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**INSHORE FISHERIES DEVELOPMENT AND MANAGEMENT:  
THE SOUTH PACIFIC EXPERIENCE; AN OVERVIEW.**

by

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1. Rising populations, urbanisation and the development of cash economies in the region have stimulated the rapid growth in commercial demand for fish and marine products in the region of the south-west Pacific. This growth has provided the opportunity for the development of small-scale commercial fishing thereby offering employment opportunities and a chance for import substitution. The commercialisation of these inshore resources has set the trend for fisheries development within the region.

2. To facilitate management of the development of these fisheries, a consideration of social, economic and political implications is necessary. In addition, there is an urgent need to address a problem of translating management theory based on reasonable scientific analysis into management practices that can be applied in the region.

INSHORE FISHERIES DEVELOPMENT AND MANAGEMENT:  
THE SOUTH PACIFIC EXPERIENCE: AN OVERVIEW

BACKGROUND:

The inshore fisheries resources of the Pacific Islands consist of a variety of fish and other marine species, most of which are exploited by the islanders for subsistence consumption. When there is a surplus to immediate needs a barter system is practised.

Traditionally, artisanal fishing activity was targetted at the inshore fishing resources around populated islands. Although these resources were fragile, fishing practices ensured their continued utilisation over the years.

Rising populations, urbanisation and the development of cash economies in the region have stimulated the rapid growth in commercial demand for fish and marine products. Subsequently there has been an increase in the number of commercial fish markets. This growth has provided the opportunity for the development of small scale commercial fishing thereby offering employment opportunities and a chance for import substitution. The commercialisation of these inshore resources has set the trend for fisheries development within the region.

INTRODUCTION:

Advances in inshore fisheries development in the region have taken on new scope as export markets were successfully expanded. However these resources are fragile and are not capable of supporting unmanaged commercial exploitation. In many places, resources around densely populated villages and urban centres have become heavily exploited and long term robustness of the resource threatened.

Fisheries administrations in the region are now hard pressed to define management programmes that will ensure the sustainable level of exploitation. Often, this will be a compromise between maximum tonnages at higher profits to fishermen or lower tonnages but providing employment to a larger number of people. The latter option would ideally offer a modest profit to individual fisherman.

The inadequacy of resource information within the Pacific islands should dictate a cautious approach to the management of these resources. However in most cases the approach adopted has largely been determined by social, economic and political consideration and has not been based on sound knowledge of the implication of various harvesting strategies on particular resources.

Inshore fisheries issues compete strongly for the attention of island fisheries administrations against offshore related fisheries; tropical tuna being the best economic resource for many of the Pacific island countries. As most of these fisheries administrations are small, young and hard-pressed, their task becomes much more critical as inshore fisheries issues bear directly on the daily lives of the great majority of Pacific islanders.

Of late, there has been a substantial increase in resources available for inshore fisheries development following the opening up of previously untapped markets; both within and outside of the region. Most countries have even gone in for high cost value-added processing locally in an attempt to maximise returns from their resources.

An indirect benefit of the introduction of extended sovereign rights over fisheries resources has been the recent increases in assistance by countries more interested in accessing national EEZ's. Japan, Korea and Taiwan have in the past few years greatly contributed to inshore fisheries development within countries they have access agreements with. Not surprisingly, these distant water fishing nations have shown a preference for assisting this sector, as developments here will not compete with the interest of their own fleets. Subsequently, many fisheries administrations are almost awash with gear and equipment for inshore fisheries development.

#### SUBSISTENCE FISHERIES.

The major modes of fishing within this sector can be witnessed along almost any shoreline in the Pacific. Shellfish and crustaceans are gathered in the shallows and on the reefs. Mud and reef-flats are foraged at low tides yielding various edible organisms.

Most fish are caught by spears(all types), lines, nets, from the shoreline or while wading through the shallows. Droplining and trap setting are normally carried out on small boats; typically canoes or punts. A wide array of traps, cages; structured coral walls (Kiribati), reed or bamboo-based fish fences(Fiji and Vanuatu), or wire netting structures (Apia and Nukualofa) are used.

Government approaches to the development of subsistence fisheries are low key bordering on being cautious. Care is often exercised in the initiation of new programmes to reduce the impact on established social and cultural arrangements. Most programmes within the countries have centred on the provision of more efficient gear at reasonable cost. The improvement of processing techniques to reduce waste and losses is gathering momentum within this sector.

#### ~~SMALL SCALE COMMERCIAL FISHERIES DEVELOPMENT.~~

By 1983 small scale fisheries development was being accorded increasing importance by most island administrations. This resulted in the initiation of new programmes involving the introduction of new small scale fishing technologies.

