

Government of Tuvalu

HOUSING TASK FORCE

July 1992

WORKING PAPERS

- I : Documents under review, July 1992**
- II : People consulted, May 1992**
- III : Civil Service May 1991 Locational Analyses**
- IV : Housing Policy Issues : First Discussion Draft**

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**WORKING PAPER NO. IV :
HOUSING POLICY ISSUES DISCUSSION DRAFT**

**FIRST
DRAFT**

GC : 10 July 1992

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- 1.0. Why bother with a complicated "Housing Policy" ? Isn't "more of the same" good enough for Tuvalu, for the next few years, at least ?**
- 1.1. What questions are truly relevant to a Housing Policy? Do we really need to bother trying to define housing objectives, strategies, land use plans, development & conservation programmes & priorities for action? Do we need only to deal with civil servant housing? or all housing? for Fongafale Islet only? or for all the atolls & islands?**
- 1.2. Successive Governments &/or Civil Servants have perceived the most immediately urgent problem as how, & where, to find money, & sites, & some way of getting some more Government owned houses, of some kind, built, for subsidised rental to Civil Servants posted away from their "Home Island", mostly to the seat of government & the centre of the cash economy on Fongafale Islet.**
- 1.3. Such perceptions seem to persist, or at least, to linger in feelings like : "Why can't we persuade one or more of our many donors quickly to build more houses for Civil Servants, somewhere, somehow; but quickly. We still have a few vacant sites here & there on Fongafale, so let's not wait until we have worked out & agreed on any complicated, longer term housing policies and plans. Some time later, we'll be able to deal with other, future problems & questions. Let's get on with the job! The immediate shortage of good & cheap housing for many Civil servants, especially on Fongafale, is causing personal problems for new appointees & transferees, thus lowering their efficiency & job satisfaction. This is hampering the development of government services, & reducing our capacity to attract & absorb aid, & to develop our economy".**
- 1.4. The purpose of this Working Paper (No. IV) is to start to define Housing Policy issues, & to begin to stimulate discussion of why the people & Government of Tuvalu might decide that it is in their own best interests to seriously pursue the Housing Task Force Terms of Reference adopted by Cabinet in June 1991, so as to deal with questions of Civil Servant housing as only one of the Priorities for Action pursuant to a comprehensive, longer term, Housing Policy, Strategy, Plan & Programme in accord with Tuvalu's unique environmental, social & economic circumstances & opportunities.**

2.0. What are "basic housing issues" for people all over the world ?

- 2.1. Any community, anywhere in the world, thinks about housing (usually intuitively; but increasingly nowadays, consciously), more or less in line with a number of universally basic questions. These may be summarised as follows.
- 2.2. How can we as individuals, as a family, as a community, in our unique situation & climate, with the economic, energy, material & technological resources & opportunities available to us, best create an environment for living which will be both physically & socially sustainable for us, and for our children & grandchildren?
- 2.3. How can we plan, design, arrange, build & maintain our housing & housing areas & make our local travel trips to & from houses, & to & from work, so as to :
 - (a) protect our environment, & live as comfortably as possible?
 - (b) optimise our self-sufficiency, independence, privacy & security?
 - (c) increase our cash income? reduce our cash expenditure? & create capital assets?
 - (d) safeguard our supply of nutritious food, most economically?
 - (e) protect our health in other ways?
 - (f) enable us to plan our family? & reduce infant mortality?
 - (g) provide education, recreation & entertainment for ourselves & our children?
 - (h) ensure social welfare & retirement security?
 - (i) ensure debt-free housing for our children after our death?
- 2.4. What, for us, is the most appropriate "mix" of types & sources of energy, building materials, tools & technologies, & means of transport, for each of our needs, at costs we can now afford, or will be able to afford, maintain, & sustain, indefinitely?
- 2.5. What housing & other living-related facilities, utilities & services do we desire, need now, & can afford at this time? & which should we plan & reserve space & opportunity for, at some time in the future?
- 2.6. Which of these facilities, utilities & services should we provide, or plan to provide later:
 - (a) within our main house? indoors, or merely roofed?
 - (b) immediately adjacent? outdoors, or in a yard, garden or courtyard?

- (c) elsewhere in the community? within walking distance? or further away?
- 2.7. Which of the above facilities, utilities & services can most economically & efficiently be managed & provided by :
- (a) self help, by members of each household?
 - (b) mutual help, by community groups?
 - (c) by small-scale private enterprises?
 - (d) by Local Government Councils?
 - (e) by large-scale Cooperatives, Companies or Government/Public Corporations?
 - (f) by Central Government Departments, Ministries, & Offices?
- 2.8. In view of our traditions & customs, our existing laws, and our current & foreseeable likely future problems & opportunities, what should be our most appropriate arrangements for land law, land tenure, environmental land use planning, the control of land conservation & development, the regulation & control of building & building maintenance, and the planning, construction & maintenance of roads, paths & other shared facilities, utilities & services for residential areas? & other areas as well ?
- 2.9. In the light of our thoughts about the questions in 2.2 to 2.8, what is a "house" ? In our climate, in our environment, in our evolving economy & changing culture, what kinds of "housing", with what characteristics, will be most appropriate for us? in what mixtures? in which types of locations? for people in different circumstances? or people at different stages of their life-cycle? & how can we most appropriately & effectively organise all this, in what ways & stages ?
- 3.0 On tiny, isolated, hot, humid, salty, wet, potentially cyclonic, emerging & eroding coral islets where low soil fertility & scarcity of vegetable & fruit fibre, minerals & vitamins limit nutritionally sustainable population : what is the ideal type of "house" & physical environment for family life ?**
- 3.1. Most houses are built on land, so the location, relationships & characteristics of land & housing, must dominate our thoughts & action, especially where land resources are as scarce as they are on Fongafale Islet & elsewhere in Tuvalu.
- 3.2. In cold, or variably hot & cold temperate, climates throughout the world, a "house"

is often entirely enclosed within a single "box" structure, well walled (as well as roofed) against the winter cold, &/or summer daytime heat. Most post-1973 houses in Fongafale have ended up copying this model.

- 3.3. Most post-1973 modern "box" houses on Fongafale Islet & elsewhere in Tuvalu are roofed with corrugated aluminium, selected to resist the wet, salty & highly corrosive air, & to collect rainwater into house tanks. But roof pitches (many of them one way "monopitch" facing west) are largely unshaded : they reflect heat & glare &, at higher Fongafale densities, will combine with the new temporarily bitumenised village streets & with the new permanently bitumenised airstrip, to damage the microclimate of Fongafale. The roofs are almost universally uninsulated & mostly without ceilings : they absorb heat throughout the day, & radiate it downwards throughout the night, onto would-be sleepers cut off from any possible easterly breezes. People seek to buy, or are given by Government, imported fans, & run them continuously day & night at high personal costs for electricity generated at high social transport & infrastructure costs by pollusive deisel oil. Alternatively, they leave their houses to sleep in open, unwallled, " fa-ales" or "maneapas".
- 3.4. To minimise the overall length & cost of external walls, & to fit snugly within the side boundary setbacks adopted on small land plots in "medium to high density" housing areas like Fakaifou in Fongafale, most house floor plans are square-ish in shape. Many houses on small plots cannot enjoy productive gardens. Some "low-cost" Government Civil Service houses (the Woollard design), on the smallest land plots in the highest density areas, were originally provided without walls. These have since all been walled, either solidly or with large areas of transparent glass louvres on galvanised metal fittings already largely corroded & difficult to open & close. The interiors of most houses are divided by interior walls into small, separate rooms, emulating interior plans carefully designed to meet the special needs of low cost, low income, homes on small land plots in urban, industrialised, cold & temperate climate, european or european-derived, small nuclear family, societies. As the years pass & vacant developable land in Fakaifou shrinks, sketch plans for subdivision of the only remaining small area, show even smaller land plots, with less chance of any garden, & narrower pathways separating them.
- 3.5. For major building programmes on Fongafale, during the second half of the 1970s & the early 80s at least, the import/transport costs of bulky materials, & the time & skilled labour costs of construction, were minimised by much use of galvanised metal pipe columns & framing to hold up roofs ; & most house floors were on-ground

concrete slabs, using local coral sand & aggregate. However, all galvanised metals eventually yield to the corrosive atmosphere, & anti-corrosion maintenance is now overdue on a goodly number of house-structures. Coral sand & aggregate is now in short supply, & the ocean-side cyclone defence barrier on Fongafale is slowly being depleted for crushing. As has been normal in urban areas for thousands of years, ground levels in heavily settled areas are rising slowly with accumulating detritus, & road levels can also rise with successive repairs & "improvements". More & more areas of impervious surfaces are increasing stormwater run off. In the absense of any stormwater drainage system in urban Fongafale, the long term amenity of residential areas, especially of the houses on slabs at ground level, is not secure against firstly, "nuisance" pools, & eventually, house floor flooding. A lack of good drainage can also increase the risks of mosquito-borne diseases.

