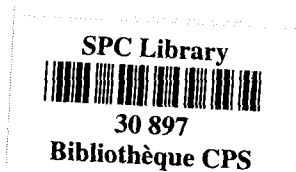


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**SOCIO-ECONOMIC IMPACT STUDY
OF THE
TRIAL FISH PROCESSING FACTORY
KILEVA, ATAFU ISLAND
TOKELAU**



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**South Pacific Commission
Office of Tokelau Affairs**

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The views expressed within are the authors' and not those of the organisations they represent.

Acronyms

CPUE	Catch Per Unit Effort
CSL	Community Services Levy
EEZ	Exclusive Economic Zone
FAD	Fish Aggregation Device
FFA	Forum Fisheries Agency
MIRAB	Migration, Remittance, Aid & Bureaucracy
OTA	Office of Tokelau Affairs
PIDP	Pacific Islands Development Programme
SPC	South Pacific Commission
TPS	Tokelau Public Service
USAID	United States Agency for International Development
UNCED	United Nations Conference on Environment and Development
USA	United States of America

Glossary

alofo	-	compassion, affection
aumaga	-	association of able-bodied men
faatele	-	traditional dancing
faipule	-	elected representative of the people, member of parliament
fatupaepae	-	foundation of the home
feagaiga	-	covenant
fono	-	meeting
ika ha	-	sacred fish
inati	-	share group system
kaiga	-	household, kinship
kaleve	-	fermented toddy used as an alcoholic beverage
malae	-	open space
maneapa	-	meeting house, meeting protocol
maopoopo	-	peace and harmony
pule	-	authority
pulenuku	-	mayor
tama fafine	-	children of women
tama tane	-	children of men
taupulega	-	grouping of senior men chosen from each kaiga; village council
tautai	-	masterfisherman

Preface

The Trial Fish Processing Factory (commonly known on Atafu as the Kileva) is Tokelau's first experience with a small-scale processing plant. Assessing the successes and failings of this venture is thus important not only to effectively evaluate its establishment and operation but also for the insights into the major problems and constraints incurred and how this impacts on the people.

This study attempts to highlight key issues that may assist in refining proposed actions in salvaging the Kileva as well as providing substantive recommendations for those interested in pursuing a similar venture in other parts of the Pacific.

In the study, some aspects of the Kileva's conception and operation have been critically questioned and discussed. The intention is not to detract from the genuine efforts contributed by technical assistance, the management team and others involved in its implementation but rather to ensure that the evaluation and impact study as a whole contributes to avoiding a repetition of past shortcomings in future formulations of such programmes.

1.0 Executive Summary

Socio-Economic Considerations

The economy of Atafu is a subsistent and aid-affluent one, enshrined within a protective socio-cultural environment. Village life is well organised, with the planning and coordination of village activities performed by the **taupulega** (grouping of senior men). To the external observer the obviousness of this complex social organisational structure is disguised in the seemingly relaxed manner in which villagers go about their assigned tasks.

In line with the egalitarian structure of Atafu society, the principle of **maopoopo** and **alofa** is manifest in the dedication and commitment the village has to community activities. The fact that the importance of the community's needs is still in this day and age suggests that this characteristic of the society will not change overnight for the sake of the Kileva project.

Resource management is not a new concept in the **taupulega** setting and the **inati** system is evidence of an age-old sharing system that serves a social welfare function.

Findings of the Research

Atoll living revolves around the sea and any development of marine resources must take into account and understand the social and survival respect the people have for the sea.

The work philosophy of the community is biased towards the welfare of the community, with community work taking precedence over individual endeavours. Thus for those not in the Tokelau Public Service (TPS) or employed in casual labour, time use patterns adhere to the programme of activities assigned by the **taupulega**. Individual initiatives and profits, where these occur, are redistributed through the **kaiga** network for communal welfare.

Income earned by TPS and casual labourers is mainly spent on store purchases, contributions to the church and small amounts set aside either to buy/replace capital equipment or to support children being educated overseas. This general expenditure pattern is also observed among the Kileva factory workers and fishermen.

The **taupulega** system is in itself a centralised planning/coordination unit, that programmes community activities within a weekly routine, adjusted from time to time to cater for visits to the island, festivities and funerals.

The Kileva Factory

Although not part of the mandate for this report, this study provided the opportunity to broadly analyse the Kileva operations in hindsight.

The introduction of a technology or development intervention is undertaken to make an impact or instigate a change in the way of life of the recipient. The impact in the lives of the people of Atafu has been both positive and negative. Positive in the sense that people have enjoyed the benefits of income injected through salaries and sales of fish to boost their uniform spending patterns. Positive in that skills training programmes to assist the factory workers perform their designated tasks are now available on the island and can be called on when required.

On the negative side, the existence of unused building and equipment depicts an efficiency problem. The fact that the factory is closed down is an admission that the intervention has been remiss in understanding fully the basic socio-cultural principles and social structures that programme this society.

The Kileva operations opposes the existing traditional system (taupulega) in the following ways:

Kileva	Taupulega
- encourages individualism;	- mobilises the community (aumaga) for fishing expeditions
- factory working hours adhere to an 8 a.m. to 4 p.m. timeframe;	- fishing hours are dependent on seasons, weather or taupulega directives and are therefore flexible;
- the processing of tuna is simple (chilling, marinading, drying, packaging), however, the coordination of ice supply and marinade formula with varying fish catch received requires sound judgement and coordination;	- management/co-ordination is a product of age and authority and is directed to concern for the welfare of all, sometimes to the detriment of modern and introduced technologies.
- access to reliable power source and water are essential.	- atoll dwellers practise resource management and conservation (i.e. water and other scarce resources).

Conclusions suggest that a taupulega directed and managed factory accentuating the corporate nature of Atafu's traditional administration body could be developed to revive the Kileva. However preliminary cost/benefit figures to gauge the scope of factory operations and to assist in consolidating trial market links will need to be finalised before any decision to re-start the factory is taken.

Underlying all these considerations is the importance of the community's active participation in all phases of project reformulation. Constant back-up support from a suitable development worker during the reformulation and initial years of operation will be an important component. The worker's priorities should focus on examining and developing the people's capacity to integrate the Kileva concept into their particular socio-cultural setting.

2.0 Introduction

The Kileva Fisheries project was established in 1990. Funds from the Economic Development Fund under the USA Tuna Treaty was secured by OTA to assist in constructing the factory buildings and providing operating capital for the factory's first year of operation.

The SPC Coastal Fisheries Programme provided technical assistance and training for the trial tuna processing venture and also contributed funds to assist in initial ingredients, packaging materials and basic tools and equipment.

The Department of Agriculture and Fisheries of the Office of Tokelau Affairs in Apia supervised and managed general operations at the factory as well as coordinating the marketing of the product to potential markets. Daily management and production operations were performed by the people of Atafu.

Initially the objective of the project was to improve the traditional methods of curing fish and to explore limited export markets where the product could be sold. After the visit of the SPC Post-Harvest Fisheries Advisor the objectives were modified to increase the product's comparative advantage by producing high-quality, value-added tuna product. This entailed a larger initial capital investment but the rationale at the time was that the returns to investment would exceed initial expenditure. This rationale however was based on the assumption that the final product would not need to compete with cheaper imports from South-East Asia, if marketed properly.

3.0 Research Methodology

Terms of Reference

The study addressed the social and economic issues that impact on the operation and existence of the Kileva Factory.

In particular the study investigated the following socio-economic issues:

- work philosophy of the community;
- time available to devote to such projects (men, women and family groups);
- attitudes to working as groups or as individuals;
- acceptance of a more routine working regime;
- money management and dispersion at the community, family and individual level.

This socio-economic impact study was the first of its kind to be conducted of the project. Ideally, socio-economic considerations and impact analysis should precede any project investment/implementation decision. Specific indicators identified in a pre-feasibility study will assist project management and monitoring of expected (and unexpected) changes that may occur. This oversight is noted at this stage.

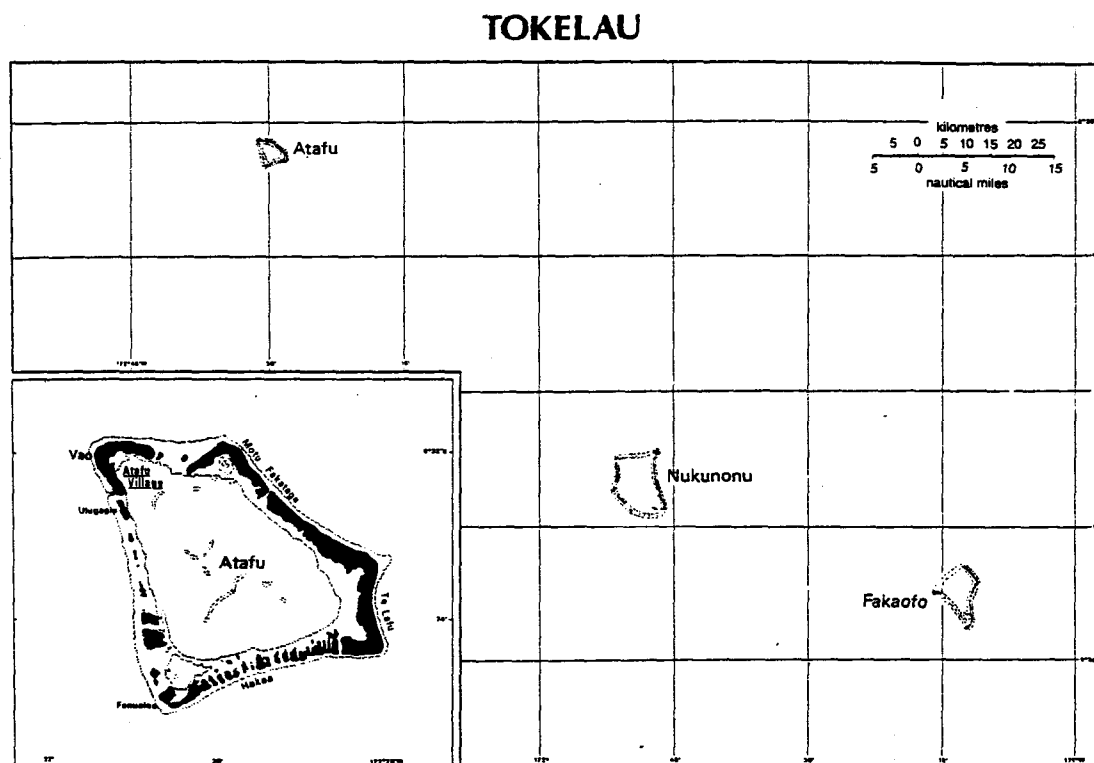
In addition, it must be noted that this study was conducted at a time when the factory had ceased operations for almost a year. The authors were not able to observe first-hand daily operations of the factory, nor measure social and economic changes during the actual operations. Instead the bulk of information and data collected and received is based on recalled observations and value judgments by the people concerned and past records kept. As far as possible quantitative descriptions are provided to explain or clarify contentious qualitative observations.