Spin-off effects from this new emphasis included the improved supplies of efficient fishing gear, establishment of lines of credit for all levels of commercial fishing operations, subsidies or reduced duties and taxes on fuel and supplies, provision of landing sites with storage facilities, improved fish collection and distribution services, and the development of marketing outlets in urban areas.

The success of most of these programmes were a result of their development at a measured pace appropriate to the capacities of both the administrations and the communities to implement changes.

Subsequently the supplies of fish have increased, prices to consumers have often stabilised or fallen, incomes from fishing operations have risen, and the decrease of imports of frozen and canned fish, 100m as a distinct possibility.

Even though there have been some failures in outer island projects, most of these were only marginal from the start. The region has had relatively few of the expensive failures which has characterised small-scale fisheries development programmes in other regions.

#### TUNA BAIT FISHERY:

Within the inshore fisheries, the fishing of bait for pole and line tuna boats is an important but often overlooked activity. Pole and line boats need consistent supplies of small fish -sprats, scad etc - to operate.

The existence of bait has been the major determinant of the pattern of development of locally based pole and line operations. Studies have shown the abundance of baitfish in waters around large land masses underpinning the operations of pole and line fleets in Fiji, Papua New Guinea and the Solomon Islands. Fresh water run-off into lagoons appears to be a major factor in providing natural conditions under which baitfish thrive.

Even though baitfish are found in atolls, their numbers fluctuate a great deal and in some cases (eg Kiribati) bait farms have developed to supplement natural supply.

Apart from their importance in supporting pole and line operations, two sets of issues are attached to baitfishing:

- . the catches are relatively large, thereby justifying rigorous programmes of research and control; many elements of which are already in place.
- . in Papua New Guinea and the Solomons at least, much of their catches are taken from grounds which are still under traditional ownership. Local governments control bait fee payments provide a source of cash to bait ground owners and to local administrations. Negotiations are sometimes difficult and protracted, and not always successful.

#### CURRENT DEVELOPMENT TRENDS

This section will attempt to portray the various trends that have developed in the region over the last few years within the inshore sector.

- . training of fishermen in the use of new fishing techniques. Training in all forms and in all aspects of fisheries has been a major activity in the region. Even where fishing is a tradition and fishermen need little assistance in adopting new techniques, fishermen are being organised into groups to commercialise their operations.

- . development of grant and loan arrangements to permit fishermen to acquire fishing gear, equipment and larger vessels. National Development Banks with other donor support are now promoting soft loans with low interest rates to help the fisheries sector. In some countries loan arrangements are supplemented by grants to cover part of the cost of boats and equipment.
- . establishment of stores to sell fishermen fishing supplies at cost. In some countries fishing gear is provided duty free to fishermen, mostly from Government stores or Fisheries extension offices.
- . relief to fishermen from duties and taxes on imported fuel. Certain Governments in the region exempt fishermen from paying import duties on fuel.
- . provision of repair facilities for vessels and equipment (particularly outboards), have been constructed in most countries through either the governmental or by the private sector.
- . provision of infra-structure for collecting, processing and holding fish at the harvesting sites. Better transport arrangements have been established between these holding sites and markets. As the growing numbers of fishermen have improved in their skills and acquired more efficient gear, the quantity of marine products available for marketing is rapidly increasing. There is an urgent need to develop means to accumulate, store and transport the products to markets. Programmes have been initiated in most countries to develop infrastructure and transport systems for fisheries products from outlying areas to principal markets.
- . arrangements for holding and marketing fish in urban centres for exports. Retail and wholesale complexes are at various stages of completion in most countries. For some there have been successful attempts at developing exports for high value species or for fish that are surplus to local demand.

#### MARKETS:

There are some established markets for a range of product notably; beche de mer, trochus, mother of pearl shells, sharkfin precious corals, cowries and fish.

Trade in these products is of special importance, because of its exceptional power in generating cash incomes in rural areas and outer islands. While there are real limits to the expansion of harvesting of these resources in specific areas, because they are relatively easily over exploited, recent studies suggest potentially large gains could be derived from:

- . diversifying into new areas and species
- . improving high quality standards; and
- . increasing value-added processing locally.

Programmes to this end are at various stages of development through out the region.

