



Water Supply & Sanitation Coverage in UNEP Regional Seas

September 2002

Need for Regional Wastewater Emissions Targets?

Section I: Regional presentation of data

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The Global Programme of Action for the Protection of the Marine Environment from Land-based Activities
GPA Coordination Office
P.O. Box 16227
2500 BE The Hague

Visiting address: Kortenaerkade 1, The Hague, The Netherlands

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UNEP/GPA Coordination Office
The Hague – The Netherlands

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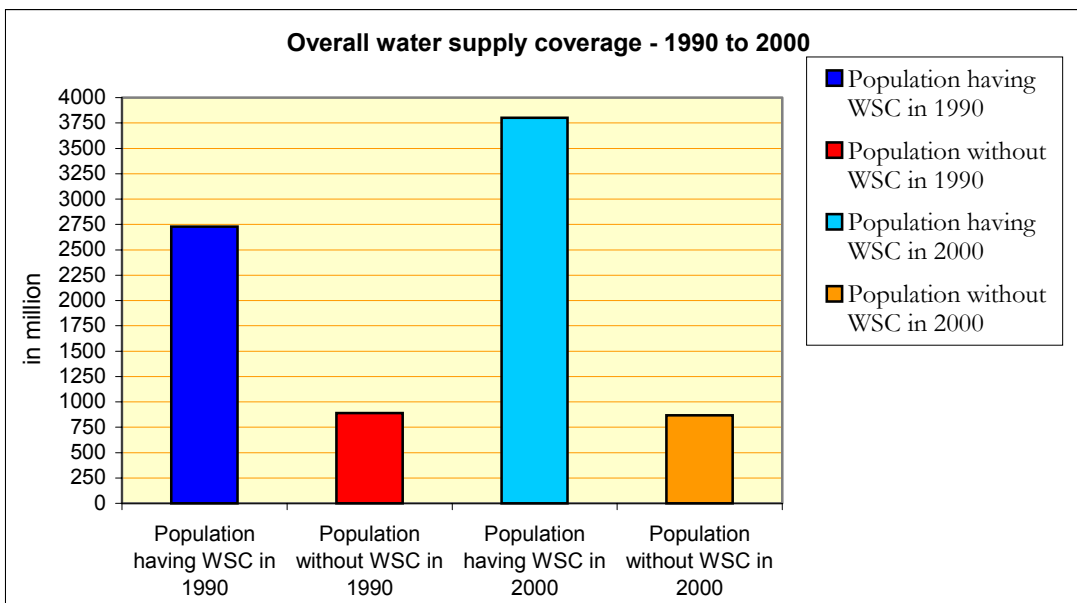
Executive Summary

Recognising that untreated wastewater emissions are one of the most significant threats to sustainable coastal development, the objective of this analysis is to assess the status of water supply and sanitation coverage for 1990 and 2000 in different regional seas within the framework of UNEP/GPA Regional Seas Programme. This analysis is based on the data from ‘Global Water Supply and Sanitation Assessment 2000 Report’ by WHO/UNICEF/WSSCC. The analysis at the regional seas level provides input for considering targets for improvement in water supply and sanitation coverage across different regions and enables a closer orientation on the proposed WSSD Type II initiative on Wastewater emission Targets in collaboration with WHO, WSSCC, UN-Habitat, ICLEI and other partners.

Water supply and sanitation are topics of great importance in addressing the serious public health problems, economic losses and the degradation of coastal ecosystems. Adequate water supply and sanitation facilities also have a social significance by having an important role to play relating to poverty alleviation, sustainable water resources management, food production and security, adequate water supply, water-related disasters and various other topics of global concern. The first part of this study deals with the more theoretical aspects of the effects of inadequate water supply and sanitation on human health. It also looks in some detail at an adequate definition for ‘improved water supply and sanitation facilities’. It is observed that in the definitions of sanitation being used by the UN, WHO, World Bank, there is no mentioning of the existence and proper functioning of sewage treatment systems. Improved sanitation facilities mostly imply presence at a household level. As advocated in the UNEP/WHO/HABITAT/WSSCC Guidance on Municipal Wastewater, UNEP/GPA considers domestic wastewater collection and treatment to be essential elements of an adequate follow-up to the WSSD agreed target on sanitation.

These issues clearly bring forth the importance of providing adequate water supply and sanitation as well as the need for preventive measures to combat both environmental transmission of pathogens and changes in ecosystems and habitats. This would require efforts at global, regional as well as local levels and prior to that assess the situation at all levels. The regional analysis and assessment carried out in this report results in the following main conclusions.

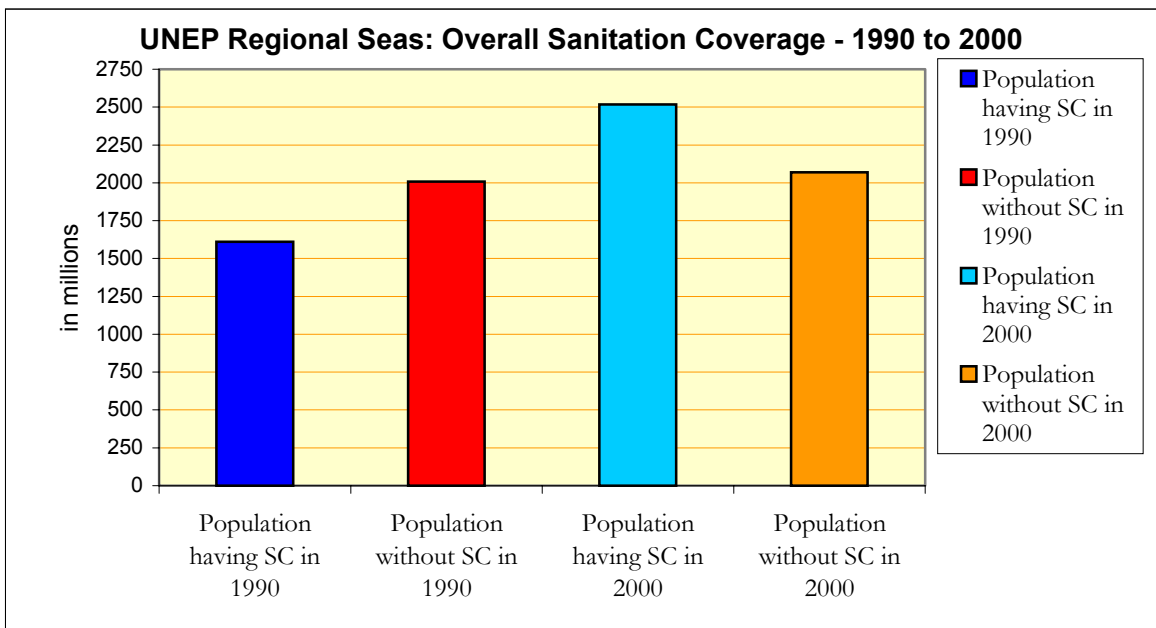
Compared to the sanitation sector, the water supply sector has relatively high service levels. The total coverage of water supply is approximately 81% of the total regional population, while total sanitation coverage is only about 55%. Where the Water Supply Sector is concerned, one of the major conclusions, which emerges from this study, is that on the whole, water access amongst regional populations is increasing. However the absolute numbers of people without access to water supply has not decreased much in the last 10 years (see graph below).



A cross regional seas analysis shows that in the year 2000, out of a total regional seas population of 4.7 billion, 870 million people do not have access to adequate water supply. The percentage coverage of population having access to water supply has increased from 75% in 1990 to 81 % in 2000.

Looking at the relative distribution of this 870 million of regional population not served with water supply in the year 2000, East Asian Seas comes in prominence with having 32% of the total unserved in the world, followed by the North-West Pacific with 19%, South Asian with 17%, West and Central African at 12%, East African at 4% followed by others.

A regional analysis of Sanitation Sector shows that in the year 2000, out of a total Regional Seas population of 4.7 billion, 2.1 billion people do not have access to adequate sanitation. As the following graph shows, there has been a marked increase in the numbers of people across regions having access to sanitation. However, the graph also indicates a slight increase in the number of population without access to sanitation.



The South Asian region emerges as the most vulnerable region with regards to lack of sanitation facilities. The 825 million of people still not having access to sanitation in this region is a big cause of concern. Having no access to basic sanitation services puts them at high risk from sewage-related diseases and death. East Asian Seas region emerges as the second most vulnerable region with 515 million people, or as stated before 25% of the unserved population in coastal countries, without access to proper sanitation services, followed by the North West Pacific with 414 million people without access.

The sea areas with the highest provision of sewage treatment, and thus the lowest threat to the health of coastal waters, include the North East Atlantic, Baltic and the Arctic regions with only a few people without proper sanitation services.

Keeping in mind the increase of population over this period of time and expected increase in the future, we seem to be unable to keep up with the backlog. With the new target of halving the number of people that have no access to basic sanitation services by the year 2015 which has been set in the *World Summit on Sustainable Development in Johannesburg* (August – September 2002), it becomes clear that much more effort and investments need to be input in the sanitation sector in the coming years. Availability of adequate sanitation facilities does not always imply safe coastal environments. The availability of adequate wastewater treatment systems is very crucial in order to protect the coastal and marine systems from discharge of untreated polluted wastewater. Future GPA activities will further highlight these issues within the framework of the UNEP Regional Seas Programme.

1. Introduction

Improved sanitation and protection of the marine environment: The Link

Municipal wastewater emissions are one of the most significant threats to sustainable coastal development worldwide. Their effects are usually localized, but they are a major source of coastal and marine contamination in all regions and therefore a global issue. Sanitation is a topic of immense importance in addressing the serious public health problems, economic losses and the degradation of coastal ecosystems. This issue strongly relates to poverty alleviation, sustainable water resource management, food production, adequate water supply and various other topics of global concern. In the developing world, however, the provision of basic sanitation, as well as urban sewer systems and sewage treatment, has not kept pace. High capital costs, the explosive growth of urbanization, and in many cases limited technical, administrative and financial capacities for urban planning and management are barriers to efficient sewage treatment (GESAMP 2001a). Removal of these barriers, as well as alternative approaches, is urgently needed.

The UNEP/GPA Coordination office, with the overall objective of the protection of the marine environments from land-based activities, addresses specific pollution problems amongst which sewage is one of the priority pollution source categories. This is achieved through effective action at local, national, regional and global level using the framework of the UNEP Regional Seas Programme. With respect to sewage the UNEP/GPA Programme of Work, executed jointly with numerous partners, directly contributes to achieving the target on sanitation agreed upon at the World Summit on Sustainable Development in Johannesburg, September 2002: of halving the number of people which have no access to basic sanitation by 2015.

The Global Water Supply and Sanitation Assessment 2000 Report, released by the World Health Organisation (WHO), the United Nations Children's Fund (UNICEF) and the Water Supply and Sanitation Collaborative Council (WSSCC), found that globally, 2.4 billion people are not served with appropriate sanitation. In such areas the possibility that humans and live stock have direct contact with excreta has a direct impact on human health and well-being. Also, untreated sewage flows directly into groundwater, lakes, streams, rivers and eventually coastal systems. Streams and rivers also direct solid domestic wastes to the coastal zone where it accumulates along the coastal fringe. In order to adequately protect the coastal and marine environment, it is clearly evident that sanitation must be improved and integrated with appropriate water supply and wastewater management. A greater insight of the water supply and sanitation coverage at the global and regional level is provided later in this report.

Objectives: A shift from global to regional outlook

As mentioned previously, the UNEP/GPA Global Programme of Action is among others implemented through the UNEP Regional Seas Programme. The majority of the Regional Seas identified untreated domestic wastewater – sewage – as one of the primary pollution source categories (Ref.). UNEP/GPA recognises that sanitation with its direct linkage with improved health conditions and positive impact on the environment is one of the most crucial global issues. As a direct follow up to the WSSD agreed target on sanitation it therefore stimulates national governments and the UNEP Regional Seas secretariats to consider national and/or regional time-bound targets as instruments to achieve further increase in sanitation coverage.

The objective of this analysis is to assess the status of water supply and sanitation coverage for 1990 and 2000 in different regional seas within the framework of UNEP/GPA Regional Seas Programme¹ based on the data from 'Global Water Supply and Sanitation Assessment 2000 Report' by WHO/UNICEF/WSSCC Joint Monitoring Programme for Water Supply and Sanitation. This data exists at a global level and has been structured in the report at the level of countries in each continent. In this report, the data for each country/continent has been realigned to be used at the regional seas level. The analysis at the regional seas level will provide input for

¹ <http://www.gpa.unep.org/>

considering targets for improvement in water supply and sanitation coverage across different regions and will enable a closer orientation on the proposed WSSD Type II initiative on Wastewater emission Targets in collaboration with WHO, WSSCC, UN-Habitat, ICLEI and other partners. This is one of the key components of the H2O – from Hilltops to Oceans Initiative², which has been launched at the World Summit in Johannesburg. This initiative proposes to better link integrated river basin management to integrated coastal area management.

For a better understanding of the reason for this analysis at a regional level, the next section provides a background to the UNEP regional seas programme. The main objectives and priority issues of the Regional Seas programme are also highlighted.

UNEP Regional Seas and partner Programmes

Globalisation has intensified many of the threats to marine life. Coastal and marine problems were for long treated as purely local or national issues. With the rise of environmental awareness over the last fifty years, they began to move up the global agenda. The 1972 United Nations Conference on the Human Environment expressly underlined the “vital importance for humanity of the seas and all living organisms which the oceans support”. The Rio Earth Summit of 1992 embodied a new concern with sustainable development. Agenda 21, the international blueprint for the environment and development community in the new millennium, devoted an entire chapter to the oceans and coastal areas. The 1992 Convention on Biological Diversity and the 1992 United Nations Framework Convention on Climatic Change put marine activities in a new perspective, in which global and regional questions were closely linked.

The Governing Council of the United Nations Environment Programme endorsed the regional approach to controlling marine pollution several times before UNEP started its Regional Seas Programme in 1974. In its first major regional activity, UNEP brought together a task force of scientists and officials to shape a plan of action of the Mediterranean, adopted in its final form at Barcelona in February 1975. Since then, 12 regional Action Plans have been established under UNEP auspices: the Black Sea, Wider Caribbean, East Africa, East Asia, the ROPME Sea Area, Mediterranean, North-West Pacific, Red Sea and Gulf of Aden, South Asia, South-East Pacific, South Pacific, and West and Central Africa. Plans for the North-East Pacific and the South-West Atlantic are in development and three similar independent agreements amongst developed countries are in place in the Baltic, Arctic, and North-East Atlantic. Altogether, more than 140 countries participate in at least one regional Action Plan.

² For more information please view: <http://www.gpa.unep.org/water/initiative.html>

Environment protection particularly that of the marine and coastal environment has proved to be a profoundly unifying issue amongst countries. The regional agreements have been extraordinarily effective in engaging governments in protecting the environment. Unlike the global environmental conventions, these regional conventions and Action Plans are comprehensive, covering issues ranging from chemical wastes and coastal development to the conservation of marine animals and eco-systems.

Some of the priority issues that are being addressed by the Regional Seas agreements include ecosystems and biodiversity, living resources, land-based sources of pollution, shipping and sea-based pollution, coastal development etc.

Priority Issues in Regional Seas

Based on UNEP's series of regional reports relating to land-based sources and activities affecting the marine, coastal and associated freshwater environments in ten geographical regions, it comes through that land-based anthropogenic activities such as agriculture, industry, refineries, coastal urbanisation, rock/mineral extraction, and tourism are main issues of regional concern. The main environmental problems identified by the regional overviews are degradation in water quality mainly caused by sewage (through direct discharge of sewage or treatment plants effluents), liquid and solid wastes as having significant impact on the environment and human health. The lack of infrastructure and treatment facilities for large quantities of domestic wastewater generated by expanding coastal urban populations represent the greatest threats to public health, coastal habitats and biodiversity and economic development.

The problems associated with wastewater management are inseparably linked with the issue of sanitation. In the regions where a large proportion of the population is not served with improved sanitation, sewage flows directly into groundwater, streams, rivers, lakes and eventually reaches the coastal systems. Streams and rivers also direct solid waste to the coastal zone where it accumulates along the coastal fringe. In order to adequately protect the coastal and marine environment, it is clearly evident that sanitation must be improved and integrated with appropriate water supply and wastewater management. Even in areas where adequate sanitation services are currently provided, frequently there is inadequate attention paid to reducing or treating the volume of wastewater entering the marine environment, and this problem must also be addressed.

“Improved Water Supply and Sanitation”: some definitions

Before proceeding with the objectives of this research, it becomes necessary to understand what is meant by “improved water supply and sanitation” and within what framework are these terms used both in the “Global Water Supply and Sanitation Assessment 2000 Report” and in this analysis.

The United Nations as well as the World Bank refer to the definitions provided by Global Water Supply and Sanitation Assessment 2000 Report, for their understanding and use. “Global Water Supply and Sanitation Assessment 2000”, WHO / UNICEF defines access to water supply and sanitation in terms of the types of technology and levels of service afforded. For water, this included house connections, public standpipes, boreholes with hand-pumps, protected dug wells, protected springs and rainwater collection; allowance was also made for other locally defined technologies. “Reasonable access” was broadly defined as the availability of at least 20 litres per person per day from a source within one kilometre of the user's dwelling. Types of source that did not give reasonable and ready access to water for domestic hygiene purposes, such as tanker trucks and

World Bank Definition

Access to an improved water source is the share of the population with reasonable access to an adequate amount of safe water (including treated surface water and untreated but uncontaminated water, such as from springs, sanitary wells, and protected boreholes). In urban areas the source may be a public fountain or standpipe located not more than 200 meters away. In rural areas the definition implies that members of the household do not have to spend a disproportionate part of the day fetching water. An adequate amount of water is that needed to satisfy metabolic, hygienic, and domestic requirements, usually about 20 litres of safe water a person per day.

Access to improved sanitation facilities refers to the share of the population with at least adequate excreta disposal facilities (private or shared, but not public) that can effectively prevent human, animal, and insect contact with excreta. Suitable facilities range from simple but protected pit latrines to flush toilets with sewerage. To be effective, all facilities must be correctly constructed and properly maintained.

bottled water, were not included. Sanitation was defined to include connection to a sewer or septic tank system, pour-flush latrine, simple pit or ventilated improved pit latrine, again with allowance for acceptable local technologies. The excreta disposal system was considered adequate if it was private or shared (but not public) and if it hygienically separated human excreta from human contact.

Definitions of access

The following technologies were included in the assessment as representing "improved" and "not improved" water supply and sanitation:

WATER SUPPLY		SANITATION	
<i>"improved"</i>	<i>"not improved"</i>	<i>"improved"</i>	<i>"not improved"</i>
Household connection	Unprotected well	Connection to a public sewer	Service or bucket latrines (where excreta are manually removed)
Public standpipe	Unprotected spring	Connection to septic system	Public latrines
Borehole	Vendor-provided water	Pour-flush latrine	Latrines with an open pit
Protected dug well	Bottled water*	Simple pit latrine	
Protected spring	Tanker truck-provided water	Ventilated improved pit latrine	
Rainwater collection			

* Considered as "not improved" because of concerns about the quantity of supplied water, not over the water quality.

Since the definitions used in the "Global Water Supply and Sanitation Assessment 2000 Report" are widely being used and adapted by organisations such as UN (also UNEP) and World Bank, this report will, for the time being, also refer to these definitions. However, it should be noted that in the definitions cited above, there is no mentioning of the existence and proper functioning of sewage treatment systems. From the viewpoint of the protection of human health and the environment, through an integrated wastewater management, as advocated in the UNEP/WHO/HABITAT/WSSCC Guidance on Municipal Wastewater, UNEP/GPA considers domestic wastewater collection and treatment to be essential elements of an adequate follow-up to the WSSD agreed target on sanitation. In a future analysis more data will be gathered on effective wastewater treatment in the various UNEP Regional Seas.

As suggested above, the concept of "improved" water supply and sanitation has direct linkages with the impacts on both human health and the environment. Urban wastewater discharges are considered to be one of the most significant threats to sustainable coastal developments worldwide. "Sustainable coastal development" also includes issues relating to public health. Understanding the extend of social and economic impact this linkage has at a global or regional level, gives us a more real view on why it is important to work towards improving water supply and sanitation coverage. This linkage and impact at the global level has been highlighted in the following section.

Sanitation and Health impacts

The facts below and many more are related to the presence of inadequate or unsafe water supply and sanitation facilities across the world. Most of these can be controlled and reduced through better sanitation, hygiene and water supply.

Provision of adequate sanitation services, safe water supply, and hygiene education represents an effective health intervention that reduces the mortality caused by diarrhoeal disease by an average of 65% and the related morbidity by 26%. Inadequate sanitation, hygiene and water result not only in more sickness and death, but also in higher health costs, lower worker productivity, lower school enrollment and perhaps most importantly, the denial of the rights of all people to live in dignity.

- ***Approximately 4 billion cases of diarrhea each year causing 2.2 million deaths***

These deaths represent approximately 15% of all child deaths under the age of five in developing countries. Water, sanitation, and hygiene interventions reduce diarrhoeal disease on average by between one-quarter and one-third

- ***200 million people in the world infected with schistosomiasis, of whom 20 million suffer severe consequences***

Epidemiological studies, found a median 77% reduction from well-designed water and sanitation interventions

- ***Intestinal worms infect about 10% of the population of the developing world***

These can be controlled through better sanitation, hygiene and water supply. Intestinal parasitic infections can lead to malnutrition, anaemia and retarded growth, depending upon the severity of the infection.

