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TABLE OF CONTENTS

TABLE OF CONTENTS **2**

INTRODUCTION **3**

1. DESCRIPTION OF TASK **4**

1.1. OBJECTIVES OF TASK 4

2. GENERAL DESCRIPTION OF THE RURAL AND PERI-URBAN AREAS OF WEST AFRICA **4**

3. INTRODUCTION OF THE PROPOSED CRITERIA **4**

4. TYPICAL CHARACTERISTICS OF RURAL AND PERI-URBAN SETTLEMENT TYPES IN WEST AFRICA **13**

CONCLUSION **14**

REFERENCES **14**

APPENDICES **15**

A: CHARACTERISTICS OF RURAL PEOPLE AND RURAL LIFE 15

B: CHARACTERISTICS OF PERI-URBAN/URBAN FARMING SYSTEMS 16

C: CHOOSING AN ECOSAN SYSTEM 16

INTRODUCTION

In many cities, towns and rural areas of the world, people live and raise their children in highly polluted environments (UN-Habitat, 2003). Urban and peri-urban areas in developing countries and cities are amongst the worst polluted and disease ridden habitats of the world. Much of this pollution, which leads to high rates of disease incidence, malnutrition and death, is caused by inadequate sanitation services. The lack of sufficient or adequate services is a result of many factors including inadequate financial resources, increasing population/demand and poor institutional arrangements. As cities expand and populations increase, the sanitation systems will grow worse and the need for safe, sustainable and affordable sanitation systems will be even more critical. This need informed the declaration of the Millennium Development Goals (MDGs) for safe water and sanitation by the United Nations at the 2002 World Summit for Sustainable Development.

The sanitation practices commonly promoted today in West Africa fall into two broad types: flush-and-discharge (flush toilets) and drop-and–store (pit latrine). Whilst the former has been regarded as the ideal technology particularly for urban areas, the latter is more common with low income households in peri-urban and rural areas. The major problem relating to the flush system is the need to treat the sewage, which is rarely achieved in practice, particularly in the fast growing urban centres of developing countries due to unaffordability of necessary resources in terms of water, money and institutional and human capacity. Consequently, sewage from the urban areas is nearly always discharged into the environment, particularly peri-urban and rural sites, without treatment.

On the other hand, although the drop-and store technology can prevent pollution in some places, in urban areas they are often not feasible because of lack of space for digging pits, unfavourable soil and groundwater conditions, destabilization of foundations of nearby houses and odours. Furthermore, nutrients and pathogens seeping from flush toilets, pit toilets and septic tanks have been documented as the cause of contamination of groundwater and surface waters throughout the world.

Implementation of sustainable sanitation requires a systems approach where the various components are holistically analysed to identify opportunities for improvement. There is the need to improve our understanding of the interaction of components such as nature (climate, water, soil), process (physical, chemical and biological), sanitation device, and the society (settlement patterns, socioeconomic, culture, and perceptions). West African countries need to seek options that are suited to the different conditions across the region and which address the limitations of existing sanitation systems, especially with regard to human exposure to potential public health hazards, environmental degradation (conserve water and natural resources) conflicts with aesthetic and cultural values.

1. DESCRIPTION OF TASK

This task will bring together the different existing evaluation criteria, which will help produce a set of criteria and guidelines of evaluation applicable across the region. It will allow for a harmonisation and systematisation of the existing information, producing at the end tools for obtaining reproducible results regardless of the country. In some cases, innovative indictors will be proposed according to the decision of the specialists; but the principal aim will be to identify criteria of evaluation, taking into account already existing criteria and guidelines, methodological framework, indicators and methods of assessment. Important input will be given by the members of this work package using the criteria of their home countries, as well as assessment tools proposed by the existing international information networks. Special attention will be given to the recommendations and results produced by the World Health Organisation and other reputable world bodies.

1.1. OBJECTIVES OF TASK

The objective of this task will be to define a "Multidisciplinary criteria for the evaluation and classification of peri-urban and rural settlements with no access to improved sanitation" by proposing or identifying a set of indicators that are critical for the sustainability of sanitation systems in rural and peri-urban settlements. The work will propose a methodological framework for the assessment of the living conditions of the people in these areas. The component of the framework will include demography (human population growth, poverty, urban and rural population), economic conditions (production sectors, financial capacity, quality of life, distribution of income, etc.) and human and institutional capacity (authority, law enforcement, community organisations etc) and infrastructure.

