further develop general theory on planning and design in relation to any kind of self-grown structures*. This we want to do through a practical trial using: (a) Participatory techniques in landscape and product design, and (b) Community based technologies for wastewater utilization

### 4.3 Integrated planning

Integrated planning is a recent buzzword in architecture and neighboring disciplines. Close and smooth interdisciplinary cooperation between different expert groups is supposed to ensure more functional solutions, by taking more aspects into consideration. For example, the Norwegian Building Research Institute is using integrated plan work to develop sanitation systems with environmental qualities considered in a life-cycle perspective (<http://www.byggforsk.no/> - Installasjoner, energi og innemiljø, read 19.02.2006).

Product design creates very concrete solutions for very specific needs. Urban landscape planners create environments and territorial dispositions. These two disciplines of planning and design are operating mainly at the micro and the macro level, respectively.

Action at the micro level has to have some macro context, macro plans are always carried out through action at the micro level. An infrastructure "is local in all its points" (Latour 1993), still connecting localities into a system. Sociologically, all action takes place locally, while social problems are defined at a structural level, statistically, historically and geographically. Infrastructure engineering creates networks of connectedness, integrating specific needs into a bigger, geographical context. System design creates the interplay and routines between products, people, manuals and the like.

### 4.4 Political tactics

On the macro level, there is a geopolitical theatre of operation taking place, where the war on water resources is one of the many powerful motivations. On the micro level, human beings might be lucky to secure some level of safe access to water, food and health - and others who are unlucky.

Centralized waterpipe-based sewerage systems is a strategy for health security that demands huge quantities of water, but in the same time enables a very centralized epidemiological control. That might be a more cost-efficient policy than influencing the behaviour of every citizen. But all centralized infrastructures are more vulnerable to military activities. A decentralized sanitation system will be much less vulnerable, because every unit is relatively more isolated, quite analogical with the guerilla method of military organization.

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