As mentioned previously, improved health is one of the main reasons for investing in hygiene and sanitation services, including safe disposal of excreta, domestic wastewater, storm water and solid waste. The starting point is the household, as people are most likely to be at risk from contamination in the place where they spend most of their time. Health benefits accrue to families who have latrines even if their neighbours do not; additional benefits then accrue as coverage extends to the whole neighbourhood. Gender equality needs to be promoted through recognition that women are key providers of health and hygiene services to the family. This household centred approach rather reverses the way in which planners and engineers view the situation; their starting point tends to be with centralised treatment and primary networks rather than households. It is important to note that where wastewater treatment is inadequate, the hazard is moved around rather than eliminated, thereby emphasising impacts on coastal areas.

Environmental sanitation and human health are closely linked as combined societal activities can lead to direct or indirect transmission of pathogens to humans. Presently 2.4 billion people have no access to basic sanitation. This is reflected in the Global Burden of Disease (1990) where poor water, sanitation and personal and domestic hygiene was ranked as the second most important contributory factor to disease occurrence, after malnutrition. It accounts for 6.8% of the total disease burden or 93 million life years lost per year expressed as DALY (Disability Adjusted Life Years). Among the different groups of diseases, transmitted by different routes diarrhoeal disease was ranked second in 1990 with a prediction that this would fall to third place by 1998. In comparison, in the developed world, diarrhoea did not appear in the top ten causes of disease.³

Several environmental factors mitigate against positive predictions of a lowering disease and diarrhoeal incidence. Important in this respect is the number of environmentally transmitted parasitic diseases. Rapid population growth results in rapid increases in the production of faecal matter and wastewater, in turn putting severe stress on water resources (especially in urban centres) and on food production and leading to conflicts of interest in relation to the recreational use of water bodies.

Although, the linkage between health and water supply and sanitation is widely known and accepted, it is important to note that inadequate or unsafe water supply and sanitation coverage also has a major impact on coastal and marine environment. These can be related to the following:

- Changes in bio-diversity and ecosystems
- Suspended solids;
- Significant nutrient inputs;

³ <http://www.sanicon.net/titles/topicintro.php3?topicId=2>

- Biochemical oxygen demand (BOD);
- Cultural issues, such as taboos, in some areas;
- Plastics and other marine debris;
- Ecosystem population effects; and
- Heavy metals and other toxic substances, e.g. hydrocarbons, in those cases where industrial sources may have discharged effluent to municipal collection systems.

This clearly suggests the importance of providing adequate water supply and sanitation and both the need for preventive measures to combat environmental transmission of pathogens and for preventive measures against changes in ecosystems and habitats. This would require efforts at global, regional as well as local levels. However, it becomes important to first assess the situation at all levels. The regional analysis carried out in this report aims to assist in setting wastewater emissions targets as a step to meet the above needs.

Before proceeding on with reviewing the global status as presented in the “Global Water Supply and Sanitation Assessment 2000 Report” and analysis of the water supply and sanitation coverage at regional level, the next section looks at some limitations of this research. Many of these limitations are linked with the base data collected and supplied in the “Global Water Supply and Sanitation Assessment 2000 Report”.

Limitations

In the ‘Global Water Supply and Sanitation Assessment 2000 Report’, many of the countries have not supplied data e.g. in the Baltic Region, the population represented for water supply and Sanitation coverage in 1990 and 2000 is 16% and 32% respectively of the total population. This lack of data affects an accurate analysis at the regional level too.

It is also unclear what the base data about sanitation and water supply is representing. Access to improved water and sanitation is estimated using technology as an indicator. Definitions of “improved” technologies are thus based assumptions that certain technologies are better for health than others. These assumptions may not be true in all individual cases. Similarly, much uncertainty about statistics of coverage remains in many countries, and there is a need to refine and develop the monitoring process.

While the type of water source and the type of excreta disposal facility can be associated with the quality of water and the adequacy of disposal, respectively, they cannot adequately measure population coverage of safe water or of sanitary excreta disposal. Access to water and sanitation does not imply that the level of service or quality of water is “adequate” or “safe”.

Relationship between Sanitation and ‘Wastewater’

In general, the level and amount of sanitation available in a region has a direct relation to the wastewater it generates. The lesser the number of sanitation connections, the greater the chance of the wastewater being directly discharged into coastal and marine environments leading to much negative environmental impact. Presence of sanitation coverage in a region hints at better wastewater treatment facilities and thus lesser discharge of polluted wastewater in coastal environments. However, in this data, in most cases, the sanitation coverage represents household connections and does not give any insight into the fact if this collected sewage is processed and treated in a Wastewater Treatment plant before being discharged into the rivers/ oceans etc. For a complete analysis of the situation and the impact of untreated sewage into the marine and coastal environments, this information is necessary. It is possible that inclusion of such data in the existing regional data (used in this report), makes the water supply and sanitation coverage situation much different across regions and a fresh analysis might need to be conducted.

In this regional analysis, a greater stress will be placed on sanitation issues and not on water supply since currently the global or regional status of sanitation is a more critical issue impacting environment as well as public health.

Framework of Report

After this brief introduction to some issues related to water supply and sanitation coverage, this section give an brief overview of the structure of this report.

The next chapter (Chapter 2) will summarise the main findings of the “Global Water Supply and Sanitation Assessment 2000 Report” and narrate the water supply and sanitation status at a global level. This will set the platform for the analysis at a regional level, which follows in Chapter 3. The first part of the analysis comprises of an overall analysis across regions. Later, some regions have been identified and detailed out for a more specific analysis. Finally some conclusions and recommendations are made in Chapter 4. Some of the assumptions and tables of data reprocessed and compiled at a regional level from the “Global Water Supply and Sanitation Assessment 2000 Report” has been given later as Annexures.

2. A Glance at Water Supply & Sanitation Coverage at the Global Level

Access to water supply and sanitation is a fundamental need and is vital for the dignity and health of all people. The Global Water Supply and Sanitation Assessment 2000 Report, constitutes a source of information and status of water and sanitation coverage estimated at the global level. It highlights the huge challenges faced in meeting the need for safe water supply and adequate sanitation worldwide.

This section summarises some of the main findings and conclusions of the Global Water Supply and Sanitation Assessment 2000 report. The figures have been copied from the same report.

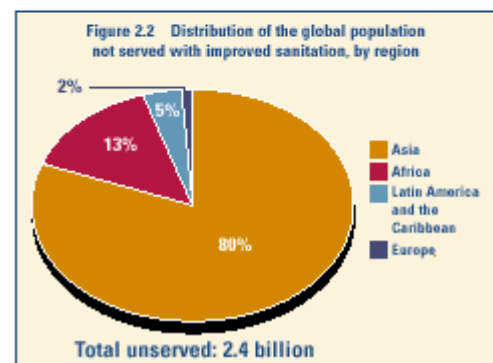
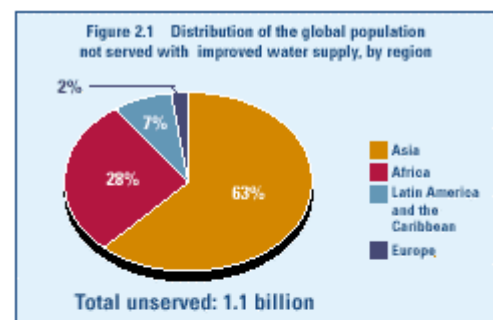
Overview of Global Status & Coverage

The percentage of people served with some form of improved water supply rose from 79% (4.1 billion) in 1990 to 82% (4.9 billion) in 2000. Over the same period the proportion of the world's population with access to excreta disposal facilities increased from 55% (2.9 billion people served) to 60% (3.6 billion). At the beginning of 2000 one-sixth (1.1 billion people) of the world's population was without access to improved water supply (see adjoining figure) and two-fifths (2.4 billion people) lacked access to improved sanitation. The majority of these people live in Asia and Africa, where fewer than one-half of all Asians have access to improved sanitation and two out of five Africans lack improved water supply. Moreover, rural services still lag far behind urban services. Sanitation coverage in rural areas, for example, is less than half that in urban settings, even though 80% of those lacking adequate sanitation (2 billion people) live in rural areas – some 1.3 billion in China and India alone. These figures are all the more shocking because they reflect the results of at least twenty years of concerted effort and publicity to improve coverage.

During the period 1990–2000 it is estimated that the global population increased by 15% (from 5.27 to 6.06 billion). Within that total figure, the global urban population increased by one-quarter, while the rural population increased by less than 8%.

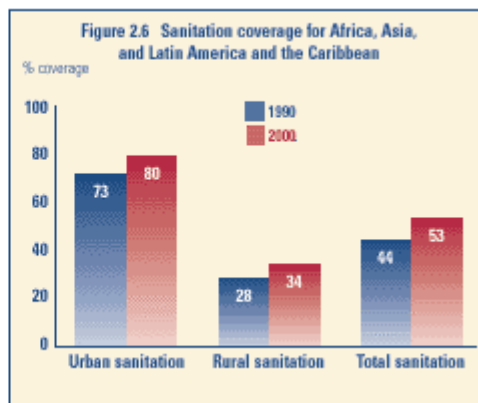
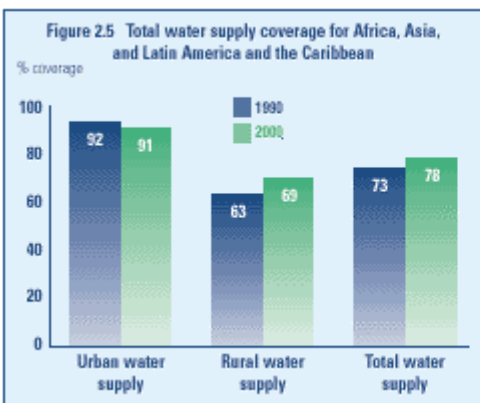
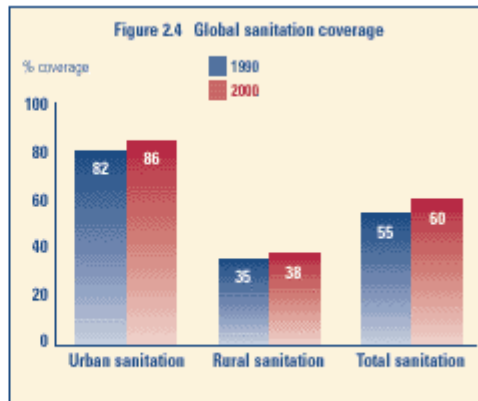
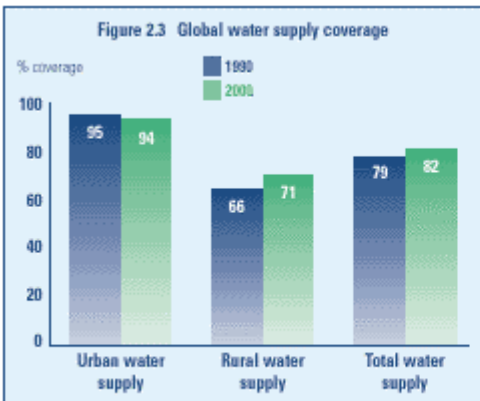
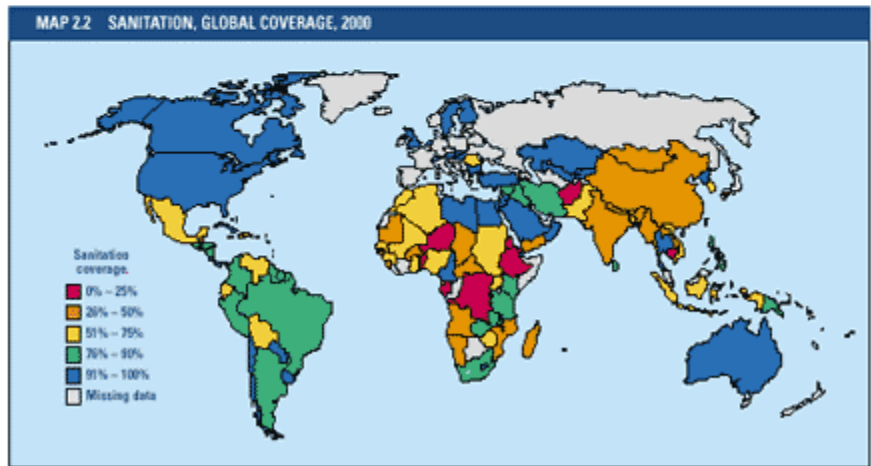
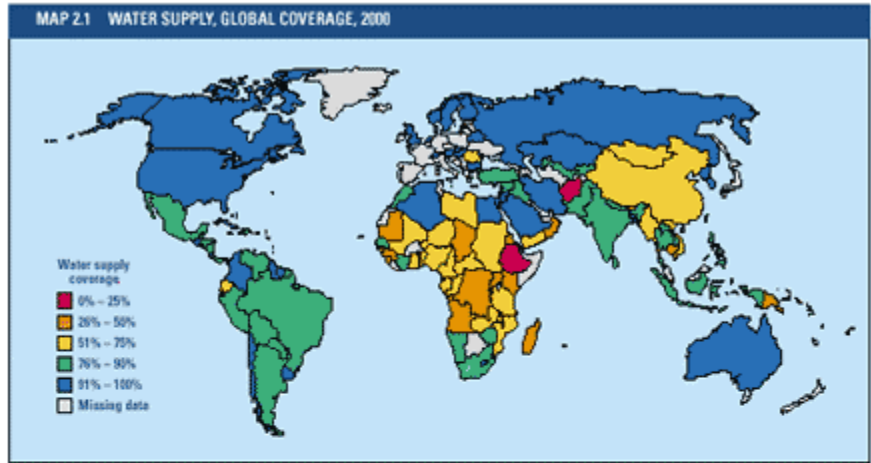
The population growth of the 1990s has meant that an estimated 620 million additional people gained access to water supply by 2000, and 435 million additional people gained access to sanitation facilities, just to maintain the percentage coverage at constant levels. Extraordinary work was done in the sector to serve an ever-increasing population. With a total population increase of 789 million people over the past decade, the sector was able to provide improved water supply to an additional 816 million people (224,000 people a day for 10 years), and improved sanitation to an additional 747 million people (205,000 people a day). Some inroads have therefore been made into the backlog of people needing improved services. However, despite all the efforts made and the results achieved, there remains a backlog of 1.1 billion people without access to improved water supply and 2.4 billion without access to any sort of improved sanitation facility.

Although an enormous number of additional people gained access to services between 1990 and 2000, with approximately 816 million additional people gaining access to water supplies and 747 million additional people gaining access to sanitation facilities, the percentage increases in coverage appear modest because of global population growth during that time. Furthermore, the numbers of people who lack access to water supply and sanitation services remained practically the same throughout the decade.



The water supply and sanitation sector will face enormous challenges over the coming decades. The urban populations of Africa, Asia, and Latin America and the Caribbean are expected to increase dramatically. The African urban population is expected to more than double over the next 25 years, while that of Asia will almost double. The urban population of Latin America and the Caribbean is expected to increase by almost 50% over the same period.

One positive finding of the Assessment 2000 is that sanitation coverage appears to be higher than would be expected from the findings of earlier assessments. This is because the consumer-based survey data in the Assessment 2000 account for households that provided their own sanitation facilities, especially in Asia and Africa. These facilities were not covered by the provider-based data used in previous assessments.



3. Analysis of Water and Sanitation Coverage across UNEP Regional Seas

In the previous section, the main findings at the global level have been summarised. When considering the need to set targets for improvement in water supply and sanitation coverage across different regions, a regional analysis of the status becomes imperative. The same information may assist Regional Seas secretariats in reporting on the progress made in achieving the WSSD agreed targets. This chapter presents regional coverage status for water supply and sanitation in 1990 and 2000, based on the global data from the report “Global Water Supply and Sanitation Assessment 2000”.

The data for each country/continent has been re-aligned to be used at the regional seas level. However, to achieve this purpose, certain assumptions had to be made regarding the populations of each country represented in different regional seas programmes. These have been highlighted in the following section.

Assumptions

Many of the countries are represented in two or more regions. This can be either due to them bordering more than one regional sea / water body and therefore they are part of all those regional sea agreements or if they have an interest in a regional sea close to them even if they do not share a coastline on that. In such a case, they are only present in the agreement as a member supporting that particular regional sea but are not necessarily contributing to the problems of that region.

Since some countries are present in two or more than two regions, it becomes necessary to split their population and data about water supply and sanitation coverage proportionally to the region, which they represent. Since the regional seas program does not specify such splits, some assumptions have been made regarding the break-up. Mostly geographical features such as river basins / continental divides have been used to proportionate the data.

The table in Annex 1 presents the data split and assumptions behind it for the countries present in two or more regional seas. Some assumptions have been made with regards to the division of population within the countries. Most of the divisions have been made on the basis of ‘river basin divide’ extrapolated from maps. This is so because the number of people living in a certain river basin will have impact on that coast with which that river basin is linked. Thus each country, i.e. each geographical location is separated by river basins divide.

Based on these assumptions, the following analysis has been conducted. The first part of this analysis is at an overall level and spans across all regions. Based on this analysis, certain regions, which are distinctive in their trends, have been picked out and a more specific analysis of these regions has been carried out for sanitation coverage. Water supply coverage and sanitation coverage are covered one by one.

The status of Water Supply Coverage across regions

The following table provides water supply coverage data for 1990 and 2000 for all regions.

Analysis of Water Supply Coverage (WSC) – Regional Status

Region	Population in 1990 (in million)	Population having WSC in 1990 (in million)	Population without WSC in 1990 (in million)	% of WSC in 1990	% without WSC in 1990	Population in 2000 (in million)	Population having WSC in 2000 (in million)	Population without WSC in 2000 (in million)	% of WSC in 2000	% without WSC in 2000
Arctic (Pop. Represented: 1990 - 62%; 2000 - 100%)	30,506	30,506	0	100	0	52,572	52,38711	0,18489	100	0
Baltic (Pop. Represented: 1990 - 16%; 2000 - 32%)	11,613	11,613	0	100	0	23,579	23,49043	0,08857	100	0
Black Sea (Pop. Represented: 1990 - 22%; 2000 - 63%)	31,831	25,4648	6,3662	80	20	93,018	76,97081	16,04719	83	17
East African (Pop. Represented: 1990 - 78%; 2000 - 100%)	49,022	22,1558	26,8662	45	55	83,278	44,64698	38,63102	54	46
East Asian Seas (Pop. Represented: 1990 - 95%; 2000 - 98%)	948,132	665,25194	282,88006	70	30	1108,748	833,04814	275,69986	75	25
Mediterranean (Pop. Represented: 1990 - 38%; 2000 - 52%)	120,087	102,95878	17,12822	86	14	185,302	165,19615	20,10585	89	11
North East Atlantic (Pop. Represented: 1990 - 34%; 2000 - 35%)	83,399	83,399	0	100	0	88,891	88,891	0	100	0
North East Pacific (Pop. Represented: 1990 - 96%; 2000 - 100%)	64,865	53,6418	11,2232	83	17	81,304	70,56755	10,73645	87	13

Region	Population in 1990 (in million)	Population having WSC in 1990 (in million)	Population without WSC in 1990 (in million)	% of WSC in 1990	% without WSC in 1990	Population in 2000 (in million)	Population having WSC in 2000 (in million)	Population without WSC in 2000 (in million)	% of WSC in 2000	% without WSC in 2000
North West Pacific (Pop. Represented: 1990 - 75%; 2000 - 85%)	577,653	410,13363	167,51937	71	29	718,997	555,46138	163,53562	77	23
Red Sea and Gulf of Aden (Pop. Represented: 1990 - 71%; 2000 - 87%)	40,271	28,25137	12,01963	70	30	65,712	51,91782	13,79418	79	21
ROPME Sea (Pop. Represented: 1990 - 65%; 2000 - 95%)	58,094	49,08619	9,00781	84	16	104,162	95,21888	8,94312	91	9
South Asian Seas (Pop. Represented: 1990 - 100%; 2000 - 100%)	1096,452	874,56692	221,88508	80	20	1318,413	1170,92036	147,49264	89	11
South Pacific (Pop. Represented: 1990 - 77%; 2000 - 85%)	19,106	16,87938	2,22662	88	12	25,216	21,79231	3,42369	86	14
South West Atlantic (Pop. Represented: 1990 - 81%; 2000 - 100%)	147,94	121,3108	26,6292	82	18	210,484	180,52559	29,95841	86	14
South-East Pacific (Pop. Represented: 1990 - 75%; 2000 - 100%)	37,414	29,70765	7,70635	79	21	59,24	48,14696	11,09304	81	19
West and Central African (Pop. Represented: 1990 - 85%; 2000 - 94%)	172,464	90,55081	81,91319	53	47	250	143,60124	106,39876	57	43
Wider Caribbean (Pop. Represented: 1990 - 75%; 2000 - 98%)	130,461	113,83754	16,62346	87	13	198,745	176,94293	21,80207	89	11

Overview of regional analysis for water supply coverage

Total Population of all regions in 1990 4.6 billion

Total regional population represented in 1990 (that is supplied data) 3.6 billion

Total population of all regions in 2000 5.3 billion

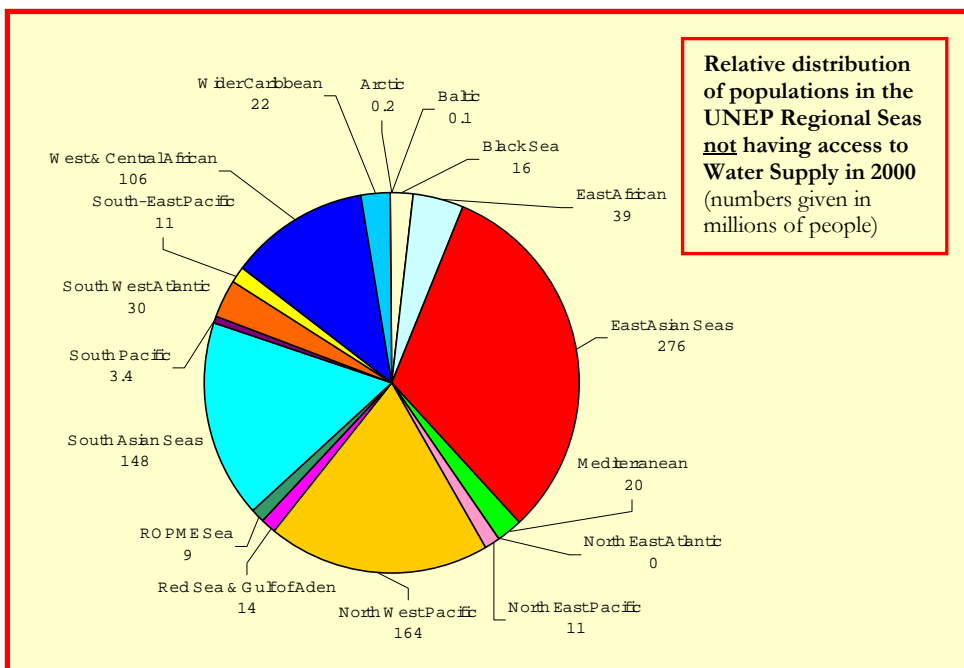
Total regional population represented in 2000 (that is supplied data) 4.7 billion

The overall data thus, was available for 78% of the regional population for 1990, while 89% was represented in the 2000 figures. It is important to note that the analysis that follows is based on the total regional population represented in 1990 and 2000 (that is population which has supplied data)

Based on a Regional Seas analysis, it comes through that in the year 2000, out of a total Regional Seas population of 4.7 billion, 870 million people do not have access to adequate water supply. This suggests that the sector has relatively high service levels compared to the sanitation sector (see analysis later in this report). The total coverage of water supply is approximately 81% of the total regional population, while total sanitation coverage is about 55%.