2. GENERAL DESCRIPTION OF THE RURAL AND PERI-URBAN AREAS OF WEST AFRICA

Rural areas in West Africa are characterised by low population densities, small size, and relative isolation, agricultural production as the major economic activity and homogeneity of the people in their values, attitudes and behaviour. Rural areas have poor access to infrastructural facilities such as markets, banks, schools, hospitals etc. and are governed by traditional rulers (chiefs and headmen).

Per-urban interphase is characterised by strong urban influences, easy access to markets, services and other inputs, ready supplies of labour but relative shortage of land and risk from pollution and urban growth (DFID, 1997). It is difficult to define the boundaries of peri-urban areas because the urban and peri-urban interphase is dynamic in space and time. Areas within the zones are heterogeneous and there competition for land for agricultural and non-agricultural uses. There is intense competition between agricultural and non-agricultural jobs and changing social and economic balance between indigenous and immigrant inhabitants. There is increasing dependence on the urban centre and increased pollution and waste disposal problems**.**

3. INTRODUCTION OF THE PROPOSED CRITERIA

The adoption of the systems approach in targeting sanitation technologies in peri-urban and rural areas of West Africa would require a set of multidisciplinary criteria that satisfies the components of the sanitation system which comprises the climatic and local conditions, soil and groundwater, infrastructure, demographic and cultural, economic and financial, institutional and health characteristics.

TABLE OF CRITERIA

The Table of Criteria has been structured in a way as to explain the bases for the selection of the criterion, the appropriate indicator for evaluation and the Methodology that can be used for the evaluation and how it compares to other indicators.

Table 1: *Table of Criteria*

Criterion	Justification	Indicator for Evaluation	Methodology of evaluation and comparison
CLIMATIC AND LOCAL CONDITIONS			
Temperature	Impact on treatment processes (eg. dehydration, composting, anaerobic digestion etc).	Average temperature Hottest month Coldest month (℃)	1: Very High 2: High 3: Moderate 4: Low
Humidity	Impact on treatment processes (eg. dehydration, composting, anaerobic digestion etc). Suitability of dry toilets.	Lowest Average Highest	1: Very High 2: High 3: Moderate 4: Low 5: Very Low
Rainfall	Planning of storm water drainage, use or infiltration, impact on irrigation requirements	mm per year max. mm per month min. mm per month	1: Very High 2: High 3: Moderate 4: Low
Season	To know how much water can be disposed off by evaporation, impact on irrigation requirements	Always dry Dry/rainy Always wet	1. Dry 2. Wet
Evaporation/evapotranspiration	Impact on irrigation requirements, dehydration processes etc.	mm per year max. mm per month min. mm per month	1: Very High 2: High 3: Moderate 4: Low
SOIL/GROUND WATER CHARACTERISTICS			
Type of soil	To know how much water can be infiltrated. Spread of pollution when infiltrating.	Sandy Clayey Loamy	Descriptive
Infiltration capacity	To know how much water can be infiltrated. Spread of pollution when infiltrating.	(mm per day)	1: Very High 2: High 3: Moderate 4: Low
Geology	To know ease with which facilities like pipes etc. can be buried down.	Rocky/Stony underground Not rocky/stony	Descriptive

Topography	To know which slope is available for gravity flow pipes, treatment and reuse units	Flat Sloping Undulating	Descriptive/Quantitative
Flooding	To know appropriate sanitation selection technology	None Occasional Frequent	Descriptive
Type of water resources/ Source of drinking water	To know how much water could be available for sanitation purposes. Could the discharge of wastewater and excreta affect the quality of water resources?	A: Ground water (well, borehole) B: Surface water (streams, rivers, lakes, dams) C: both surface and ground water	Descriptive
Availability of water	To understand if water reuse might be of interest	(m^3 per person, yr)	1: Very High 2: High 3: Moderate 4: Low
Groundwater	To understand risk for ground water contamination.	Depth (m) and recharge (mm/yr)	1: Very High 2: High 3: Moderate 4: Low
EXISTING INFRASTRUCTURE IN WATER AND ENERGY			
Type of water supply	To obtain information on the access to potable water and to understand the level of consumption and the potential risk to human health.	Household piped-water connection Public stand post pipe water Hand pump Open well Traditional water source (rivers/streams)	Descriptive
Quality of water supply	To compare with acceptable WHO guidelines	Microbiological Physico-chemical	1: Very High 2: High 3: Moderate 4: Low
Consumption of drinking water	To know how much grey or wastewater has to be treated	l/cap/day	1: Very High 2: High 3: Moderate 4: Low
Consumption of irrigation water	To understand if water reuse may be of interest	M^3/ha/year	1: Very High 2: High