The methodology for quantitative data collection included reference to census and statistical reports; conducting of guided interviews with factory workers and fishermen (see Appendix 1); and consultations with cross-sections of the community.

All factory workers on Atafu were interviewed excluding one woman who had migrated to New Zealand. The top ten suppliers of fish to Kileva were interviewed with two fishermen representing the two **aumaga** teams - Puamelu and Peletania. The **aumaga** represents over 45 percent of the Atafu labour force.

4.0 Tokelau – General Background

The Tokelau Group is situated over 300 nautical miles to the north of Western Samoa and is made up of three low-lying atolls - Fakaofu, Nukunonu and Atafu. The Group is neighboured in the West by Tuvalu, the Phoenix Islands of the Republic of Kiribati in the north and the Northern atolls of the Cook Islands in the east.



The land area of the three atolls totals 12.2 sq.km (Nukunonu - 4.7 sq.km, Fakaofu - 4 sq.km, Atafu - 3.5 sq.km) and the sea area extends over 187 sq.km. The climate is tropical with temperatures averaging 20 degrees celsius and relative humidity is high at 90 %. Mean annual rainfall is fairly high at 3,000 metres. Tokelau lies within the tradewind belt and experiences tropical cyclones from time to time.

In 1991, Tokelau's population declined by 6.7% from 1,690 in 1986 to 1,577. Table 1 summarises the population structure over the two census periods.

TABLE 1: TOKELAU POPULATION SUMMARY 1981-1991

Village	1986	1991	Intercensal Change 1986 - 1991	
			Number	Percent
<i>Atafu</i>				
Males	295	265	-30	-10.17
Females	603	543	-60	-9.74
Total	603	543	-60	-9.95
<i>Nukunonu</i>				
Males	207	220	13	6.28
Females	219	217	-2	-0.91
<i>Fale</i>				
Males	220	187	-33	-15.00
Females	230	202	-28	-12.17
<i>Fenuafala</i>				
Males	109	102	-7	-6.42
Females	102	106	4	3.92
Total	211	208	-3	-1.42
Tokelau				
Males	831	774	-57	-6.86
Females	859	803	-56	-6.52
TOTAL	1690	1577	-113	-6.69

4.1 Transportation and Communication Links

Tokelau is serviced by two shipping vessels; its own inter-atoll vessel, *MV Tutolu*, and a monthly charter of the *MV Salamasina* that stops in at each atoll during its visit.

The islands are linked by a CB radio network system.

A seaplane air service operated out of Fiji in the early 1980s, but ceased operations because of costs involved in servicing this out of the way route.

4.2 Political/Administrative Structure

Tokelau is part of New Zealand and is listed as a territory which must in due course exercise its right to self-determination. Tokelauans have New Zealand citizenship.

The atolls are administered by an Administrator who resides in Wellington (NZ), but most of his powers are delegated to the Official Secretary of the Office for Tokelau Affairs (OTA) who is settled in Apia (Western Samoa) because of the remoteness and lack of regular communication and transportation links to and between the Tokelau atolls.

The Official Secretary is the head of the Tokelau Public Service (TPS). The TPS is divided into several departments headed by a Director: Administration, Health, Education, Public Works, Agriculture and Fisheries, Finance. All Directors are based in Apia.

On each atoll, the Executive Officer is the link between the TPS staff in Apia, the local public servants and the people.

The three atolls are completely separate entities. Each has a local Government consisting of a **faipule** (elected representative of the people) and a **pulenuku** (mayor). But all important decisions are made by the **taupulega** or Council of Elders, which is composed of the head of each family together with the **faipule** and **pulenuku**. Once or twice a year, a general **fono** is held to make decisions that concern the three atolls. The general **fono** comprises representation of select members from each of the councils, representatives from TPS and non-government bodies.

The 'bringing home' of the OTA and the TPS to Tokelau has long been discussed at past general **fono**'s. The relocation of the OTA and redistribution of the TPS throughout Tokelau dominated recent **fono** discussions and once these can be attended and agreed upon, Tokelau comes into its own with a likely redirection of the delegation of constitutional authority from Wellington.

5.0 Atafu

Atafu is the smallest atoll of the Tokelau group in terms of land area extending 3 miles north and south and 2.5 miles east and west.

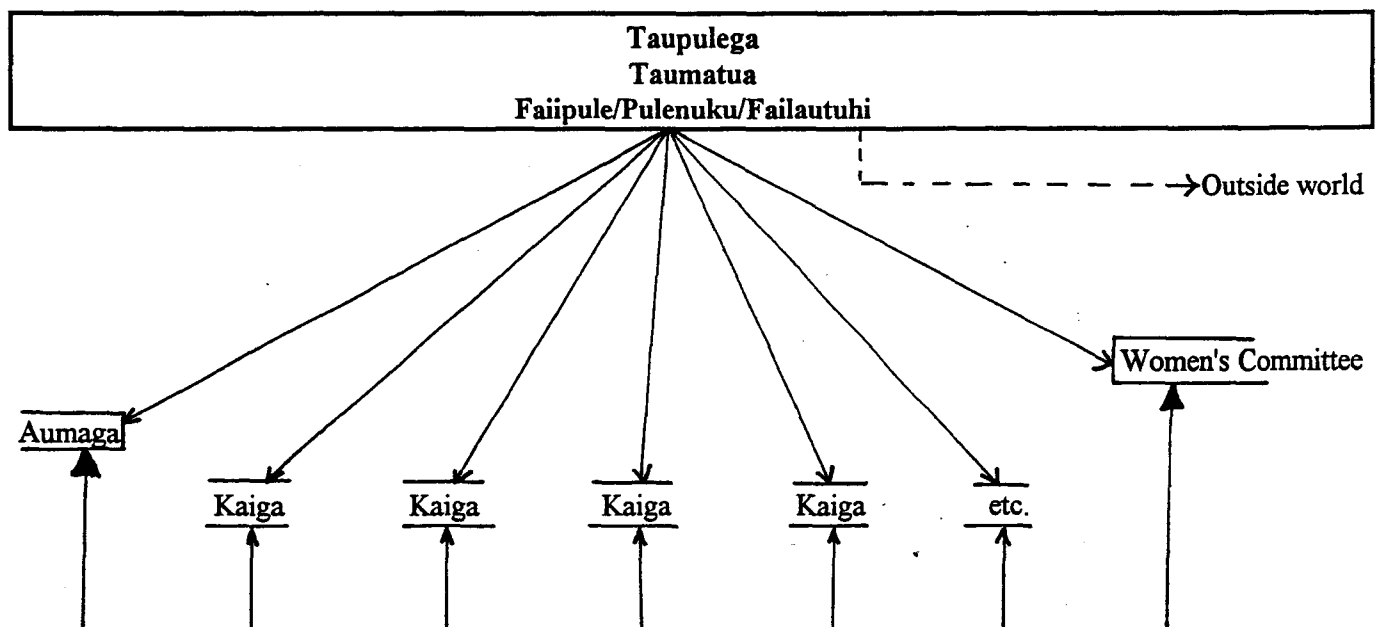
In 1991, the Atafu population totalled 543 with females outnumbering males by 278 to 265 (a sex ratio of 95). The dependency ratio is 112 and suggests in particular a high dependency in the 0-14 age bracket. Household occupation averages 6.6 per household.

5.1 Socio-cultural Setting

Village life in Atafu is always communal and well-organised, with the co-ordination of village activities done by the *taupulega*. To the outside eye, the obviousness of this social organisation structure is disguised in the seemingly relaxed manner in which villager's go about their assigned tasks.

The governing of village life is based on an age-old model probably observed from the first settlement of Atafu before outside influence. Figure 1 illustrates the features of this traditional model and the participatory nature of the village system where each *kaiga* (family) provides a senior member for the *taupulega*, young men for the *aumaga* (the workforce of able-bodied men) and women for the Women's Committee.

FIGURE 1: TOKELAU TRADITIONAL GOVERNMENT



Source: SPREP Report: NEMS Legal Consultancy: Tokelau

This structure aligns itself to traditional governing structures in other Polynesian atoll islands where societies tend to prefer egalitarian precepts (i.e. Tuvalu *maneapa* system, Northern Cook Islands), given their environmental constraints and the need to ensure equitable distribution and access to limited resources available.

In spite of Atafu's direct contact with external influences it still maintains basic cultural principles that underlie the behaviour and functions of community life. To date, these principles have acted as a mainstay in the transitions that have been experienced in the society.

Maopoopo

At the centre of community functions such as meetings or village work projects is the concept of **maopoopo** or peace and harmony at the community level. In line with the egalitarian structure of the Tokelauan society, the principle of **maopoopo** is manifest in the dedication and commitment the village has to community activities over individual plans and projects.

In the western context for instance, a meeting is convened to achieve results and to make decisions. In the **maopoopo** context a **fono** is judged successful rather for the sense of harmony that it engenders than for the decisions it takes.

In communal enterprises and activities, effective leadership and planning are essential precursors in sustaining **maopoopo** in for instance a fishing expedition or work activities. So, for instance, even though individuals have set work programmes, these are superseded by community needs that require the participation of all. Of course, there may be those that perform their obligations grudgingly but if leadership skills are highly recognised a sense of harmony will prevail as the task is undertaken.

Authority of Age

The wisdom and knowledge of the elders is the foundation of village governance and social order in Atafu. Even within the **kaiga** structure the authority of senior members is regarded and obeyed while junior members are directed. Within the various social groupings (i.e. **aumaga**, **taupulega**, women's committee), the voice of the elder members is respected and noted.

At the highest hierarchy is the **taupulega** who deliberate over matters governing the island.

Status of Women

There is a Tokelauan saying that reflects the recognition the society gives to women - *ko te fafine e nofo: ko te tagata e fano i te auala* (the women stays: the man goes on the path).

In daily living this is observed when upon marriage a son or brother will leave his natal home and reside at his wife's home. A daughter or sister (especially the eldest) is expected to remain in her natal home after marriage.

Although this custom is straightforward in the sense that because men are involved in community enterprises that require their absence away from the home for extended periods of time (i.e. fishing and food gathering expeditions), it is also logical that women must look after the remaining occupants in the household (especially the elderly and the children) and her rights to execute this function would be less controversial in her natal homestead.

The role and status of women in Atafu complement the activities and functions of men. The woman's importance is exemplified in the **feagaiga** (covenant) of brothers and sisters and in the **fatupaepae** (foundation of the home) connotation that describes the importance of the senior woman in the natal home. These two definitions suggest obedience, honour and respect all in one.