During the period 1990 – 2000, the total regional population increased by about 15% (0.7 billion). The population growth of the 1990's has meant that an estimated 1.07 billion additional people gained access to water supply by the year 2000. The percentage coverage of population having access to water supply has thus increased from 75% in 1990 to 81 % in 2000. ⁴

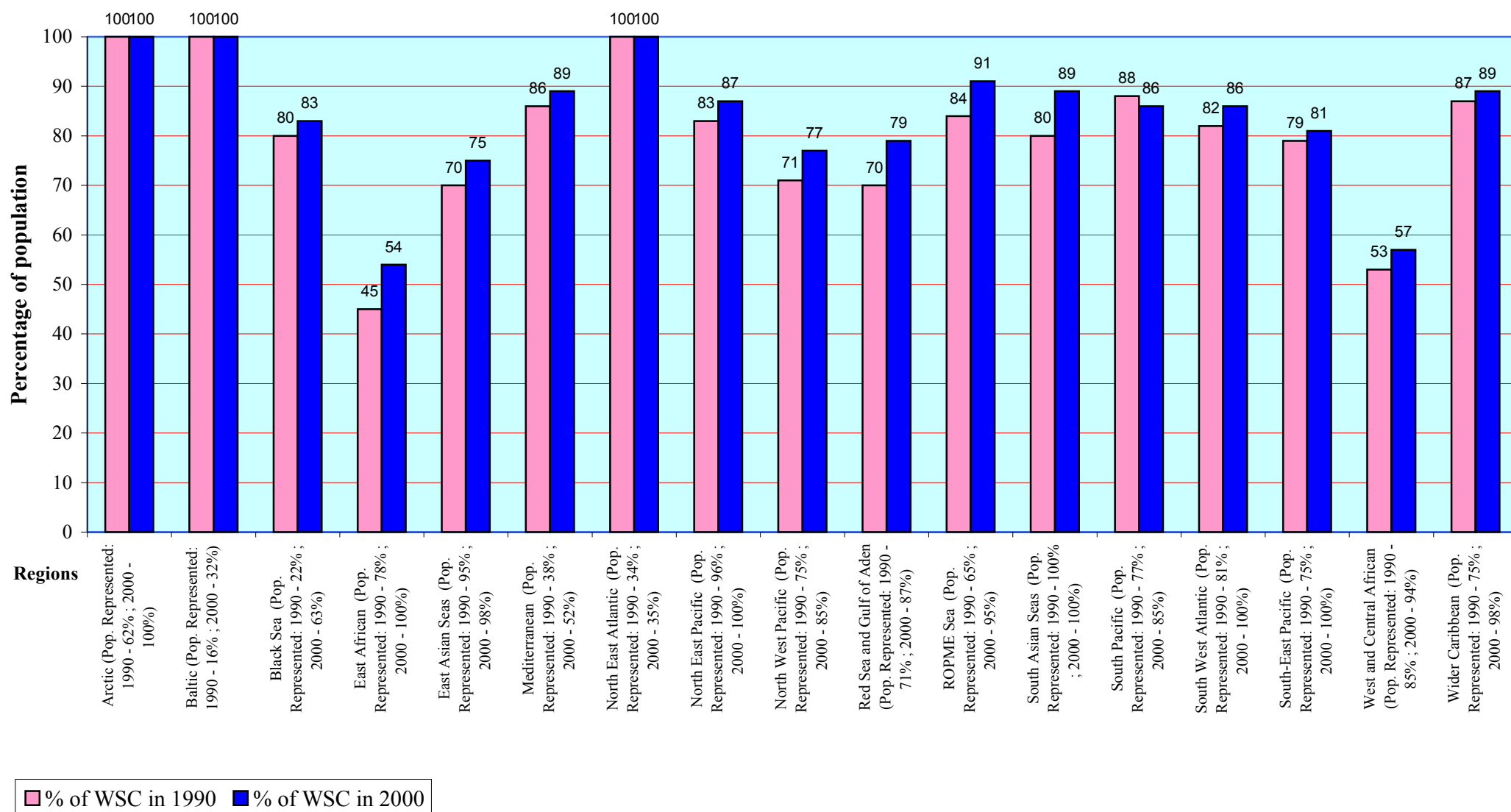
The following figure shows the relative distribution of populations in the UNEP regional seas without access to Water supply in the year 2000.



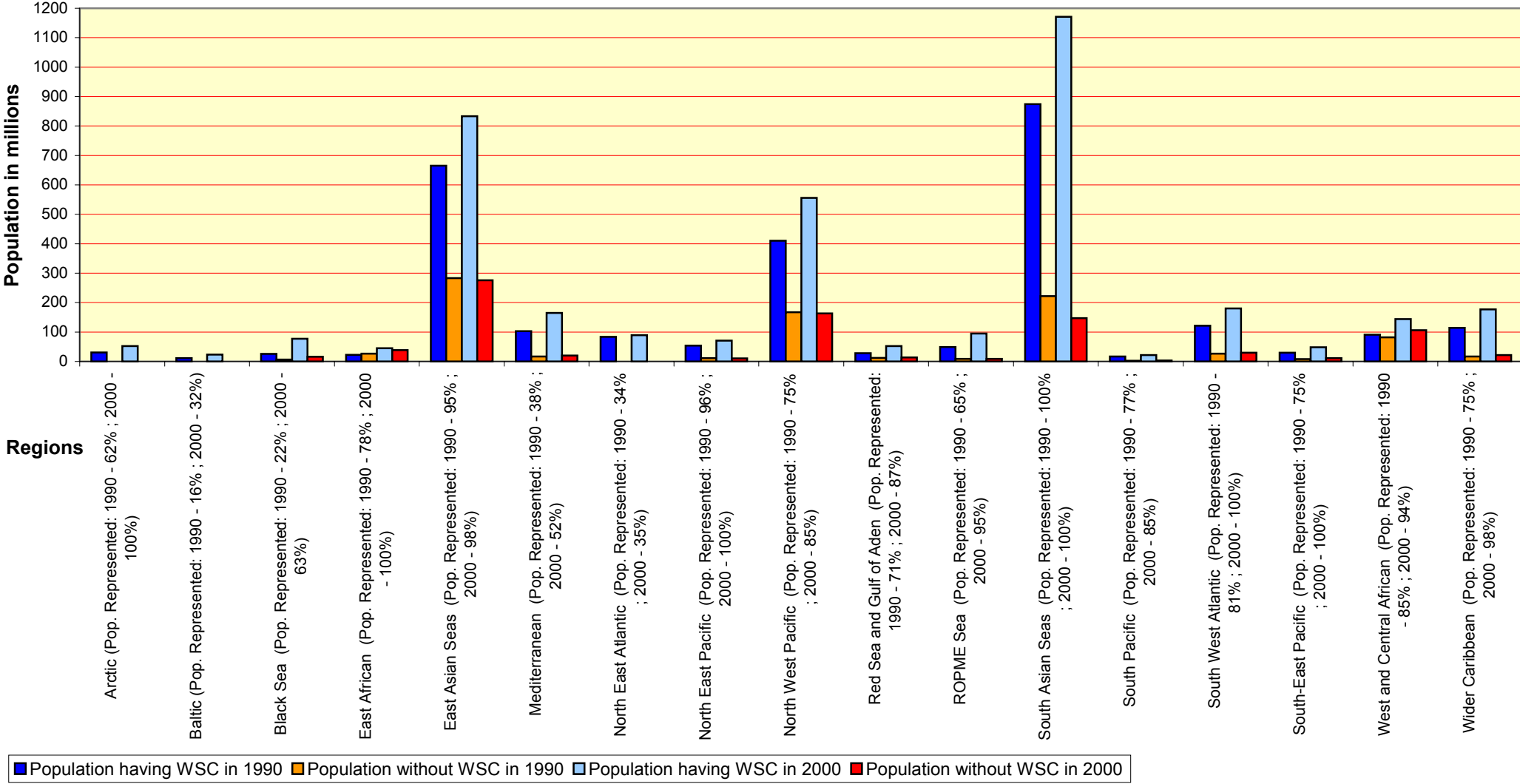
A detailed analysis of the status of water supply coverage in different regions follows. This analysis has been presented mainly through the following graphs.

⁴ It should be recognized that more data was available for a greater number of countries per region for the year 2000 than for 1990

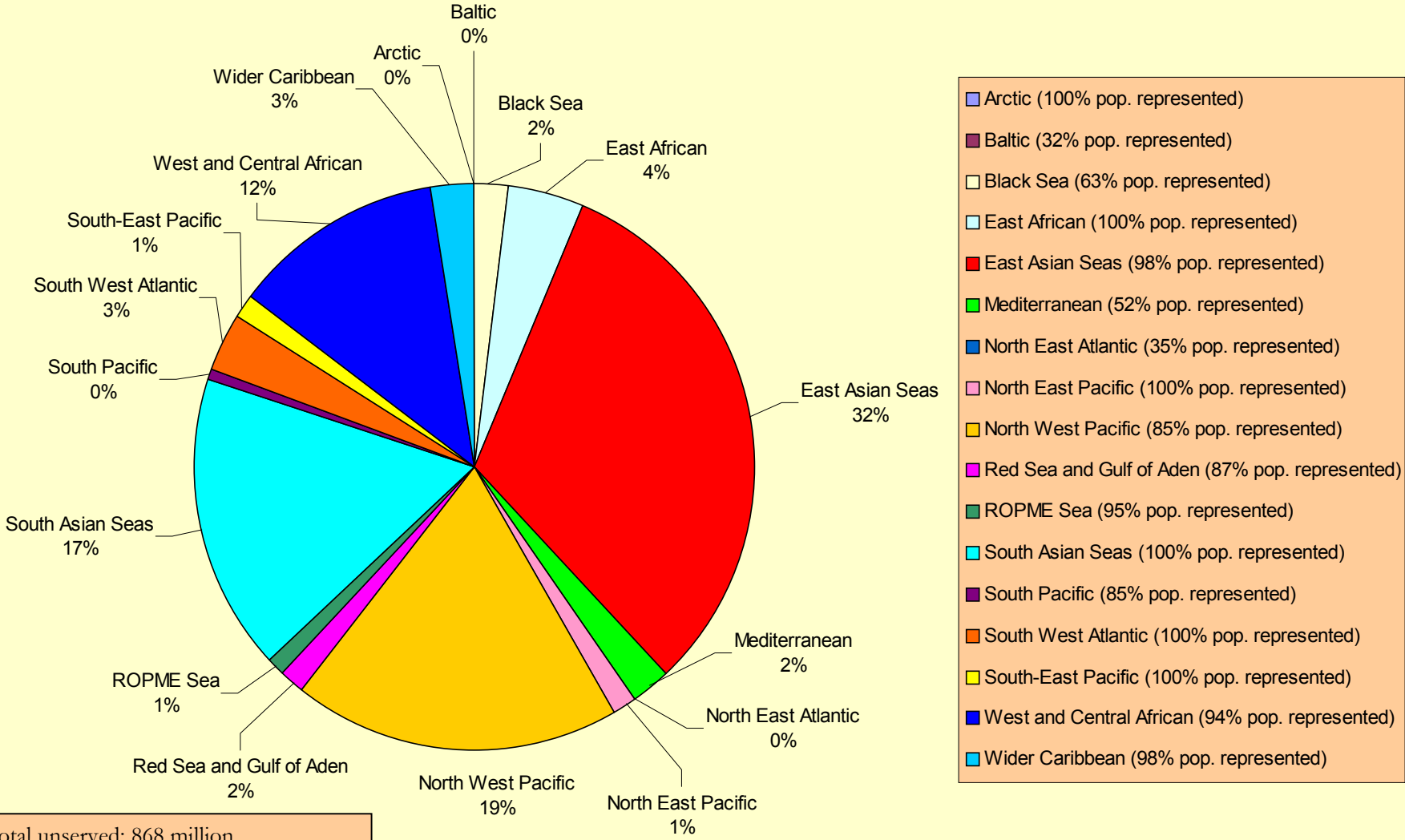
Percentage of Population having access to Water Supply Coverage in 1990 & 2000



Access to Water Supply (WSC) - 1990 to 2000



Distribution of Regional Population not served with Water Supply in 2000



Total unserved: 868 million

Inter-regional analysis for Water Supply Coverage

Looking at the graphs giving the trends in the Water Supply coverage across regions from 1990 till 2000, it becomes clear that on the whole water access amongst populations is increasing. However, certain regions come into a greater light due to their clear positive or negative trends. It can be seen that a vast majority of the population unserved with water supply is found in Asia followed by Africa.

Looking at the relative distribution of the regional population not served with water supply in the year 2000, East Asian Seas comes in prominence with having 32% of the total unserved in the world, followed by the North-West Pacific with 19%, South Asian with 17%, West and Central African at 12%, East African at 4% and so on. In the East Asian Seas as well as North West Pacific regions, the amount of population having access to water supply has increased greatly between 1990 to 2000. However, the number of people without access to water supply remain the same in both these regions.

The South Asian Seas region, shows a clear positive trend to a greater percentage of people having access to water supply. In this region, there is a marked increase in number of people having access to water supply and proportionally a clear decrease in number of people without water supply access.

The regions, which indicate no problem with water supply access, are the Arctic, Baltic and North East Atlantic.

When viewing the whole scenario with the percentage of a region's population without access to water supply coverage, the African regions are the most lacking. The East African region is distinct with 55% of its regional population without access to water supply in 1990 and 46% in 2000. West and Central African region had 47% of its population without access to water supply in 1990, which decreased to 43% in 2000. In absolute terms, despite a rise in water supply access from 1990 to 2000, there is also an equally proportioned increase in number of people not having access to water supply. With the overall growth of population in these African regions being almost double in the last decade, the backlog seems to be growing and not keeping pace with the growth in population. Population growth is likely to continue over the coming decades, creating increasing pressure on services that are already overwhelmed in these regions. In East Asian region, the percentage of population without access to water supply coverage decreased from 30% to 25% from 1990 and 2000 respectively.

In the Wider Caribbean region, there is an increase in the number of people having access to water supply. The number of people having no access to water supply remain the same. This indicates a positive trend.

The status of Sanitation Coverage across regions

The following table provides sanitation coverage data for 1990 and 2000 for all regions.

Analysis of Sanitation Coverage (SC) – Regional Status

Region	Population in 1990 (in million)	Population having SC in 1990 (in million)	Population without SC in 1990 (in million)	% of SC in 1990	% without SC in 1990	Population in 2000 (in million)	Population having SC in 2000 (in million)	Population without SC in 2000 (in million)	% of SC in 2000	% without SC in 2000
Arctic (Pop. Represented: 1990 - 62%; 2000 - 100%)	28,386	28,386	0	100	0	31,796	31,796	0	100	0
Baltic (Pop. Represented: 1990 - 16%; 2000 - 32%)	11,613	11,613	0	100	0	12,076	12,076	0	100	0
Black Sea (Pop. Represented: 1990 - 22%; 2000 - 63%)	31,831	27,69297	4,13803	87	13	68,336	54,44213	13,89387	80	20
East African (Pop. Represented: 1990 - 78%; 2000 - 100%)	49,022	42,19728	6,82472	86	14	83,278	64,49693	18,78107	77	23
East Asian Seas (Pop. Represented: 1990 - 95%; 2000 - 98%)	948,132	412,33924	535,79276	43	57	1108,748	594,26516	514,48284	54	46
Mediterranean (Pop. Represented: 1990 - 38%; 2000 - 52%)	118,169	96,50692	21,66208	82	18	183,316	157,80595	25,51005	86	14
North East Atlantic (Pop. Represented: 1990 - 34%; 2000 - 35%)	81,278	81,278	0	100	0	84,012	84,012	0	100	0
North East Pacific (Pop. Represented: 1990 - 96%; 2000 - 100%)	63,645	44,67537	18,96963	70	30	81,304	61,34505	19,95895	75	25
North West Pacific (Pop. Represented: 1990 - 75%; 2000 - 85%)	577,653	167,51937	410,13363	29	71	709,662	296,04635	413,61565	42	58
Red Sea and Gulf of Aden (Pop. Represented: 1990 - 71%; 2000 - 87%)	40,271	23,00268	17,26832	57	43	65,712	44,42018	21,29182	68	32

Region	Population in 1990 (in million)	Population having SC in 1990 (in million)	Population without SC in 1990 (in million)	% of SC in 1990	% without SC in 1990	Population in 2000 (in million)	Population having SC in 2000 (in million)	Population without SC in 2000 (in million)	% of SC in 2000	% without SC in 2000
ROPME Sea (Pop. Represented: 1990 - 65%; 2000 - 95%)	58,094	47,10969	10,98431	81	19	104,162	86,24111	17,92089	83	17
South Asian Seas (Pop. Represented: 1990 - 100%; 2000 - 100%)	1096,452	273,65769	822,79431	25	75	1318,413	493,92857	824,48443	37	63
South Pacific (Pop. Represented: 1990 - 77%; 2000 - 85%)	19,06	18,36898	0,69102	96	4	25,036	23,35949	1,67651	93	7
South West Atlantic (Pop. Represented: 1990 - 81%; 2000 - 100%)	147,94	106,5168	41,4232	72	28	210,484	165,6359	44,8481	79	21
South-East Pacific (Pop. Represented: 1990 - 75%; 2000 - 100%)	37,414	28,76173	8,65227	77	23	59,24	46,79772	12,44228	79	21
West and Central African (Pop. Represented: 1990 - 85%; 2000 - 94%)	182,869	98,59901	84,26999	54	46	244,207	136,85884	107,34816	56	44
Wider Caribbean (Pop. Represented: 1990 - 75%; 2000 - 98%)	126,802	102,71545	24,08655	81	19	198,521	164,72197	33,79903	83	17

Overview of regional analysis for Sanitation coverage

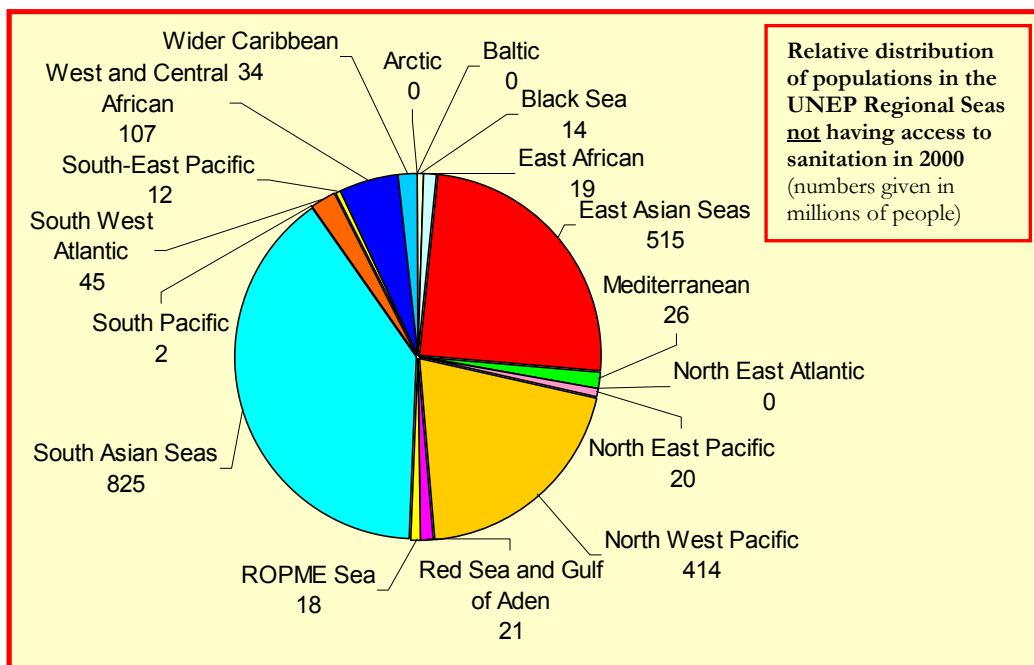
Total Population of all regions in 1990	4.6 billion
Total regional population represented in 1990 (that is supplied data)	3.6 billion
Total population of all regions in 2000	5.3 billion
Total regional population represented in 2000 (that is supplied data)	4.7 billion

The overall data thus, was available for 78% of the regional population for 1990, while 89% was represented in the 2000 figures. It is important to note that the analysis for regional access to sanitation coverage that follows is based on the total regional population represented in 1990 and 2000 (that is population which has supplied data)

Based on a Regional Seas analysis, it comes through that in 2000 out of a total Regional Seas population of 4.7 billion, 2.1 billion people do not have access to adequate sanitation. This suggests that the sector has relatively lower service levels compared to the water supply sector as we have seen previously in this report. The total coverage with water supply is approximately 81% of the total regional population, while total sanitation coverage is only about 55%.