- 3.6. The infilling by occupants, of continuous walls & large areas of glass louvres (often curtained) around small square-ish "box" houses on small plots in medium to high density areas, are natural, even if unsuccessful, responses to perceived needs for :
- (a) protection of occupants during the season of strong westerly winds, against wind & wind-driven rain ;
 - (b) concealment & protection of food & other small consumer goods against casual "borrowing" or theft in a densely populated area ;
 - (c) visual privacy from the eyes & psychological closeness of passers by, & of neighbours on all sides of the house "box" ; transparent louvres do not give these qualities, so curtains are added, thus blocking air flow at even extra money & maintenance cost. A more effective solution is to cultivate tall narrow "hedgewalls" along land plot boundary lines ; these have been cultivated successfully in some parts of the high density Civil Service housing area of Fakaifou in Fongafale ;
 - (d) "finishing" the appearance of the house to conform to images of what a "proper" house should be like, as seen during travels in cooler climes (even Fiji is cooler), and as seen in magazines, newspapers & videos. For Tuvaluans, historically & still culturally isolated from tropical Asia, close to 100% of such images would come from urban, industrialised, europeanised societies in cold, or variably hot & cold temperate, climates ;

- (e) a compromise with the heat, humidity & desire for air flow & outward views throughout the year, by using transparent glass louvres, despite the fact that they inhibit air flow, particularly because the interior walls of small rooms prevent through-the-house cross ventilation, & what little air flow is induced, even without privacy curtains, is insufficient to dissipate the interior stillness & the heat radiating down from an uninsulated aluminium roof, even where a ceiling is provided.
- 3.7. Traditionally intelligent & resourceful Tuvaluans have responded to the dilemmas created for them by the "modern" houses they have been given or have copied, by building in whatever tiny corner they can find on even small house plots, a traditionally unwallled, open, "fa-ale" of the type traditionally used by Tuvaluan Polynesians for cooking with fuelwood, so that smoke could escape.
- 3.8. Civil Service tenants have even built such "fa-ales" at their own unsubsidised expense, in the otherwise empty "garden" corners of house plots they cannot expect to retain longer than the date of their next transfer, or at most, until their compulsory retirement age of 50. Such insecure tenants build, as cheaply as possible, a shanty fa-ale, often of modern waste material. Civil Service house owners with long land sub-leases build more substantial & beautiful fa-ales, often of traditional form & materials, with a woven pandanus roof of more than 5 year quality; they line the floor with deliciously soft pandanus mats for sitting in traditional comfort. The houses of the wife of the Auditor General, & of the wife of the Director of Works, have particularly fine examples; one traditional, the other an architecturally & structurally innovative interpretation of the traditionally intelligent concept. But nearly all of these self-help fa-ales are, in Fongafale, only incidentally or rarely used for cooking. Their predominant use & value is for sitting, relaxing, socialising, or sleeping, in comfort & relative coolness, with airflow unimpeded by louvres or walls, & unstified by a heat-absorbing roof. Recent comparative studies on Fongafale Islet, have dispelled any possible lingering notion that Polynesians don't feel the equatorial heat & humidity as much, or as badly, as people of European extraction do.
- 3.9. The British Colonial Service had, by long necessity, evolved a "housing policy" of providing Government built, furnished & maintained Duty Station housing accommodation at subsidised rents for expatriate Civil Servants far from their homes in Great Britain. After Hurricane (or "Cyclone") Bebe on 21.10.1972, & in the lead-up to Tuvalu's independence in 1978, the British Government provided on Fongafale,

in various ways, what was planned in 1973 as a total of up to 400 houses, intended as :

- (a) about 125 houses to replace all the local homes on Fongafale prior to 21.10.72 ;
- (b) about 117 houses for the projected 117 future Tuvaluan Civil Servants who were to be stationed at the selected "Headquarters" of the new Government, Fongafale Islet (or 72.7% of the projected total Civil Service of 161 people spread over all 8 coral atoll & island groups) ; &
- (c) between 120 & 160 additional houses for people with non-Civil Service jobs at the airstrip, in Fisheries Service, at the Island Council, & in then anticipated future private commerce & shops.

The Tuvalu Government has since followed the Colonial policy & General Administrative Order which assumes that Government will always normally, supply, furnish & maintain houses for Civil Servants, at least.

- 3.10. Between 1975 & 1978 the Transitional Administration subsidised a "Civil Servant Home Ownership Scheme" which permitted & encouraged then Civil Servants, particularly those moved to Fongafale Islet from other places (e.g. Tarawa) to acquire the ownership of a house structure on Fongafale, mostly of houses on land leased by Government from Fongafale hereditary inalienable land tenure custodians. The Administration then sub-leased the plots on which the houses sat, to the new Civil Servant owners of the house structures. Many of the original Civil Servant beneficiaries under this Scheme have already retired ; some have died ; & the house structures are coming to be owned by their heirs, who either live in them, or rent them to others. Some of the heirs have themselves become current Civil Servants ; some have married current Civil Servants. Some of the heirs, &/or their spouses, now hold some of the now 73% of all Civil Service posts with Duty Stations on Fongafale.
- 3.11. A house on Fongafale Islet today, at the urban centre of Government & the cash economy, naturally attracts visitors & in-migrants from other, "outer" "Home Islands". A few urban Tuvaluans may have created "nuclear families" or may suffer broken homes (but not yet many?) which do not encourage, or permit, relatives as frequent or long stay house guests. Many people on the quieter, still only slowly developing, other "Home Islands", welcome, & seek, accommodation & meals on Fongafale, for periodic visits to the stimulus & excitement of the "big smoke". Younger men, in particular, seek to stay in Fongafale to seek a job in the cash economy, particularly a Government job, initially perhaps as a "Classified Worker",

preferably as a Civil Servant. Because Fongafale is now seriously deficient in fresh food, visitors can merit hospitality by bringing, or having sent, food supplies, mostly coconuts, as gifts to Fongafale residents.

3.12. The Government is the only major cash-paying employer on Fongafale, as it is throughout Tuvalu. The Government directly employs "Civil Servants" & "Classified Workers"; & indirectly, the staffs of "Public Corporations", & also the staffs of Local Government "Island Councils" such as the Funafuti Town Council, which is supposed to plan & manage those disconnected pieces of Fongafale which are not supposed to be planned & managed by an un-co-ordinated mixture of Central Government Divisions, Departments, Ministries & Offices. In 1991, the Civil Service alone had 485 "established posts", of which 354, or 73%, had Duty Stations on Fongafale Islet (possibly including 1 or 2 at the adjacent Maritime Training School on Amatuku Islet) on Funafuti Atoll. Only 36 Civil Servants, a very low proportion, nominated "Funafuti" as their "Home Island" ; & of these, 34 were fortunate enough to enjoy Duty Stations on their own "Home Island" where they have hereditary rights to use & occupy available land. Potentially, the remaining 320 Civil Service posts (not all of them filled) on Fongafale Islet would need to be filled by people from "outer" Home Islands, & who could need to be housed on Fongafale.

3.13. In view of 3.10 to 3.12 above, it seems **logical & inevitable that :**

- (a) **competition is keen for any jobs (cash or subsistence) in the urban centre of the cash economy on Fongafale Islet ;**
- (b) **competition is even keener for cash paid Government jobs, particularly Civil Service posts ;**
- (c) **competition for Civil Service posts is more intense from "outer" "Home Islanders" than from people with still exercisable hereditary use & occupancy rights for available land on Fongafale or other Islets of Funafuti Atoll;**
- (d) **within the Civil Service, competition is quietly intense for Duty Stations on Fongafale Islet;**
- (e) **houses on Fongafale Islet will exhibit a propensity to be overcrowded, despite any design, construction or environmental shortcomings they may have ;**
- (f) **the most overcrowded houses on Fongafale will be those occupied by Civil Servants originally from "outer" Home Islands ; this logical deduction has been**

confirmed by direct observation, & by answers given by Civil Servants & non-Civil Servants to simple, direct questions. It is not uncommon for an extended family of up to 12, or more, people to try to stay, & frequently to succeed in staying, with a Civil Servant in a small Government "box" type house on a small plot, both originally designed (by non-Tuvaluans) for a nuclear family of a married couple and at most 2 or 3 children ;

(g) if the disparities between the "attractions" of Fongafale & other Islets & other Atoll & Island groups, continue to widen as they have been widening ; & if past & current urban & housing "policies" & practices, & other related & causative policies & practices, are let drift, then Government will continue to be under mountingly irreconcilable pressures from 3 different directions :

(i) "outer" Home Islanders wanting Government to create, &/or to fill, more Civil Servant Duty Stations, & more & more subsidised Civil Servant houses, on Fongafale ;

(ii) residents of Fongafale, of all origins, demanding more & more costly Government expenditures for the better maintenance of existing, & the creation of new, increasingly essential &/or merely prestigious urban infrastructure, facilities, utilities, goods & services ; all required merely to alleviate or ameliorate the declining quality & growing complexity of life on Fongafale, caused by higher & higher social, environmental & nutritional deficit densities ;

(iii) people with hereditary "inalienable" rights to land use & occupancy on Fongafale Islet, increasingly in the future concerned by the shrinking availability & environmental quality of land for their children, & increasingly concerned by the inadequacy of the compensation they receive by way of rent for the increasing areas of their land the Government will be forced to compulsorily "acquire" & alienate by way of inevitably "perpetual" lease, in order to provide on Fongafale, the infrastructure & other facilities, in addition to housing, demanded by the continuously growing percentage of the national population (43% in November 1991) living on Fongafale.

3.14. To suggest that serious consideration be given by serious & responsible people, to the possibility, or the probability, of such irreconcilable conflicts & insoluble dilem-

people sleep, relax, cook or eat (& also in bathrooms & toilets), cold & temperate climate european-type "box" houses are often built, but they can be dreadfully uncomfortable (as has now been experienced in Fongafale) unless they have air conditioning for cooling & dehumidifying; or at least, mechanical fan ventilation, day & night. The economic & environmental costs, of first building expensive boxes, & later more expensively cooling, dehumidifying & ventilating them, are extremely high. Mechanical ventilation & air conditioning can also be noisy & polluting to neighbours in medium to high density residential areas.