The **feagaiga** is an unwritten covenant honoured by brothers and sisters. Particularly during adolescence and even after marriage there is mutual respect and love by both to the extent that sisters must be attentive to the needs of their brothers, and brothers must have the well-being and protection of their sisters foremost in their heart. This latter point is manifest in the **fatupaepae** concept which, although not widely practised, is noted by respondents in Atafu. For instance a brother returning from a fishing or food gathering expedition will give his catch or harvest to his eldest sister (**fatupaepae**) to distribute (rather than to his wife), particularly when the produce comes from property such as canoes and plantations to which both have rights.

The 'Kaiga' (kinship)

The **kaiga** is the basic economic and social unit. Although **kaiga** may refer to an extended family residing in a certain location it has a broader meaning. For a Tokelauan, to be part of a **kaiga** is to acknowledge the dense network of active kinship ties she/he has through cognatic descent (Wessen:p.54). It is at the **kaiga** level that the **maopoopo** and **feagaiga** principles are central to the way kinfolk should interact at all times. This adherence to respect, obedience and authority is further cemented by **alofa**. **Alofa** is manifest mainly through acts of obeying, providing and giving unreservedly and sharing freely.

The mechanisms of Tokelau communal life governed by the **kaiga** concept encompasses land tenure, household maintenance, production/distribution of food, the control of resources, marriage and much of the unwritten rules of interpersonal relations.

The intricate observances within the **kaiga** of the **tama tane** (children of men) and **tama faine** (children of women) sides promotes the complementary roles that are also enshrined in the **feagaiga** between brothers and sisters. This division is based on genealogical descent of present day occupants to a brother or sister in the ancestral origins of their **kaiga**. Those descendants of the **tama tane** side have the **pule** (authority) and obligation to exploit family lands for the benefit of the whole **kaiga** while the **tama faine** side have the obligation to divide and distribute to all **kaiga** members whatever produce is brought to them. The **kaiga** is not a co-resident unit as its members are distributed either by marriage or kinship within other households in the village. However it is important to note the complementary division in the household especially when discussing the distribution of produce throughout the village. Within the **kaiga** therefore members work together for the welfare of all, respecting their elders and carrying out their duties as women and men in the spirit of **alofa** for one another.

Traditional Institutions

The attributes of the **kaiga** are magnified at the village level to the extent that all Atafuans who live regularly on the atoll have a right to distribution of produce shares made by the village and at the same time are obligated to following decisions/instructions made on behalf of all by the **taupulega**.

Taupulega (Village Council)

The management of the village is vested in the **Taupulega**. The **taupulega** oversees the efficient and orderly conduct of village affairs and the promotion of economic and social well-being of the people.

The council meets every Sunday evening to review activities and consider issues that have arisen during the past week and to work out a schedule of activities for the forthcoming week. There are presently 28 members of the **taupulega**.

There is a standard weekly programme which is the basic workplan the Council works with to programme communal work projects in addition to the multitude of requests received from the various social and administrative groupings. Days of the week have been assigned to various social groupings as follows:

Sunday	day of rest
Monday	Taupulega
Tuesday	Women's Committee
Wednesday	Taupulega
Thursday	Aumaga
Friday	Kaiga
Saturday	Kaiga

During days allocated for taupulega activities, fishing or food gathering expeditions for community consumption or functions is usually planned in a week. It is surprising how rigid yet flexible this weekly schedule can be. For instance during periods of festivities, bad weather or a death on the island, communal work projects have to be rescheduled. In cases where visiting delegations are on-island or festivities are being held, days allocated to the taupulega may be increased in order that the community can organise fishing and food gathering trips for the community festivities and visiting delegation consumption as it is customary for the island to provide for guests. The point to note is that any rescheduling to increase community work activities by the taupulega is never queried in terms of its encroachment on kaiga and individual level demands.

Social control through kaiga and community pressure censure against non-conformity in most cases and any serious attempt at disobedience to the Council's work schedules is dealt with by the Council in the next weekly sitting with an appropriate fine or reprimand. The fact that the Council must plan activities to ensure an equitable distribution of benefits and sharing of the workload highlights the elaborate planning skills and in-depth understanding the Council members have of their community. As a community the people of Atafu have existed through this traditional central planning experience. The casual, relaxed village life mistakenly perceived by outsiders gives credit to the intricate and detailed development planning and administrative structure Atafu practises on a weekly basis.

The taupulega is funded from internal sources (community service levy (CSL), fine payments etc.) and from OTA allocations called the village development fund which assists in the payment of fuel and labour for community development plans. At the time of the researcher's visit major community works were under way - the sports field extension; the community hall construction; and the seawall construction project. The latter work was suspended until after October when the inter-atoll sports competition would have taken place.

The Aumaga

This association of able-bodied men ranges from young men who have left school to men who have not yet reached the age of 60. Membership numbers over 100 and the aumaga is the work-force and providers of the village. As compared to the other two atolls, Atafu's aumaga is more elaborately organised and autonomously administered. There are twenty elected office bearers who meet each week to plan the activities of the aumaga for the day set aside by the Council and to consider and plan any tasks that the Council has instructed they perform. There is also a weekly general meeting of all aumaga members and attendance is strictly monitored by aumaga officials who have been designated 'policemen' by the executive. The taupulega and aumaga rarely meet together. The aumaga are divided into two groups for the purpose of competition and food gathering tasks required by the executive. The names of the groups are Puamelo and Peletania.

The Women's Committees

Originally set up in the early 1900s to take responsibility for child welfare activities under the guidance of health officers, the women's committees have grown to become the women's counterpart of the *aumaga* in terms of women working together in women's work activities for the welfare of all. There is only one Women's Committee at the village level on Atafu. Under the Church there are three teams namely: Titanika, Parataiso and Utulaina.

The importance of the inati

The *inati* is a time-old share group system that ensures that any collection of marine or land produce by the community is equitably shared among all the households. According to the *taupulega* count there are 98 households entitled to shares (in the 1991 Census 94 households were recorded).

The social welfare function of the *inati* extends not only to ensure everyone shares communal produce but also that the less fortunate in the community (elderly, widows, children) will always be catered for.

In addition to community fishing expeditions to provide fish for the *inati*, there are village rules that are observed when certain types of fish or marine animal are caught (known as the *ika ha* - sacred fish). Turtles, billfish and skipjack are among the species considered sacred and fines are imposed for people who do not carry these types of fish back to the *malae* (open space) for an *inati*. There are also limits to the amount of fish a *kaiga* may harvest. If a fishing trip catches over 50 bonito, automatically the catch must be taken to the *malae* for village distribution.

The *inati* institution designates village distributors (who are descended from the ancestral *fatupaepae* line). Normally men, their task is to ensure for instance a fair and equitable apportioning of say 423 fish of different species and sizes among 543 people who are divided into 98 *inati*, with *inati* sizes ranging from 2 to 20. Such an intricate distribution system requires constant updating of births, deaths and migration in and out of the atoll.

In reverse, the Council may call upon the share groups to contribute their share to collections they require for upgrading community houses or food for village gatherings.

In the second week of the researcher's stay, women's day was celebrated. This is a special day set aside by Atafu to honour the women in the community. Celebrations lasted four days and nights. Prior to the festivities each household had been asked to provide their share of cabin bread biscuits, corned beef and rice for distribution through the *inati*. Thus during the festivities people could concentrate on the cricket game during the day and *faatele* (traditional dancing) at night.

The Church

Although the church is not a traditional institution, Christian principles are already deeply embedded in Tokelauan culture (i.e. to work for the benefit of all, to ensure a sense of peace and harmony in all communal and *kaiga* level activities).

The only church on Atafu is Protestant. Pastors are supported and provided with food and living necessities through community contributions. Cash contributions made on the last Sunday of each month are for the Pastor's upkeep and it is usual for most *kaiga* to make some contribution in monetary terms.

5.2 Economy and Employment

The economy of Atafu, although fairly reliant on land and marine resources for sustenance, has increasingly developed a high dependence on imported food and goods. According to the MIRAB model proposed by Bertram and Watters, patterns of behavior in the small island economies (particularly dependencies) adhere to four basic characteristics, namely, migration (MI), remittances (R), aid (A) and bureaucracy (B). In Tokelau the main driving force in the economy is based on the public service (B), aid and to a lesser extent migration and remittances. This suggests that the economy is in a permanently transitional state with mixed modes of production and subsistence co-existing. Aid assistance to Tokelau has mainly been in the form of budgetary aid that sustains TPS salaries and underwrites the maintenance of current living standards (Hooper, A. et al;p.35).

Tokelau has one of the highest foreign aid per capita allocations in the region. In 1990, it was second to Niue with AUD\$3,750 per capita (SPC;1993). Rather than serve its primary purpose of supplementing domestic savings and investments until the 'take-off' stage, aid has become the mainstay of the island's economy.

Despite the admission of high aid inflows, economic development activities have been geared towards improving the productivity of the traditional atoll agricultural system and utilising the potential of the 200 mile EEZ.

The nature of Atafu's socio-cultural principles and the general recognition of egalitarian norms does not encourage private sector development with a profit motive on a large scale. The previous section does highlight the various principles and structures that maintains a unity and common objective amongst the various groups and kaiga. The corporate thinking prominent in the Council and petered out to the community is evidence of a self-sufficient corporation in itself, not necessarily profit-oriented but rather welfare-oriented (perhaps this could also be called a Pacific form of socialism).

Naturally, Tokelau's main investment asset is its marine resources and village life and sustenance revolves around the sea. On a macro-level, the Tokelau report to the United Nations Conference on Environment and Development (UNCED) observes that because of the micro size of the economy in terms of land and population, capital investments are limited. Furthermore, increases in productivity are unlikely to be achieved from resources currently employed. Given the limitations to investment opportunities, most households have a high propensity to consume rather than save their disposable income. The introduction of investment activities that exploit the use of marine resources must therefore be advocated within the perspective of the communal norms regarding common resources and with respect for existing traditional structures that maintain equity.

5.3 Patterns of Income and Expenditure

As mentioned above although the community is able to provide for sustenance in land and sea resources, money is increasingly becoming an important variable in meeting import consumption and internal and external obligations.

The increase in the importance of money has shifted value systems over the years to the extent now that although daily life rotates around subsistence living people require some money for a number of purposes. These range from small purchases at the cooperative store, school fees (for children schooling in Western Samoa and further afield), church donations, to the purchase of major items such as outboard motors, sewing machines or a freezer. People derive income from several avenues.

**Table 2: Source of Income of Households on Atafu
Dec '90 - Nov '91**

Income Source	Number of Household
TPS Salaries	42
Casual TPS Wages	80
Honoraria	17
Remittances	35
Copra/Handicraft/ Livestock Sales	38
Other *	12

*includes sales of homemade products, land lease and accident compensation payments.

Source: Census of Tokelau population and Dwellings, 1991

Table 2, shows the significance of income derived from government transfers which are maintained by budgetary assistance from New Zealand. The only productive sector income is derived from sales of copra, handicraft and livestock and is small being reported by 19 of the 94 households in the Census. Remittances a common and often major source of income in other Polynesian societies is visibly not an important source of income and remittance values may vary per household from NZ\$150 to over \$1,000 per annum, with the bulk of households (23) receiving about \$250 a year.

