

Urban development and uncontrolled discharge in Apia, Samoa

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Background - growing pacific towns and cities

The Pacific region comprises great diversity and complexity in the three geographic divisions, namely, Melanesia, Micronesia and Polynesia. While the scattered islands in the Pacific region contrast in their socio-economic settings, geography, culture and resource base, high rates of urbanisation and an absence of urban management practices, skills and commitment to comprehensively tackle urban problems are commonplace (Jones, Taulealo and Kolhase, 2001; Jones, 1996). The growing need for effective urban environmental management as a result of urbanisation will become one of the most significant development issues for Pacific Island countries in the 21st century as Governments and communities are increasingly unable to keep pace with the rapidity of urban growth. Approximately 40% of the populations in Pacific Island countries are now living in urban areas, a trend that continues to rise. Of increasing concern is the fact that urban growth rates continue to outstrip national growth rates in most Pacific Island countries (see Figure 1). Education, lifestyle choices, increasing centralisation of Government sector bureaucracy, moderate industrialisation and private sector development have all fuelled the movement of population to Pacific Island cities and towns, further reflecting the permanency of the rural urban transformation (World Bank 2000).

Figure 1: Pacific island populations 2001 – selected countriesⁱⁱ

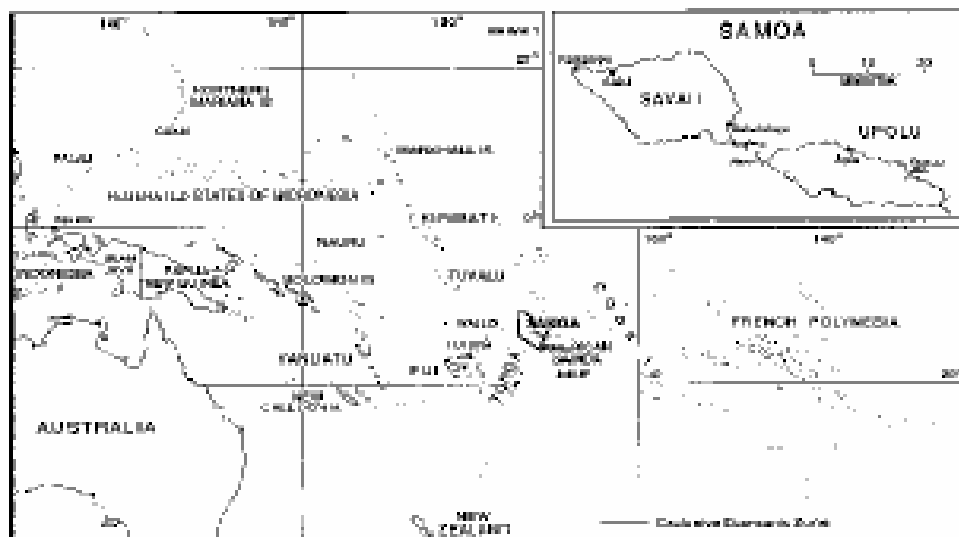
Pacific Island country or territory	Last census	Population as counted at the last census	Urban population (%)	Annual intercensal urban growth rate (%)	Annual intercensal national growth rate (%)
Fiji Islands	1996	775,077	46	2.6	1.6
New Caledonia	1996	196,836	71	2.7	1.8
Papua New Guinea	1990	3,607,954	15	4.1	2.3
Vanuatu	1999	193,219	21	4.3	3.0
Solomon Islands	1986	447,900	13	6.2	3.4
Guam	1990	133,152	38	1.9	1.0
Kiribati	1995	77,658	37	2.2	2.5
Marshall Islands	1999	50,840	65	1.8	2.0
Palau	1995	17,225	71	2.9	2.2
American Samoa	1990	46,773	48	4.6	2.9
Cook Islands	1996	19,103	59	0.6	-0.5
French Polynesia	1996	219,521	53	1.4	1.6
Niue	1997	2,088	35	1.2	-3.1
Samoa	2001i	176,848	35	2.0	2.3
Tonga	1996	97,784	32	0.8	0.6

The problems of urbanisation and lack of commitment to effective urban planning and management solutions are evident in many ways in all Pacific island towns and cities. Urban population has grown enormously, squatter settlements are increasing and housing densities

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continue to rise, domestic and industrial waste is increasingly visible as collection systems (if they exist) try to match demand, uncontrolled wastewater discharge and environmental degradation, crime and family breakdowns including youth suicide are now commonplace, urban land cases continue to escalate before the courts, and generally, access to basic water, sanitation and road infrastructure cannot keep up with the demand for services (Connell and Lea 1998; Jones 1995; World Bank 2000).