During the period 1990 – 2000, the total regional population increased by about 15% (0.7 billion). The population growth of the 1990's has meant that an estimated 907 million additional people gained access to sanitation by the year 2000. Correspondingly, the population without access to sanitation has increased only 62 million. The percentage coverage of population having access to sanitation has thus increased from 45% in 1990 to 54% in 2000. ⁵

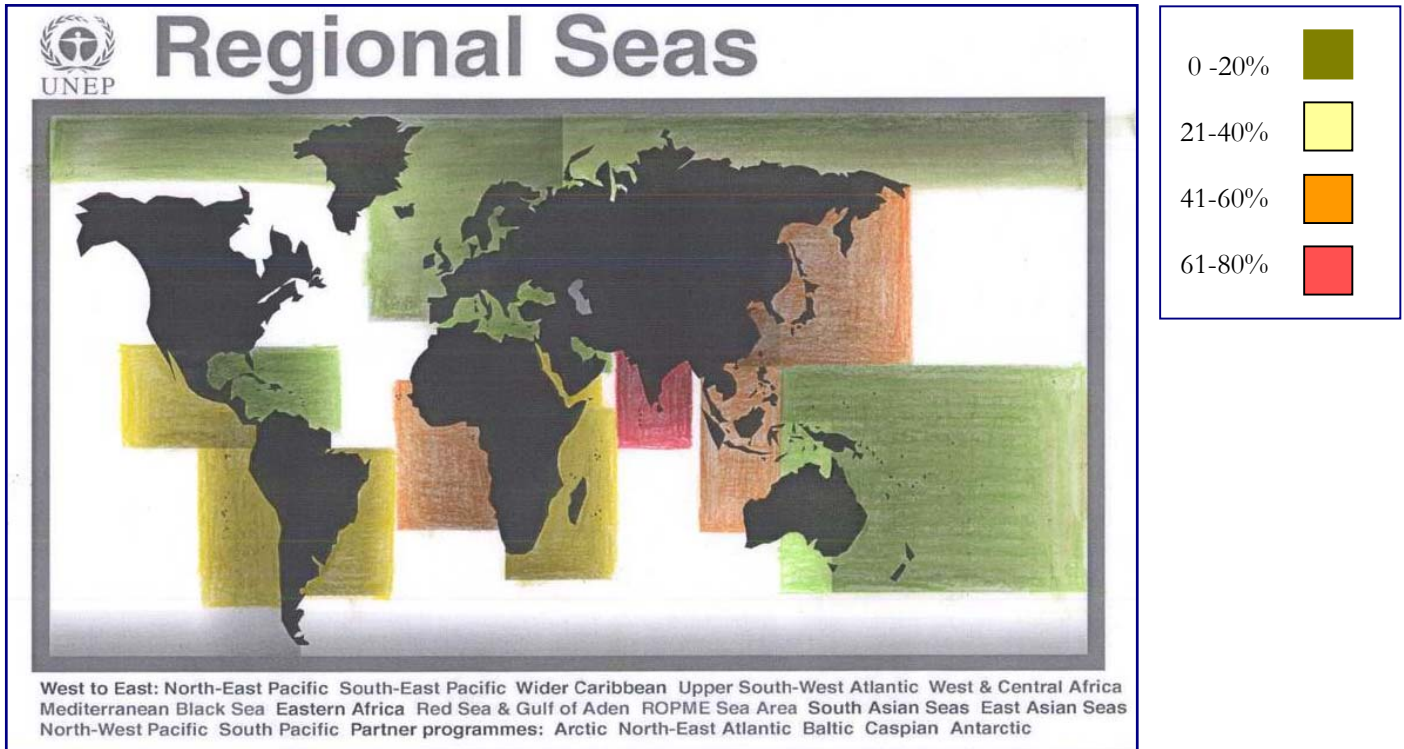
The following figure shows the relative distribution of populations in the UNEP regional seas without access to sanitation in the year 2000.



⁵ It should be recognized that more data was available for a greater number of countries per region for the year 2000 than for 1990

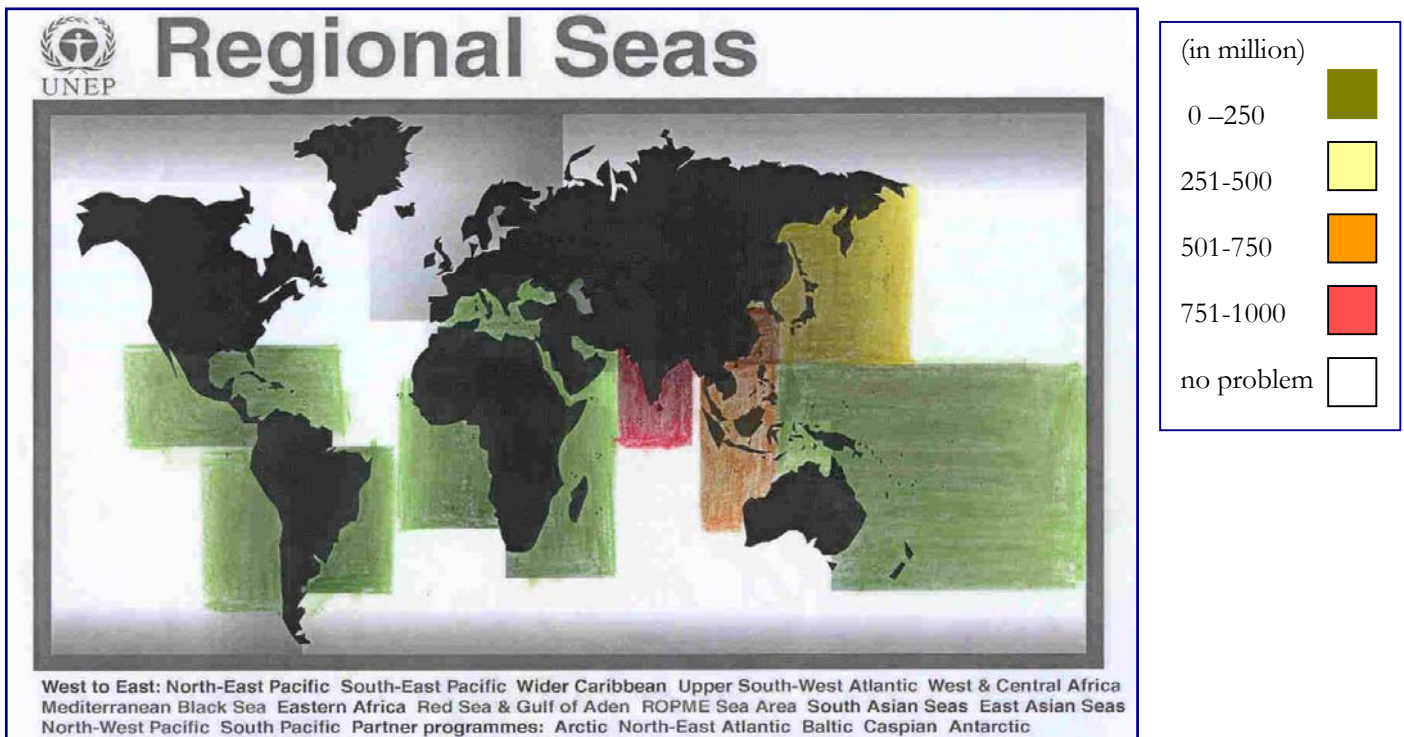
Based on the regional data, the following maps have been compiled which analyse the sanitation coverage across regions graphically. These maps also highlight how different indicators give different results with respect to depicting 'problematic' regions affecting the decisions to act or implement projects.

% of Population without Sanitation coverage in 2000



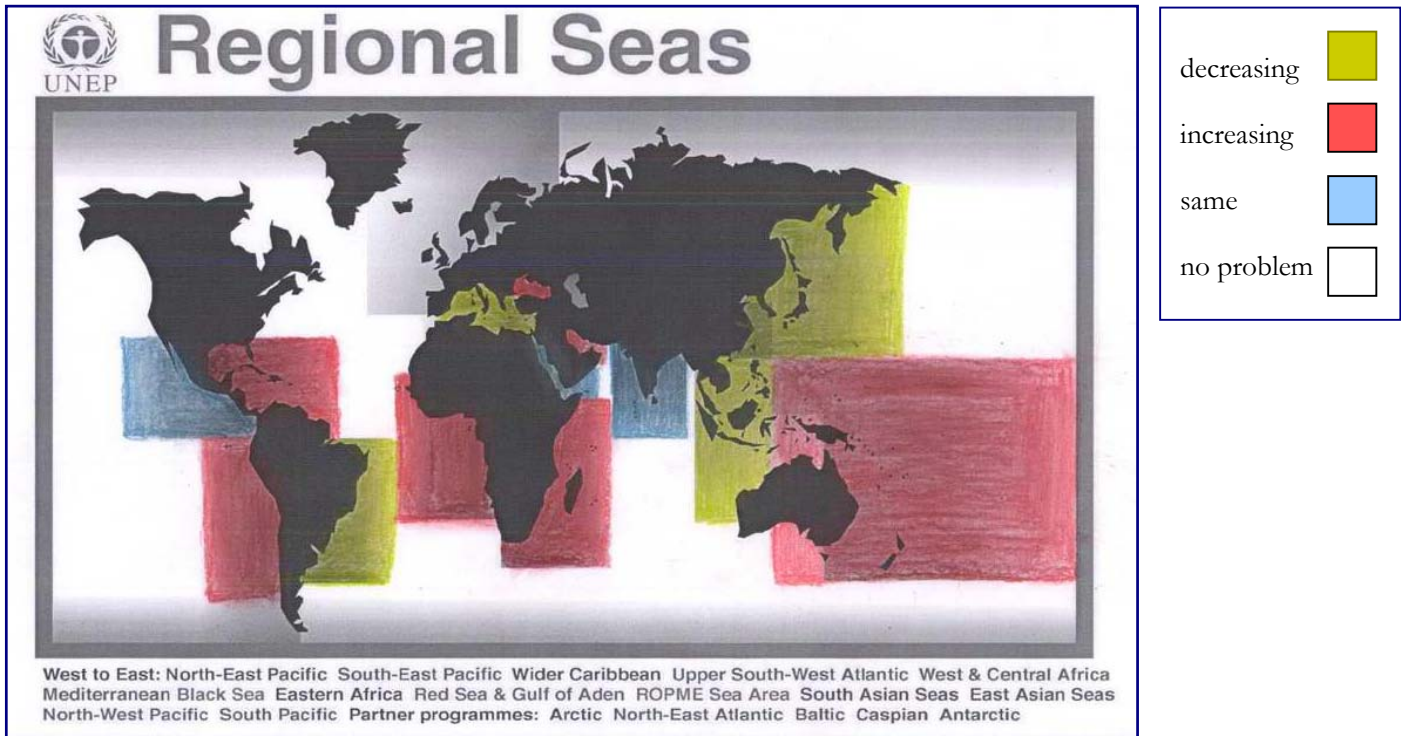
The above map indicates the 'hotspots' for implementing sanitation projects. South Asia emerges as the most prominent of these hotspots with population without sanitation access being 63%. This is followed by North West Pacific region with 58%, East Asian Seas with 46% and West and Central African Region with 44% of population without sanitation access respectively.

Absolute number of Population without Sanitation coverage in 2000



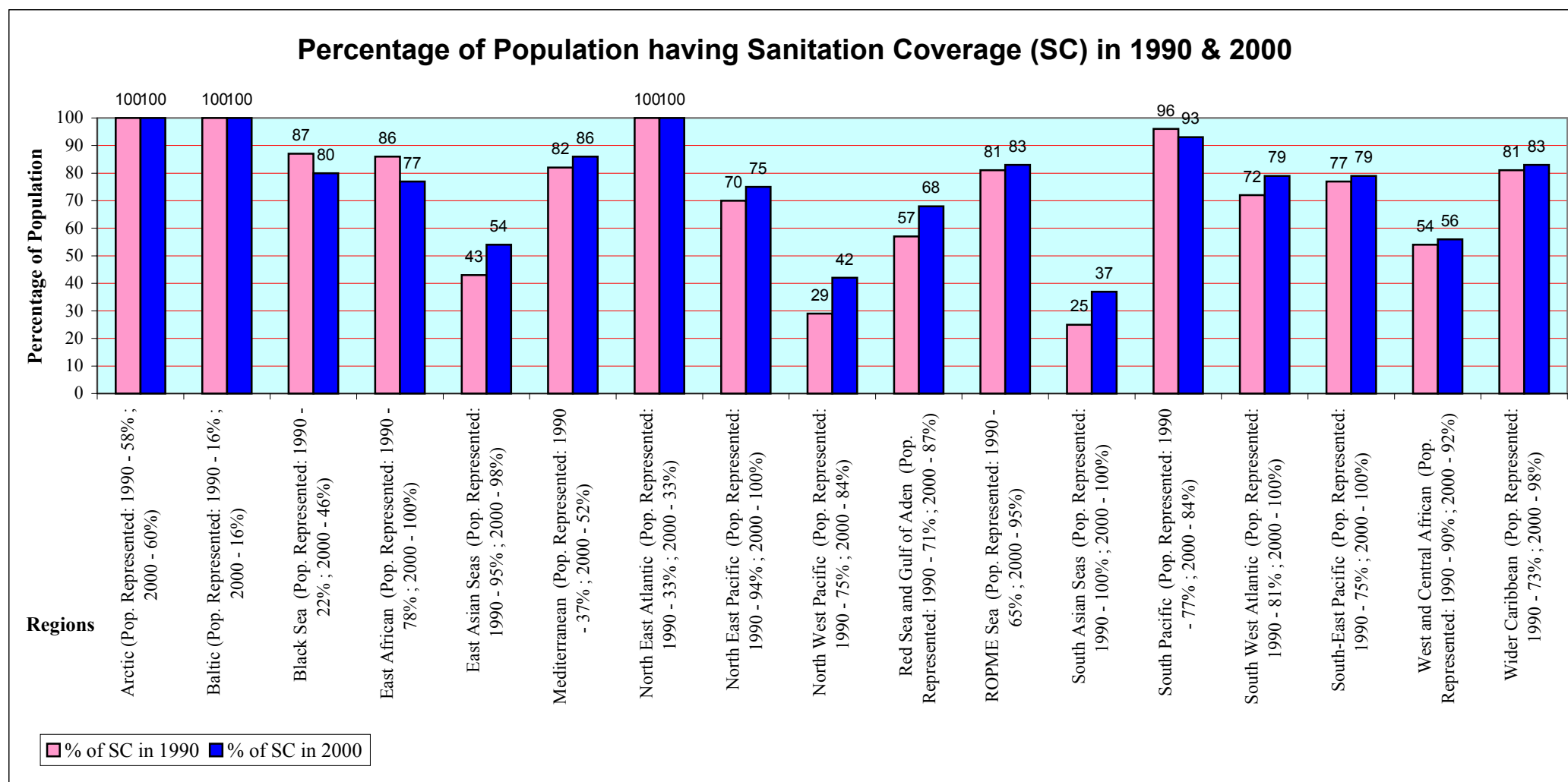
The previous map depicting graphically the absolute number of population without sanitation coverage across regions brings forth the South Asian Seas as one of the key 'hotspot' region again. It also depicts that the major population without sanitation coverage is centred in Asia.

Patterns of change in Populations without Sanitation coverage from 1990 to 2000

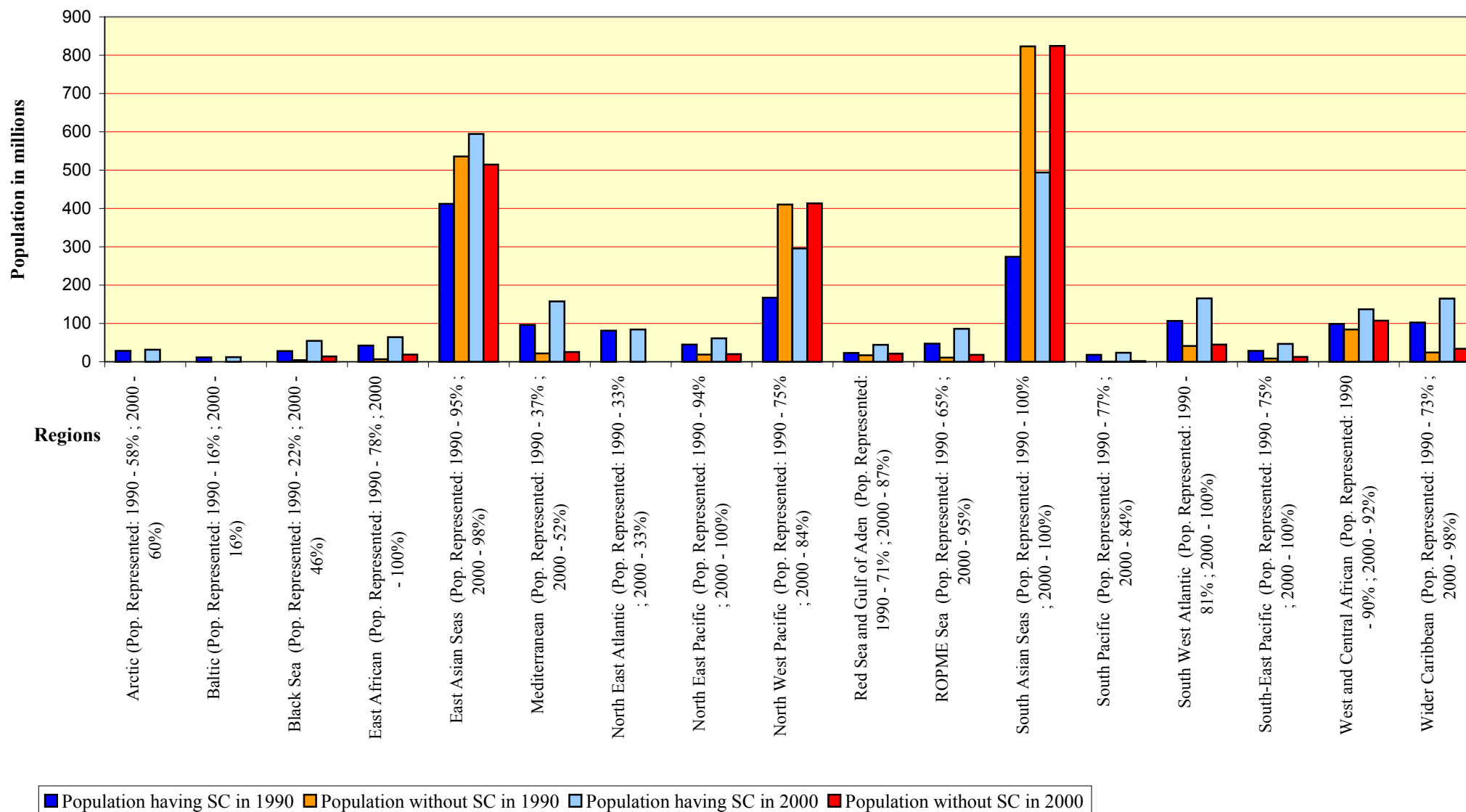


The above map shows trends in increase and decrease of sanitation coverage across regions. A majority of the regions seem to show a trend where the population without sanitation access is increasing.

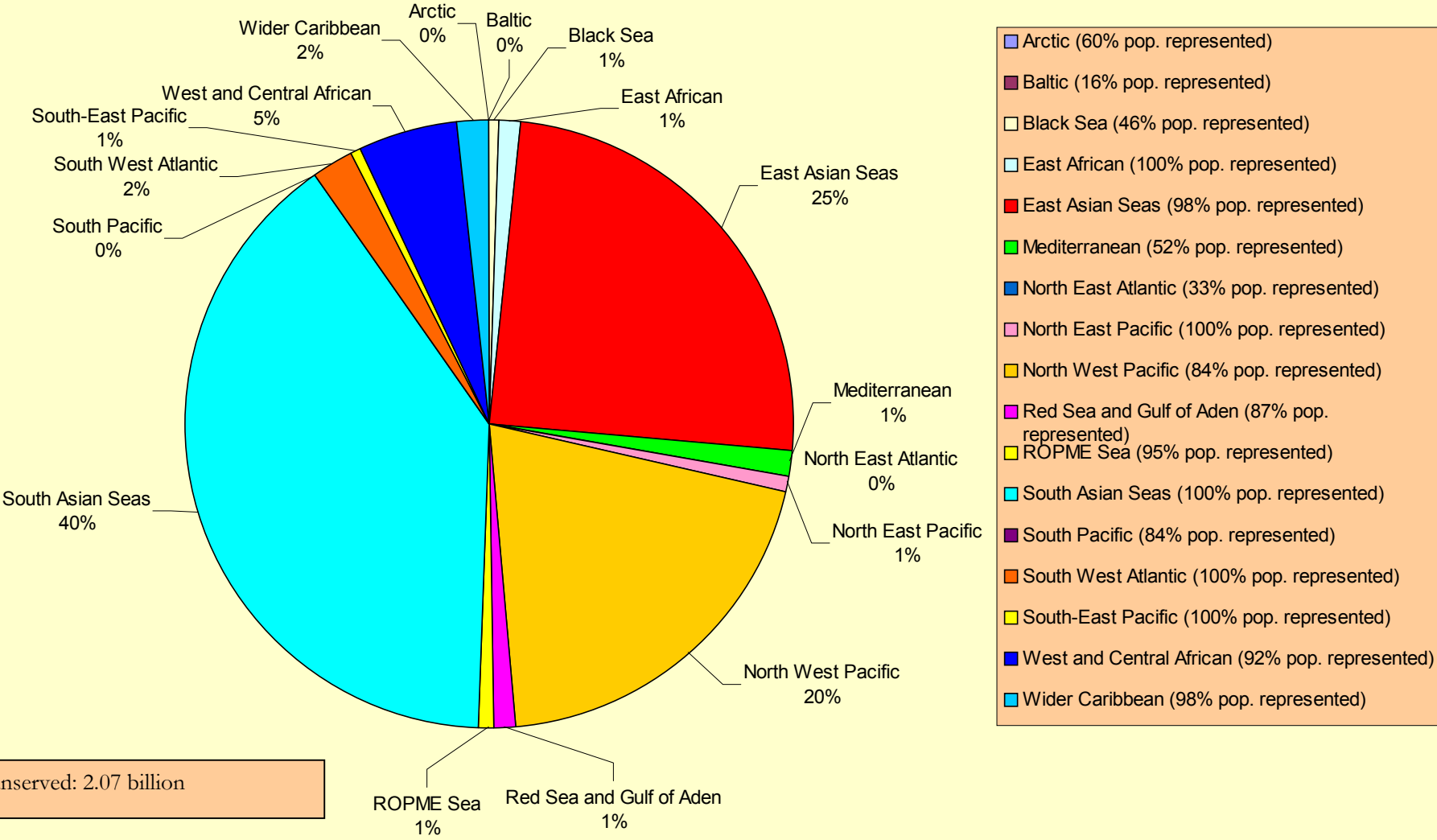
A detailed analysis of the status of sanitation coverage in different regions follows. This analysis has been presented mainly through graphs, which follow.