Although recipients of TPS salaries may receive higher incomes on a regular basis, it is the casual wage category that ensures a maximum dispersion of income to most of the households on Atafu. In keeping with the norms of fair distribution and access, the Council have an organised rotation system for the casual TPS wage workers. This innovative policy ensures that each month at least most households (particularly those that have no salaried worker) have some access through the casual labour force to income.

Monthly expenditure patterns derived from the latest Census support the premise that most income is consumed rather than saved or invested. Table 3 illustrates this phenomenon.

**Table 3: Monthly Expenditure by Household on Atafu
November 1991**

Expenditure Item	Number of Households
Store	94
Electricity	77
Donations	80
Remittances	32
Overseas Stores	23
Overseas Commitments	22
Other*	15

*includes housie, club fees and payments to non-family members

Source: Tokelau Census of Population and Dwellings, 1991

Apart from store purchases and electricity payments, donations (particularly to the church) are a regular monthly expenditure of most households with amounts per household averaging \$20 to \$25 a month. Although specific data is not available to derive more precise aggregate expenditure values, averages suggest that monthly total expenditures at the store exceed \$8,000; donations average at \$2,200 and electricity payments account for about \$1,900. Therefore monthly expenditures per household on the basic expenditure items (at least) averages \$128.

5.4 Attitudes to Earning Income

The micro size of the economy in terms of small population, land area and natural resource development, hampers the people's opportunities to develop income-generating activities at sustainable levels although in recent times informal sector enterprises have flourished to an extent. The traditional economy of Atafu involves communal land rights, labour invested in atoll agriculture and fishing, livestock production and fish harvesting for exchange and subsistence purposes.

However this idyllic atoll environment has over the years been subject to the inevitable advent of modern influences. Import expenditure are now greater than export earnings and government maintenance of this gap (in the form of budgetary assistance -salaries, wages) is essential. 1989/90 budgetary assistance figures for Tokelau totalled NZ\$4.1 million or NZ\$2,426 per capita which when compared with other Pacific island nations suggests a fairly satisfactory standard of living and confirms the MIRAB principle that budgetary assistance cushions the adverse effects of global price changes and sustains the standard of living at higher levels.

All interviews conducted with fishermen and ex-factory workers on Atafu restated their support for avenues to increase their income-earning prospects. These results are discussed in detail in section 5.12.

Permanent salaried workers on the island are mainly those who have had experience or education overseas and it is not unusual for their salaries to be committed to the general welfare and upkeep of the kaiga they live in or are associated with, within the traditional context. Thus for salaried workers, their monetary contributions to their kaiga are a substitute for their physical participation in family or community work projects.

Atafu has a strict ban on the sale of alcohol. As a result the production of kaleve (fermented toddy used as an alcoholic beverage) has been produced for sale. There are 5 regular kaleve producers who average sales of NZ\$232 each per month (or an aggregate total for all producers of \$13,920 per year). Thus limited income-earning opportunities does exist and entrepreneurial skills are prevalent. All kaleve producers confirmed that the income earned was mainly used for consumption, donations and maintenance of children at overseas education institutions.

5.5 Attitudes to Fishing

For atoll dwellers, fishing is more than just another form of finding food for daily living; it is also an artform and a skill passed down from generation to generation. Prior to the advent of government salaries and wages which has adjusted community life, fishing was also considered a sport which produced a lot of good food as well as a lot of good anecdotes and stories. Fishing and especially fishing in the open sea is the prerogative of men, although women may angle and assist in fish drives.

In Tokelau, there are rules and prohibitions concerning the sea. Although not practised extensively today, young men in Atafu do respect certain aged elders in the village who have the title of tautai (masterfisherman).

The working hours fishermen maintain are influenced by the weather and availability of bait and fish. Thus, their day to day work schedule differs from those in salaried/wage earning jobs.

There is concern now that because of labour demands by the Council for set village projects of a capital works nature sometimes fishermen are not able to catch fish at the best time (i.e when the moons, tides, seasons are right) and indiscriminate western methods are being practised. Of the three atolls, Atafu still maintains the largest fleet of traditional canoes (See Table 4).

Table 4: Transport Amenities by Atoll - 1991

Transport Mode	Atafu	Nukunonu	Fakaofu	Total
Traditional Canoe	48	2	9	59
Aluminium Dinghy	19	36	57	112
Wooden Dinghy	0	1	1	2
Fibre-glass boat	0	3	1	4
Outboard Motor	32	33	62	127

Source: Tokelau Census of Population and Dwellings, 1991

Various writer's have recorded the extensive fishing rites and techniques of fishing undertaken by Tokelau fishermen. This report reiterates much of the significance attached to fishing as being a time-old tradition passed down from each generation and still very much apparent in Atafu today. For instance, if a fishing group sees a canoe in the distance belonging to a tautai sea protocol prescribe that the approaching canoe must either give way for the tautai's canoe or else must veer a respectable distance from the tautai's canoe if it is stationary. Also fishermen have admitted to giving all of their catch to women and children who have been fishing at the mouth of the passage entrance, this observance is based on traditional beliefs.

According to a study by Zann and Aleta (1984) on fish consumption in Atafu, conclusions showed that an average of 370 grams of fish per person per day was eaten with fish consumption frequency being about 5.5 days per week. The study also researched fishing techniques and concluded that the catch per unit effort (CPUE) (based on 58 recorded fishing expeditions) averaged 2.93 kg fish/man/hour with fishing time averaging 2.7 hours. Flyingfish scooping was the most productive fishing method, followed by gill netting and bottom hand lining. Outboard powered canoes were the main means of accessing fishing grounds and an average of 4.8 fishing expeditions were conducted by each household in a week. Zann and Aleta were able to provide a conservative estimate of the total catch for consumption purposes for the year at 74.8 metric tonnes. Although the results of the study are somewhat dated, the figures reflect present day observations that fish is still of major importance in the modern diet of the people of Atafu.

5.6 The Kileva Operations

Factory operations began in 1990 and were timed with the visit of the SPC Post-Harvest Fisheries Advisor who provided advice on the construction of the processing buildings according to international hygiene standards; staff requirements; technical and management training needs for supervisors and processing staff; and conducted a training session with the fishermen on chilling of fish catch. A detailed processing protocol overseeing the processing of the dry marinated tuna product was developed as a result of that visit (See Appendix 2).

Initial production targets estimated 500 kg of dried tuna product per month. Processing was limited to only yellowfin tuna as this produced a high quality product. The fish was purchased from local fishermen who caught yellowfin by the traditional drop line method.

The stages for the processing of the fish are fairly simple and straightforward with hygienic checks built in at each stage.

5.7 Ownership of the Project

The trial nature of the Kileva Factory required careful monitoring by OTA during inception. All three atolls were interested in the factory, however limited financial support could only justify a single establishment sited strategically to service the atolls.

A General Fono decision sited the factory on Atafu as a national project, meaning that all three atolls had equal say in Kileva operations. In this respect OTA assumed management of the factory on behalf of the atolls.

5.8 Staffing of the Factory

A factory manager, fish processing supervisor, ice machine operator were recruited on a salary basis. An assistant to the ice machine operator and 7 casual women workers were employed to facilitate factory operations. In addition, women trainees were identified: four each from Nukunonu and Fakaofo, to work at the factory in order to gain experience in the event that a similar processing venture might be built on their islands.

5.9 Rationale for the Establishment of the Kileva Factory

Tokelau with its natural abundance of fishing stock has over the years pursued initiatives that would develop this resource to becoming a potential foreign exchange earner for the economy. Before the advent of the Kileva Factory, foreign exchange earning for the resource was primarily derived from the US Tuna Treaty fund handled by the Forum Fisheries Agency (FFA).

With aid and technical support, fish aggregation device (FAD) deployment programmes throughout the atolls have facilitated the fishing activities of the inhabitants. As a result, fish caught in excess of communal demands has directed efforts towards exploring additional income earning avenues.

The Kileva Factory provided the opportunity for OTA to explore the prospect of tapping the offshore fishery in a commercial setting and experimenting with a product that might be able to supplement the changes in income and expenditure patterns gradually taking hold in a mixed subsistence/money driven economy.

5.10 Operations

Drying fish is a traditional food preservation practice to store excess fish caught. The emphasis of technical assistance to the project was on providing advice on refrigeration requirements and processing techniques that would enhance and improve the curing process, and more importantly, investigating the marketing potential of the cured/processed product.

Operations at the Kileva Factory involved purchasing the raw material (yellowfin) from the local fishermen for processing into a high grade tuna jerky product. Given the isolation of the island from market outlets (and the perennial issue of transportation and communication links) it was important that the final product should be able to compete among cheaper alternatives from Asian sources.

The Kileva Factory comprises one storage, one processing and one coolstore building with out-door drying racks located towards the eastern side of the buildings.

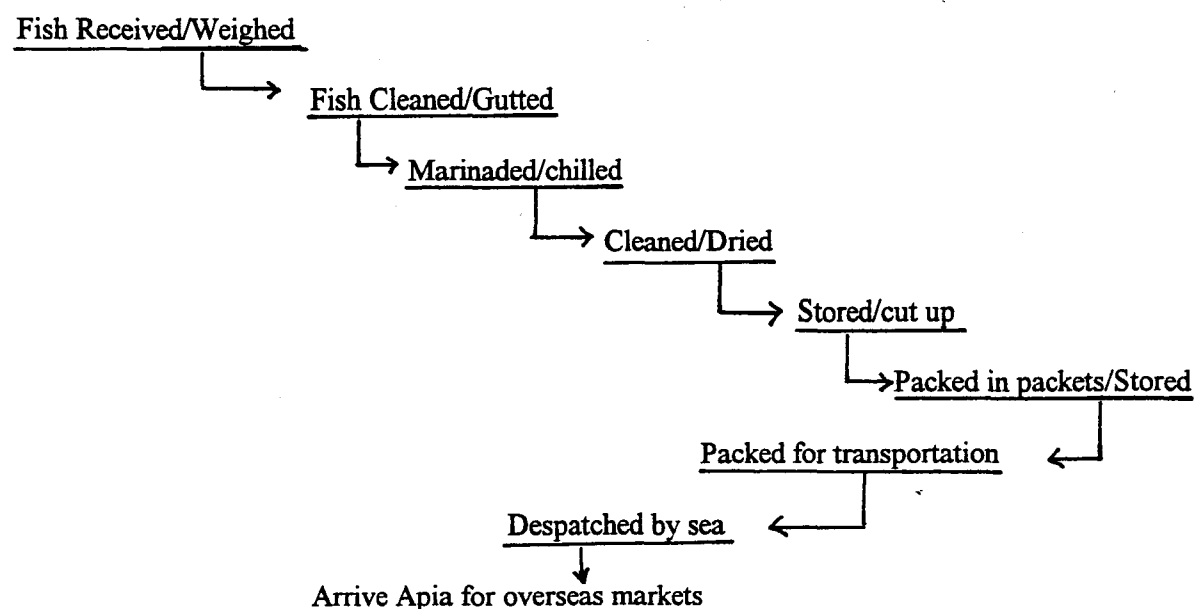
The hours of work for factory workers follows an 8 a.m. to 4 p.m. regime. Fishing for the fishermen is dictated by the seasons, availability of bait, weather conditions and community obligations and therefore can not follow a more set pattern as the factory workers. In general, tuna fishing activities are conducted during the early hours of the morning, although with the presence of FADs fishing hours are extended throughout the day and night.