- 3.17. **In equatorial climates which are fairly consistently hot &/or humid throughout the year, day & night, traditionally intelligent local people's local experience, over a few centuries, has tended to evolve radically different types of "houses".** Such types are characterised by a group or cluster of smaller, separated, more open & less boxed-in structures, each designed for a special series of uses. The open, often tree-shaded, spaces between the structures can be used for movement & circulation, for gardens, for relaxation & play, for home occupations or industries & for extended family social & religious ceremonies & gatherings. The gardens produce both pleasure & food at low marginal cost. All roofs are insulated by the use of local (or imported) fibre. All of the structures are only 1 "room" wide, facilitating natural cross ventilation. Visual privacy & security from outsiders can be provided by external boundary hedges, fences or walls. Protection from hot afternoon (western) sun, & from the seasonally prevailing wind-driven rain (west in Tuvalu) can be provided by permanent walls, screens, hedges &/or trees; or by movable screens or storm shutters. Dampness & smells in bathrooms & toilets can be permanently stopped by the simple & economical expedient of omitting the 1 exterior wall, & providing visual privacy by a permanent exterior screen or wall (often part of the external land boundary screen), enclosing a small bathroom courtyard garden, which some people in very small houses may choose to use also as a private laundry & drying yard.
- 3.18. Inside such hot/humid climate "courtyard" or "compound" houses, there is less real need than Europeans or modernity minded Tuvaluans, for example, might at first imagine, for the internal sides of the roofed spaces to have walls or windows apart from a few fixed or movable screens (or blinds or shutters) for seasonal protection against, say, wind driven rain from 1 or 2 directions. Cooking, eating, relaxing, entertaining, play & other spaces function better without walls & windows all around them. So do many sleeping spaces, particularly those for children, the elderly, or most visitors. Many people often vary their sleeping place on different nights, or even

during a single night, in accord with variations in temperature, breeze, wind or rain. Visual privacy is required for some sleeping places, for purposes of sexual activities, for toilets & bathrooms, & for some clothes storage & dressing activities. Lockable walk-in cupboards for clothes can also safely store valuable movable articles when, if ever, no one is at home. Lockable wall cupboards, drawers & trunks can also be built in. Visual privacy & lockability can also be provided on mezzanine or attic levels, or in a full second storey on one of the structures. The best defence against theft & other crime (the only effective defense) is a vigilant community in a strong & cohesive culture. Extended family households, in which someone is usually or always at home, are very safe. Similarly, the best, & only effective defense against flies & mosquitoes, is personal, family & social hygiene, good waste disposal habits & facilities, effective drainage, & the minimisation of dogs, pigs & rats in residential areas.

- 3.19. Such "courtyard" houses can be on smaller plots of land, designed for a nuclear family of parents & children. But they are particularly adaptable (on only slightly deeper plots) for "compounds" of extended family groups, of grandparents, parents & children, and/or for visitors, guests, lodgers &/or tourists. On a deeper plot, more sleeping structures can be added; & if necessary, more bathrooms, & even an extra kitchen or cooking & eating structure, especially for extended family households housing more than one wife & mother.
- 3.20. Social, land & housing policies, land plot areas & house designs, should, wherever possible, not prohibit, penalise or discourage large households, extended families, &/or visitors, lodgers or tourists staying in people's private houses unless public health, or the amenity of neighbours, is damaged. Large households can be social & cultural norms, and persist through periods of cultural change. Cultural change can be safer if it is not abrupt. Thus, residential land plots, "houses" & households of people, may be either small, or large. This should be recognised as being applicable for any & all income groups, social classes, levels of technology, & for cash or subsistence economies. Many of the world's most "modern" &/or "rich" people live in large households, as also do many of the world's "traditional" &/or "poor" people.
- 3.21. Larger households of extended families, & widespread "home stay" opportunities for relatives, visitors & tourists (inter-island or foreign), can save Government much in land, capital & recurrent costs of many kinds of separate facilities & services, including social welfare & tourism. Cultural cohesion & social discipline can be less at risk, & potential increases in the rate of crime can be more easily avoided.

Encouragement is given to family life, self-help, & self-reliance. "Inter-island" cohesiveness can be encouraged, & social isolation reduced. If & where hospitality is rewarded, by either barter or cash payment, then benefits go direct to the providers of services without the overhead costs of intermediaries. Small private, albeit informal, businesses, business skills, employment & employment skills, & private capital formation, can also emerge.

- 3.22. This is already happening on Fongafale, with the setting up of restaurants & accommodation businesses for visitors & tourists, some in private houses, but also some in Civil Servant homes originally provided by Government, presumably where the house, if not the land, is now owned by the Civil Servant or his or her heirs. Town planning & other controls & permits will be essential to stop this sort of thing causing land use & traffic nuisances or inequities. But these needs & trends must be taken into account in land use & traffic planning & development for roads, paths, house plots, business plots, & house designs.
- 3.23. These needs & trends are also relevant to economic planning for economic growth through the privatisation of inherently inefficient Government owned, Government managed, Government staffed, maintained & subsidised facilities & services. The "informal" & "small formal" business sectors can be strong contributors to economic growth in large economies, but even more so in small, land-scarce & capital-scarce economies, like that of Tuvalu.
- 3.24. Home occupations & home industries in residential areas, even on isolated outer islands, need not be limited to visitor & tourist accommodation & meals, or to handicrafts or to small, quiet machine work. With the now rapid spread of more efficient & economic solar photovoltaic energy technology, small computers, & satellite telecommunication of voice, facsimile & computerised data, government & private administrative & intellectual work & jobs can be decentralised to remotely located offices or even to homes. More than the current 27% of Tuvalu Civil Service jobs could begin to be decentralised away from Fongafale. As soon as the technology is acquired (by loan, lease or purchase) & operating skills can be acquired by people willing to use them at internationally low labour costs, then, to take another example, the repetitive bulk processing of numeric data, for big organisations in high labour cost countries, could be sub-contracted to, & done in Tuvalu.
- 3.25. The land resources of Tuvalu are not merely isolated, tiny & widely separated, they are also made only of coral fragments, only thinly covered in places where there was

once, or still is, any tree, plant, bird or animal cover which has had time to create a thin layer of soil by depositing nutritious organic matter; or where people have dug deep pits & filled them with nutritious organic mulch to cultivate the traditional ceremonial staple food, giant swamp taro, now rapidly being abandoned as people turn to imported (often tinned) food. Since modernisation began in earnest in 1975, tree, plant & bird cover has diminished, especially on rapidly urbanising Fongafale Islet, although the populations of humans, pigs, chickens, illegally high powered motor-bikes, & dogs (& presumably also rats) has increased dramatically.

- 3.26. Over the 17 years between 1974 and 1991, human populations have grown approximately as follows :

	1974	1991	% change
All Tuvalu born, or Tuvalu Citizens :	7,000	10,000	+ 43 %
All residents in Tuvalu :	4,500	9,000	+ 100 %
All residents on Fongafale Islet :	800	3,850	+ 380 %

These figures will be subject to minor adjustment following analysis of the final 1991 Census results.

- 3.28. The resident population of the urbanising Government centre on Fongafale Islet, one of the 26 islets of Funafuti Atoll, which in turn is only one of the 8 coral Atoll or Island groups of Tuvalu, was about 800 before the creation of the Government centre began in 1975, about 18 % of all the then Tuvalu born people in the world. Over the 17 years since, the resident population living on Fongafale has increased by 380% to 3,850. This is now about 43 % of all people now living in Tuvalu, & roughly 40% of all Tuvalu Citizens throughout the world. The number of Civil Servant Posts with Duty Stations on Fongafale Islet grew from the 117 planned in 1973 to be provided by 1978, to 354 by early 1991. Over those 13 years, this would represent a growth of 237, or 202%. Over a comparable period of 17 years, this would represent a growth of 264% to 426 Posts on Fongafale by 1995. The rise in other, non-Civil Servant, Government jobs, has presumably been even greater.
- 3.29. These figures illustrate the remarkable achievement of the successful creation of an ethnically homogeneous, peaceful, democratic, legally independent, sovereign nation-state, in the very short period of only 16 years since the administrative separation of the Ellice from the Gilbert Islands in 1975, & in only 13 years since Tuvalu's Independence in 1978. Tuvaluans are entitled to be quietly proud of the

- perceptive, patient, persistent & steady ways in which they have achieved so much, & so much assistance from sometimes initially sceptical other people.
- 3.30. But what do we do today, to prepare for the next 5, 10 & 15 years ? What future population sizes, compositions & distributions could Tuvalu not support ? What influences on, & trends in, birth & death rates, & in internal & international migration rates, can we now anticipate ? What kinds & amounts of tourist accomodation housing do we desire ? What rates & targets, for all of the foregoing, do we plan to achieve ? If we are to intelligently evolve, co-ordinate & implement today's policies, priorities & plans, & to attract our own Tuvaluan people, & others, to support & help implement them, we cannot escape the need to address & answer those particular questions, & to keep our answers under continuing review.
- 3.31. The locational & other characteristics of urban development, & of housing & tourism policies, priorities & plans, are powerful influences on internal & international migration, & on the distribution of population; & have strong influences on domestic costs & capital formation, on social equity, & on public health & happiness. Urban development, housing & tourism inter-act with transportation & traffic facilities, building materials & construction industries, & food production & distribution systems, so as either to improve, or to damage, their combined effectiveness & efficiency.
- 3.32. Land & housing development is a costly & very long term investment, & is normally physically irreversible. Land, once subdivided & converted to housing & other urban development, rarely can revert to agricultural production. However, houses, if carefully located & designed, & occupied by people given appropriate incentives, can be set in productive gardens. Paths, roads & other urban installations close to ground level, once informally or formally established, cannot easily or cheaply be relocated. If badly designed or located close to a shoreline, & unprotected by trees, vegetation, drainage, sand & rocks, they will be eroded. This has already happened all along the tree denuded lagoon (western) side of Fongafale; & the informally established road along the lagoon side of the North Spit is also suffering. But if carefully preplanned, designed & developed in stages, roads & paths will survive major cyclones. Buildings & houses, depending on policy, & personal choice, may be either low-cost, of impermanent materials, & easily replacable; or high-cost, of permanent materials, & designed & built so as to resist cyclones of particular degrees of force. High cost buildings & houses can have an economic life of 50 to 100 years, or more.
- 3.33. Because urban development & housing, as indicated in 3.31 & 3.32 above, is a costly,

resources, as listed here in order of their distance & accessibility from Fongafale :