Figure 2: Location Map – Samoa in the Pacific



Purpose of the paper

In the context of the need to improve urban management including environmental monitoring as a means to tackle rising development problems associated with the process of urbanisation in the Pacific, the purpose of this paper is to

- (i) overview urban development trends in Apia and why they have occurred how, and
- (ii) discuss the implications of uncontrolled wastewater discharge into the urban environment.

The themes of the presentation are that:

- (i) uncontrolled urban development and poor planning leads to uncontrolled discharge of waste and leads to environmental degradation of the biophysical and social and economic environments, and
- (ii) better planning of development and land use including environmental monitoring will mitigate the uncontrolled discharge of waste leading to an improved urban quality of life in Apia.

What do we mean by uncontrolled discharge of waste?

Uncontrolled discharge refers to the discharge of waste that cannot be assimilated into the environment. By assimilated, we mean having an environment that can sustainably absorb waste. By waste, we mean material both liquid, solid and gas - for example, waste from toilets, washing water, oils and chemicals, solid waste from packaging, and exhaust fumes - that is discarded as a result of various land use and development activities. Waste can therefore be from households, villages, industry and commercial operations. A receiving

environment, biophysical or otherwise, receives waste. In Apia, the receiving environments of Apia Harbor and Vaiusu Bay receive water from catchments.

Understanding the contextual setting for urban growth and development in Apia

Apia is the capital city of Samoa, the largest of the Polynesian countries in the Pacific. Samoa comprises two main islands, Upolu and Savaii, where the bulk of the population resides, as well as seven small islands (see Figure 2). The total land area is 2,828 km² with an exclusive economic zone of 98,500 km², the smallest in the Pacific. A rapidly growing urban Apia on Upolu Island clearly dominates the settlement pattern in Samoa supported by over 350 smaller rural villages. This includes the small Government designated town growth area focused on Salelologa in southeastern Savaii. The strong development pattern that has emerged is one where both rural and urban villages are generally located close to the coast along the fringing plain. Approximately 98 percent of the population live within this narrow coastal plain and in or around greater Apia with produce gardens and agricultural lands located inland (ADB 2000).

Samoa's population has nearly doubled in the last 40 years, from 97,000 persons in 1956 to 176,848 persons in 2001 (Government of Samoa 2002a). The natural rate of population increase is estimated at approximately 2.3% per annum, a rate that is associated with the relatively moderate population growth. Key features of Samoa's demographics over the last two decades have been sustained out migration primarily to New Zealand, Australia and the United States, a net population growth rate of just under 0.9 % per annum and the dominant influence of Apia and North West Upolu in attracting population from other regions within Savaii and Upolu. On an island share basis, Upolu and Savaii accounted for 76% and 34% of the population share respectively in 2002, noting the population share for Upolu has continued to rise throughout the 1990s.

The rate of urban growth in Apia and the pattern of regional development in Upolu is to a large degree, a reflection of the manner in which the urban boundary of Apia is defined. Like many towns and cities in the Pacific, the issue of defining the urban area of Apia is problematic given:

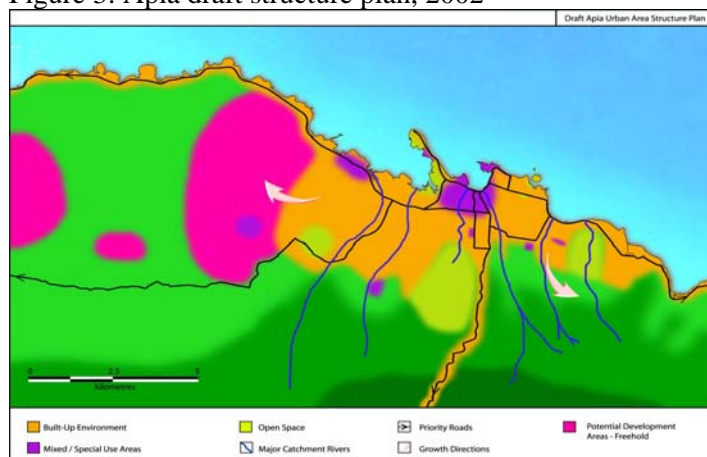
- the coverage of 'urban' type services - water, electricity, transport and waste disposal - is widespread in the Census-defined Apia urban area, North West Upolu and Upolu.
- population is growing both within and outside the narrow Census-defined Apia urban area; and
- the coastal road corridor between the small Census-defined Apia urban area and Faleolo Airport in North West Upolu contains contiguous village development where one village abuts the other, thus complicating defining a precise urban boundary for Apia.

The 2001 Census indicates the population share for Apia and North West Upolu has risen from 46% in 1991 to 52% in 2001. The narrowly defined Apia urban area as defined by the 2001 Census had marginally increased from 35,489 in 1991 to 38,836 persons in 2002. However, if the two census districts to the east and west of the core urban area are added to reflect the contiguous Apia urban area, then the population of the existing built up urban area of Apia is 60, 872 persons or approximately 35% of the 2001 national population.

The implication of the above is that the population of Apia and its adjoining areas are rising and its growth corridor on the undulating coastal plains of North West Upolu will be the area in which this growth is accommodated (see Figure 3). Estimates of Apia's urban share of national growth for planning purposes should be seen in the context of to what extent the

growing North West Upolu corridor including Apia is effectively defined as urban in 'character'. The clear trend is that population growth will lead to continued pressure on the resources of Apia as well as continued economic, social and environmental change within the wider regions of Upolu and Savaii. These changes will continue to lead to increasing demands for land, infrastructure and services, housing, changes in village size, home ownership and village and family social organizations and patterns, as is currently being experienced.

Figure 3: Apia draft structure plan, 2002



The villages are growing rapidly in the urban hinterland, with many having expanded to the extent their village boundaries blur the 'urban rural' divide. As a result, villages now form one linear strip of urban development between Apia and the international airport at Faleolo some 30 kilometres to the northwest of Apia. Traditional housing and plantation lands are being supplemented by modern housing and smaller gardens especially on customary lands, where open walled housing (fale) and large areas for gardening characterize households that support their livelihood based on a contribution from the 'subsistence' sector

There is generally a high coverage of service levels in the provision of water supply - 94% of households in the Apia urban area had piped reticulated water (2001 Census) - as well as main roads in urban Apia, despite increasing concerns of road maintenance. There is also a solid waste household collection service for not only Apia but for both main islands. Significantly, sanitation in Apia is by septic tank, pit latrine or a handful of package treatment plants for commercial buildings. There is no reticulated sewerage system for the urban area of Apia or elsewhere in Samoa. This is despite the Apia central business area (CBA) and adjoining customary villages being built on the floodplain, having a high water table and being subject to annual wet season flooding.

Land tenure

Land tenure is the most dominant factor in shaping the form and distribution of settlement and land use in the greater Apia urban area specifically and Samoa generally. Understanding the pattern and history of land tenure in the wider Apia area goes along way to explaining the current fragmented patterns of development and difficulties faced in implementing a more formal planning and urban management system. Land tenure and ownership systems introduced and legislated from the mid 19th century and onwards, rather than an integrated planning system, have been the primary influence in Apia's development.

In Apia, alienation of customary lands from traditional owners to freehold and Government lands began in the 1850's as European settlers including missionaries and traders

sought land for housing, churches and warehouses around Apia harbour as well as for agriculture. The largest areas of alienated lands were on the gentle plains and foot slopes on lands above Apia harbour as well as in North West Upolu, the latter lands suitable for development as coconut plantations. In 1893, Britain, Germany and the United States setup a Land Commission under the Berlin Act of 1889 to assess land claims by non-Samoans (Ward and Ashcroft 1998). As a result, freehold as well as Government lands were registered as being alienated, with further alienation except for Government purposes finally prohibited by law under the Samoa Constitution in 1962. Alienation of new lands to freehold has not occurred since this time, notwithstanding that disputes on the status of existing alienated lands continue to be heard by the Lands and Titles Court of Samoa.