In brief, the factory operations begins from the purchase of the raw material (yellowfin) at the factory door from local fishermen. After quality inspection the fish moves into the processing line, being cleaned, gutted and filleted before marinating. As guided in the fish handling protocols, the marinade formula is dependent on the weight of tuna strips prepared. The marinated product is then placed in the cool room on a bed of ice for at least 12 hours. After the 12 hours, the tuna strips are taken from the marinade solution, washed in fresh water to remove most of the soya sauce colouring from the surface and placed on clean plastic mesh trays for sun drying.

Sun-drying may take up to one and a half days (depending on the weather). A day later the dried tuna is cut into 'sticks', 'chunks', or 'bits 'n' pieces' sizes. The three cut sizes were then stored in separate containers until ready for packing in the retail packets. Retail packing included weighing and packaging the dried tuna cuts and sealing. The packets are then packed into cardboard cartons and placed in large airtight plastic storage containers awaiting transportation to markets.

The tuna jerky is packed in wooden crates and is transported on a monthly boat charter to Apia. Throughout the whole process, hygiene and cleanliness are constantly observed with basic weight checks and quality control procedures observed as the fish moves from each processing stage.

Figure 2: Stages in the Processing of Tuna Jerky at Kileva



5.11 Transportation and Marketing

The consignments of dried tuna are shipped on either the monthly chartered vessel or the inter-atoll vessel - *MV Tutolu*, to Apia. Freight, wharfage, customs, insurance and handling charges are included on the transportation cost. It is stored at the OTA and airfreighted once orders or interested markets are identified.

In the initial months of Kileva's operations, marketing investigations were being conducted and vigorous attempts were undertaken to distribute the product to as many potential outlets as was possible. By the end of 1991, an interested company began to place steady orders and was followed by a second company interested in adapting the final product to suit prospective clients.

5.12 Analysis of Community Comments

All the people on Atafu who were met and interviewed responded positively to the presence of the factory on the island.

For the workers (many of whom would not have had the chance to work) it was a source of steady income into the household. In the main the income was spent on consumer goods for the *kaiga*. For the fishermen, it provided a source of income where before they never received money for their fish catch. Usually, they would reserve some catch for the household or distribute for the community and then sell the excess to Kileva.

Kileva Factory Workers Responses

The main aim of the guided interview sessions with factory workers was to gauge -

- i) whether individuals would conform to a more routine working regime;
- ii) the significance of income received from the factory compared to other sources and the dispersion of money through the economy; and
- iii) whether working at Kileva conflicted with community obligations/activities.

i) Conformity to a Working regime

All the workers responded positively to being able to adapt to a working regime from 8 a.m. to 4 p.m., with allowance for overtime working during periods of glut supply of fish to the factory. Comments were received on the management of personnel and resources and emphasised the importance of coordination throughout the whole process of producing tuna jerky. For instance, the level and frequency of supply of fish to Kileva is not easily predictable although the ice maker has a fair idea of the times when fish would mainly arrive at the factory door (in the morning). More importantly fish catch levels are unknown at this stage because fishermen (depending on how much is caught) will allocate some of the catch to *kaiga* and communal distribution first. Also ice sales to fishermen going out fishing during the day are made and this competes with ice requirements for chilling of marinated stocks from the previous day.

The manager, the fish processing supervisor and the ice making machine operator do not meet weekly to discuss production levels/targets for the forthcoming week or to review operations the previous week.

The productivity level of the fish processing labourers depended on the levels of fish stocked at varying processing stages in the factory. Occasions were relayed when because of lack of fish, workers have conducted minor maintenance and clean-up activities only but were paid the full working day. Other times some of the workers had worked several late shifts but had not been paid overtime.

In the early days of the Kileva, the rotation of casual labourer principle was applied but was revised as the processing of fish requires a certain level of commitment and skills. The fish processing supervisor was able to select the best casual workers who in the later months became the core work force for Kileva.

Income received was cited as the main influence in workers being prepared to work fixed or extended time periods.

In terms of past experience, the fish processing supervisor, the ice making machine operator and his assistant had worked before in New Zealand in factory jobs and were aware of work ethics like hours of work etc.

ii) Significance of Income-earned from Kileva compared to other sources and dispersion of income through the economy

Weekly expenditure estimates derived from Kileva workers averaged \$492 over the 2 year period. Annually, this amounted to over \$23,000. Table 5 shows where incomes were expended. The amounts set aside for banking were included in the food category as savings book references showed that these were withdrawn at a later date to purchase store items.

**Table 5: Weekly expenditure of Income-earned by Kileva
Factory Workers (NZ\$)**

	Food/Banking	Church Donations	Community Obligations	Other	Total
Aggregate Amount	281	87	41	85	492
%	57	18	8	17	

Three of the ten workers were the sole income earners in their household. A further 5 workers had a spouse who once a month would receive a wage as a result of taking his turn in the rotation of casual workers in the taupulega work scheme. The remaining two workers confirmed that a member of their household was a permanent TPS worker.

All of the workers interviewed advised that remittance was not a major phenomenon in their household. Normally clothes (for children) were the main items received from families abroad but estimated values could not be imputed. Three workers recalled receiving cash from relatives last year with amounts ranging from \$100, \$200 and \$400.

iii) Conflict with community obligations/activities

The factory workers claimed that working at Kileva did not conflict with their obligations to the community. As factory workers they were automatically excused for not turning up to community functions during working hours. For the female staff, they were still able to participate in their weekly women's committee activities after they knocked off from work. Three of the older women workers complained about being tired by day's end and thus sometimes being absent from women's day activities.

Two of the three male workers responded that though they were excused from aumaga activities, they would still like to have had a chance to participate in the weekly aumaga day activities.

Fishermen's Responses

The main aim of the fishermen guided interviews was to discern -

- i) the importance of other sources of income to the household;
- ii) whether fishermen would be prepared to increase fishing activities for cash purposes;
- iii) what major reasons affected their catching fish.

i) Importance of other sources of income

The fishermen interviewed were the top ten regular suppliers of fish to Kileva. Two of the regular suppliers were permanent TPS workers. Two others had family members who were permanent TPS workers. Four fishermen were enlisted as casual workers within the *taupulega* work scheme and the final two individuals answered on behalf of their group in the *aumaga* organisation.

Table 6 shows payments made to suppliers of fish to Kileva during the period of the factory's operation.

**Table 6: Total Payments to Fishermen Supplying Fish to Kileva
1990*, 1991, 1992* (NZ\$)**

Year	1990	# of fish	1991	# of fish	1992	# of fish	Total	# of fish
Total Amount	709	154	3359	519	5953	755	10021	1428

* 1990 (3 months payments only - Oct, Nov, Dec)

1992 (9 months payments only - Jan - Sept)

Combined 1990 and 1992 figures suggest maximum annual payments of \$6,662 and a minimum amount of \$3,359. Although income received from the sale of fish does not provide significant injection into the Atafu economy (as compared to say TPS salaries and government transfers), it has the positive effect of realising money for a resource that was only valued in the traditional sector (i.e. for communal distribution through the *inati*).

The fact that most *kaiga* have a member (or members) drawing regular income from the TPS affects the fishermen's translation of spoken support to fishing more for money into action.

ii) Increase in fish supplied to Factory

All fishermen interviewed expressed their support to catching more fish for money, but only four of the ten fish more than three times in a week. These four fishermen are hired once a month as casual labourers and therefore income from fishing supplements their wage earnings. Also this group has more time available in a month to plan and conduct fishing trips as opposed to the *aumaga* representatives and the fishermen with TPS links.

Another dimension that appears to affect the supply of fish to Kileva is of a socio-cultural nature. The nature of atoll-living dictates careful management of resources to avoid wastage and to ensure a continuous supply for all. The unwritten rules for utilising marine resources guide individuals and groups to share fish catches in excess of 50. This cultural management rule is observed but is not a regular occurring phenomena, although it may have an influence on supplying fish to the Kileva.

iii) Major reasons for not fishing

All responded that the main reason for not fishing was because of bad weather and lack of bait. This suggests that the fishermen either own boats or have access to kaiga boats, have supplies of fishing gear available, and are not deterred by shortage of fuel.

The Puamelo and Peletania groups of the aumaga, supply fish to the Kileva either because there is not enough to share amongst the members or, because there is enough to share among the members and any surplus fish is sold to Kileva. The money received is directed back into the groups coffers to cover operating and administrative costs (i.e. to buy fuel for the next planned fishing expedition). Selling fish is one of the options these groups have for raising funds, other avenues include organising bingo games and disco nights.

The supplementary nature of income derived from fish sales is reflected in the responses to how the income is used, as follows: food purchases (7 respondents), church donations (2 respondents) and 'other' reasons (8 respondents).

In the 'other' category, the main use of income was for operating costs to cover the next fishing expedition. Two respondents in this category also mentioned a sharing of the income to members of the kaiga as the boat used was kaiga- owned.

Other comments from fishermen included the following:

Price of Tuna

One respondent queried the pricing levels for tuna over the period and quoted tuna prices landed in Apia as a better reflection of the value of tuna in Atafu. The researcher has not come across any references on the economics of fishing in Tokelau but it would seem that the prices used during Kileva's operation (50c, 70c and \$1) were arbitrary amounts taken from the minimum casual labour wage rate per hour. The latter amount was a hiked figure (in early 1992) to encourage fishermen to supply the Kileva. Whether the prices truly reflect the catch per unit effort (CPUE) is still debatable.

Old Generator

A common observation was that the buildings and processing equipment supplied at the beginning of the project were brand new, but the generator to power processing operations was old and rundown. As a result constant generator breakdowns hampered the ability of the factory to supply ice and store fish.

Treatment of waste from fish

An alternative for the left-over of the wet fish received at the factory door should have been planned for at the beginning of the project. One fisherman had on many occasions asked to buy some of the offage for processing into pig meal and fertilizer.

Taupulega Response

The **taupulega** emphasised their general support for the resumption of the factory operations. They were concerned that written reports about the failings of the Kileva factory were biased towards views and opinions only of the OTA. They strongly requested that their views on reasons why the Kileva did not operate effectively be reflected in this report.

Although the project was started up as a trial, there were basic stages in the development of the project which were not considered.