			3: Moderate 4: Low
Consumption of water for other purposes (business, cattle etc.)	To know how much grey or wastewater has to be treated	l/cap or household/day	1: Very High 2: High 3: Moderate 4: Low
Existing irrigation practises	To know which knowledge and infrastructure for irrigation is available	Manual irrigation, furrow, drip irrigation etc.	Descriptive
Energy supply	To know if anaerobic treatment for biogas production would be an option	Availability and reliability/cost	1: Very High 2: High 3: Moderate 4: Low
Other Infrastructure			
Health facilities	To know coverage in health treatment	Number/Type/Distance	1: Very High 2: High 3: Moderate 4: Low
School facilities	To know coverage of school education	Number/Type/Distance	1: Very High 2: High 3: Moderate 4: Low
Bank/Saving facilities	To know potential to have access to credit (either for household investment in sanitation or investment in private sector to improve services	Number/Type	1: Very High 2: High 3: Moderate 4: Low
DEMOGRAPHIC AND CULTURAL CHARACTERISTICS			
Population	This enables calculations on number of toilets and wastewater treatment facilities to be provided, the logistics needed when proposing a sanitation system. Helps to classify settlements as rural, peri-urban and urban	No. of inhabitants	1: >100000 2: 50000 to 100000 3: 20000 to 50000 4: 5000 to 20000 5: 2000 to 5000 6: 1000 to 2000 7: <1000
Population density	To give a first idea about the volume of the flow streams to be treated and about the availability of land for the treatment and reuse	No persons per sq km.	1: Very High 2: High 3: Moderate 4: Low
Population growth	Helps to predict future requirements for sanitation facilities	(% per annum)	1: More than 25 2: 15-25 3: 5-15

			4: 1-5 5: Less than 1
Residence pattern	This gives an idea who and how many people are involved in the decision making process	Number of families living in one house or compound (extended family etc.)	1: Very High 2: High 3: Moderate 4: Low
Household size	To know load from a household	Number of persons living in a household	1: Very High 2: High 3: Moderate 4: Low
Household composition	e.g. To know if the systems have to be run by households lacking middle-aged people, who might be away in town working	Age structure	Descriptive
Non-built plot area	To know if on site sanitation can be used and logistics needed.	m^2/household	1: Very High 2: High 3: Moderate 4: Low
Type of habitat	To know what building material is mainly used	Availability of construction materials etc.	1: Very High 2: High 3: Moderate 4: Low
Religion	To know preferred cleansing habits: Use of toilet paper and other material for wiping, Use of water. It will also help to identify other believes with regard to hygiene and sanitation	Proportion of religious group	1: Mostly Muslim 2: More Muslims than Christians 3: More Christians than Muslims 4: Mostly Christians 5: Traditional African
Ethnicity	To be able to determine social skill and behaviours, cooperation among members of the community. To identify whether there is risk for social conflicts that have to be addressed	Proportion of ethnic grouping	1: Homogenous (same language and culture) 2: Partly homogenous (same language, different cultures) 3: Heterogeneous (small number of different ethnic groups) 4: Extremely heterogeneous (Huge numbers of different ethnic groups)
Acceptability of innovative sanitation facilities	To get an idea about the interest in the implementation of ecological sanitation	Percentage of population	1: Very High 2: High 3: Moderate

			4: Low
Position of women	This allows us to know at what level women are involved in decision making processes and project implementation	Position of women in decision making and project implementation	1: Very High 2: High 3: Moderate 4: Low
Governance/ Social organisation	This would let us know who can talk or take decision in the name of the community. Also, this would let us know the appropriate stakeholders to involve in decision making about the locality.	Type	1. Traditional 2. Administrative 3. Decentralised structures 4: Civil society organisations
Settlement patterns	This helps to consider the logistics needed when proposing a sanitation system	Type	1: Dispersed (Scattered houses) 2: Nucleated (Densely clustered houses) 3: Peri-urban low income slums and shanty towns
Plans for infrastructure	To know about existing plans for relevant infrastructure which will have an impact on the sanitation design and acceptance (if e.g. household water supply and a sewer system has been planned to be implemented with some donor support, it may be more difficult to convince the population to make use of dry toilets	Availability of master plans or detailed plans for water supply, sanitation, stormwater drainage, roads, electrification etc.	Yes / No
Security	Risk associated with sanitation facility (assaults and rapes, snake bites)	Number of reported cases	1: Very High 2: High 3: Moderate 4: Low
Land for crop production or under cultivation	To know how much nutrients can be recycled	m^2 per person	1: Very High 2: High 3: Moderate 4: Low
Existing activities in horticulture and agriculture	To know the need for fertilisation. To identify the quantity needed and the period fertilizer is needed	Proportion of major cash (food and industrial) crops and crops for home consumption	1: Very High 2: High 3: Moderate 4: Low
Existing livestock	To know, if co-treatment of human excreta with animal manure is an option	Number of cattle, goats etc per household	1: Very High 2: High 3: Moderate 4: Low
Livestock keeping	To know how animal manure can be made available	Type or mode	1: Nomadic 2: Free range or extensive 3: Semi-intensive