(a) Funafuti coral Atoll :

- (i) Fongafale Islet, the overcentralised urban, seaport, airport & Government centre, but without enough nutritional resources for its existing, or any larger, population;
- (ii) Amatuku Islet, the sub-urban site of the Maritime Training School;
- (iii) Funafala Islet, a potential sub-urb or "satellite" new village;
- (iv) the other 23 smaller & currently uninhabited Islets around the very large Funafuti lagoon;

(b) Nukufetau coral Atoll, relatively large, around a navigible lagoon, & with 10 Civil Service Posts :

- (i) Motulato Islet, with 100 acres of developable land excluding the abandoned N - S airstrip which could be remade ;
- (ii) the other Islets as a group ;

(c) Nukulaelae coral Atoll, in the wetter South, but with no navigible entry to its lagoon; & with only 5 Civil Service Posts in 1991;

(d) Vaitupu coral Island, at 1385 acres, the largest land mass in Tuvalu, with the best freshwater lens, & the most fertile soils; with no safe anchorage but potential for a small airstrip. Vaitupu has long had the only secondary boarding school (a second has recently been built on Fongafale); & now has 44 Civil Service Duty Stations, the most yet outside Fongafale. If the 1991 total of 485 Civil Service Posts could ever be distributed evenly among all 8 Island/Atoll groups, each would have 61 Posts;

(e) Nui coral Atoll, some of whose people were originally of Micronesian origin; & which has a 122 m long passage for boats, blasted through its reef into its lagoon; & 9 Civil Service Posts;

(f) Niutao coral Island, in the drier North, whose people also own Niulakita coral Island, the smallest (41.1 hectares or 101 acres) & southernmost outpost of Tuvalu, but with fossilised seabird guano deposits which give it the second most fertile soils, after Vaitupu coral Island; Niutao has 13 Civil Service Posts, &

Niulakita 5; Niulakita is 157 miles or 250 km south of Fongafale; Niutao is 215 miles or 350 km north of Fongafale;

- (g) **Nanumaga coral Island** (or **Nanumanga**) in the drier North of Tuvalu's large "exclusive economic zone" ; & with 15 Civil Service Post in 1991;
 - (h) **Nanumea coral Atoll**, with 2 main Islets 5 to 6 km apart ; the northernmost, closest to the Equator, & driest outpost of Tuvalu, with about 2000 mm (80 inches) of rainfall per annum, as compared to about 3000 mm (120 inches) in the southern locations of Niulakita coral Island, & Nukulaelae & Funafuti Atolls. Nanumea Atoll is 295 miles or 470 km in a direct line north west from the airstrip on Fongafale Islet. In 1991, Nanumea had 17 Civil Service Posts.
- 3.37. There are a large number of inter-related reasons why Tuvaluans would be wise & serve their own best interests by setting & monitoring such population limits and distributional balances. Most of these reasons have already been stated at length, & in some technical depth, by the Government of Tuvalu itself, in its **Report for the United Nations Conference on Environment & Development (UNCED)** held in Rio de Janeiro, Brazil, in June 1992 (published by the Office of the Prime Minister, Vaiaku, Fongafale, Funafuti, January 1992 ; 129 pages). Many of those & other, additional, reasons are stated in other parts of this Housing Issues paper. However the reasons arising from the Tuvalu Report for UNCED are so well stated that they merit some quotation here, particularly those referring to the declining per capita productivity, availability & consumption of fresh fruit & vegetable dietary fibre, minerals & vitamins. Each of the following quotes raises one or more issues highly relevant to housing policies, plans & designs & programmes:

p.xxi: "Infant malnutrition; iron deficiency anemia; obesity & nutrition-related non-communicable diseases such as heart disease, stroke & diabetes among adults, are increasingly serious health problems in Tuvalu. The main causal factor is a shift from a traditional diet to a diet of imported foods which are high in sugar, salt, alcohol & animal fat; & low in vitamins, minerals & fibre. This shift is due in part to the breakdown in the traditional food system & a change to a sedentary lifestyle, particularly on (Fongafale) Funafuti". **(The design of houses, house plots & housing areas must incorporate fresh food growing & consumption facilities).**

p.xxiii: "the over-riding concern will continue to be issues arising from over-population & the impact of urbanisation on limited terrestrial & near-shore

fishery resources, particularly on Funafuti. Related to this is the accelerating breakdown of the traditional subsistence production system, which has, for hundreds of generations, given Tuvalu's people resilience & protection against natural & economic factors beyond their control. The promotion of culturally acceptable birth control measures is of the highest priority, followed closely by the need for water supply & waste disposal improvement & the promotion of local food production & consumption to address serious environmental-health & nutrition-related problems". **(Environmental land use planning & development control, properly coordinated within a legal framework, is an imperative need that should no longer be postponed).**

p.xxiv: "Government emphasis on sustainable production systems will move..... towards more traditional agro-forestry systems which incorporate a range of tree crops, long & short term ground crops & other plants of economic, cultural & ecological importance. The promotion of appropriate food & fuel species, particularly on Funafuti, is of high priority". **(This is applicable to house yards & housing areas).**

p.xxv: "The overall aim is to achieve the optimum balance between modern economic development & cash employment & the protection of our traditional subsistence base.....". **(This applies in Fongafale urban area as well as elsewhere).**

p.5: "The atoll soils of Tuvalu are among the most infertile in the world. They are young, shallow, alkaline, coarse textured & have carbonatic mineralogy..... Fertility is, thus, highly dependent on organic matter for the concentration & recycling of plant nutrients to a lower soil pH, & for soil water retention in the excessively well-drained soils". **(All household organic waste should be buried in house gardens, or in nearby land planned for enrichment).**

p.10: "giant swamp taro or pulaka.....pits have been excavated to the level of the freshwater lens, through the limestone bedrock to depths of 1.5 to over 4 metres. Due to increasing salinity & the declining importance of pulaka relative to copra production (in the past), cash employment and imported food, a large proportion of the pits on some islands have been abandoned". **(Over-deep, abandoned pulaka pit mulch should be salvaged for new gardens).**

"the most important functions (of trees & other vegetation & flora) include the provision of shade & animal & plant habitats, protection from wind, erosion, flood & saltwater incursion, land stabilisation, protection from the desiccating effects of

salt spray, soil improvement & mulching". (Tree planting & cultivation is an essential component of housing activity).

"Shade is important to humans, plants & animals, especially in highly reflective low-lying coral island & lagoonal environments, & in villages & urban areas. As populations increase, shade & the role that trees & coastal plants play as habitats for (humans &) for other important animal & plant species will become more important. Of particular importance are mangrove ecosystems.....". (Belts of trees are needed in & around housing areas & along foreshores).

p.11: "Species commonly used for living fences or hedging include *Clerodendrum interme*, *Cocos nucifera*, *Ficus tictoria*, *Hibiscus tiliaceus* & *Premna serratifolia*". (These protect houses & give visual privacy).

p.12: "many of the current generation, schooled in the modern education system & living in the cash economy, often know few of the traditional uses of plants..... a 'devegetation of the mind' which has undoubtedly contributed to the degradation of the vegetation of Tuvalu". (Education for living starts in houses & house yards).

"the abandonment (of traditional food & beverage crops) for imported foods such as sugar, white rice & flour, cabin bisquits, noodles, canned fish, softdrinks, alcohol & tea, has led to dangerous levels of food dependency & some of the highest, or most rapidly increasing, incidences in the world of vitamin & mineral deficiency & nutriton-related diseases. Diseases such as iron-deficiency-induced night blindness, diabetes, cardiovascular disease, hypertension & stroke, gout & hyperuricaemia, some forms of cancer & dental disease, which were rarely encountered in the past, are now serious causes of morbidity & mortality in Tuvalu & among other atoll populations". (House gardens can be created from household compost, to produce fresh food for home consumption or local sale or barter).

"There is still a need for planners & national development plans in Tuvalu to place a high priority on vegetation protection as a basis for sustainable development". (Intensive tree & other vegetation planting & protection must be a key element & priority in detailed Land Use Planning & Implementation everywhere in Fongafale).

p.27: "Between 1984 & 1988, imports of food, beverage & tobacco increased by 68 per cent". (A genocidal trend that needs to be reversed).

p.33: The following was written just before the November, 1991 Census when it was thought that the population of Funafuti (including Fongafale Islet) was only 3,000. The Census revealed a population close to 3,850, or 28% more than the then estimated population & population density for Funafuti & Fongafale.

"the future for sustainable development in Tuvalu does not look good. Projections based on even medium assumptions indicate that current demographic trends will very soon lead to disastrous crude population densities on the generally marginal land of Tuvalu. The 'nutritional' densities (the average number of persons per unit of arable land) are certainly significantly higher than these crude densities. The continuation of current population growth rates will soon result in densities which are impossible to support, not only in urban areas, but also in many of the rural outer islands". (Population densities & distributions must be brought under planned control using nutritionally sustainable densities as one criterion).