These included (the main ones):

- i) Failure of OTA, SPC to consult fully with the **taupulega** and people of Atafu on the nature of the project. As far as the people were aware, when OTA and SPC consulted them initially the decision to implement such a project on Atafu had already been made. With the benefit of hindsight, the **taupulega** advised that they would have appreciated more information on the funding arrangements for the project as a fair amount of money has been expended to date.
- ii) Management/controlling the project from Apia was not a suitable arrangement, as Atafu were not aware at all of expenses involved in operating the project.

Production output was not regular mainly because the on-site management team were informed from Apia. There was no participation by on-site management in production level decisions.

The **taupulega** noted that the Apia-based person (Director of Agriculture/Fisheries) also had other duties and functions which affected to a great extent constant monitoring of factory operations and management at the island level.

- iii) Generator breakdown. The project installed an old generator at the factory. However, because the processing of the fish required a steady supply of electricity, this was not always possible with a generator that breaks down often.
- iv) Table 7 provides a financial report of the operations of Kileva for the last two financial years.

**Table 7: Financial report of the Kileva Factory
(1990/91 and 1991/92)**

		1990/91	1991/92	% change
Sales	Atafu	1429	720	-49
	Apia	1298	713	-39
	Overseas	1069	11159	943
	Miscellaneous	610	684	12
TOTAL SALES		4406	13276	206
Expenses	Purchase of fish	650	4810	640
	Raw materials	2056	2518	22
	Salaries & wages	33986	38959	15
	Packaging	--	3063	100
	Fuel	1669	1953	17
	Other consumables	1044	523	-50
	Repairs and maintenance	454	2396	427
	Freight and insurance	337	1422	321
TOTAL EXPENSES		40196	55644	384
Plus: Opening Stock			8139	
Less: Closing Stock			-6627	
		35790	43880	22.6

(Source: OTA, Apia)

The major expense to the project was taken up by salaries and wages averaging over 70 percent of total expenses during the period.

The *taupulega* advised that they were not informed on the amounts of costs and benefits that would accrue to the operation of the factory but were only instructed and consulted on their importance as suppliers to the project. Over the years, although their support may have been questioned by OTA officials, they advised that at times it was a reaction to the lack of communication on costs and benefits accruing to the people and receiving confusing feedback from OTA. What should have happened before the project had even started was for OTA/SPC to have discussed with the people the costs and benefits that would accrue to the project. From this exercise a more clearer indication of the people's commitment to the project would then be attainable because they are fully informed of potential benefits and probable consequences.

- v) On a similar note as above, the people stated that they should have at least been informed of the investigatory nature of the marketing phase of the project. Marketing trials should have been carried out prior to the commitment of funds to the building and equipping of the factory to gauge the projected levels of demand and potential for supply by the people. That this basic step in project formulation and development was overlooked suggests a major oversight on the part of the project proposers.

Taupulega Final Comments

The benefits of increased levels of income and opportunities for the fishermen of Atafu to sell yellowfin tuna to the Kileva over the period it operated, has been experienced and according to the taupulega it has greatly assisted the people.

There are a multitude of problems that have hampered the factory's operations but none of the blame (even though it is easier to place on an isolated community) should fall on the people of Atafu. As mere cogs in the process, they have only participated in the project by following instructions and receiving training. Any conflicting reactions that may have occurred as a result can best be explained as the people reacting to misleading and confusing information. Their opinions on what suited them better or what they would prefer was never sought.

The taupulega commitment to the project is firm. They likened this commitment to the way they own and maintain their kaiga canoes (the life-blood of their fishing activities). The experiences gained from observing the factory operations in the past have confirmed the possible options for resurrecting the factory tailored more towards the peculiarities of Atafu society as it has been evolving presently. Possible financial contributions from the island itself were suggested to assist in starting factory operations once again.

OTA Responses

OTA officials were constantly plagued with problems related to the project, most of which they state were locally related (on Atafu).

Inefficient Power Supply

OTA officials noted the state of the factory generator which according to their records was bought second-hand. The inconsistent operation of the generator often led to the undersupply of ice to freeze large amounts of fish.

Improper processing and packaging

Market outlets reported batches of poorly packaged and processed products arriving in their consignment and even signs of fungus growth on a small percentage of packaged products. This was suspected to be the result of either improper packaging or the product itself not dried properly.

Irregular Supplies of Inputs

Kileva factory operations are reliant on a consistent supply of raw materials (soya sauce, lime juice etc for marinade) and fresh fish. Often times than not because of irregular supply of one of the inputs, factory output targets would be delayed.

Mismanagement of funds and factory

Initially, financial allocations had been set aside to employ a Manager, Assistant Manager (Ice Machine Operator), food processing supervisor and seven labourers. In spite of this, more labourers than were required were employed without the Director of Agriculture and Fisheries' knowledge. Thus an overspending on salaries and wages occurred.

The recovery rate of flesh from the tuna was set at 50 % for medium size tuna with larger tuna expecting higher recovery rates. Reports from Atafu advised that factory workers were taking home sizeable portions of the off-cuts from the tuna.

Price of tuna

It was argued that the purchase of tuna from the fishermen contributed to the close down of the Kileva, particularly when prices were hiked in early 1992 to \$1 as an incentive to fishermen to supply the factory. Thus a 50 kg tuna would cost \$50. Bearing in mind the recovery rate, only about 30-35 kg of the fish would be used to make tuna jerky and about \$15-20 would be wasted.

OTA Final Comment

From a financial viewpoint the Kileva has incurred losses in its two years of operation with sales not being able to cover expenses. The losses incurred were covered by financial allocations from the budget and the remainder of FFA contributions to the project (Budget - \$52113, FFA - \$19418). Poor sales performances are related to a limited effort to penetrate the overseas markets where production has been aimed at. A number of commercial and trade contacts indicated interest in the product. However, the present product formula was not acceptable to most of them. Recommendations to improve the flavour, texture and packaging of the product were pursued by SPC. In the latter part of 1991 contact with Riyjo Holdings was established, but this market fell through when further orders put through for tuna jerky could not be met.

According to OTA officials production output levels had to be controlled from Apia because of communication links with market demands.

From a national perspective, the aim to utilise Tokelau's main natural resource has not been realised. Problems with the management of the factory at the island level have escalated and this has led to the inability to satisfy limited overseas market orders. National emphasis should be directed at reconciling alot of the problems and bottlenecks encountered along the way because the OTA has allocated a fair amount of financial resources to developing and maintaining the factory so far.

6.0 MAJOR ISSUES AND CONSTRAINTS

Socio-Economic Trends

The economy of Atafu is a subsistent and aid affluent one, enshrined within a protective social-cultural environment. Some sources argue that the economy is in a permanently transitional stage. From the analysis of the workings of the community and its reactions to introduced forms of economic development and technology, it could also be argued that the economy is a programmed but adaptive one. Programmed in terms of socio-cultural norms that prevail. Adaptive in that adjustments in programmes are influenced by changing times.

The importance of income in Atafu is mainly to sustain the levels of living that most **kaiga** have now come to enjoy. Though not necessarily well-off by western standards, this living standard assures supplementing levels allocated to supporting children in school, regular donations to the church and community, store purchases and purchases of a few capital equipment.

The majority of Atafuans are out to make money if they can, not necessarily for individual accumulation of wealth, but more importantly for the betterment of their **kaiga** and community. Casual labour employment ensures maximum dispersion of income to most of the households.

As highlighted below, the nature of Atafu's socio-cultural principles does not encourage private sector development with a profit motive on a large scale, any accumulation of wealth is distributed regularly through the kinship and **inati** systems. Therefore given the limitations to investment opportunities, most households have a high propensity to consume rather than save disposable income. Thus introducing investment activities that exploit the use of marine resources should always bear in mind the perspectives of community norms regarding common resources and respect the existing traditional management structures that maintain equity.

Socio-cultural Norms

Atafu still maintains basic cultural principles that underlie everyday living and balances external interaction with location and limited resource constraints. The **kaiga** is the main economic and social unit where the principles of **maopoopo** and **feagaiga** are practised with **alofa**. At the community level these social protocol transpire to regulate interactions and formal meetings. Mistakenly interpreted by outsiders as scenes of peacefulness (and laziness); this environment is carefully programmed and nurtured. The **taupulega** scheduling of activities for the week exemplify this programmed approach.

The intricate network of kinship relations and the manner of behaving and conducting affairs at the community and **kaiga** level illustrate the intrinsic significance of traditional protocol even in modern day Atafu. Given the combined physical constraints of isolation and smallness, it makes sense that the cultural observations relating to the way individuals conduct themselves in interpersonal relationships at the **kaiga** and at the community level facilitate well-being and harmony.

In communal activities, effective leadership and planning skills are essential precursors in sustaining **maopoopo** among the various **kaiga**. The attributes of the **kaiga** are magnified at the village level to the extent that the people who live regularly on Atafu have a right to distribution of produce shares made by the village and at the same time are obligated to follow instructions or decisions made on behalf of all by the **taupulega**. The respect for the deliberations of the elderly is reflected in the **taupulega** institution that centrally plans the written and unwritten development plans of the community. This institutions still maintains alot of clout (even in this day and age) in the use and distribution of community resources.

In line with the egalitarian structure of Atafu society, the principle of *maopoopo* and *alofa* is manifest in the dedication and commitment the village has to community activities. The welfare of the community is above individual needs, and in a small island setting such as Atafu, this makes a lot of sense as most *kaiga* are connected to some extent. The fact that the importance of the community's needs are still pursued in this day and age since the 1970's when New Zealand began pouring in capital and budgetary assistance suggests that this characteristic of Atafu society will not change overnight for the sake of the Kileva project.

As mentioned earlier resources are carefully managed to avoid wastage and to ensure a constant supply for all. The unwritten rule of sharing fish catch over the minimum of 50 fish assists in ensuring that everyone enjoys the resource while at the same time discourages greedy attitudes.

Also of note is that any announcement for re-scheduling or increasing the hours of community work is never queried by individuals. Social control through *kaiga* and community pressure censure against non-conformity in most cases.

The *inati* system is a time-old share group system that serves a social welfare function to ensure that the benefits of community harvests and fishing trips are shared by all, including the less able-bodied in the community (i.e. elderly, widows, children).

Physical Issues

Consequence of Isolation

Isolation from emergency health services, marketing outlets and social bright lights conveys a feeling of unchallenged acceptance and resignation to the in-built mechanisms that organise the affairs of the community. Isolation also confines the people to maintain strict adherence to traditional rules that govern the island.

The physical constraint of distance and the inadequate communication links influence the level of coordination and instructions received from the OTA in Apia. A popular adage describing communication links between OTA and the atolls says 'that the message will be relayed but never is'.

A logistical problem experienced, on the one hand, involves supplying the Kileva with the right amounts of inputs to marinade the fish, packaging and shipping containers and other basic ancillary equipment which the factory is heavily dependent on. On the other hand, the safe delivery of the finished product to Apia for onward transportation to market outlets is a constant concern of OTA officers.