Access to Sanitation (SC) - 1990 to 2000



Distribution of the Regional Population not served with sanitation in 2000



Inter-regional analysis for Sanitation Coverage

As it is in the Water Supply coverage, the graphs giving the trends in the Sanitation coverage across regions from 1990 till 2000, also indicate a clear trend of increase in access to sanitation amongst the populations in all regions. However, certain regions show a greater cause of concern compared to others and some show a positive trend. From the graphs it becomes clear that a vast majority of the population unserved with sanitation is found in Asia and then followed by Africa.

Looking at the relative distribution of the regional population not served with sanitation in the year 2000, South Asian Seas come in prominence with containing 40% of the total unserved in the world, followed by the East Asian with 25%, North-West Pacific with 20%, West and Central African at 5% etc. In the South Asian Seas, East Asian Seas as well as North West Pacific regions, the amount of population having access to sanitation has increased vastly between 1990 and 2000. However, the number of people without access to sanitation almost remain the same in all these regions. The South Asian region shows a 12% increase in number of people having access to sanitation. The absolute number of people still not having access to sanitation in this region (825 million) is a big cause of concern.

The South Asian Seas emerge with the highest risk of pollution as a result of 825 million people being without basic sanitation services followed by East Asian Regional seas, 515 million; North West Pacific, 414 million; West and central African, 107 million; South West Atlantic, 45 million; Wider Caribbean, 34 million; Mediterranean, 26 million; Red Sea and the Gulf of Aden, 21 million; East African, 19 million; ROPME, 18 million; Black Sea, 14 million; South East Pacific, 12 million; South Pacific, 2 million.

Looking at the graph depicting the percentage of regional population having access to sanitation coverage from 1990 to 2000, the following points are highlighted. The Asian regions are the most lacking and have the least percentages of sanitation access. The South Asian region is prominent with 75% of regional population without access to sanitation in 1990 and 63% in 2000. North West Pacific region had 71% of its population without access to sanitation in 1990, which decreased to 58% in 2000. The absolute figures in the North Pacific region show that despite a rise in sanitation access from 1990 to 2000, there is also an equally proportioned increase in number of people not having access to sanitation unlike the South Asian Seas where in this duration, there is an marked increase in absolute population with access and the population without access to sanitation remains the same. In East Asian region, the percentage of population without access to sanitation coverage decreased from 57% to 46% from 1990 and 2000 respectively. The absolute number of population of this region without access to sanitation shows a slight decrease in 2000 compared to 1990.

In both the West and Central African region and East African region, although there is a rise in sanitation coverage from 1990 to 2000, yet there is also an increase in number of people not having access to sanitation. The population growth in Africa is almost double the global average. The combination of fast population growth with accelerated urbanization, and low levels of water supply and sanitation coverage makes Africa especially vulnerable to the risk of water-related disease. Population growth is likely to continue over the coming decades, creating increasing pressure on services that are already overwhelmed in these regions.

In the Black Sea region, the amount of population represented for this region is only 16% for the data of 1990 and 32% for 2000. Therefore, the data is not sufficient to get a real picture of the trends. The data available depicts a rise in the population without access to sanitation from 1990 till 2000.

In the Wider Caribbean region, there is a big increase in the absolute number of people having access to sanitation. However, the number of people having no access to sanitation remains the same. This indicates a positive trend.

In the Red Sea and Gulf of Aden region, there is a rise in the percentage of sanitation access from 1990 to 2000, yet there is also an increase in absolute number of people not having access to sanitation in this period.

The regions, which indicate no problem with sanitation access, are the Arctic, Baltic and North East Atlantic. South Pacific region faces minor problems with regards to sanitation access with 96% of population having coverage in 1990 and 93% in 2000. Even though the availability of sanitation facilities is very high in these regions, still a large quantity of untreated wastewater is being discharged into the coastal environments. An article from W&WI (April 2002) states, "*Of the 542 European cities of more than 150,000 inhabitants, 37 are discharging*

wastewater into the environment without prior treatment. Some 72 cities discharge most of their wastewater without treatment or after inadequate treatment, while 131 others have given incomplete information to the Commission. The most notorious case is Brussels, which did not have any treatment at all by the end of 1998, and since autumn 2000 treated only 1/3rd of wastewater to secondary level, still below the standard demanded by the Urban Wastewater Treatment Directive (UWWTD) of the European Commission". Therefore just availability of adequate sanitation facilities does not always imply safe coastal environments. The availability of adequate wastewater treatment systems is very crucial in order to protect the coastal and marine systems from discharge of untreated polluted wastewater.

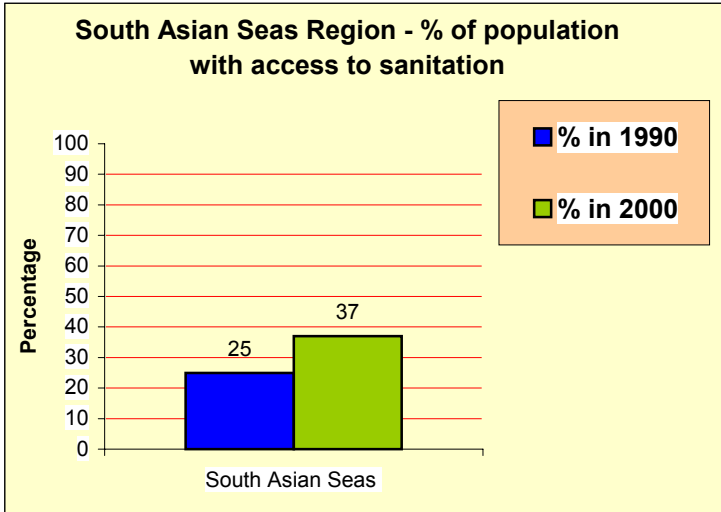
Thus there needs to a availability of data about the amounts of untreated wastewater discharged into the coastal systems across the regions. Data about sanitation coverage at a household level is not sufficient to make an accurate analysis about the pollution of the coastal environments from sewage.

So far we have seen the overall status of sanitation access across regions. The following section will detail out a few of these regions from Asia and African seas. These regions have been selected since regions around Asian and African seas have been found to be in more dire need of interventions and support in the sanitation sector.

Some examples of the Regional Seas' analysis on sanitation coverage

Example 1: South Asian Seas

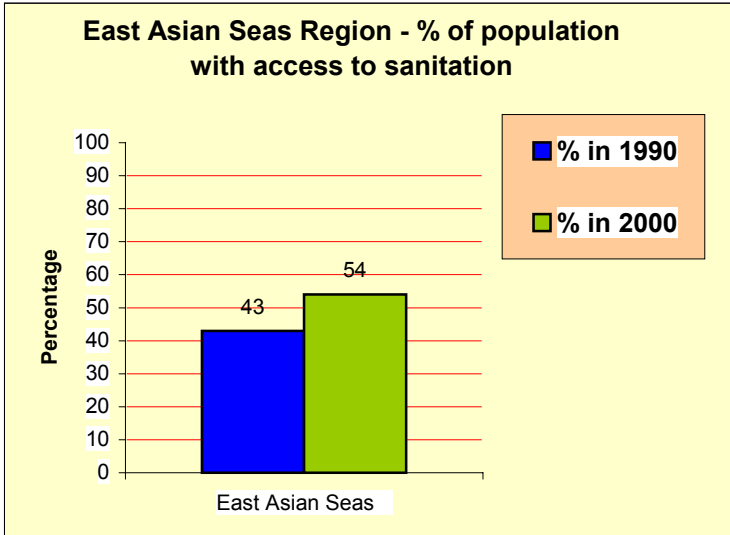
1990 – 2000	increase of the regional population	222 million people
1990 – 2000	new access to improved sanitation	220 million people
1990 – 2000	increase category 'un-served'	2 million people
2000	regional population 'un-served'	825 million people



Of all the UNEP Regional Seas the South Asian Seas Region has the lowest coverage in sanitation services. Since the absolute population numbers of the category 'un-served' in South Asia total up to 40% of the world population without access to improved sanitation, this gives South Asia a high need for improved and innovative approaches in the sanitation and wastewater sector to reduce the high emission loads.

Example 2: East Asian Seas

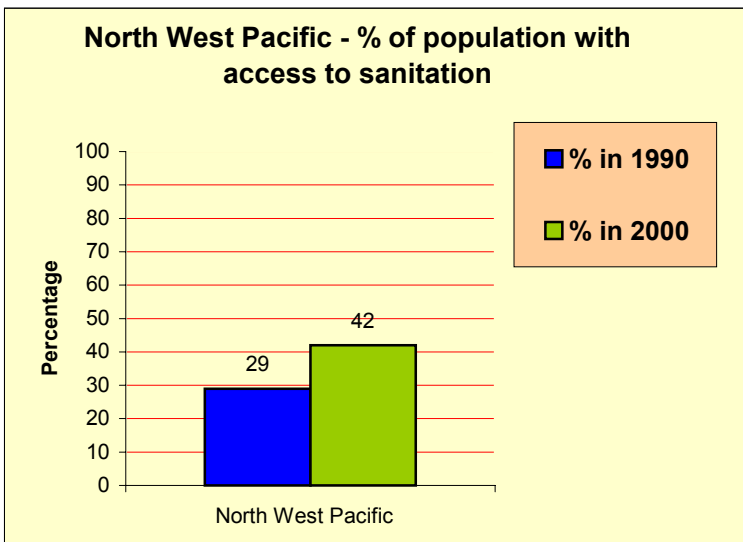
1990 – 2000	increase of the regional population	161 million people
1990 – 2000	new access to improved sanitation	182 million people
1990 – 2000	decrease category 'un-served'	21 million people
2000	regional population 'un-served'	515 million people



As can be seen by the data analysis, the percentage of the population having access to improved sanitation has increased from 1990 to 2000. However, the absolute number of people having access to sanitation is almost equal to the number of people without access to sanitation. The numbers unserved in the East Asian Seas region account for approximately 25% of the world population without access to improved sanitation.

Example 3: North West Pacific

1990 – 2000	increase of the regional population	132 million people
1990 – 2000	new access to improved sanitation	128 million people
1990 – 2000	increase category 'un-served'	4 million people
2000	regional population 'un-served'	414 million people

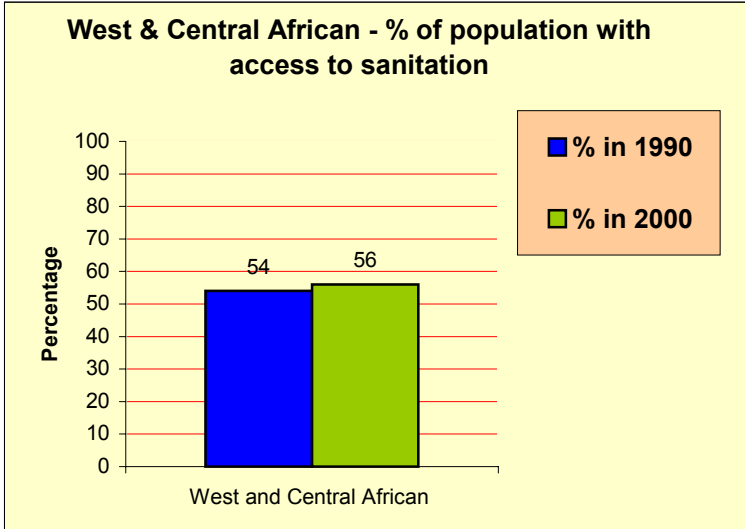


The data analysis clearly indicates that although there is a rapid increase in the number of people having access to sanitation, a large part of the population is still without access to sanitation.

The numbers unserved in the North West Pacific Seas region account for approximately 20% of the world population without access to improved sanitation.

Example 4: West and Central African Seas

1990 – 2000	increase of the regional population	61 million people
1990 – 2000	new access to improved sanitation	38 million people
1990 – 2000	increase category 'un-served'	23 million people
2000	regional population 'un-served'	107 million people

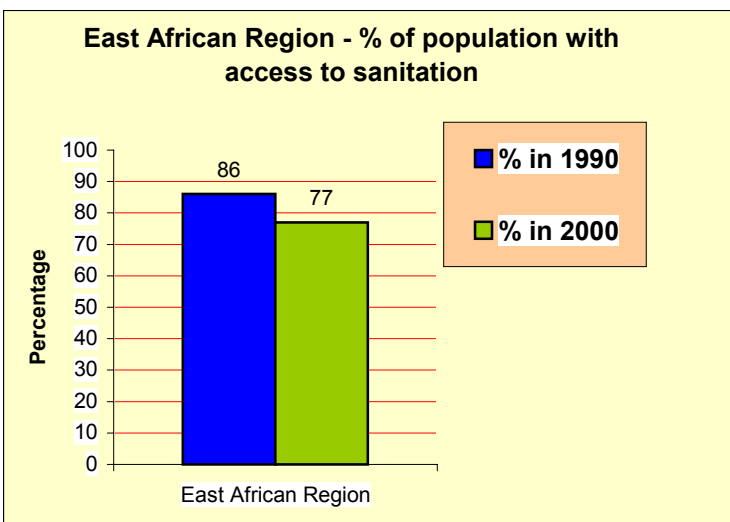


As in the East African region, it is seen here that there is an alarming increase of population from 1990 to 2000. The population has almost increased double during this duration from 58 million to 104 million people. The sanitation sector is needs to cope up with this increase in population.

The graph on the left indicates a positive trend with an increase in percentage of population with access to improved sanitation (in absolute numbers 38 million people which is a majority of the new population added to the region).

Example 5: East African Region

1990 – 2000	increase of the regional population	20 million people
1990 – 2000	new access to improved sanitation	11 million people
1990 – 2000	increase category 'un-served'	9 million people
2000	regional population 'un-served'	19 million people



Since the population growth of Africa is almost double the global average, this makes Africa especially vulnerable to the risks of an increasing backlog of the population without access to improved sanitation.

The main findings and conclusions from this chapter have been summarised in the following chapter. The next chapter also endeavours to give some recommendations and directions in which to proceed in order to increased regional access of populations for water supply and sanitation.

4. Conclusions & Recommendations

This Chapter presents the main findings and conclusions of the regional coverage status for water supply and sanitation in 1990 and 2000. It also presents an overview of the change in water supply and sanitation coverage over time as well as some potential directions in which to proceed.

Main Findings: Water Supply and Sanitation Coverage

Social, economic and environmental impacts

Untreated municipal wastewater emissions are one of the most significant threats to sustainable coastal development worldwide. They are a primary pollution source category affecting human health and the environment, and are identified as such in the UNEP Regional Seas Programme. Water supply and sanitation are topics of great importance in addressing the serious public health problems, economic losses and the degradation of coastal ecosystems. Pathogenic organisms, for example, in domestic wastewater-contaminated marine and estuarine waters cause massive transmissions of infectious diseases to bathers and consumers of raw and undercooked shellfish with a global economic impact recently estimated at \$10 billion per year (GESAMP, 2001).

Adequate water supply and sanitation facilities also have a social significance by having an important role to play relating to poverty alleviation, sustainable water resources management, food production and security, adequate water supply, water-related disasters and various other topics of global concern. Despite all efforts to date, the fact remains that at a global level a significant decrease in the number of waterborne diseases and associated human death has not been realised.

Due to the permanent growth of the world's population, the numbers of people without access to improved sanitation and wastewater treatment will remain the same or even increase, if investments remain at present day levels. The problems associated with wastewater management are inseparably linked with the issue of sanitation. In the regions where a large proportion of the population is not served with improved sanitation, sewage flows directly into groundwater, streams, rivers, lakes and eventually reaches the coastal systems. Streams and rivers also direct solid waste to the coastal zone where it accumulates along the coastal fringe. In order to adequately protect the coastal and marine environment, it is evident that sanitation must be improved and integrated with appropriate water supply and wastewater management. Even in areas where adequate sanitation services are currently provided, frequently there is inadequate attention paid to reducing or treating the volume of wastewater entering the marine environment, and this problem must also be addressed.

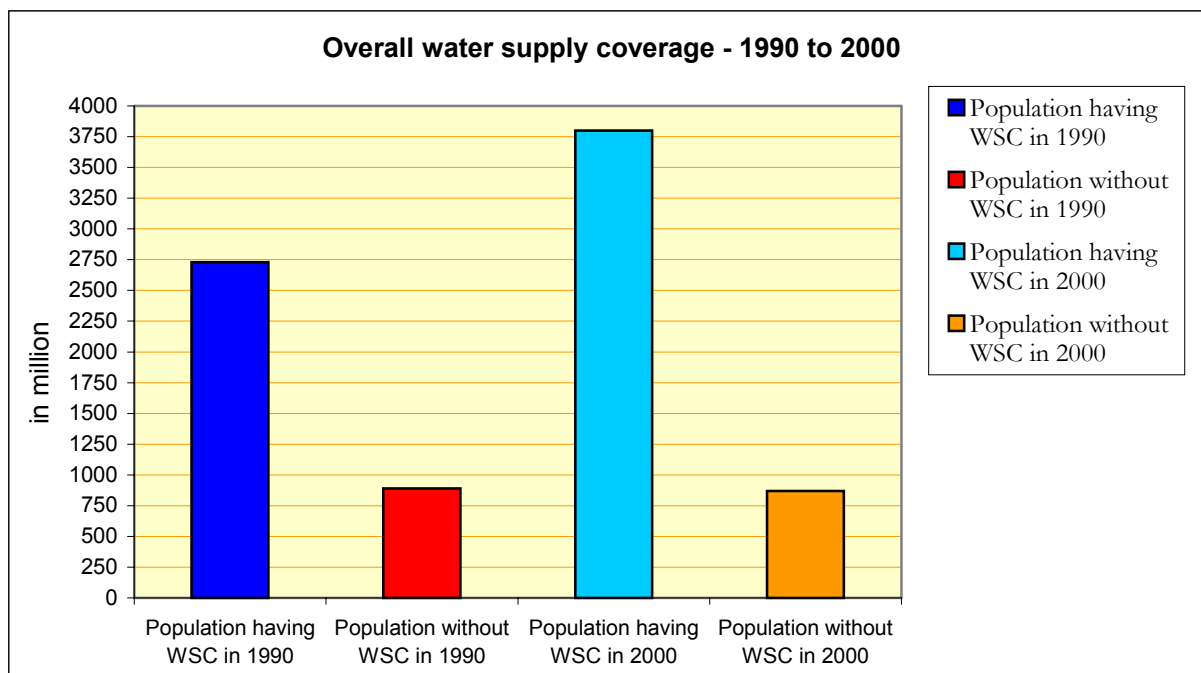
Human and ecosystem health impacts and economic losses due to emissions of untreated wastewater are avoidable assuming adequate, innovative measures are being taken. Such measures could involve an integrated water and wastewater management systems within national and trans-boundary basins; increase of public awareness; building of human and institutional capacities; strengthening policy measures etc.

These issues clearly bring forth the importance of providing adequate water supply and sanitation as well as the need for preventive measures to combat both environmental transmission of pathogens and changes in ecosystems and habitats. This would require efforts at global, regional as well as local levels. However, it becomes important to first assess the situation at all levels. The regional analysis carried out in this report results in the following main conclusions.

A cross-regional comparison

Main Findings and Conclusions regarding Water Supply Coverage across Regions

One of the major conclusions which emerges from this study is that on the whole, water access amongst regional populations is increasing. However the absolute numbers of people without access to water supply has not decreased much in the last 10 years.



Based on cross regional seas analysis, it comes through that in the year 2000, out of a total Regional Seas population of 4.7 billion⁶, 870 million people do not have access to adequate water supply. Compared to the sanitation sector, the water supply sector has relatively high service levels. The total coverage of water supply is approximately 81% of the total regional population, while total sanitation coverage is only about 55%. The percentage coverage of population having access to water supply has increased from 75% in 1990 to 81% in 2000.