			4: Intensive
Distance to crop production site	To assess transport needs for recycling nutrients	km	1: Very High 2: High 3: Moderate 4: Low
Local practices of fertilisation	To know if e.g. traditions and knowledge about the use of animal manure, sewage sludge, wastewater reuse or use of human excreta are available	Types	Descriptive
Ownership of agricultural land	To know the motivation to invest time and money to improve agricultural land through improved techniques	Type	1: Communal 2: Family owned 3: Individual 4: Rented 5: Leasehold 6:Government
Degree of degradation of natural resources management	To assess whether there are land use conflicts and misuse of land	Rate of erosion, deforestation, water pollution	1: Very High 2: High 3: Moderate 4: Low
Availability of land for central treatment	To know if there is space for semi-central treatment (water/wastewater/nutrient products)	m^2 and location	1: Very High 2: High 3: Moderate 4: Low
ECONOMIC AND FINANCIAL CHARACTERISTICS			
Household income	To understand financing ability and comfort requirements Potential ability to pay for sanitation services/facilities	€ per household, year	1: Very High 2: High 3: Moderate 4: Low
House and land ownership	If the land and house is legally owned and can be used as a security, then money might be borrowed for toilet as this increases value of house	Type	Descriptive
Costs of conventional sanitation, water supply, construction material, fertiliser etc.	To make cost estimations	€ per unit etc	1: Very High 2: High 3: Moderate 4: Low
Principal production sectors	Opportunities for reusing the wastewater and the nutrients	Type	1: Primary (agriculture and mining) 2: Secondary (industry) 3: Trade and services 4: Mixture

Income used for water and sanitation	Willingness to pay for sanitation services/facilities	Percentage of household income	1: Very High 2: High 3: Moderate 4: Low
Cost Recovery (Installation/ Maintenance)	Economic sustainability	Percentage	1: 100 2: 50-99 3: Less than 50
INSTITUTIONAL CHARACTERISTICS			
Literacy level	To know how information can be disseminated	Percentage of population	1: Very High 2: High 3: Moderate 4: Low
Education	To know how information can be disseminated	Number of years in school	1: Very High 2: High 3: Moderate 4: Low
Legal framework	To know which legal requirements are given	Relevant legal documents	Descriptive
Law enforcement	To know who is mainly concerned with enforcing hygiene and sanitation issues	Type	1: Formal (Police, Court, Hygiene service) 2: Informal (Traditional)
Level of decentralisation	To understand whether hygiene and sanitation issues have been developed	Type	1: Very High 2: High 3: Moderate 4: Low
Responsibility for sanitation policy and strategy formulation	This would let us know who can talk or take decision in the name of the community. Also, this would let us know the appropriate stakeholders to involve in decision making about the locality	Type	1: National Authority/Agency 2: Regional Authority/Agency 3: Municipal/District Authority/Agency 4: Community based organisation 5: International Authority/Agency
Responsibility for financing/ Planning and design/ Construction/ Maintenance	Ability of level of authority to finance project. This would let us know who can talk or take decision in the name of the community. Also, this would let us know the appropriate stakeholders to involve in decision making about the locality.	Type	1: National Authority/Agency 2: Regional Authority/Agency 3: Municipal/District Authority/Agency 4: Community based organisation 5: Household