"There continues to be considerable migration from outer islands to urban Funafuti..... There are currently about 1000 Tuvaluan contract workers in Nauru.....With the projected cessation of mining operation in Nauru near the turn of the century.....most can be expected to return either to Funafuti or their (other) home islands.....". (A questionnaire survey, or other form of enquiry, needs to be conducted among these 1000 workers (plus their dependents), so as to clarify their future desires, so that contingency plans can be drawn up both to exploit the opportunities these people can offer Tuvalu, & to resolve the problems they present).

p.38: "the use of inorganic (artificial) fertilisers is ineffective in Tuvalu soils, due to high pH & carbonate content". (i.e. only organic vegetable, plant & animal residues are effective fertilisers in Tuvalu). (Every human being in Tuvalu must conserve every scrap of organic waste for burial in gardens & other areas designated for enrichment).

p.43: "A rapidly increasing number of the urban-born or urbanised, & some urban or overseas-educated leaders, have lost the knowledge of & respect for the environment that their ancestors had. Their modern education "teaches" them economics, accounting, administration, politics, history & even modern agriculture & fishing.....the tools of western development & modernisation, but little about their traditional resources-use systems. Such an orientation will continue to induce widespread environmental blindness which will foster an adherence to existing, environmentally-disruptive development alternatives". (The practical knowledge of

"old fashioned" women & men who are still environmentally sensitive, must be sought out, & used, particularly in land use & housing planning & design work).

p.45: "there are signs of increasing incidences, & some potential for an outbreak, of Sexually Transmitted Diseases (STD) in urban Funafuti". (The detailed planning & design of urban areas, housing & housing layout, facilities & services, can either help to resist or help to accelerate any such trend).

p.49: "Tuvalu's petroleum imports (alone) have exceeded the value of (all) exports over the past decade". (Not all of the motor vehicles & motor bikes registered in Fongafale in March 1992, are essential, or of desirable engine sizes. See 3. 41 to 3. 49, & 3. 51 to 3. 59 of this Housing Issues paper).

"Fuelwood.....is in short supply for urban households in the densely populated area of Funafuti, where.....partly due to the increasing cost of kerosene.....it has been estimated (by the Pacific Energy Development Programme, in Suva, following household surveys in 1990) the biomass resource may be exhausted.....". (What source of cooking energy should houses in Fongafale & elsewhere use? imported gas bottles? kerosene? solar? A world leader in indoor domestic stoves for night-time solar-thermal cooking, is the Applied Physics Department of Sydney University)

p.51: "agro-de-forestation, in the forms of both declining tree planting & the elimination of trees from agricultural & urban areas.....is particularly serious on atolls.....where the main agricultural & food crops are trees, & where agricultural areas & houseyard gardens serve as the few remaining reserves where endangered plant varieties can be protected". (Houseyards & gardens, & tree & shrub planting in & around urban areas, are essential parts of any urban or housing land use development & conservation plan & programme).

"Only recently.....has the Tuvalu government begun to acknowledge that 20 years of institutionalised coconut replanting & rehabilitation have led to serious "agro-de-forestation" & the gradual elimination of a wide range of ecologically & culturally important tree species, all traditionally components of the sustainable Tuvaluan integrated agricultural system". (Residential plantings should avoid too many coconut trees for this reason, & also because falling coconuts are dangerous near houses & where people walk).

p.52: "De-forestation, the widespread practice of burning organic debris &

the decline in traditional intensive mulching systems have led to soil deterioration in some areas of Tuvalu". (**Bury in compost heaps, do not burn, debris**).

p.53: "Rapid urbanisation, rural-to-urban migration & increasing centralisation of employment opportunities, social services, infrastructure & administration are major problems in Tuvalu.....". (**Decentralise jobs & services away from Fongafale & Funafuti. This requires new houses & facilities on outer Islands**).

p.54: "The 'tropicalisation' or 'atollisation' of mid-latitude, Continental technologies is often inappropriate". (**Take pride in evolving unique Tuvaluan solutions to unique Tuvaluan problems & opportunities, a theme of this Working Paper**).

p.55: "technological change is often implemented before the long-term environmental & social implications are fully understood. Such considerations are critical in the fragile atoll environment.....". (**The 1992 temporary bitumenising of Fongafale streets was one glaring example. It may have been influenced by a desire to have the status symbol of bitumen roads that Tarawa apparently has**).

"Although not widespread, signs of social disintegration are increasingly common in Tuvalu, especially in urban areas. The extended family system & wider kin-based, traditional 'social security' systems are weakening, with nuclear, often broken, families becoming increasingly common.....crimes.....are increasingly widespread in Funafuti. Much of this has been associated with increasing use of alcohol, & drunkenness.....It is also correlated with increasing.....traffic accidents". (**Housing policies, design & layout can reduce personal & family stress. The proliferation of motor vehicles, especially of apparently illegally imported motor bikes over 150 cc engine size, is increasing it**).

- 3.38. The Tuvalu Report for UNCED, in its Appendix I, indicates that 6 out of 26 widespread Pacific Island shrubs, & 52 out of 62 widespread Pacific trees, have uses in "General Construction". One shrub & 3 trees can be used for "Thatching & Roofing". One herb, one shrub & 5 types of trees can be used for "Living Fences & Hedges". (Refer to 3.17 of this Working Paper). Appendix II of the Report for UNCED, on page 109, lists the botanical & Tuvaluan names of 28 trees & plant species found in Tuvalu, by the numbers of different uses they can be put to. The 17 most multi-purpose are :

(a) *Cocos nucifera* (niu) 125 uses;

- (b) *Hibiscus tiliaceus* (fau, fautuu) 57 uses;
- (c) *Pandanus tectorius* (fala) 53 uses;
- (d) *Calophyllum inophyllum* (fetau) 43 uses
- (e) *Cordia subcordata* (kanava) 40 uses
- (f) *Guettarda speciosa* (pua) 36 uses
- (g) *Scaevola sericea* (ngasu, ngahu) 32 uses
- (h) *Pemphis acidula* (ngie) 30 uses
- (i) *Thespesia populnea* (milo) 26 uses
- (j) *Rhizophora* spp. (tongo) 25 uses
- (k) *Tournefortia argentea* (tausunu, tauhunu) 32 uses
- (l) *Casuarina equisetifolia* (toa) 22 uses
- (m) *Premna serratifolia* (aloalo) 22 uses
- (n) *Morinda citrifolia* (nonu) 22 uses
- (o) *Pipturus argenteus* (fau vau, fau) 21 uses
- (p) *Terminalia catappa* (talie) 21 uses; &
- (q) *Ficus tinctoria* (felo) 21 uses.

The Tuvaluan names of the other 11 are: puka, puka vaka; sangale; puka, puka vai; futu; kafuti; tiale; tolo tolo; inato; fetai; talo talo; miale; & fue.

3.39. All 28 of the most useful species merit consideration either for :

- (a) general construction;
- (b) house building structure;
- (c) house finishes;
- (d) "fa-ale" construction;
- (e) planting in house yards & gardens;

- (f) thick, layered, planting along foreshores, for future sustainable harvesting, & also to help prevent erosion & to reclaim or create land, to break unwanted strong westerly winds, & to protect houses & urban residential areas from hot afternoon westerly sun; the western (lagoon) side of urban Fongafale is bare of, or only thinly lined by, trees for most of its length; notably, astonishingly enough, the lagoon side of the Government owned & managed (the only) Hotel, the "Vaiaku Lagi", where public rooms, terraces & bedrooms all stare, without protection, due west into the hottest sun, the strongest winds & the glare from the lagoon surface; or
 - (g) general planting along roads & paths, in public spaces & green belts, in & around urban, including housing, areas, for both shade & harvesting;
- 3.40. The quality of life in housing, & the detailed design of housing & housing land plots, depends very heavily on : -
- (a) the relationships between plot boundaries, house walls on or near boundaries, boundary "living fences" or hedges, yard trees & gardens, the walls & openings of different "rooms" & "spaces"; & the number of storeys, mezzanines or attics in each part of each house or housing precinct;
 - (b) the relationships between "houses" & other types of housing such as row houses, flats, hostels & hotels;
 - (c) the relationships between housing of all types, & footways, pedal bicycle ways, motorbike ways & other vehicular traffic ways;
 - (d) the types & volumes of motorbikes & other motor vehicles which are permitted on Fongafale overall, & to use particular roads & paths;
 - (e) the relationships between housing & primary & secondary schools, shops, workplaces & other community facilities;
- 3.41. A quick & yet unchecked count of the number of vehicles registered on Fongafale Islet between 1.4.91 & 31.3.92 on the ledger of the Funafuti Island "Town" Council, showed 280 vehicles newly or re-registered over that 12 month period. This was about 1 for every 13.75 people enumerated on Fongafale by the November, 1991 Census. They include Government & private mobile motorised equipment; trucks & utilities; many motorbikes; public & school buses; & a very few sedan cars, including 1 taxi. They may, or may not, also include trailers, hand carts &/or bicycles.

- (f) create profitable, local "import-substitution" manufacturing or assembly, maintenance & personal service industries (either a few relatively large operations, or many small-scale home industries & occupations);
- (g) create more, or at least not lose, local cash-paid jobs; &
- (h) create better quality housing on less land;

simply by limiting the use of any kind of imported, & imported energy-consuming, motorised transport to essential purposes which cannot be served by any intelligently organised alternative, & more appropriate, technologies or modes. To act thus, would only marginally, but insignificantly, reduce the turnovers & profits of a very few overseas multi-national corporations, most of whom are in any case, diversifying into alternative technologies for which Tuvalu could be a valuable proving ground. But it would be an enormous step forward by Tuvalu towards its financial independence, & its environmental as well as economic sustainability for more Tuvaluans, & more tourists, in a more attractive, healthier Tuvalu.

- 3.53. Compared to the continental & megalopolitan problems that modern motor vehicles are designed to cope with, movement & transport on Fongafale Islet is a micro-problem which, like the task of opening a peanut, is best not attempted with a lot of power drills. The "urban" area of Fongafale is only 1 mile (1.6 km) long; from the Container Wharf on the North Spit, to the southern end of Vaiaku, is 2 miles (3.2 km). Yet there are 5 miles (8 km) of "urban" roads, local streets & vehicular ways, much of which should never have been opened to vehicular traffic, but reserved for the exclusive use of pedestrians & bicyclists, as was planned & recommended in the 1973 "advisory" town plan; & was again recommended in 1987, this time even by a roads engineer, albeit in only a roads engineer's modest measure (converting 2 short streets to walking & bicycle ways). There are 5.6 miles (9 km) of rural tracks out of town along the North & South Spits. No vehicles can get further away from the centre of the village than 4 miles (6.4 kms) along the North Spit.
- 3.54. In "urban" Fongafale, the legal speed limit for all vehicles is said to be 15 miles or 24 kilometres per hour, set under Ordinance No 7 of 1983. Along the Spits, out of town, Commercial Vehicles were, in 1987, able to speed up to 20 mph or 32 kph; & Public Service Vehicles to 30 mph or 48 kph. The 1987 roads engineer recommended that the urban limit be kept at 15 mph, & that the limit along the Spits be reduced to 20 mph or 32 kph maximum for all vehicles, & also that all vehicles over 3 tonnes

Gross Weight be prohibited on Fongafale Islet roads. The several public minibuses & the 1 taxi do not currently have overmuch business: more is needed to make their services more economic, more profitable, more frequent & more reliable, & to increase the quality of residential life.