There are significant differences between customary and freehold lands that have been the determining factor in **where** and **how** development has occurred in Apia and its hinterland. Customary land can be developed by its customary owners in accordance with the authority of the family matai or chief and any conditions set by the village council or fono. Customary land cannot be subdivided or sold for freehold development - its development potential is severely limited. Conversely, freehold land - representing approximately 70% of the land tenure pattern in Apia and the wider urban fringe - can be sold, subdivided and leased while customary land can only be leased.

Given the above, the urban morphology of Apia constitutes a loose assembly of areas of freehold properties interspersed with villages on customary lands and with no independent local government administration. As a result of a pattern of settlement where development of freehold land 'leap-frogs' customary land, the emerging urban growth trend in Apia is clearly one where:

- the dispersed nature of development means high servicing costs and a major lag in service provision, as is prevalent in the Government's own freehold subdivisions;
- there is an absence of an effective sewerage system for high populated areas within Apia, especially the flood prone Apia central business area where septic tanks empty into storm water drains or directly into the harbour;
- there is a fragmented distribution of freehold land for 'private' development;
- there is a fragmented distribution of freehold land for 'private' development;
- environmental degradation including waste discharge is increasing, being clearly visible in drains and waterways as development encroaches into developable lands in the lower catchments areas;
- an extensive network of water and electricity services in the rural areas which blur a clear division between the Apia urban and rural areas;
- minimum cost recovery and user pay charges for services. User pays is still a foreign concept for many especially those living on customary lands, noting water rates have only been introduced in 2001.

These issues and concerns cut across social structures, community needs and demands, land and land use, services and infrastructure provision, all within an urban area that is the commercial and industrial centre of Samoa. In this context, the importance of urban Apia to the economy cannot be understated with the urban area generating 70% of the national income (UMPT 2001). Increasing environmental degradation combined with population growth, economic development, increasing stress on environmental resources, declining infrastructure levels and concern over community and village well being, are all overlapping themes in the development of Apia. These all contributed to Government establishing the Planning and Urban Management Agency (PUMA) in 2002. The functions of PUMA are:

Function 1: Generating Urban Policies and Plans

- Setting goals for urban improvement
- Developing plans and policies

Function 2: Regulating

- Regulating development

Function 3: Managing urban services

- Mobilising resources for urban improvement
- Implementing improvements through annual operating plans
- Achieving desired urban outcomes, monitor and review

Uncontrolled waste discharge and implications

Factors that are significant to our understanding of uncontrolled waste discharges in an urban development and their effects are:

- the urban environment compared to a rural environment
- the types of waste generated and the effects on the environment
- our knowledge of the plants and animals that live naturally in soils and water and keep these environments healthy.

Typically a traditional, rural environment has a low population density, much open space generally enriched by foliage, and few machines and modern appliances. In contrast, a modern, urban environment has a medium to high population density, little open space with foliage, much land cover with buildings and artificial pavements, and many machines and modern appliances. The consequences of this urban environment are twofold: discharges from people and machines are more concentrated and the natural environment available to assimilate the discharges is limited. For example, a wastewater discharge in a rural environment can be readily absorbed and renovated by the soils and the micro-organisms within them and the plants. A wastewater discharge in an urban environment, if it is uncontrolled, is likely not to have open, natural soils and plants for absorption and renovation.

Waste is composed of materials that can be assimilated by a natural environment where the concentration of the waste is not too high. However, where the concentration is high, the waste load puts stress on the natural systems in the environment and this stress can damage or destroy the natural systems of plants and animals. Examples of waste material and their effects on a natural environment in urban Apia are.