			6: NGO 7: International Authority/Agency 8: Private sector body
Responsibility for advocacy and promotion at community level	This would let us know who can talk or take decision in the name of the community. Also, this would let us know the appropriate stakeholders to involve in decision making about the locality	Type	1: National Authority/Agency 2: Regional Authority/Agency 3: Municipal/District Authority/Agency 4: Community based organisation 5: NGO 6: International Authority/Agency 7: Private sector body
HEALTH			
Average life span	To understand the general health situation	Years	1: Very High 2: High 3: Moderate 4: Low
Disability and old aged	To know need for avoiding stairs and steps etc.	Percentage	1: Very High 2: High 3: Moderate 4: Low
Diarrhoea and helminths	To know special challenges for the sanitation system	Percentage and most frequent agents	1: Very High 2: High 3: Moderate 4: Low
Awareness of personal and domestic hygiene practices in the settlement	To know how water sanitation systems are used. Hygiene education needs	Percent of population	1: High 2: Medium 3: Low 4: Non existent
Hygiene education	Hygiene education needs	Percentage of population	1: Regular 2: Medium 3: Low 4: Non existent
WATER AND SANITATION SERVICES CONDITIONS			
Open defaecation	Present problem areas, habits valuable when considering new system.	Percentage	1: Very High 2: High 3: Moderate 4: Low

Pit latrines	Present problem areas, habits valuable when considering new system.	Percentage	1: Very High 2: High 3: Moderate 4: Low
Daily collection (Night soil)	Present problem areas, habits valuable when considering new system.	Percentage	1: Very High 2: High 3: Moderate 4: Low
Septic tanks	Present problem areas, habits valuable when considering new system.	Percentage	1: Very High 2: High 3: Moderate 4: Low
Sewers	Present problem areas, habits valuable when considering new system.	Percentage	1: Very High 2: High 3: Moderate 4: Low
Use of present wastewater treatment facilities,	Present problem areas, habits valuable when considering new system	Qualitative	1: Good 2: Fair 3: Bad
Current greywater and stormwater management situation	Present problem areas, habits valuable when considering new system	Qualitative	1: Good 2: Fair 3: Bad
Current sanitation situation in schools, public buildings, market etc.	Present problem areas, habits valuable when considering new system	Qualitative	1: Good 2: Fair 3: Bad

4. TYPICAL CHARACTERISTICS OF RURAL AND PERI-URBAN SETTLEMENT TYPES IN WEST AFRICA

Using the above Criteria Table (Table 1), it is expected that one can select a settlement (village or town) as either a typical rural or typical peri-urban community in West Africa. However, there are certain general criteria that are common to all typical rural or peri-urban areas in West Africa. Using the general criteria as listed below a Typical Rural or Peri-urban community can be identified. However, there could be certain peculiarities such as soil/ground water characteristics, existing infrastructure in water and energy and institutional characteristics of the particular location that would further differ from one community to the other.

Table 2: *Rural Settlement Types*

Criterion	**Characteristics of settlement types**					
	One	**Two**	**Three**	**Four**	**Five**	**Six**
Environment	**Dry**	Dry	Dry	Dry	**Humid**	Humid
Settlement Pattern	**Dispersed**	Dispersed	**Nucleated**	Nucleated	Nucleated	Nucleated
Population Density	**Low**	Low	**High**	High	High	High
Religion	**Christian**	**Muslim**	**Christian**	**Muslim**	**Christian**	**Muslim**
Wealth Status	**Poor**	Poor	Poor	Poor	Poor	Poor
Agriculture	**Compound farming**	Compound farming	**Bush farming**	Bush farming	**Distant farming**	Distant farming

Table 3: *Peri-urban Settlement Types*

Criterion	**Characteristics of settlement types**					
	One	**Two**	**Three**	**Four**	**Five**	**Six**
Environment	**Dry**	Dry	**Humid**	Humid	**Dry**	**Humid**
Settlement Pattern	**Nucleated**	Nucleated	Nucleated	Nucleated	Nucleated	Nucleated
Population Density	**High**	High	High	High	High	High
Religion	**Muslim**	**Christian**	**Muslim**	Christian	Muslim/Christian	Muslim/Christian
Wealth Status	**Poor**	Poor	Poor	Poor	**Rich**	Rich
Agriculture	**Market gardening**	Market gardening	Market gardening	Market gardening	**Backyard gardening**	Backyard gardening

CONCLUSION

The nature of these factors will determine both the relative importance of preventing pollution, recycling excretal nutrients, conserving water and other design objectives and constraints.

For some communities, the need for a source of plant nutrients may be the driving force behind a move toward Ecosan and they will give special care in developing a system that ensures recovery of urine for use as fertilizers. For others, the need to protect sensitive water resources is paramount and they may be willing to sacrifice complete recovery of excretal nutrients if design strategies that favour composting and the atmospheric loss of nitrogen are easier to implement. In dry areas, it will be easier to sanitize faeces through dehydration whereas composting may be more successful in very humid areas.