3.55. The modes & technologies of movement & transport on land ought to be those most appropriate to the circumstances of local life as have been discussed in 3.1 to 3.54 above. The needs for any type of deisel petrol or electric motorised road-using equipment or vehicles, are limited to only 3 categories:

(a) **need:** essential heavy-duty, high-technology services, e.g. container & crate handling, high technology maintenance, public safety & disaster-response services, including some public works needs;

technology & mode: fork lifts, airport fire tenders, fuel tenders, ambulances; coral movers, crushers & carriers; road graders, rollers & compactors; & small water tankers. These can often only be provided by motorised equipment running on imported, high cost, pollution- prone fuels.

(b) **need:** deliveries of heavy-bulky goods &/or equipment, possibly including heavy bulk imports delivery; & also the rapid, controlled, special purpose, point to point transport of special groups of people, such as work teams, or school children on outings;

mode & technology: a small & strictly limited number of trucks (none over 3 tonnes gross weight), utilities, & maybe 1 or 2 special purpose buses, could be appropriate, subject to justification of need before the issuance of an "essential entry"/import permit &/or acceptance for registration; such a vehicle could be Government owned & operated (the Public Works Division would be a major user), or privately owned & operated, but the essential nature of the National need for, & desirability of, each separate vehicle should be assessed on the same strict criteria; presumably all such trucks & utilities or buses will be petrol or deisel powered, at least for the foreseeable future.

(c) **need:** publicly available & reliable, Government licensed & regulated, privately owned & operated, public transport for goods, materials & those passengers such as children, the elderly or otherwise infirm, office workers & other commuters, shoppers or market-bound sellers with parcels, incapable or unwilling to walk or bicycle, particularly for longer trips to & from the fast growing residential & other urban development along the North & South Spits;

mode: fixed route, continuous & frequent within fixed hours; simple, rugged, roomy & well ventilated for large people with parcels in a hot climate, but small overall (seating, say, 8 people) & as numerous as necessary to ensure frequency & reliability of service & yet reasonable profitability, using the most economic & simple technology such as converted utilities ("jitney" in the Phillipines; "bemo" in Indonesia) or well ventilated, wide-doored minibuses with rugged suspensions & durable bench seating; plus 1 or 2 taxi trucks licensed & obliged to be available for public hire; plus 1 or 2 passenger taxis, on call, at higher prices, for emergencies, out of hours needs, airport arrivals & departures & foreign business visitors;

technology: although about 5 or 6 petrol engined vehicles are currently in use for these purposes, a change should be made as soon as possible to electric-powered vehicles; battery powered vehicles can operate comfortably at the low speeds & short ranges of Fongafale; & solar voltaic powered vehicles should be available in the foreseeable future. Meanwhile, further over-investment in petrol or deisel powered vehicles, facilities & services should be avoided;

quality of service, & profitability of service: if, as is recommended herein, all forms of new or replacement **personal** motorised transport using imported fuels, are phased out & not allowed entry into Fongafale, then the demand for, & the quantity, quality & profitability of **public** transport, can be assured.

- 3.56. Apart from the strictly limited numbers & types of motorised equipment & vehicles for essential National needs, Government & public services, as in (a), (b) & (c) above, there is no necessity for any other motorised petrol or deisel powered vehicles on Fongafale Islet, except possibly 1 official & ceremonial vehicle for the Prime Minister as Head of Government, & 1 for the Governor General, as Head of State. But in view of the stately pace & short distances involved, if such vehicles are desired, then they could best exemplify leadership & foresight by being electric-powered. Donors could be delighted to provide electric-powered vehicles as demonstration models for purposes of proving & publicity.
- 3.57. All other personal & goods movement & transport on Fongafale Islet can most appropriately be provided without the use of any imported motorised vehicles or fuel:
- (a) **need:** deliveries, by Government or private people, of relatively light weight but relatively bulky goods or equipment, &/or transport for several people;
- mode & technology:** both Government & privately owned & used, geared corrosion-resistant or corrosion-proof pushbikes drawing lightweight plastic or non-

corrosive metal trailers or carts, powered by the fastest growing, most economical energy source in "people-rich" Fongafale, many of whom are very young, very big & very strong, &, as the Government's Report for UNCED states, increasingly & dangerously prone to the health risks of obesity & a sedentary lifestyle; & who are also facing the increasing health & financial risks of too many motorbikes;

- (b) **need:** the freedom & convenience of personalised, individual mobility, with or without parcels, shopping, schoolbooks, tools, briefcases or small children;
mode & technology: walking on tree-shaded pedestrian ways, or riding personally owned, geared or ungeared modern pedal bicycles, with attachable carrier baskets &/or a child's bucket seat (Ireland rents them to tourists), & with a lamp for night-riding, powered by a wheel or by a battery; with the optional use of a shoulder/backpack. Most bicycles seen around Fongafale are of antiquated design, & without even basic accessories, such as lamps & carrier baskets; with or without Donor technical assistance or aid, Government could co-ordinate an appropriate choice of a standard product & accessories, & co-ordinate bulk orders at discount prices for retailers in Fongafale & elsewhere; & local sales of bikes, spare parts & accessories, service & maintenance, could become a series of successful home occupations or industries.

3.58. Both walking & bicycling are coming back into fashion among trend-setters & opinion leaders in many countries; & in many countries, pushbikes are the focus of major social & sports events. These are advanced modern trends that Tuvaluans would be serving their own best interests in emulating. One major continuing attitudinal problem for Tuvalu however, was recently neatly put by a senior Civil Servant & member of the Housing Task Force: "Why should we bother about pushbikes when a new Donor Country will give us lots of the 4 wheel drives they make?" This Housing Issues Working Paper has addressed that & similar questions in some detail. Tuvaluans do need to look into the mouths of gift horses, & to be wary of proffered chocolates & of their cumulatively bad longer term effects.

3.59. If & when Tuvalu changes (or enforces) its present rules so as to prevent the import of new personal motorised vehicles using imported fuel, along the lines of 3.51 to 3.58 above, questions would arise of what, if anything, to do about existing but thenceforth non-conforming vehicles already in Tuvalu on the day of the Government's warning notice announcement of the new rules. The most economical & equitable answer may be to allow them to continue in use until they become too old & unsafe to be road worthy &

safe for re-registration. That would create scarcity values for the "irreplaceable" assets, & would permit people to sell & to buy their hearts desire, but at a price that would reflect the costs the machines impose on their fellow citizens, & on the Nation as a whole. Another result would be to encourage extreme care in the use & maintenance of the machines, lest they be damaged, scrapped or otherwise lose market value. All of these would be socially, economically & environmentally good outcomes, & popularly welcomed by the lucky existing owners of such vehicles & motorbikes. It may, however, nevertheless be desirable to require, by law, that all riders & passengers on motorbikes wear approved models of safety crash-helmets. Head & brain injuries are often expensive for Governments, & others, in medical, hospital & welfare costs, often for many years after such accidents.

- 3.60. An integrated Housing, Movement, Traffic, Transportation, Roads & Paths Policy, Strategy & Priority Action Programme, has been outlined in some detail above, in order to demonstrate that such inter-related environmental & economic Policies can be integrated & worked through in practice based on fundamental facts & principles. Whatever the details of action henceforth, the fundamental principle is that Tuvalu should learn from the unfortunate experiences of villages, towns & cities throughout the world, where the rising densities of, & degrees of personal use of, motor vehicles & motorbikes have been let drift until it was too late for anyone to do anything except worry about, pay for, & try to pacify the pain of the results of lack of earlier foresight & action. Tuvalu needs to act now, before the problems become critical, & opportunities, to create a high-quality & sustainable community, are lost forever.

4.0. What types of "housing" use the least land? & reduce costs? how can we best accommodate people who need, or want, to live for periods away from their relatives & home bases?

- 4.1. In the tropics, the first obvious step to take in order to economise on land, & yet retain the benefits of a detached, single-family house set in a garden which gives food, shade, privacy & play & work space, is to create an upper floor level, private, well ventilated, sleeping area. Such an upper level may be:
- (a) a mezzanine level over only part of the ground floor area, under the same overall, single, only slightly raised roof, very similar to an "attic", only not fully walled; or not walled at all, but only with a balustrade for safety, & for visual privacy from below;

- (b) a full head height, second storey, with a higher roof than (a); this can provide more than 1 private sleeping place (or "bedroom") but, for cross ventilation, should only be 1 "room" wide;

The stair to a mezzanine or 2nd storey should be simple & open; & may be steep, & or circular, to save space; Such stairs can be fitted with a lockable door, at top or bottom, to provide secure storage & more privacy, especially if the lower floor is open & not fully walled, as it should be in the tropics.