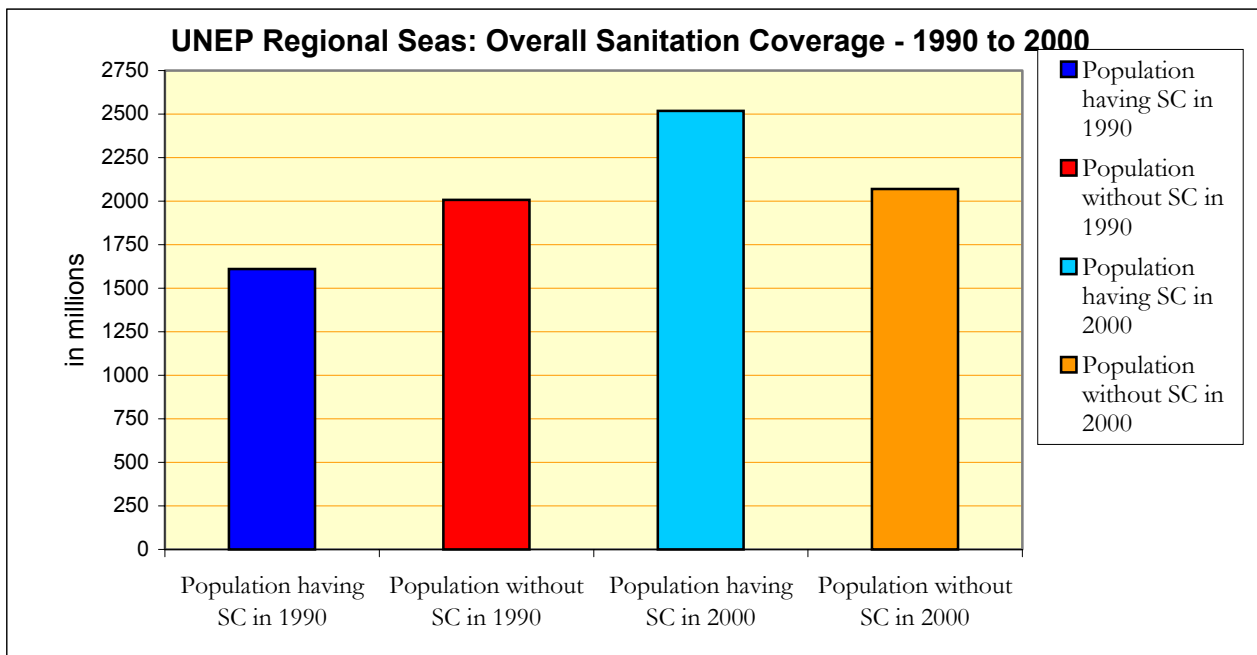
Looking at the relative distribution of the regional population not served with water supply in the year 2000, East Asian Seas comes in prominence with having 32% of the total unserved in the world, followed by the North-West Pacific with 19%, South Asian with 17%, West and Central African at 12%, East African at 4% followed by others. In the East Asian Seas as well as North West Pacific regions, the amount of population having access to water supply has increased greatly between 1990 to 2000. However, the number of people without access to water supply remain the same in both these regions.

The problems of access to water supply in the African regions are also highlighted with this research. The East African region is distinct with 55% of its regional population without access to water supply in 1990 and 46% in 2000. West and Central African region had 47% of its population without access to water supply in 1990, which decreased to 43% in 2000. With the overall growth of population in these African regions being almost double in the last decade, the backlog seems to be growing and not keeping pace with the growth in population. Population growth is likely to continue over the coming decades, creating increasing pressure on services that are already overwhelmed in these regions.

⁶ This represents the regional population that has supplied water supply data.

Main Findings and Conclusions regarding Sanitation Coverage across Regions

Based on a Regional Seas analysis, it comes through that in the year 2000, out of a total Regional Seas population of 4.7 billion⁷, 2.1 billion people do not have access to adequate sanitation. As the following graph shows, there has been a marked increase in the numbers of people across regions having access to sanitation. However, the graph also indicates a slight increase in the number of population without access to sanitation. Keeping in mind the increase of population over this period of time and expected increase in the future, we seem to be unable to keep up with the backlog. With the new target of halving the number of people that have no access to basic sanitation services by the year 2015 which has been set in the *World Summit on Sustainable Development in Johannesburg* (August – September 2002, it becomes clear that much more effort and investments need to be input in the sanitation sector in the coming years.



The coastal habitats, fisheries, marine wildlife and the people of the South Asian Sea Region are the most threatened in the world from untreated sewage discharged into coastal waters. From the relative distribution of the regional population not served with sanitation in the year 2000, South Asian Seas come in prominence by containing 40% of the total unserved in the world, followed by the East Asian with 25%, North-West Pacific with 20%, West and Central African with 5% and so on.

Thus the South Asian region emerges as the most vulnerable region with regards to lack of sanitation facilities. The 825 million of people still not having access to sanitation in this region is a big cause of concern. Having no access to basic sanitation services puts them at high risk from sewage-related diseases and death. It also means that the level of untreated domestic wastes being discharged into South Asia’s coastal waters are likely to be the highest in the world, increasing the risk of shellfish contamination and the chance of toxic, algal blooms poisoning fish and wildlife. Precious habitats, such as South Asia’s coral reefs, are likely to be under increased stress as a result of the high levels of nutrients and suspended solids linked with the discharges.

East Asian Seas region emerges as the second most vulnerable region with 515 million people, or as stated before 25% of the unserved population in coastal countries, without access to proper sanitation services, followed by the North West Pacific with 414 million people without access.

The Asian regions also have the least percentages of sanitation access. The South Asian region is prominent with 75% of regional population without access to sanitation in 1990 and 63% in 2000. North West Pacific region had 71% of its population without access to sanitation in 1990, which decreased to 58% in 2000. The absolute figures

⁷ This represents the regional population that has supplied sanitation data.

in the North Pacific region show that despite a rise in sanitation access from 1990 to 2000, there is also an equally proportioned increase in number of people not having access to sanitation unlike the South Asian Seas where in this duration, there is an marked increase in absolute population with access and the population without access to sanitation remains the same.

The sea areas with the highest provision of sewage treatment, and thus the lowest threat to the health of coastal waters, include the North East Atlantic, Baltic and the Arctic regions with only a few people without proper sanitation services.

In many developing parts of the world, the increased levels of sanitation coverage and wastewater treatment are being overwhelmed by rising populations. For example in the South Asian Seas region, access to improved sanitation during the period 1990 to 2000 has benefited 220 million people. But during that period the population grew by 222 million leaving 825 million still without access to acceptable sanitation systems and thousands of miles of coastline vulnerable to pollution. In the East African region the numbers un-served even doubled over the last decade, to 19 million people having no access to basic sanitation.

Availability of adequate sanitation facilities does not always imply safe coastal environments. The availability of adequate wastewater treatment systems is very crucial in order to protect the coastal and marine systems from discharge of untreated polluted wastewater. Future GPA activities will further highlight these issues within the framework of the UNEP Regional Seas Programme.

Recommendations

(to be completed)

Need for regional Wastewater Emission Targets?

Among the potential instruments to solicit appropriate action and associated budgeting for increasing regional access to proper sanitation facilities are time-bound Wastewater Emission Targets. As this study highlights, Asian and African Seas are the regions where efforts are most urgently needed. One way of doing this is get governments and other key parties to set realistic but ambitious Wastewater Emission Targets (WET), echoing those that have been developed in many parts of the world for emissions of toxic chemicals and noxious gases from power stations and factories.

Long-term Targets and consecutive regular progress reporting may be linked to existing Regional Seas Conventions and Protocols; National Governments are invited to consider realistic and workable intermediate benchmarks.

Governments should be urged to consider Wastewater Emission Targets as instruments for prioritization, resource allocation and progress reporting towards achieving the global targets agreed upon at the WSSD in Johannesburg. One additional target, which could be do-able at the global level, is to have a minimum of 20 per cent of coastal cities implementing sustainable and environmentally sound water supply and wastewater treatment systems by 2012, using alternative technological, infrastructure, managerial and financial approaches to the traditional large scale investments, paying due attention to operation and maintenance costs and to equitable water service pricing.

To achieve these targets, in some places wastewater treatment systems, mirroring those in place in Europe and the United States, might be needed. However numerous, alternative, low-cost techniques also exist. These include dry sanitation and natural sewage filtering systems, such as ponds, reed beds and mangrove swamps, and possibilities for re-use and refilling of groundwater reservoirs. This can give the environment a double-benefit: Many mangrove swamps and reed beds, important habitats for wildlife such as birds and fishes, are being cleared and drained for agriculture and other activities. When more people are made aware of their use as 'natural' wastewater treatment systems, then more will be conserved for their economic and health benefits as well as for their importance for nature and wildlife.

The ultimate goal is to provide safe drinking water and proper sanitation to all the world's people by 2025. Some experts estimate that this would cost \$180 billion a year: 2-3 times more than present investments in the water sector. It may seem high, but the benefits in terms of disease reduction and dramatic environmental improvements to the coastal and marine environment are also high.

Need for Appropriate Data

There is still a need for detailed information regarding the amounts of untreated wastewater being discharged into the coastal environments across regions. This will assist in making a more specific analysis on the status of pollution in the coastal environments being caused by lack of sanitation facilities including wastewater treatments in the various Regional Seas.

Increase in investments in the water and sanitation sector

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Annexures

Annex 1: Assumptions

In the case of Columbia, the country is naturally divided on the basis of river basins into three regions. Two of the regions impact the regional seas of Wider Caribbean, South-East Pacific and North-East Pacific respectively. The third region geographically in terms of its sewage and water disposal does not contribute to these three regional seas. However since this region has a very minor population and also since Columbia is not a part of a fourth regional sea, this population is equally divided amongst two of the three regional seas. (The same population has been used for South-East Pacific and North-East Pacific since there is a region overlap in these).

To calculate the population representation of USA in the Caribbean region, the population has been tabulated by counting the total population present in the five US States bordering the Caribbean coastline. These states are Texas, Alabama, Florida, Mississippi and Louisiana. This division logic is similar to divisions of countries in regional seas where each 'regional sea' constitutes countries bordering or impacting that particular regional sea. Source for population of states in USA: <http://quickfacts.census.gov/qfd/>

Similarly, for Australia, the division of the population have been based on the presence of states around the coastlines since no river basin divides are applicable. Source for population of states in Australia: <http://www.abs.gov.au/ausstats/abs%40.nsf/>

Assumptions regarding populations in 1990 or 2000: In the instances when the population divides based on the river basin divide method are a clear fraction (such as $\frac{1}{3}$, $\frac{2}{3}$) or percentage (such as 25% or 50%), the total population of the country in 1990 and 2000 has been divided on this basis. However, in some instances the population of a country impacting a particular regional sea is known for only 1990 or 2000. In this scenario, the population division of the other year has been tabulated keeping in mind the same percentage increase or decrease in population as present in the total population of that country in 1990 and 2000.

Russian Federation is a part of four regional seas. However, its population is not entirely divided between these four regional seas (on the river basin divide principle). This is because a large part of the population and their water supply and sanitation links belongs to the Caspian Sea region, a regional sea area not covered by GPA, UNEP but by another organisation. The population of this region in the year 1990 is estimated to be 86,361,000 and in the year 2000 as 85,571,000. Due to the lack of new data (on paper or Internet) for the provinces / republics of the Russian Federation, the numbers of population divide are extrapolated to reach current figures from older data (1985, source: Encyclopaedia Britannica). A few educated guesswork's have thus been made in this aspect.

Table: Division of Population into different Regions

UNEP Regional Seas Country	Year	Total Population (thousands)	Population Region 1	Population Region 2	Population Region 3	Population Region 4	Assumptions
Costa Rica			Wider Caribbean 75%	North-East Pacific 25%			River basin divide
	1990	3049	2287	762			
	2000	4024	3018	1006			
Columbia			Wider Caribbean	North-East Pacific	South-East Pacific		River basin divide
	1990	34970	32225	2745	2745		Extrapolated from population in 2000
	2000	42322	39000	3322	3322		
Guatemala			Wider Caribbean 50%	North-East Pacific 50%			River basin divide
	1990	8749	4374	4374			
	2000	11385	5692	5692			
Honduras			Wider Caribbean 75%	North-East Pacific 25%			River basin divide
	1990	4879	3659	1220			
	2000	6485	4864	1621			
Mexico			Wider Caribbean 33%	North-East Pacific 67%			River basin divide
	1990	83226	27465	55761			
	2000	98881	32631	66250			
Nicaragua			Wider Caribbean 80%	North-East Pacific 20%			River basin divide
	1990	3827	3062	765			
	2000	5074	4059	1015			
Panama			Wider Caribbean 16%	North-East Pacific 84%	South-East Pacific 84%		River basin divide
	1990	2397	384	2013	2013		

	2000	2855	457	2398	2398		
USA			Wider Caribbean bordering states	Arctic Alaska state	South Pacific islands		Calculated from 5 states bordering the Caribbean sea
	1990	254076	45639	580			Extrapolated from population of 2000
	2000	278357	50000	635			
Australia			East Asian Seas 10%	South Pacific 90%			Division of states around coastlines since no river basin.
	1990	16888	1689	15199			Extrapolated from population of 2000
	2000	18886	1889	16999			
People's Republic of China			East Asian Seas 50%	North-West Pacific 50%			Sea/region overlap so total population divided into the two regional seas
	1990	1155306	577653	577653			
	2000	1277558	638779	638779			
Russian Federation			North-West Pacific	Baltic	Arctic	Black Sea	River basin divide
	1990	148291	9421	8939	18660	24910	Extrapolated from population of 2000
	2000	146934	9335	8857	18489	24682	
Norway			North-East Atlantic 50%	Arctic 50%			Sea/region overlap so total population divided into the two regional seas
	1990	4241	2121	2120			
	2000	4465	2233	2232			
Sweden			North-East Atlantic	Baltic	Arctic 0%		no coastline of Sweden in Arctic region but only signed agreement. River basin divide
	1990	8558	1931	6627	0		Extrapolated from population of 2000
	2000	8910	2010	6900	0		river basin divide
Denmark			North-East Atlantic 50%	Baltic 50%	Arctic (Greenland)		Greenland represents part of Denmark in Arctic Region. Baltic and NE Atlantic regions have overlap so total population divided equally in these.
	1990	5140	2570	2570			
	2000	5293	2646	2646	55000		
Finland			North-East Atlantic 0%	Baltic 100%	Arctic		coastline dependent. Finland has no coastline in NE Atlantic but only signed agreement.
	1990	4986	0	4986	15		Extrapolated from population of 2000
	2000	5176	0	5176	15		figures from river basins
Iceland			North-East	Arctic			Sea/region overlap so total population divided into the two

			Atlantic				regional seas
			50%	50%			
	1990	255	128	127			
	2000	281	141	140			
France			North-East Atlantic 67%	Mediterranean 33%	South Pacific islands	Wider Caribbean	(rough) River basin divide
	1990	56718	38001	18717		(French Guiana)	
	2000	59080	39584	19496			
Germany			North-East Atlantic (100% - Baltic region)	Baltic Region			River basin divide
	1990	79365	75214	4151			Extrapolated from population of 2000
	2000	82221	77921	4300			
Spain			North-East Atlantic 60%	Baltic Region 40%			River basin divide
	1990	39304	23582	15722			
	2000	39629	23777	15852			
Turkey			Black Sea	Mediterranean			River basin divide (3 rd river basin going to Persian Gulf was divided equally between these 2 regions)
	1990	56098	31831	24267			Extrapolated from population of 2000
	2000	66591	37785	28806			River basin divide
Saudi Arabia			Red Sea & Gulf of Aden 50%	ROPME Sea Region 50%			Sea/region overlap so total population divided into the two regional seas
	1990	16045	8023	8022			
	2000	21607	10804	10803			

Annex 2 : Base Data for Regional Analysis

UNEP Regional Seas Countries	Year	Total Population (thousands)	% total water supply coverage	% total sanitation coverage
Arctic Region (PAME)				
Russian Federation	1990	18660		
	2000	18489	99	
United States of America	1990	580	100	100
	2000	635	100	100
Canada	1990	27791	100	100
	2000	31146	100	100
Norway	1990	2120	100	
	2000	2232	100	
Sweden	1990	0		
	2000	0		
Denmark	1990			
	2000	55	100	
Finland	1990	15	100	100
	2000	15	100	100
Iceland	1990	127		
	2000	140		
Baltic Region (HELCOM)				
Denmark	1990	2570		
	2000	2646	100	
Estonia	1990	1572		
	2000	1396		
Finland	1990	4986	100	100
	2000	5176	100	100
Germany	1990	4151		
	2000	4300		
Latvia	1990	2684		
	2000	2357		
Lithuania	1990	3738		
	2000	3670		
Poland	1990	38119		
	2000	38766		
Russian Federation	1990	8939		
	2000	8857	99	
Sweden	1990	6627	100	100
	2000	6900	100	100
North East Atlantic (OSPAR)				
Belgium	1990	9951		
	2000	10162		
Denmark	1990	2570		
	2000	2646	100	
Finland	1990	0		
	2000	0		
France	1990	38001		

	2000	39584		
Germany	1990	75214		
	2000	77921		
Iceland	1990	128		
	2000	141		
Ireland	1990	3503		
	2000	3730		
The Netherlands	1990	14952	100	100
	2000	15786	100	100
Norway	1990	2121	100	
	2000	2233	100	
Portugal	1990	9869		
	2000	9874		
Spain	1990	23582		
	2000	23777		
Sweden	1990	1931	100	100
	2000	2010	100	100
United Kingdom of Great Britain	1990	57561	100	100
	2000	58830	100	100
Luxembourg	1990	381		
	2000	431		
Switzerland	1990	6834	100	100
	2000	7386	100	100
Northern Ireland	1990			
	2000			
Black Sea Region				
Bulgaria	1990	8718		
	2000	8225	100	100
Georgia	1990	5460		
	2000	4967		
Romania	1990	23207		
	2000	22326	58	53
Russian Federation	1990	24910		
	2000	24682	99	
Turkey	1990	31831	80	87
	2000	37785	83	91
Ukraine	1990	51891		
	2000	50456		
East Asian Seas				
Australia	1990	1689	100	100
	2000	1889	100	100
Cambodia	1990	8652		
	2000	11168	30	18
People's Republic of China	1990	577653	71	29
	2000	638779	75	38
Indonesia	1990	182812	69	54
	2000	212108	76	66
Malaysia	1990	17845		
	2000	22244		
Philippines	1990	60678	87	74
	2000	75967	87	83
Republic of Korea	1990	20461		
	2000	24039	100	99

Singapore	1990	3016	100	100
	2000	3567	100	100
Thailand	1990	55595	71	86
	2000	61399	80	96
Vietnam	1990	66689	48	73
	2000	79832	56	73
East African Region				
Kenya	1990	23552	40	84
	2000	30080	49	86
United Republic of Tanzania	1990	25470	50	88
	2000	33517	54	90
Mozambique	1990	14198		
	2000	19681	60	43
Mediterranean Region				
Albania	1990	3290		
	2000	3114		
Algeria	1990	24936		
	2000	31471	94	73
Bosnia and Herzegovina	1990	4308		
	2000	3972		
Croatia	1990	4517		
	2000	4473		
Cyprus	1990	681	100	100
	2000	786	100	100
Egypt	1990	56333	94	87
	2000	68469	95	94
France	1990	18717		
	2000	19496		
Greece	1990	10220		
	2000	10645		
Israel	1990	4660		
	2000	6217		
Italy	1990	57024		
	2000	57298		
Lebanon	1990	2555		
	2000	3282	100	56
Libya (Libyan Arab Jamahiriya)	1990	4416	71	97
	2000	5604	72	97
Malta	1990	354	100	100
	2000	389	100	100
Monaco	1990	30	100	100
	2000	34	100	100
Morocco	1990	23932	75	62
	2000	28350	82	75
Slovenia	1990	1918	100	
	2000	1986	100	
Spain	1990	15722		
	2000	15852		
Syria (Syrian Arab Republic)	1990	12386		
	2000	16125	80	90
Tunisia	1990	8156	80	76
	2000	9586		
Turkey	1990	24267	80	87

	2000	28806	83	91
North East Pacific				
Columbia	1990	2745	87	82
	2000	3322	91	85
Costa Rica	1990	762		
	2000	1006	98	96
Guatemala	1990	4374	78	77
	2000	5692	92	85
Honduras	1990	1220	84	
	2000	1621	90	77
Mexico	1990	55761	83	69
	2000	66250	86	73
Nicaragua	1990	765	70	76
	2000	1015	79	84
Panama	1990	2013		
	2000	2398	87	94
El Salvador	1990			
	2000			
North West Pacific (NOWPAP)				
People's Republic of China	1990	577653	71	29
	2000	638779	75	38
Russian Federation	1990	9421		
	2000	9335	99	
Democratic Republic of Korea	1990	20461		
	2000	24039	100	99
Republic of Korea	1990	42870		
	2000	46844	92	63
Japan	1990	123537		
	2000	126714		
Red Sea and Gulf of Aden				
Jordan	1990	4619	97	98
	2000	6669	96	99
Saudi Arabia	1990	8023		
	2000	10804	95	100
Sudan	1990	24062	67	58
	2000	29490	75	62
Yemen	1990	11590	66	39
	2000	18112	69	45
Djibouti	1990	517		
	2000	637	100	91
Somalia	1990	7773		
	2000	10097		
ROPME Sea Region				
Bahrain	1990	490		
	2000	617		
Iraq	1990	18078		
	2000	23115	85	79
Islamic Republic of Iran	1990	56309	86	81
	2000	67702	95	81
Kuwait	1990	2143		