Technical Issues

Technical biases and inflexibility of the model to the social and cultural characteristics of the Atafu society explains a lot of the reasons for the failure of the Kileva factory to first, be integrated into the everyday operations of village life and second, to attain commercial viability during its short life.

Atoll living revolves around the sea, the faithful supplier of food. Any development of marine resources must therefore understand the social and survival respect the atoll dwellers accord this resource. In traditional times the *inati* system centred around the distribution of fish. Excess fish caught was distributed among the *kaiga* and community with leftover fish (especially during good seasons) being cured for storage. Fish curing is the premise of women and production is at the *kaiga* level.

The Kileva operations rivals the existing traditional system (taupulega) in the following ways:

Kileva	Taupulega
encourages individualism;	mobilises the community (aumaga) for fishing expeditions;
factory working hours adhere to an 8 a.m. to 4 p.m. timeframe;	fishing hours are dependent on seasons, weather or taupulega directives and are therefore flexible;
the processing of tuna is simple (chilling, marinading, drying, packaging), however, the coordination of ice supply and marinade formula with varying fish catch receive requires sound judgement and coordination;	management/coordination is a product of age and authority and is directed to concern for the welfare of all, sometimes to the detriment of modern and introduced technologies;
access to reliable power source and water are essential.	atoll dwellers practise resource management and conservation (i.e. water and other scarce resources).

Earlier in the report the expansion of the original objective of improving the traditional methods of curing fish and exploring limited export markets was replaced by a more ambitious goal - to increase the dried fish products comparative advantage in export markets. Rather than adapt technical assistance to local production level conditions, technical assistance advocated the need to centralise the production of dried tuna with no in-depth consideration of why the women produce dried fish at the kaiga level as opposed to the community level. No attempt to adapt the factory concept to a more innovative and relevant existing mode of production was ever explored.

Another major flaw on the part of the project proposers was setting up the supply side of the factory without consolidating acceptable products for sale and finding confirmed market niches for the final products. One of the greatest sins that can be inflicted on rural/outer island dwellers is to raise expectations only to have them unfulfilled in the end. Of course it can be argued that no market negotiations can take place without product samples to promote. The point is that these product samples could easily have been investigated and developed at less costs (and without necessarily constructing the buildings immediately) to all concerned and probably with more applied research participation by the people themselves.

The Kileva operations are not integrated into the community activities of Atafu. This is apparent in the way the factory is managed by instruction from Apia with no avenues for input into management and monitoring by the taupulega other than to select the right type of manpower for the factory based on outside criteria and to ensure that the factory is supplied with a regular supply of fish.

It can be argued that the technical assistance adhered to is one of the major reasons the factory has not been able to attain commercial viability. There are no records on file of any social cost/benefit analysis and projections conducted of the project concept prior to the promotion of the idea with aid donors. A preliminary costing schedule of the proposed amounts involved in setting up and operating the Kileva were calculated but this schedule does not replace an analysis that takes into account the cost and benefits (both direct and hidden) that may occur to a society with the introduction of a new or adapted technology.

In this day of environmental concerns another technical advisory oversight has been the support and promotion of a resource assessment of the stocks of fish to be supplied over a period of time to the factory. Any conclusions from the assessments would advise the relation of the technology to maximum sustainable yields. It is the researcher's belief that had these issues been sorted out before the decision to allocate funds to building the present buildings and procuring cool storage equipment, a more appropriate model for Atafu would have been developed.

Management/Institutional Issues

Lack of understanding or ignorance of the existing management structures on Atafu resulted in OTA imposing a factory management structure not in line with cultural norms. A corporate body already exists on Atafu in the form of the *taupulega* who have a say in the use of island resources. A more creative approach could have looked at utilising this body as the collection outlet for the tuna jerky product or the fish caught to be sold to the factory.

Traditionally, women dry fish at the *kaiga* level. The process involves the fish being rubbed with salt. In the case of the Kileva the fish is marinated and stored in cool storage. Although processing techniques are more sophisticated at the Kileva, from time to time when chemical inputs (soya sauce, lime sauce etc) have been low the processor's have had to improvise with the remaining ingredients and although this may not be in keeping with the protocols developed to oversee quality production, as mentioned before the finality of isolation often engenders people to be as creative as possible.

Management and coordination of operations in a fish processing factory requires a degree of flexibility on the part of the management team given that fishing does not always follow 8 a.m. to 4 p.m. working regimes. Depending on the weather and the lie of the natural elements, good fishermen are always out fishing, whether it be in a community fishing drive or on their own for the *kaiga*. More consideration on the type of staffing and hour of working schedules for fish processors should have been thought through. Developing team spirit could have contributed to a more open atmosphere for sharing the decision-making process and setting daily production targets in consultation with the suppliers, the processors and the ice machine operator.

Management of the Kileva also requires, particularly during the initial trial year of the project, constant backup and support from all development partners involved. Having the factory monitored and ordered from Apia is not an ideal situation for management purposes although the logic of Apia was because it had direct communication links with SPC and market outlets. However, if the ground work leading up to the formulation of the project had included analyses of the costs/benefits of providing the tuna jerky in bulk containers to either more experienced packagers overseas, who could worry about the presentation and marketing at the same time, this may have left more productive time for the workers of Kileva and the people of Atafu to refine methods of operation for processing fish caught at varying hours of the day.

Good management requires clear active channels of communication and not just a message sender ordering the receiver to react. These clear channels were not present in the Kileva operations as can be seen by the way the on-island management team were themselves often confused with the messages relayed from OTA. For sure OTA must have also felt confused when receiving messages from Atafu. Clear channels of communication can be attained by encouraging consultations between the development partners, in the case of Atafu this could have been tackled by including the *taupulega* in the consultations and to hear out any suggestions they may have to the project.

The traditional institutions on Atafu (*taupulega*, *aumaga*, womens committees) need to be encouraged through a series of consultations to contribute ideas, resources, and solutions to reformulate the Kileva factory to truly becoming a part of their on-going activities. The importance of community active participation in their development process is a central concern in efforts to pursue the re-opening of the Kileva issue.

7.0 Recommendations

There are no simple strategies for resurrecting the operations of the Kileva. However, the first concern should be (for the sake of assisting the people find a mid-way solution to a factory that has been set up outside their own production network) to re-trial the project once again, taking into account prerequisite actions mentioned in the above section. These include:

Short term

1. an indepth social cost/benefit analysis of the present set up, with the analysis also considering alternative modes of production and/or supply to the market (the analysis should reflect the views of the people as far as possible);
2. any future re-opening of the factory should take into account (and possibly trial) the use of existing management systems (taupulega) in the running of the factory;
3. equipment replacements will need to be purchased (new generator and ancillary);

Medium term

4. Community consultation and participation is an essential precursor to any introduction of appropriate technology or development project. It will require a suitable development worker working solely with the taupulega and people to examine and develop the community's capacity and capability to integrate the Kileva concept into their peculiar socio-cultural setting.
5. Marketing outlet investigations need to be more innovative and include visits to and from Atafu by trade missions. Development partners that are mandated to promote private sector development and export trade (USAID, Forum Secretariat, PIDP, Regional Chambers of Commerce etc.) should be consulted for support/advice. Before any decision to re-start the Kileva is made, market outlets (even if only for a trial period of say two years) needs to be confirmed.
6. Based on the results of Recommendation 1; a revision of the operations of Kileva must be undertaken in full consultation with the people.
7. For other Pacific island countries intent on developing a similar project, a socio-economic impact study should be included with the social cost/benefit analysis of the scheme.

General

8. Given OTA and the people of Atafu's strong interest to resurrect the Kileva operations it is important that a comprehensive work plan be drawn up over a time frame of at least three years, with budgets, targets, market and transportation links highlighted and possibly overseen by an appropriate development worker in the initial years. The outline for this work programme would come from the results of recommendation 1 and 4.

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APPENDIX 1: GUIDED INTERVIEWS
FOR THE FISHERMEN

1. **How many times do you go fishing in a week?**
 - ☐ Once
 - ☐ Twice
 - ☐ Three times
 - ☐ Other, please specify
2. **What is the main reason for going fishing? (Tick right box)**
 - ☐ For food
 - ☐ For fun
 - ☐ For money
3. **Would you go fishing more if you could get money for your catch?**
 - ☐ Yes
 - ☐ No
4. **What are some reasons why you do not go fishing?**
 - ☐ Bad weather
 - ☐ No boat
 - ☐ No fishing gear
 - ☐ No fuel
 - ☐ No bait
 - ☐ No fish
 - ☐ Other community activities
 - ☐ Any other, please specify
5. **What do you do with the money you get from fishing?**
 - ☐ Buy food
 - ☐ Donate to church
 - ☐ Any other, please specify
6. **Do you have any other way of getting money?**
 - ☐ From Tokelau Public Service
 - ☐ From families in NZ and Samoa
 - ☐ Other business, please specify
7. **Do you sell most of the you catch?**
 - ☐ Yes
 - ☐ No

APPENDIX 1: GUIDED INTERVIEWS
FOR THE FACTORY WORKERS

1. Are you the only income earner in the family?

☐ Yes

☐ No

2. Have worked for money before?

☐ Yes

☐ No

If yes, where? _____

3. Does your family receive money/or goods from overseas?

☐ Yes

☐ No

If yes, from where and what are the things or about how much money do you get? (estimate)

4. How do you usually spend your weekly wages from Kileva? Please specify how much:

\$ _____ for food, fuel etc.

\$ _____ banking

\$ _____ for church donations

\$ _____ for community activities

\$ _____ any other please specify.

5. Does working for Kileva affect your participation in community activities?

☐ Yes

☐ No

If yes, please specify

KILEVA FISHERIES, ATAFU, TOKELAU

FISH HANDLING PROTOCOL

**Prepared by
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Fish Handling and Processing Officer**

**South Pacific Commission
B P D5, Noumea, New Caledonia
October 1990**

Processing Protocol for Naturally Dried Marinaded Tuna

Introduction

Dried marinaded tuna is a dry savoury product that can be eaten as a snack, like potato chips or peanuts, and served up in bars and parties to go with drinks.

Dried marinaded tuna is a simple product to make - but to produce high quality products you must use very fresh yellow-fin tuna that has been handled and chilled properly. It can also be made from other species of fish such as king fish (wahoo), shark, etc. However the marinade formula may need to be modified to match the different flavour and texture of the particular species.

The following processing protocol should be closely followed in the manufacture of "NATURALLY DRIED MARINADED TUNA":

1 HYGIENE

1.1 The processing site and all equipment and materials should be perfectly clean before processing starts. The processing supervisor should check this, and all staff aware of this requirement.