- 4.2. Roof pitches can be steeper than normal, so as to give more upper level floor space with full head height; & more insulation space, possibly with a partial sloped ceiling over the upper level to stimulate air-convection cooling.
- 4.3. If the eaves of such steeper roofs also project downwards & outwards past the edges of ground floors, they give:-
 - (a) protection from wind-driven rain;
 - (b) more shaded sitting, walking & other usable space around the outer edges of the building;
 - (c) better air-convection currents to cool the interior, if one part of the roof allows hotter air to escape at a higher level;
 - (d) more roof rainwater collection area;
 - (e) more visual privacy;
 - (f) less need for any walls at all, because visual privacy close to the ground can be more easily provided by a low height "living fence" hedge or shrubs.
- 4.4. It is not suprising, therefore, to learn that houses in Fongafale built by traditionally intelligent Polynesian Tuvaluans in the late 19th Century, had exactly such steep pitched (45 or more degree) roofs, the eaves of which came down to within 4 feet (1.25 metres) from the ground. Photographs & descriptions of such houses along the central pedestrian "street" of Fongafale Village, are in Mrs Edgeworth David's book *Funafuti, or 3 months on a Coral Atoll*, published in 1899 (see Document 89 in Working Paper No. I "Documents under Review").
- 4.5. Such houses were roofed & screened by quickly hand-woven pandanus or other fronds, still abundant locally because they are so little used by "modern" urban

Tuvaluans in Fongafale. Steeper pitched, (45 to 55 degree), natural local thatch surfaced & other roofs can have the following characteristics in Tuvalu:

- (a) rainwater (80 to 120 inches per annum usually well distributed throughout the year) can run down steep pitched thatch as or more quickly & cleanly, than down lower pitched roofs of any surface material;
- (b) a very much longer lifespan than is nowadays popularly, & wrongly, alleged, before requiring maintenance by the replacement of a few particular fronds, & ultimately, renewal of the whole roof surface; the steeper the pitch, the simpler the geometric shape, the more care & skill in the selection, folding, laying & treatment of the material, the longer the lifespan: 10 to 15 years should be able to be achieved;
- (c) simple gable shapes, on rectangular plans only about 1 room & verandah in depth, are easiest for thatched roof surfaces, because sloping "hip" ridges become weak points & create unequal rain flows, & unequal wear;
- (d) rainwater collection into gutters draining into tanks can be arranged; edge roof joists need to be evenly shaped & trimmed, & strong enough, to allow the affixing of straight gutters; gutters either need to be a little wider than usual (6" instead of 4") or have a back flashing, in order to catch all water falling off an edge that is more ragged than machine cut metal; all gutters in heavily treed areas need clearing of leaf litter, & all tanks need lids;
- (e) if a "house" is made up of several smaller, individual pavilions, as discussed in 3.17 to 3.19 above, a house may have several smaller water storage tanks instead of 1 large one; such tanks, being lighter, could be mounted higher & feed water by gravity to points of use; &/or several small tanks could be interconnected by pipes; but electric or deisel or hand pumps could more easily be done away with; gable roofs would reduce gutter lengths; so the application of intelligent design skills could provide good results;
- (f) as with all roofs just South of the Equator, they will receive & absorb less sun-stress, be cooler & last longer, in gable lengths running generally East-West, facing South & North, perhaps with the front of the house facing South or South East so as to maximise shade & catch the South East trade wind breezes;
- (g) thatched surfaces create no reflectivity or glare, & are excellent neighbours; unlike aluminium or other metal or bitumen surfaces in large numbers & areas,

they do not worsen the micro-climate of a neighbourhood;

- (h) thatched surfaces on steeper pitches give excellent insulation against heat gain, more so if the fronds are overlaid closely & tightly together, with the thickness of thatch gradually increasing as the volume of rain run-off increases towards the eaves, & any transmitted heat comes closer to people's bodies; this technique, evolved by tropical islanders, Asians & others over thousands of years, also extends the life span of thatched roofs, & can give elegant profiles to such roofs;
 - (i) triangular gable-ends can project past floor-edges & protect small, top triangular openings at each end; these stimulate natural convection currents & breezes to exhaust hot air & to draw in cooler air from below, especially in early evening & through the night. The West-facing such top opening can be closed with a lightweight storm-shutter during the season of strong westerly winds. The lower parts of gable-ends can be thatched at angles of between 45 & 90 degrees;
 - (j) the underside of thatched or aluminium roof surfaces & structures can be lined with pandanus (or other material) woven mats (usually used for sitting on floors or a ventilated platforms). These serve 3 purposes: insulation, protection from falling dust, & a beautiful interior finish;
 - (k) steeper pitches (needed for thatch but also possible in aluminium) offer low-cost opportunities for raised interior mezzanine floor levels; these can provide private, lockable, wind-driven rain protected, sleeping dressing & storage areas (particularly useful for sexually active heads of households), while freeing up space at ground floor level for other uses, & thus reducing the land area covered by building, thus freeing up productive garden space;
- 4.6. Tuvalu is, historically & theoretically, not as prone to cyclones as many other areas. But since 1972, when "Bebe" hit Fongafale out of season in October, minds have been focussed on the permanent preservation of highly capitalised building assets. Thatched surfaces are less able to resist cyclonic forces than aluminium sheets, but a major threat to life & property in a cyclone is flying metal roof sheeting. Roof structures under roof surfaces can be, at a cost, designed & built to resist particular degrees of cyclonic force which may nevertheless be exceeded, or may not be, over unpredictably long periods. The tail end of "Ofa" hit Vaitupu in 1989.
- 4.7. It is simply not possible, not necessary & not desirable for every building & house in Fongafale & other areas of Tuvalu to be of high-cost, capital-intensive, skill-inten-

sive, labour-intensive, materials-intensive reinforced concrete frame, floor & roof slab, or other well-designed, well-supervised, well-built, cyclone-proof or resistant, structure. But there are & should be increasing numbers of such structures: enough, either already or soon, to shelter, during an emergency, all the population & a good proportion of other core assets. In 1992, satellite weather photography quickly identifies, & continuously tracks, cyclonic events as they unfold. This gives plenty of advance warning & time for all people & many assets in low-cost, less-permanent, more-exposed structures to be moved to safe refuges in the stock of cyclone-proof or resistant structures. Disaster contingency plans along these lines, presumably (or should be) in place.

- 4.8. If enough houses are now to be either newly built, rehabilitated or redeveloped to satisfy all demands for reasonable comfort at reasonable cost within a reasonable period, using least land, using available skills in design, supervision & construction, & avoiding excessive imports of industrial technology skills & materials, or imported pre-fabricated houses, then a large proportion must be of less-than-complete cyclone resistance in some, or even all, of their parts.
- 4.9. On the basis of 4.8 & 4.9 above, policy can be adopted which does not discourage the use of thatch roof surfaces or other modes of traditional or local techniques or materials in a goodly proportion of houses, even on Fongafale Islet, simply on the grounds of lack of cyclone resistance.
- 4.10. It would be logical & reasonable that a hybrid culture in a unique situation, such as Tuvalu, would evolve a hybrid species of house design & structure of some unique character. For example, a thatch roof surface could be used on a more "modern" roof structure. This & other potential variations need to be conceived & examined. One new Public Works Division prototype is now being tested on Vaitupu. Evolution proceeds through a continuing series of prototypes, yielding both trial & error, but also success. More demonstration, test, model prototypes are needed.
- 4.11. A raising of the main floor level well off ground level can save land if the space created underneath can be made useful. Thus, the "Queensland" type house is raised a full storey height to create an open space at ground level, at the cost of a number of posts, piers or columns. The extra space may be partly or wholly used for many different purposes, including food production in shaded gardens or nurseries, or by aqua-ponic cultivation (green & other vegetables grown in nutrient water without soil: Tuvalu has a lot of rainwater but little soil).

- 4.12. Even slightly raising the floors of living & sleeping areas, by much less than a full storey height, can create useful storage areas; & improve climate control, water supply, cleanliness & drainage. Bathroom, toilet, kitchen & laundry areas that need water-use points can be on slabs close to ground level, & more easily supplied with gravity-fed water; & the whole land plot & house interior can be more easily kept clear, & drained.
- 4.13. Housing design should help people to reduce water waste, & to avoid being forced to buy water from mobile tankers, either because of waste or because of the occasional drought. The answer is not simply to continuously increase the total amount of money allocated to more & more, & bigger storage tanks, but also to reduce waste. Showers are the most wasteful of all methods of bathing, & first became fashionable & ubiquitous in Australia. There are other pleasant ways of bathing the upper parts of the body. The shower method is unsuited to Tuvalu for several reasons: wastage is one; but the other is the height of the shower head in relation to the bottom of the water storage tank, & the need for a pump (electric, deisel or other; automatic or manual) to raise water from the lower part of the tank (during a water shortage) to the shower head.
- 4.14. Water pumps (now in many Fongafale houses) are imported, & costly to buy, install, operate (especially by electricity), maintain & replace. It is irritating, & wasteful of time, if one has regularly to remember to use a pump in order to refill a higher tank to give gravity feed to shower heads &/or other water-use points at levels higher than the bottom of the lowest tank. Thus, house design must seek to lower the level of all water-use points &/or to lift the level of bottoms of all tanks. The floor levels of all toilets, bathrooms, laundries & kitchens can sensibly, & more cleanly, be kept at least 1 step, if not a half or full storey, below the "dry" levels of living, sleeping & other areas. The lowering of shower heads can also help to eliminate the need for pumps.
- 4.15. Highly fastidious people in highly civilised cultures close to the Equator with high rainfall, hot & sweaty climates like Tuvalu's, have evolved ways of bathing their bodies pleasantly indoors, or at least under roofs (see 3.17 above) which are not as aggressively Australian as the shower head. They can also maintain perfect sanitation, & they use pedestal toilet bowls, without having any taps or toilet cisterns in their bathrooms; & prepare beautiful food without taps in their kitchens or laundry areas. Instead of water being dispensed by a shower head & by a toilet cistern, & by a handbasin tap, & by a kitchen tap, all water is dispensed from a "ladle" or "dipper". Until recently, this ladle was often a half or three-quarter coconut-shell with, or