	2000	1971		
Oman	1990	1785	37	84
	2000	2542	39	92
Qatar	1990	485		
	2000	599		
Saudi Arabia	1990	8022		
	2000	10803	95	100
United Arab Emirates	1990	1921		
	2000	2441		
South Asian Seas				
Bangladesh	1990	109466	91	37
	2000	129155	97	53
India	1990	850785	78	21
	2000	1013662	88	31
Maldives	1990	216		
	2000	286	100	56
Pakistan	1990	119155	84	34
	2000	156483	88	61
Sri Lanka	1990	17046	66	82
	2000	18827	83	83
South Pacific Region				
Australia	1990	15199	100	100
	2000	16999	100	100
Cook Islands	1990	19	100	100
	2000	20	100	100
Federated States of Micronesia	1990	97		
	2000	119		
Fiji	1990	726		
	2000	817	47	43
French Polynesia (France)	1990	196		
	2000	235	100	98
New Caledonia (France)	1990	167		
	2000	214		
Wallis and Futuna Islands (France)	1990	14		
	2000	15	100	80
Kiribati	1990	72		
	2000	84	47	48
Republic of the Marshall Islands	1990	46		
	2000	64		
Nauru	1990	10		
	2000	12		
New Zealand	1990	3361		
	2000	3862		
Tokelau (New Zealand)	1990	2		
	2000	2	48	
Niue	1990	3	100	100
	2000	2	100	100
Palua	1990	16		
	2000	19	79	100
Papua New Guinea	1990	3839	42	82
	2000	4807	42	82
Solomon Islands	1990	321		
	2000	443	71	34

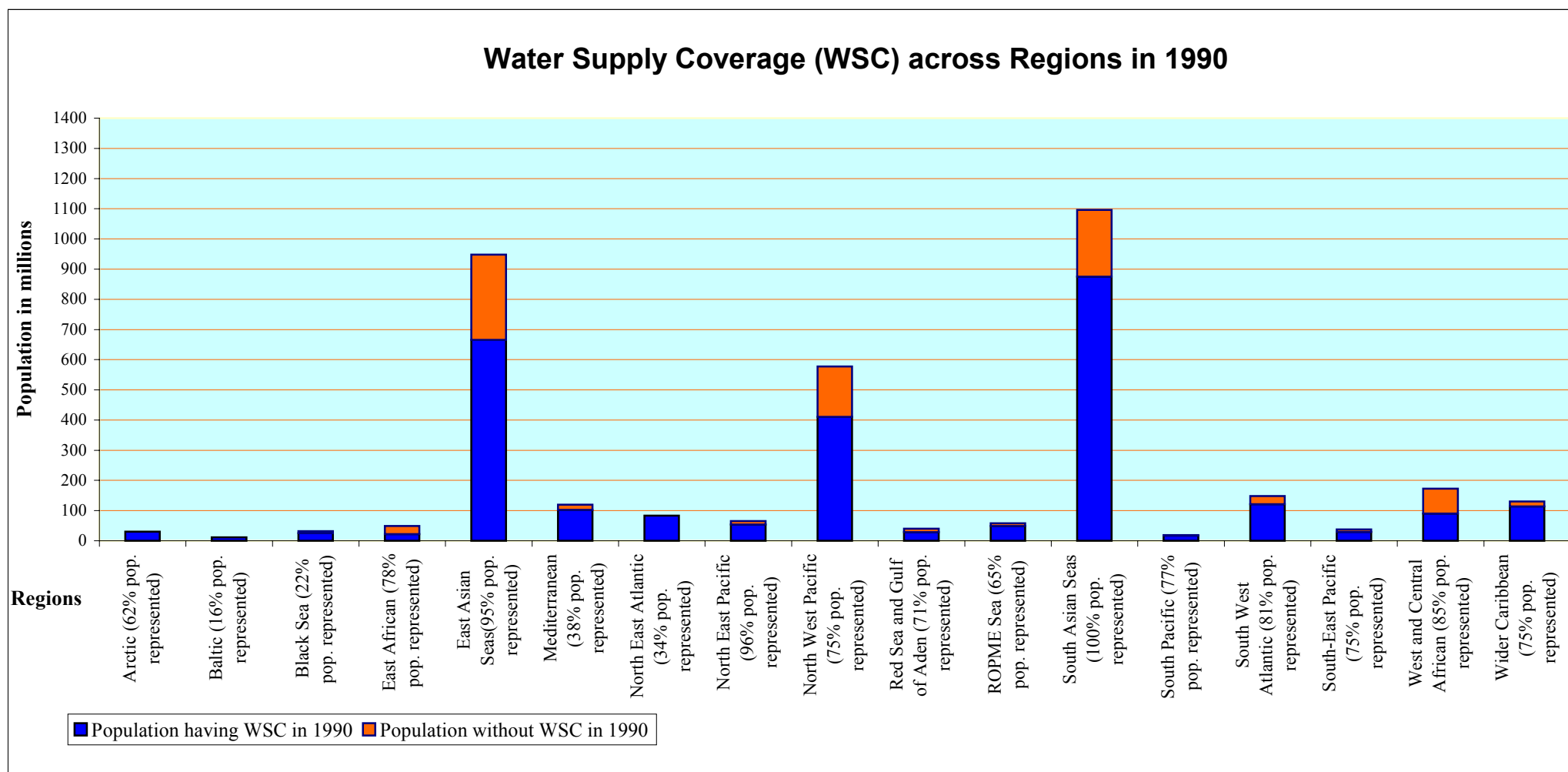
Tonga	1990	96		
	2000	98	100	
Tuvalu	1990	9		
	2000	12	100	
Pitcairn (United Kingdom)	1990	0		
	2000	0		
American Samoa (USA)	1990	46	100	
	2000	68	100	
Guam(USA)	1990	134		
	2000	168		
Hawaii (USA)	1990			
	2000	1225 *	100	100
Northern Mariana Islands	1990	44		
	2000	78		
Vanuatu	1990	149		
	2000	190	88	100
Western Samoa	1990	160		
	2000	180	99	99
* source: Britanica Encyclopedia				
South-East Pacific Region				
Columbia	1990	2745	87	82
	2000	3322	91	85
Chile	1990	13099	90	97
	2000	15212	94	97
Ecuador	1990	10264		
	2000	12646	71	59
Panama	1990	2013		
	2000	2398	87	94
Peru	1990	21570	72	64
	2000	25662	77	76
South West Atlantic Region				
Brazil	1990	147940	82	72
	2000	170115	87	77
Uruguay	1990	3106		
	2000	3337	98	95
Argentina	1990	32527		
	2000	37032	79	85
West and Central African Region				
Mauritania	1990	2026	37	30
	2000	2669	37	30
Senegal	1990	7327	72	57
	2000	9481	78	70
Gambia	1990	921		
	2000	1306	62	37
Guinea Bissau	1990	973		
	2000	1213	49	47
Guinea	1990	5755	45	55
	2000	7430	48	58
Sierra Leone	1990	3994		
	2000	4855	28	28
Liberia	1990	2579		
	2000	3154		
Cote D'ivoire	1990	11635	65	49

	2000	14786	77	
Ghana	1990	15128	56	60
	2000	20213	64	63
Togo	1990	3512	51	37
	2000	4629	54	34
Benine	1990	4660		20
	2000	6097	63	23
Nigeria	1990	87030	49	60
	2000	111506	57	63
Cameroon	1990	11472	52	87
	2000	15085	62	92
Equatorial Guinea	1990	352		
	2000	452	43	53
Gabon	1990	935		
	2000	1226	70	21
Congo	1990	2219		
	2000	2944	51	
Angola	1990	9231		
	2000	12878	38	44
Burkina Faso	1990	9061	53	24
	2000	11937		29
Central African Republic	1990	2943	59	30
	2000	3615	60	31
Chad	1990	5745		18
	2000	7651	27	29
Mali	1990	8843	55	70
	2000	11234	65	69
Niger	1990	7732	53	15
	2000	10730	59	20
Cabinda	1990			
	2000			
Wider Caribbean Region				
Anguilla	1990	8		
	2000	8	60	99
Antigua & Barbuda	1990	64		
	2000	68	91	96
Aruba	1990	-		
	2000	-	100	
Bahamas	1990	255		
	2000	306	96	93
Belize	1990	187		
	2000	241	76	42
British Virgin Islands	1990	16		
	2000	21	98	100
Cayman Islands	1990	26		
	2000	38		
Columbia	1990	32225	87	82
	2000	39000	91	85
Costa Rica	1990	2287		
	2000	3018	98	96
Cuba	1990	10627		
	2000	11201	95	95
Dominica	1990	71		
	2000	70	97	
Dominican Republic	1990	7110	78	60

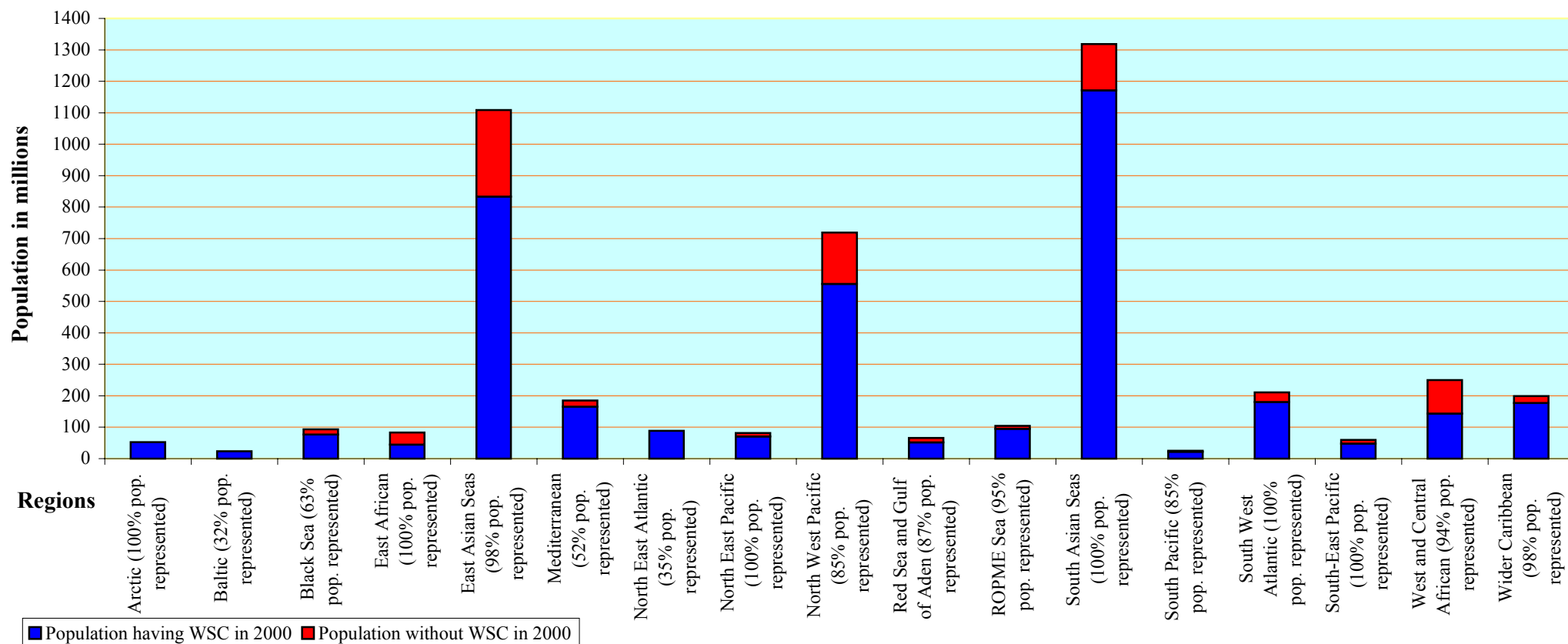
	2000	8495	79	71
French Guiana (part of France)	1990	117		
	2000	182	84	79
Grenada	1990	91		
	2000	94	94	97
Guadeloupe	1990	391		
	2000	455	94	61
Guatemala	1990	4374	78	77
	2000	5692	92	85
Guyana	1990	795		
	2000	861	94	87
Haiti	1990	6916	46	25
	2000	8222	46	28
Honduras	1990	3659	84	
	2000	4864	90	77
Jamaica	1990	2369		
	2000	2583	71	84
Martinique	1990	360		
	2000	395		
Mexico	1990	27465	83	69
	2000	32631	86	73
Montserrat	1990	11	100	100
	2000	11	100	100
Netherlands Antilles	1990	187		
	2000	217		
Nicaragua	1990	3062	70	76
	2000	4059	79	84
Panama	1990	384		
	2000	457	87	94
Peurto Rico	1990	3528		
	2000	3869		
St. Kitts and Nevis	1990	41		
	2000	38	98	96
St. Lucia	1990	134		
	2000	154	98	
St. Vincent and the Grenadines	1990	106		
	2000	114	93	96
Suriname	1990	402		
	2000	418	95	83
Trinidad and Tobago	1990	1216		
	2000	1295	86	88
Turks and Caicos Islands	1990	12		
	2000	17	100	96
United States of America	1990	45639	100	100
	2000	50000	100	100
U.S. Virgin Islands	1990	102		
	2000	93		
Venezuela	1990	19502		
	2000	24170	84	74

Annex 3

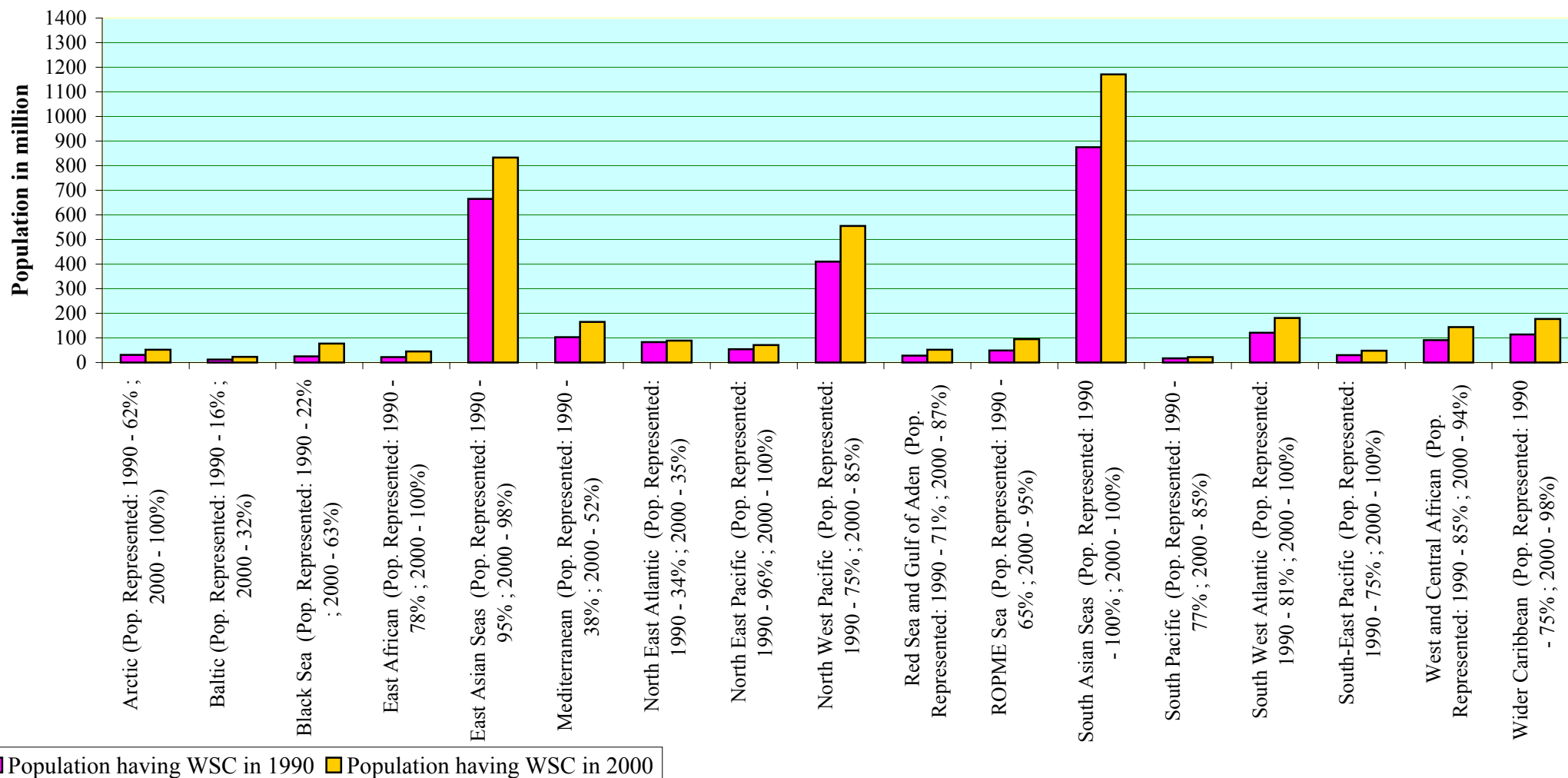
Water Supply Coverage Across Regions – some more graphs