1.2 All staff must wash their hands before handling any equipment and wear a clean apron and hat. Towels should be changed daily or as soon as they appear dirty, whichever happens soonest. No jewellery are to be worn and nails should be short and properly scrubbed with a small nail brush. Any cuts or open wounds on hands must be treated and covered with a sterile clean plaster. The processing supervisor must ensure this is carried out and inspect the hands and protective clothing of staff regularly.

1.3 Staff must report any sicknesses, particularly intestinal problems such as gastro-enteritis and diarrhoea, to the processing supervisor. Those affected staff members will not be allowed to work on the processing operation until their sickness has totally cleared.

2 PROCESSING PROCEDURE

2.1 Inspect the quality of each tuna before accepting it into the processing room. Check the eyes, gills and firmness of the flesh to ensure that they meet the set quality standards. Reject any fish that do not meet the required standards.

2.2 Weigh and record the weight of all the fish coming into the processing room.

2.3 Store the tuna in ice immediately up to when it is needed for processing.

2.4 Process the tuna quickly. Cut out the four loins (quarters) removing as much flesh as possible. Any flesh remaining on the frame of the tuna should be sliced away and used for marinading with the tuna strips.

2.5 Keep the processing knives sharp by regular daily sharpening using the sharpstone (with oil or water) and the steel, or when the knives become blunt during processing.

2.6 Remove the skin, and cut out the dark red muscle of each loin that runs along where the backbone would be. Remove any bones and trim away any loose tissue. Cut long thin slices of fish flesh along the length of the loin to a thickness of approximately 5 mm (1/4 inch).

2.7 Wash the slices or strips in lightly salted water (about a handful of salt in a bucket of fresh water), then place them in a mesh tray to drain. The longer and wider the strips of tuna flesh are the better will be the final product.

2.8 Wash away blood and slime regularly between each of the above steps to ensure that the flesh is not contaminated by waste solids, blood and slime, and in particular the contents of the gut.

2.9 Once all the tuna has been cut as above, wash everything thoroughly with detergent and plenty of water. Remove all tuna waste as soon after processing as possible. Discard preferably by burying waste some distance away from the processing site. If waste is dumped into the sea it is preferable to use the open ocean side.

2.10 Weigh the tuna strips once they have drained and work out the recovery rate of flesh as follows:

$$\frac{\text{Weight of tuna strips}}{\text{Weight of tuna(s)}} \times 100 = ? \% \text{ recovery}$$

A recovery rate of around 50% should be achieved. The larger the tuna the higher the recovery rate.

2.11 Marinade the tuna strips immediately or chill on a bed of ice until required (do not delay longer than 20 to 30 minutes).

2.12 Work out how much marinade is needed for the weight of tuna strips processed. For every kilo of tuna 0.5 litre of marinade is needed. For example, for 10 Kg of tuna strips make 5 litres of marinade.

2.13 Prepare the marinade with good quality soy sauce, water, salt, sugar and lemon juice referring to table 1 to help find the correct quantity for each ingredient. Mix the marinade thoroughly in a clean container until all the sugar and salt has dissolved.

2.14 Add the tuna strips to the marinade. Stir and mix to make sure that each piece of tuna is surrounded by the marinade.

2.15 Place the marinade mix in the cool room on a bed of ice. The fish strips must be completely covered by the marinade, and left to soak for at least 12 hours (overnight) with occasional mixing.

2.16 Wash and clean all equipment and materials thoroughly with detergent at the end of the operation.

2.17 Before leaving the processing room for the day prepare a solution of sterilising solution (sanitizing/chlorine compound) by mixing 1.5 cups of the steriliser into a bucket of fresh water, and mix. Liberally sprinkle the solution on floors, walls, processing table, cutting boards, etc, and leave overnight. Washdown with fresh water the following morning. **BE CAREFUL! -THIS COMPOUND IS CORROSIVE! READ THE LABEL ON THE CONTAINER FOR INSTRUCTIONS IF IT HAS MADE SKIN CONTACT OR HAS BEEN ACCIDENTALLY CONSUMED!**

2.18 Remove the strips of tuna from the marinade after the time has elapsed (the following morning) and wash quickly in fresh water to remove most of the brown colour of the soy sauce from the surface. Carefully lay the strips on the clean plastic mesh trays so that they are flat and that one strip does not overlap another. Clean up properly afterwards.

Table 1. - Tuna Marinade Formula for different volumes of marinade

Volume:	1 Litre	2 Litre	3 Litre	4 Litre	5 Litre
Ingredient\					
Soy Sauce	0.600	1.200	1.800	2.400	3.000
Water	0.330	0.670	1.000	1.330	1.670
Salt	0.033	0.067	0.100	0.133	0.167
Sugar	0.100	0.200	0.300	0.400	0.500
Lemons (as juice)	5	10	15	20	25

Volume:	6 Litre	7 Litre	8 Litre	9 Litre	10 Litre
Ingredient\					
Soy Sauce	3.600	4.200	4.800	5.400	6.000
Water	2.000	2.330	2.670	3.000	3.330
Salt	0.200	0.233	0.267	0.300	0.333
Sugar	0.600	0.700	0.800	0.900	1.000
Lemons (as juice)	30	35	40	45	50

2.19 Place the trays out to sundry for one to one and a half days (depending on the weather) on racks, so that the trays are at least 0.7 m off the ground, and plenty of wind and sun can get at the flesh. Turn the fish strips over every hour during the first four or five hours of drying.

2.20 If it comes to rain quickly take the trays indoors so that the product does not become wet. When the rain has passed put the trays back out for the drying procedure to continue.

2.21 The dried marinated tuna is ready when the flesh is completely dry and has a reasonably tough and chewy texture. This should take less than one to one and half days when drying conditions are good. Do not allow the flesh to become too dry. They sometimes develop a white powdery appearance on the surface, and the loss of too much weight will affect profitability.

2.22 Take the trays of dried tuna indoors remove the product from the trays and weigh them. Record the weight and work out the yield of product produced from the original tuna(s) processed. Use the following formula to work this out:

$$\frac{\text{Weight of dried marinated tuna}}{\text{Weight of fresh tuna(s)}} \times 100 = ? \% \text{ yield}$$

2.23 Wash the plastic mesh trays thoroughly with detergent and water. Store in a clean place ready for using the following day.

3 STORAGE, TRIMMING AND PACKAGING

3.1 Store the dried tuna in plastic bags and store in one of the large white containers with the lid securely in place until ready for cutting into "sticks", "chunks" and "bits'n'pieces". Do not cut these the same day they are brought out of the sun - wait until the following day (this allows for any moisture in the flesh to become more evenly distributed throughout the product).

3.2 Never leave dried products in plastic bags in direct sunlight - this could lead to spoilage. Always store dried products in a cool, dry place, that is also protected against rodents and insect infestation.

3.3 When ready for cutting and trimming the products into their final format make sure all equipment and materials are clean and perfectly dry. Any moisture left on any surfaces could otherwise be transferred to the products resulting in up-take of water, which can eventually deteriorate the quality of the dried marinated tuna.

3.4 Cut the dried tuna into as many pieces of 100 mm long and 20 mm wide (this format may change at a later stage). Use the wooden blanks to help cut the products to the right size. These pieces will be packed as "STICKS". Large pieces that remain that are too small for sticks can be cut into "CHUNKS". All irregular and very small pieces that remain after trimming should be collected and will be packed as "BITS'N'PIECES". Weigh each product format and record. Work out percentage of each format from the total weight of sun-dried tuna strips.

3.5 Store in plastic bags and put into one of the large white plastic containers until ready for packing in the retail packs. Remember to mark the bags with the date.

3.6 Retail packing should be carried out with care and accuracy. Present size of packs are for 200 g net weight (this will probably change at a later stage to 100 g and 50 g packs). Make sure the electronic weighing scale is properly balanced before it is used. The small bubble must be perfectly placed in the centre of the red circle. Adjust by turning the corner legs of the scale.

3.7 Make sure the pan of the scale is clean and dry.

3.8 When the scale is switched on ensure that the reading is 0.000 Kg. If not you must zero the scale (follow the procedure in the manual supplied with the scale).

3.9 Before weighing the products check that the quality of the dried product is still good and that there is no mould growth, insect infestation and rodent damage. Mould growth will indicate that the product was not dry enough (either poorly stored or were not dried properly initially). Any insect infestation must be reported to the liaison officer in Apia for technical assistance to be sought. Rodent damage indicates that the product is not being stored against rodents effectively enough. Look into why this is so and improve product protection.

3.10 Weigh out the cut and trimmed products as near to 200 g as possible. NEVER weigh out less than 200 g. Always allow 2 to 3 g over. For the sticks if the weight is a little too high, say 210 g, swap a large piece for a small piece until the reading is 201 to 203 g.

3.11 Put the weighed product into the retail packs and put on one side into a mesh tray until ready for sealing. Do not mix up the different format of products.

3.12 After all the products have been weighed put any samples not packed into storage, and clean up thoroughly.

3.13 Sealing the bags MUST be carried out with care so that a full and secure seal is made to lock the product inside the package to protect it against moisture, oxygen in the air and any contaminants. Also all seals should be straight and parallel to the top of the pack. Place the open end of the bags between the jaws of the impulse sealer. Squeeze out as much air as possible from the pack. Flatten out the bag in the sealed area and press the jaws closed. A red light will come on when full contact has been made. After a second or two the red light will switch off and the jaws can be opened to release the pack.

3.14 Check the seal carefully for gaps where the seal has not been effective, by holding the pack up to the light. If the seal is defective, repack the contents in a new pack and seal it again.

3.15 Put 25 x 200 g bags into each cardboard carton (whose bottom opening has previously been sealed with brown packing tape). The different product format should be packed in separate cartons.

3.16 Until pre-printed cartons are supplied, label the cartons neatly as follows:

Kileva Fisheries, Atafu, Tokelau

Naturally Dried Marinaded Tuna

STICKS

25 x 200 g Packs

Replace STICKS with CHUNKS or BITS'N'PIECES as necessary. (Different size cartons will be provided at a later date).

3.17 Check the weight of each box before sealing it. The weight should be just over 5 Kg (the weight of product plus packaging materials). If the weight is too high or too low check that the number of bags in the carton is right or that the weight of each pack is correct. Seal the boxes properly with brown packing tape. Store the boxes in the white plastic storage boxes. Record the date of packing.

3.18 To despatch the cartons to Apia place them carefully in the wooden crates provided and lock it. Try to fill up the crates so that the cartons do not move around too much and get damaged. Record the date of despatch.

4 Cleaning Procedures

4.1 Effective cleaning of the processing room, dried fish packing room, the fish drying area, all equipment and materials is to take up a major part of the working day. This should be done on a routine basis. All staff should be involved in cleaning tasks.

4.2 Daily cleaning: Floors and drains, particularly after each processing procedure. All tables, sinks, containers, cutting boards, knives, aprons, etc.

4.3 Weekly cleaning: All walls, windows, and ceiling. Outside in the fish drying area and immediately surrounding the buildings.