without, a wooden handle neatly affixed. Nowadays, it is a specially designed & mass-produced lightweight plastic ladle with one plastic handle & a capacity of 1.25 to 1.5 litres. This is dipped into, & quickly filled from, a waist high, open topped, tank or cistern built of fully tiled brick or concrete (in Tuvalu, this would probably have to be plastic or non-corroding metal) in a corner of the bathroom between the "shower bathing area" & the pedestal toilet, & close to the hand washbasin. A similar tank or cistern is in a corner of the kitchen &/or laundry. Water is fed into, & stored in this floor to waist-high tank, ready for immediate & quick fills & refills of the lightweight one-handed 1.25 to 1.5 litre dipper or ladle. In the bathroom, this water is then poured or splashed either over the head, or the particular part of the body being washed at that moment; or alternatively, into the pedestal toilet, to flush it; or into the hand wash basin if & when desired. The lightweight dipper is easy to use with 1 hand. The 1.25 to 1.5 litre capacity is just the most convenient amount for use at any one moment of wetting, soaping, scrubbing or rinsing one section of the body. The number of dipper-fuls used to flush a toilet (1, 2 or 3 or any part thereof) can be precisely adjusted to the precise need of the toilet bowl at any particular moment. The overall result is a very hygienic, pleasant & refreshing system which is most economical of water. Taps cannot be left running while one shaves or brushes one's teeth; or leaves the room. Showers cannot be left continuously running while one soaps or scrubs one's body; & the only tap that can drip or leak is the one which occasionally refills the floor or bench tank (slowly if pressure is not high) from a nearby roof-fed tank, the bottom of which needs only to be at or above waist height of person standing on the bathroom floor. A further advantage is that the one handed dipper of 1.25 to 1.5 litre capacity can be tilted from behind by a person leaning forward while sitting on the pedestal toilet, so as to provide a flow of water with which to perform the function for which a very small percentage of the world's population uses either toilet paper or a separate piece of plumbing called a "bidet". In Tuvalu, it would eliminate any need to buy (imported) toilet cisterns & toilet paper.

- 4.16. Most houses in Fongafale since 1973, have been designed by people in (or from) the United Kingdom, Australia or New Zealand; people who have not lived in Tuvalu or any comparable culture, economy & climate for long enough, with eyes & minds open enough, to begin to realise just how irrelevant & inappropriate the details of their designs are to long term life in Tuvalu for a Tuvaluan. Tuvaluans appear to have meekly accepted & even copied these irrelevant, inappropriate & costly details, while quietly spending unnecessarily large proportions of their cash incomes (very low when compared to those of the alien house-designers) on the costs of operating those

houses. A few examples highlighted in this Working Paper are:-

- (a) electricity for fans;
- (b) electricity for water pumps;
- (c) public water tanker refills of their house tanks; or alternatively, over-large house tanks, to allow water to continue to be wasted for longer periods;
- (d) the capital costs of new & replacement fans, water pumps, shower heads, taps, glass louvres & fittings etc;
- (e) the maintenance, spare parts & repair of fans, water pumps, taps, shower heads, movable glass louvres, curtains & the like;
- (f) toilet cisterns & toilet paper; &
- (g) imported food to replace food that could have been grown in houseyards if house plots & house designs & the organic waste disposal system had been carefully considered with this in mind.

No household income & expenditure survey data has yet been available or studied for the purposes of this Working Paper; the above concern about house-operating costs is only based on anecdotal evidence. For example, costs of electricity used per month, mentioned by Civil Servants of different salary levels, appear to be an unreasonable percentage of net salary. One reason, perhaps, why there does not appear to be any outcry against house-operating costs, has been that house-rental, & land-rental, for Civil Servants at least, has been heavily subsidised by Government, at least in the sense that the actual rents are not related to the economic costs of maintaining houses & neighbourhoods, paying ground rent for the neighbourhood as a whole, & ultimately replacing the houses at the end of their useful lives: the original capital cost of most of the houses was supplied directly by the UK & other Donors.

- 4.17. An interesting example of one possible alternative way of thinking of a "house" in Tuvalu at least on "outer" islands, or for low income non-Civil Servants on Fongafale, is a land-saving, low-cost, local-materials, cool, 2-storey house set in a small but productive tree & food garden bounded by "living fences". Such a house & garden has been designed & sketched by Paul Sommers, a UNICEF agriculture, food & nutrition specialist, in his 38 page booklet **Low Cost Farming in the Humid Tropics** (see Document 95 in Working Paper No I), a copy of which is available in Tuvalu.

- 4.18. Increasingly in future, more Civil Servants & other people in Fongafale will, for periods at least, be single people, or couples either without children or with only 1 pre-school child. Housing for such people can be in different forms of terrace or row houses, flats or apartments of any number of storeys, limited only by foundation conditions, cyclone resistance, overall construction costs per square metre of floor space, & environmental sustainability. Two storeys may be possible, & could save land space. Such housing should face South or South East, away from the sun, & towards the South East trade wind breezes. They should be of minimum depth to facilitate cross ventilation. Such possibilities need to be examined.
- 4.19. There are people who need, or want, to live for periods away from their home bases, away from their long-term land use rights, & away from their relatives. These typically include Civil Servants, & others, who work for periods away from their home bases, or who, for short or medium term periods, attend courses, in-service training, or perform special assignments. Many such people, particularly those who are single, or married without children, can be lodged in Government or in private rental accommodation, in lodging or boarding houses, in "home-stays", in hostels, or in hotels. These needs & possibilities need to be examined for Fongafale, & also for each of the "outer" Islands & Atolls.
- 4.20. Every Government is an "employer". So are many Non-Governmental & private organisations. Tuvaluan Civil Servants & Classified Workers are "employees".
- 4.21. It is quite normal for employers to require their employees to travel, live & work away from their home area, often for years. An employee of any kind is normally paid a "package" of salary, incentives & special allowances which enable the employee to rent, lease, build or buy his or her own accommodation or housing wherever the employee may be posted by the employer. Special allowances are also normally paid for travel, temporary accommodation, & relocation expenses.
- 4.22. The long term employees of large, stable organisations, whether Government or private, are often assisted to lease, build or buy their own permanent homes, either in their original, or their new, home areas; such assistance often is the form of employer-guaranteed long term loans, with or without employer subsidised interest rates; & repayable over time by weekly or monthly salary deductions.
- 4.23. It may have been an historico-cultural accident that Tuvalu inherited & has continued to date, the British Colonial Service policy & General Administrative Order on Housing for Civil Servants. In recent years, the world (including employers &

employees everywhere) is increasingly turning to the creation &/or the stimulation of private markets in land & housing.

- 4.24. Some Governments, in the recent past, have created very large stocks & areas of housing, built, owned & maintained by Local or Central Government, & rented at subsidised rents to voters, including Civil Servants & other Government employees. The United Kingdom, from the 1950s to the 1970s, through the period when Fon-gafale was planned, was one example. The erstwhile Soviet Union was another. Neither of these housing policies proved to be sustainable. One of the many reasons for the failure of such policies, in addition to their economic & financial insupportability, was the unavoidable inefficiency of inescapably bureaucratic organisations in managing, repairing & maintaining large stocks of housing over a long period when the occupants, being merely tenants of a political authority, have no vested interest in their homes.
- 4.25. The Singapore Government also planned, designed & built large stocks of housing. But it harnessed its compulsory national savings/social security/pension scheme to finance the housing by enabling occupants to buy equity in their own homes, & it harnessed traditional cultural values & disciplines to solve long term management, maintenance, upgrading, rehabilitation & redevelopment problems.
- 4.26. All of the "advanced economy" arrangements summarised in 4.18 to 4.25 above, are easily possible wherever the culture & the Government permits or encourages a "market" in short & long term private rental accommodation; & in the private leasing & sub-leasing (or buying & selling) of sites, buildings or parts of buildings (such as flats, condominiums or home units). But wherever 2 or more human beings exist, it is not often difficult to create, encourage or stimulate some form of "market", even in land & housing accommodation, even on long land leases.

5.0. Which other Tuvalu issues & policies are inseparable from housing issues & policies? What kind of "integrated approach" needs to be adopted to all these issues & policies?

- 5.1. "Housing" Policy depends upon, & inter-acts with, many other Government policies & actions, as well as with the evolving social attitudes of different groups & communities within Tuvalu. This has been demonstrated throughout Sections 1 to 4 of this Working Paper Discussion Draft. The particularly inseparable matters raised

throughout those Sections will not be re-capitulated here.

- 5.2. This "DISCUSSION DRAFT" has been written with the aim of stimulating discussions by the members of the Housing Task Force & other people in Tuvalu, during July & August 1992. Following the results of those discussions, it is currently intended that this draft Working Paper be corrected, revised & completed during September for re-submittal in November 1992 in a more integrated, structured & positive form, hopefully introducing a first draft Housing Policy, Strategy & Priority Action Programme, for further discussion.
- 5.3. Contributions to this work are invited, solicited, & will be welcome. They may be formal or informal, by way of queries, comment, advice, data, ideas, agreement or disagreement, constructive criticism, or alternative proposals. They will be considered & responded to in due course as they are received.
- 5.4. One particular matter on which advice is sought, relates to policies & plans for the future of Government employment in general, & the Civil Service in particular. Such advice is needed in order to prepare a policy & plan for the housing of the people likely to be involved. For example:-
 - (a) what are the currently desired or intended scales, natures & distributions of these types of employment?
 - (b) what is likely to be the patterns of recruitment, transfer & mobility, turnover & retirement?
 - (c) will Civil Servants & others be encouraged to become more multi-skilled so that they can switch Posts between Ministries & yet stay living in the same house on the same Islet, Atoll or Island?
 - (d) to what extent could Civil Servants stay on their own "Home Islands"?
 - (e) to what extent could compulsory or voluntary salary deductions be used to fund housing & home ownership over the longer terms to retirement?
 - (f) what is, or is likely to be, Government policy on retirement ages, & the continued employment of retired or over-age Civil Servants in less responsible Posts after they have made way for younger people?