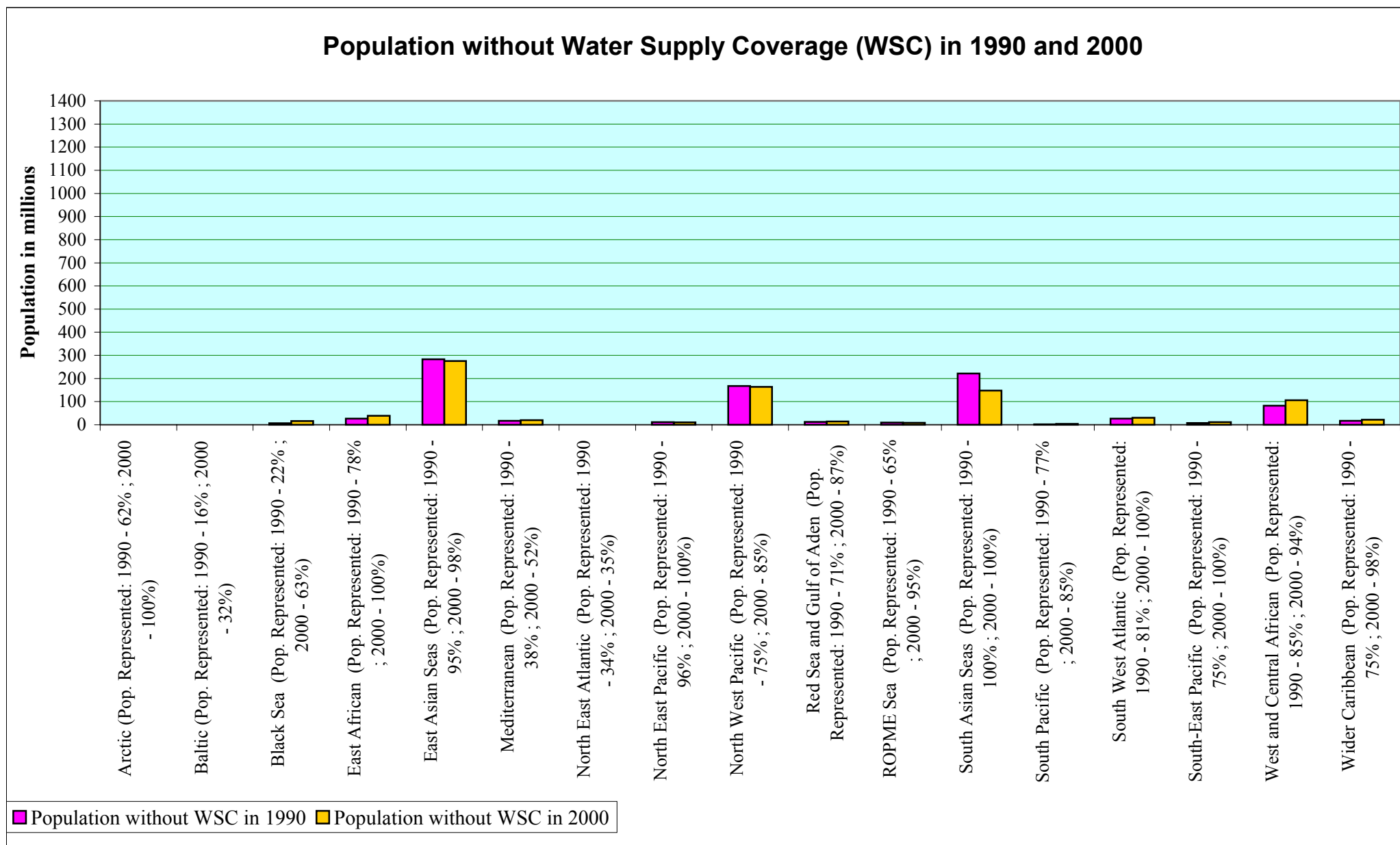


Water Supply Coverage (WSC) across Regions in 2000

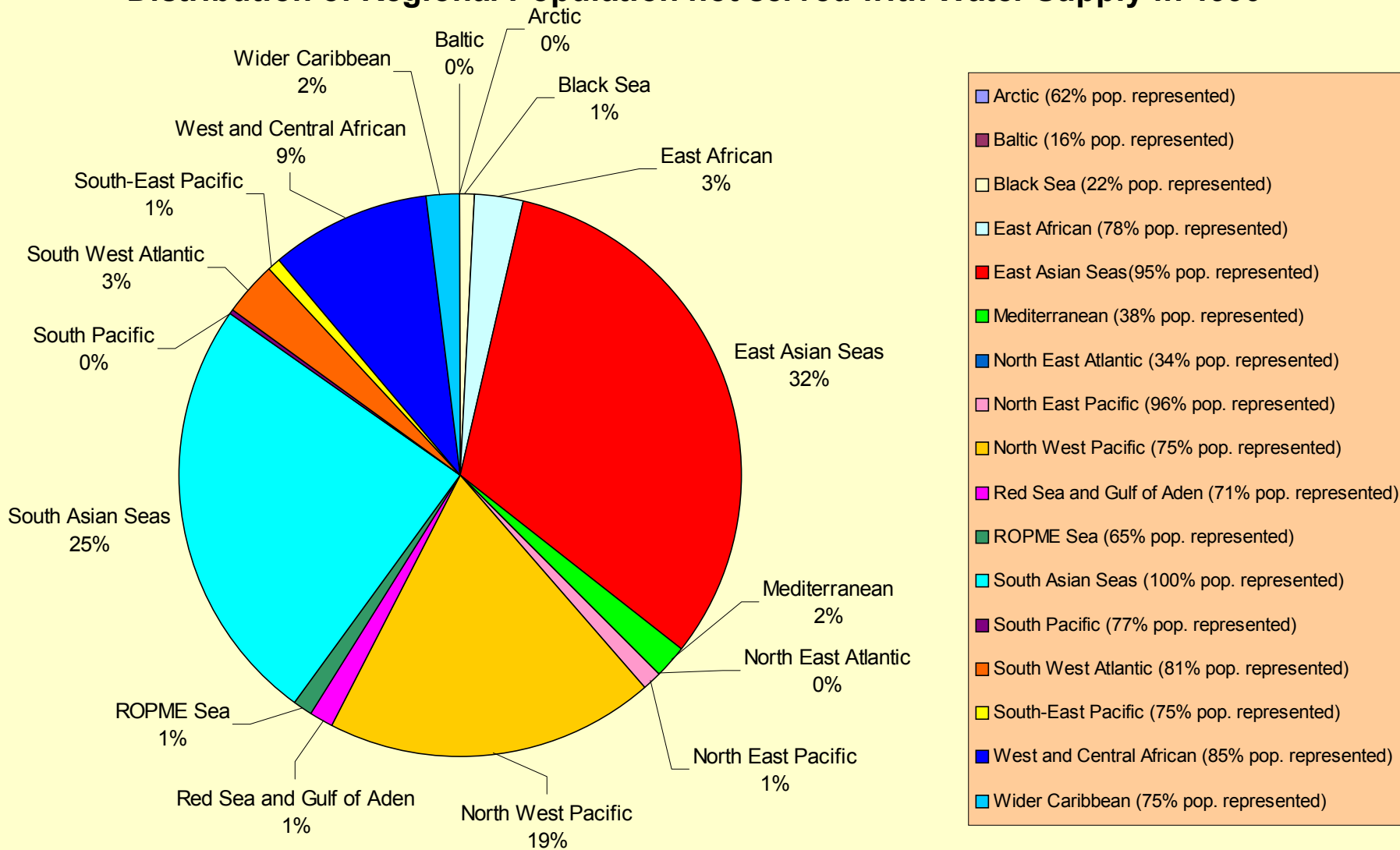


Population having Water Supply Coverage (WSC) in 1990 and 2000





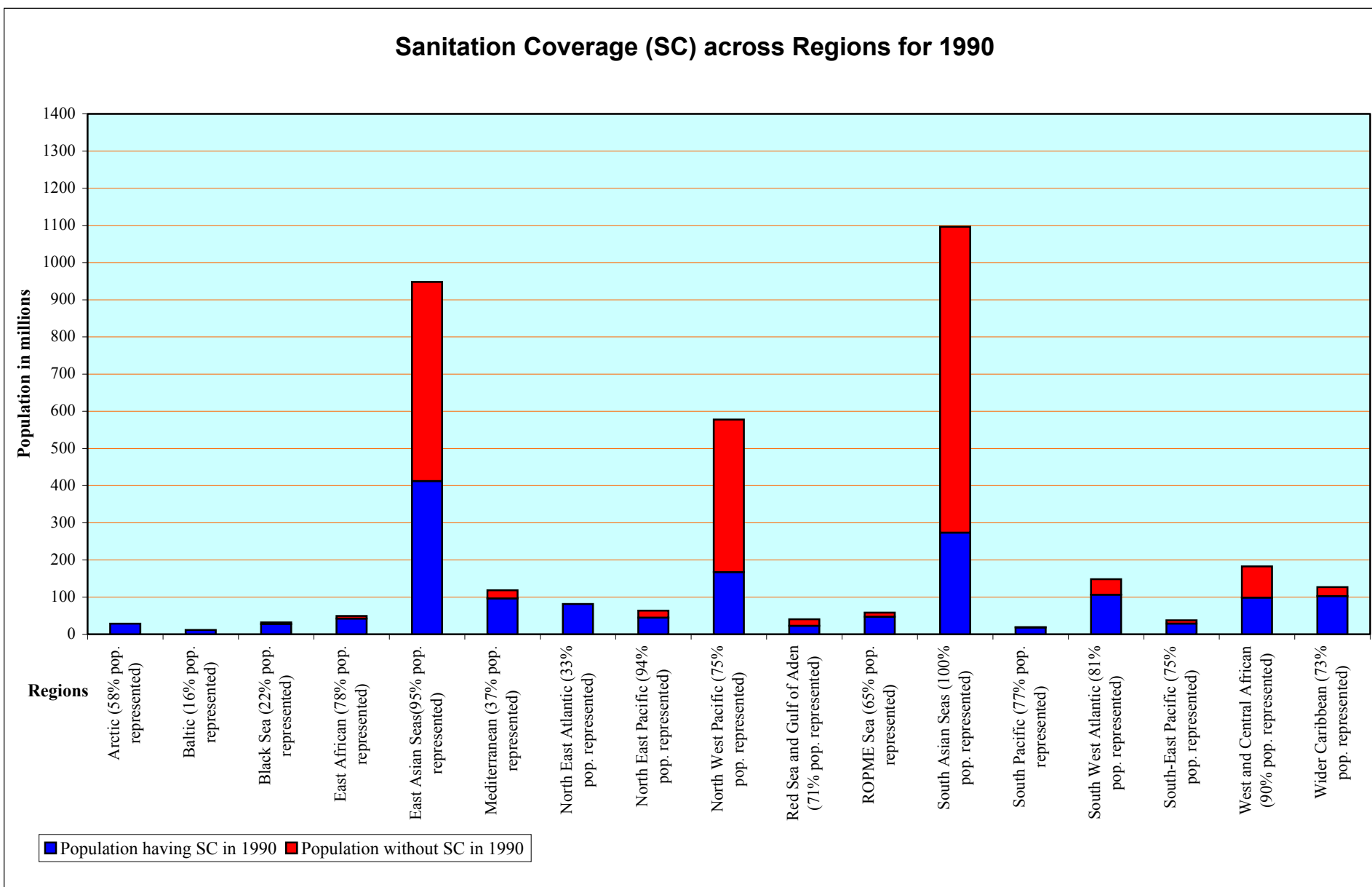
Distribution of Regional Population not served with Water Supply in 1990



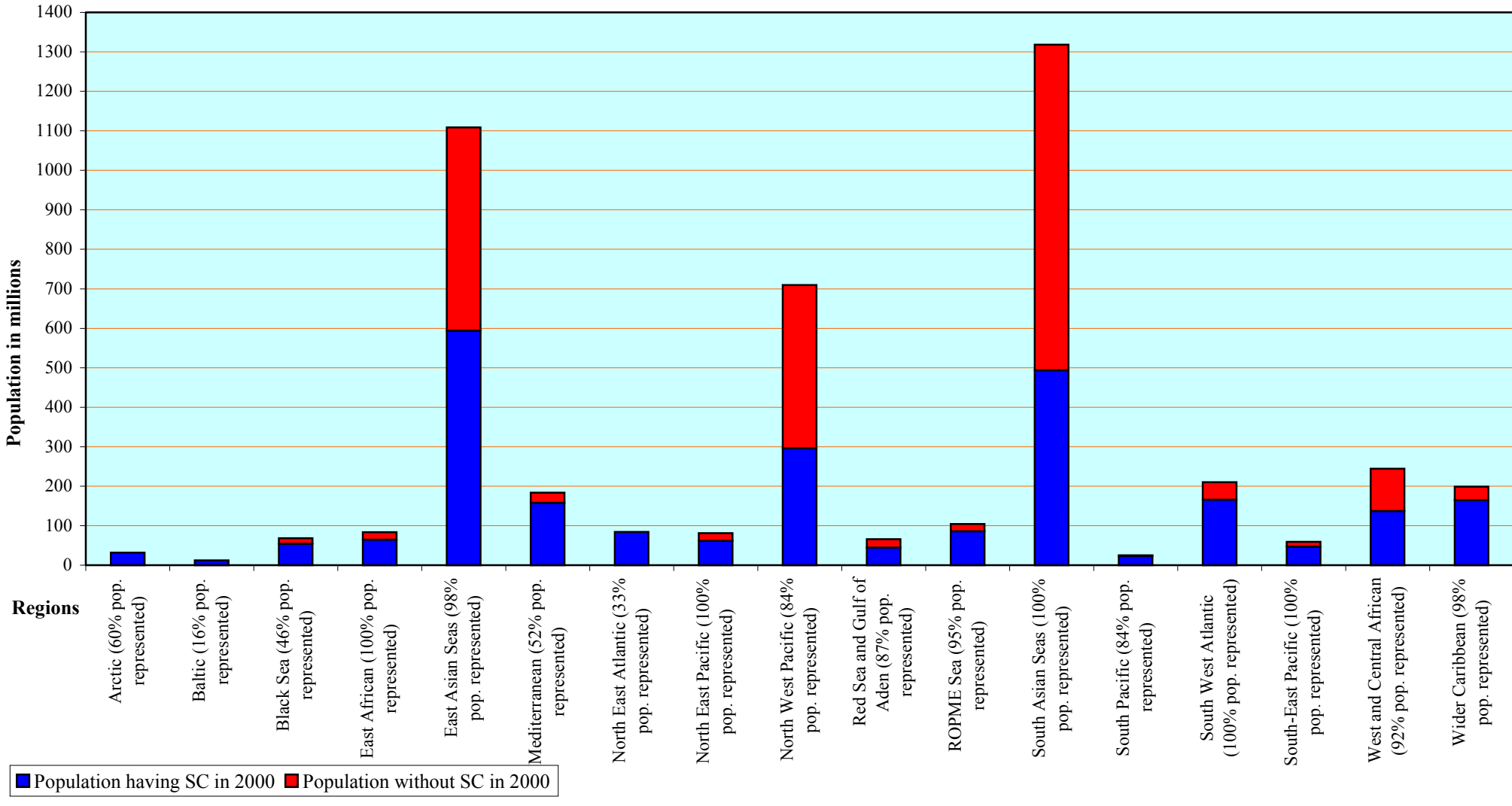
Total unserved: 890 million

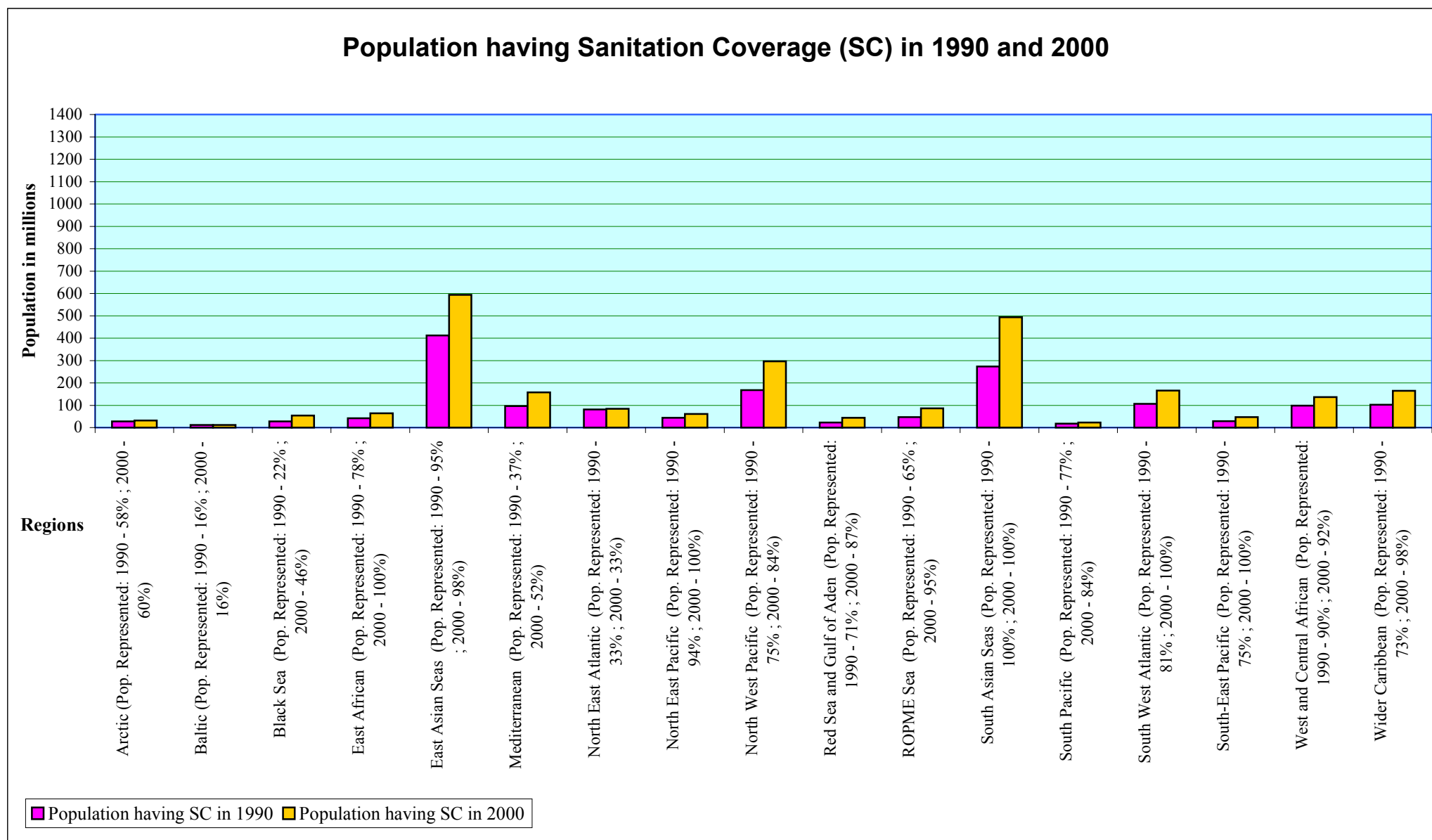
Annex 3

Sanitation Coverage Across Regions – more graphs

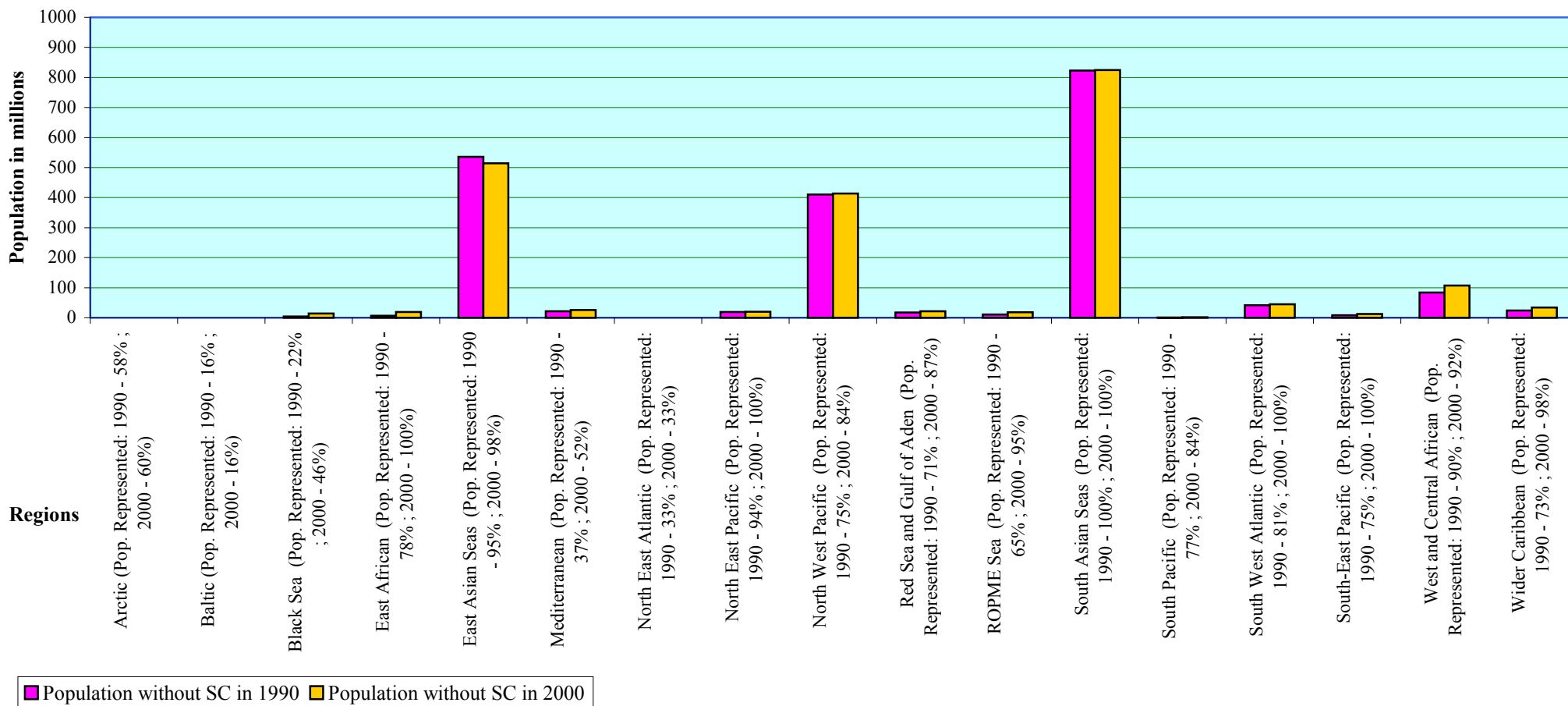


Sanitation Coverage (SC) across Regions for 2000

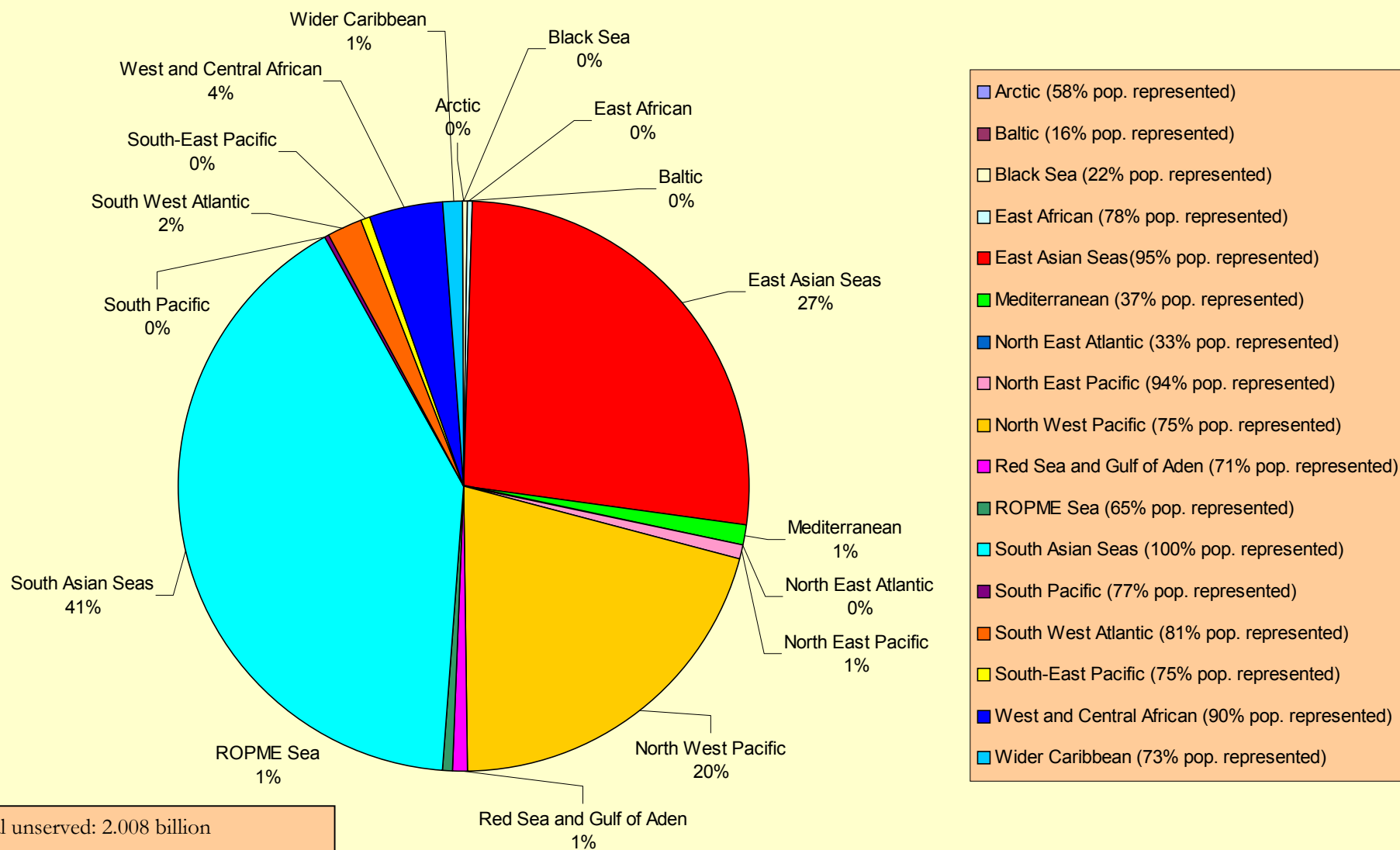




Population without Sanitation Coverage (SC) in 1990 and 2000



Distribution of Regional Population not served with Sanitation in 1990



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UNEP/GPA Coordination Office
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