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APPENDICES

A: CHARACTERISTICS OF RURAL PEOPLE AND RURAL LIFE

1. By their geographical location in rural areas, rural people are closely related to nature. They have to contend with the natural elements - rain, drought, flood, etc. These elements influence their behaviour or general life style. Their beliefs, convictions, philosophies are based on the natural elements – e.g. superstitions, worship of nature etc.
   Urban dwellers have some control of the natural elements.
2. Major occupation is agriculture. Others depend on collection of natural resources – hunting for game, snails, fruits etc. secondary vocations also exist e.g. tailors, artisans and teachers.
3. Rural community is always smaller than the urban. There is a higher land-to-man ratio.
4. Comparatively low population density.
5. More homogeneous.
6. Low degree of social differentiation – e.g. there is little division of labour.
   Urban areas show high degree of differentiation – in jobs, educational, recreational facilities etc.
7. Social stratification – rural area is less stratified in terms of occupation, economic, socio-political characteristics.
   There is little variation in wealth or social class, e.g. most people may be poor.

   There is little social mobility – e.g. from lower to higher class since most people have similar human and material resources. Greater bonds because of greater regular contacts.
8. Social pressure is greater because of strong sense of group membership.
9. Standard of living is relatively low. Quality of housing, physical infrastructure (roads, health, schools etc).
10. Leadership pattern – governed by traditional rulers (chiefs, headmen etc) who have influence on the acceptance or rejection of innovations.
11. Social solidarity
    In rural areas, cohesion and unity results from shared common traits, experiences, common objectives, informal personal relationships. In Urban areas, unity is based on division of labour, specialization, impersonal relationships, etc.

    These characteristics influence the response of rural people to innovations.

B: CHARACTERISTICS OF PERI-URBAN/URBAN FARMING SYSTEMS

1. Smaller towns are surrounded by intensively cultivated land, while larger urban centres have conspicuous inner and outer zones where cultivation of food crops and market gardening are rigorously pursued.

2. A wide spectrum of production systems ranging from household subsistence to large scale commercial farming can be found around these major towns.

3. General tendency towards more intensive production systems.

4. Vegetables and fruits are grown on land unsuitable for building purposes and on undeveloped public and private lands.

5. Intensive production of livestock and poultry for meat, milk and eggs are operational around city limits.

6. Currently, limited external inputs are used in peri-urban agriculture and the precarious land situation resulting from the highly dynamic city boundaries creates uncertainty about long-term viability, hence peri-urban agriculture hardly receives any government assistance.

7. Mismanagement of intensive crop production systems, particularly in vulnerable areas may lead to soil erosion and fertility decline and depletion of water resources. Conversely, the ingredients for a process of sustainable intensification of production in the peri-urban interface (fertilizers, agro-chemicals, nutrients export in urban wastes etc.) are potentially present in the urban centres.

C: CHOOSING AN ECOSAN SYSTEM

Ideally, an ecosan system will prevent pollution, sanitize excretal nutrients and return them to the soil and require no water for transport or processing – “Sanitize and recycle”.

Many local variables influence the choice of an appropriate Sanitation System:

1. Climate – temperature, humidity and precipitation. These parameters influence the die-off rate of pathogens (time taken for all organisms of the same type to die)
   Increase in temperature, sunlight, pH and decrease in moisture, nutrients and organisms speed up the death of pathogens.
2. Topography and soil type – determine the relative ease or difficulty of placing systems in the ground, how quickly and the direction in which water and pollutants move through soils.

3. Abundance/scarcity of water – the relative importance of water conservation.

4. Proximity/sensitivity of water resources and aquatic ecosystems – groundwater level and availability, closeness to lakes, rivers and streams or coastal waters.

5. Energy – the availability of local energy inputs, such as solar radiation.

6. Social/cultural – the customs, beliefs, values and practices that influence the design of the “social” components of a sanitation system, its acceptability or “fit” within a community. (It should be noted that these things are not static and that new practices are constantly evolving in most societies).

7. Economic – the financial resources of both individuals and the community as a whole to support a sanitation system.

8. Technical capacity – the level of technology that can be supported by local skills and tools.

9. Infrastructure – the existing level of both physical infrastructure and existing services that might help support a sanitation system (i.e. extent of existing water supply, transport, public health, educational system etc).

10. Population density and settlement pattern – the availability of space for on-site processing and storage and local recycling.

11. Agriculture – the characteristics of local agriculture and home gardening.