- oils and grease that float on water - for example, in parts of the Mulavai or Fugalei Streams - and prevent oxygen diffusing into the water to keep the plants and animals that live there healthy
- food scraps, human excrement, and litter that settle, covering soil and the base of drains and streams and preventing sunlight reaching the plants and animals that live there naturally
- nutrients, such as nitrogen and phosphorus, that are essential for the growth of plants and animals but which, in high concentrations, can cause excessive growth and dominance by some species and an upset to the natural balance
- pathogens (micro-organisms that cause disease in humans) from human excrement and washing water
- toxins, such as mineral oils from cars and other machines, chemicals from paints, cleaners and herbicides, which kill plants and animals. Tests indicate hydrocarbons are high in parts of Vaiusu Bay including in close proximity to the oil storage tanks on Mulinu'u Peninsula.

The drains and streams in and around Apia receive discharges from septic tanks and laundries, contaminated run-off from markets, roads and vehicle servicing yards, and litter. The contaminants in this waste, as described above, cause the water to become congested with unnatural plant growth or anaerobic (i.e. without oxygen), black and smelly. The contaminants also result in the soils becoming covered and clogged with material and this in turn kills the plants and animals that live there. Similarly, the open areas in Apia that are covered with litter, oils and grease from machines, and other waste material suffer because the small organisms that live in the soils and keep it healthy die.

The plants and animals that live in water and soils naturally have an ability to assimilate small quantities of waste, thus keeping the environment healthy. When they die, the environment loses essential life-generating systems and the results can include bad smells, unsightliness, public health risks, and loss of food sources.

The proposed method of creating a healthy urban environment is to:

- recognise the need for change and this means community awareness of the issues
- plan systems that will result in improvement and that are affordable; these systems will include rules and standards
- build the systems that will bring about change and these will involve institutions, private enterprise and individuals
- operate and maintain the systems so that they remain efficient
- monitor the systems and the environment and continually reassess and development the systems so that they remain effective in creating a healthy urban environment for all to enjoy and prosper in.

Conclusion

Conclusions of this paper are that:

- Apia is growing rapidly with more people, buildings, traffic - PUMA therefore has many challenges
- the urban environment is deteriorating and this reduces the quality of life
- planning and appropriate actions start in everyone's backyard
- the cumulative impact of no action is a worsening environment
- a shared responsibility in addressing the uncontrolled discharge of waste is key to a sustainable urban environment
- community education and awareness must continue so as to modify peoples behaviour and attitudes to the environmental protection in fragile small island systems
- the cumulative impact of positive actions will be a healthy urban environment.

References

- Asian Development Bank (ADB) 2000 *Samoa 2000: Building on Recent Reforms*. Pacific Studies Series. Manila, Philippines.
- Connell J and Lea J 1998 *Urban management in Micronesia: learning from Kiribati?* Development Bulletin, Number 45, Australian National University, Canberra, Australia
- Government of Samoa 1999 *Agricultural Census* Ministry of Agriculture, Forestry, Fisheries, and Meteorology Apia Samoa
- Government of Samoa 2002 *Strategy for the Development of Samoa, 2002-2004 - Opportunities for All*. Treasury Department, Economic Policy and Planning Division, Apia, Samoa.

- Jones 1995 *Responding to Urban Change: Observations on urbanisation, urban planning and urban management in the Pacific*. Ministry of Home Affairs and Rural Development, Tarawa Atoll, Republic of Kiribati.
- Jones P 1996 *Changing Face of the Islands: Urban Management and Planning in the Pacific*. Royal Australian Planning Institute Journal, Volume 33, No 3. Canberra, Australia.
- Jones, P; Taulealo, T; Kohlhase, J 2002 *Growing Pacific Towns and Cities - Samoa's new planning and urban management system*. Planning Institute of Australia Journal, Volume 39, No 4. Canberra, Australia.
- Urban Planning and Management Project Team (UPMPT) 2001 *An Integrated Urban Planning and Management System for Samoa*. Treasury Department and the Department of Lands, Survey and Environment, Apia, Samoa.
- Ward G and Ashcroft P 1998 *Samoa - Mapping the Diversity*. Institute of Pacific Studies, University of the South Pacific, Suva, Fiji, and the National University of Samoa, Apia Samoa.
- World Bank 2000 *Managing Pacific Towns*. Volume 2 of the Series, Cities, Seas and Storms - Managing Change in Pacific Island Economies. Washington, United States of America.