#### BASIC PROBLEMS ASSOCIATED WITH INSHORE FISHERIES DEVELOPMENT

The logistical problems associated with the development of inshore fisheries in the region may be summarised as follows;

- . the accessible resource is often not large enough to support substantial expansion of fisheries effort, and not consistent enough to attract part-time subsistence fishermen to specialise and invest in fishing. This is especially true of islands (like all those of Tuvalu) which lack substantial continental shelves. Greatly increased exploitation of limited reef fish resources would rapidly endanger an important subsistence source of protein.
- . the local market cannot absorb a greatly increased output of fish, and the cost of sending surpluses to another island or another country may be prohibitive. Besides, once a fisherman has to look beyond his local market he has to concern himself with such matters as regularity of supply, uncertainty of price and unfamiliar market requirements.
- . available species (especially reef fish) are often not known to or valued by potential buyers in other markets.
- . there are substantial costs and logistical problems associated with supplying inputs to outer islands, especially fuel, and providing necessary extension support.
- . relevant expertise is not generally available on out islands: for instance to repair and maintain outboard motors, freezers, ice-making plant etc and to organise processing, transportation and marketing.
- . individual entrepreneurship may be incompatible with traditional values and social organisation. The following section presents the various development trends countries have attempted in tackling logistical problems facing inshore fisheries.

#### IMPROVED VESSELS AND GEAR

In several countries considerable success has been reported following the introduction of new fishing vessel designs. In Western Samoa, for instance, the 'Alia' fishing catamaran has been an essential ingredient in the doubling of the country's catch in under ten years.

In Vanuatu the same boat design has been introduced to a dozen outer islands, together with a rather smaller mono-hull Hartley design. This program only started in 1982, but indications are that the new vessels have given rise to significantly increased catches. Two 'Alias' were also sent from Western Samoa to Tonga in 1979 for demonstration purposes and as a precursor to Tonga's development of her own design suited to Tongan conditions.

The chief advantage of the new boats over traditional craft is that they allow fishermen to go further afield, fishing deeper waters, and to stay at sea for extended periods instead of coming home every evening. Where inter-island distances are not extreme - e.g. in Tonga's Ha'apai group, they permit fishermen to transport their catches to other islands for sale.

In almost all cases the new vessels are motorised, but there is interest in developing motor-sail designs. Adaption of an existing fishing boat design for sail assistance is currently taking place in Fiji, and there are similar projects in Tonga (funded by UNDP).

There have also been improvements to gear and technique which have increased the productivity of fishermen, both in the new, longer range boats and in traditional craft. The sheer availability of modern gear can be a major factor, and this forms an important component of the artisanal fisheries programme in Kiribati.

Equally important in some locations are fish aggregating devices (FADs). Used successfully in Hawaii and now widespread, these anchored rafts attract small fish which in turn attract bigger predators. By going to these FADs, village fishermen can enjoy assured catches without expending time and fuel in possibly fruitless searching. These can be costly to install, especially in deeper waters where long anchor chains and ropes are necessary. Sometimes they are lost before the investment has been recouped. In Western Samoa, twelve out of fourteen FADs were lost in two years. Three of the five FADs (or 'payaos') anchored between Tarawa and Maiana were lost "owing to bad weather and other factors" in 1983. A design improvement developed by the South Pacific Commission is expected to increase the average service life of a device at least four-fold, from 6-9 months to three years.

An important aspect of the new fishing vessel designs (and FADs) is that they can be constructed domestically - though probably not at an outer island location - and so contribute to the development of new skills and new fields of manufacturing. In Papua New Guinea, for example, small-scale manufacture of fibreglass boats has led to the production of other fibreglass products. Until foreign exchange shortage limited the number of outboard motors which could be imported, the 'Alia' factory in Western Samoa was producing over fifty vessels a year.

#### STORAGE AND PROCESSING

Numerous attempts have been made to install freezers and ice-making plants on outer islands. This was to smooth out irregularities of supply and to enable fish to be kept in good condition until an inter-island vessel could take it to the main marketing centre. However, in the great majority of cases the machines have broken down due to lack of fuel, spare parts or the necessary maintenance skills; or have proved much too costly to run. There is a dearth of data on the operating costs of such equipment, but evidence suggests that they are unacceptably high, especially where diesel oil is the energy source.

Nevertheless, the current Kiribati development plan provides for trials to assess the economic viability of both diesel and solar powered ice-making machines for outer island use. Fiji development include provision of 1000kg ice-making plants to established rural fishing groups under Japanese Aid.

There is a preference both in the outer islands and in the urban markets for fresh fish, with chilled or frozen fish a second choice. But preservation by smoking, salting and sun-drying exists in the islands and fish so treated is marketable. In Kiribati efforts are being made to improve salting methods and introduce smoke kilns to outer islands which can be used simultaneously to cook food, thus conserving scarce fuelwood.

Large scale processing facilities such as canneries cannot be contemplated for outer islands. The optimum scale for a commercial cannery is 15,000 tonnes per year and any viable size of plant would have requirements for fresh water, electricity and even labour which would be beyond the capacity of a typical outer island to provide. And in such a globally competitive field the inevitable cost penalties of establishing such a plant on an outer island would almost certainly make it non-feasible. (It may be argued that Fiji's tuna cannery is at Levuka, on the island of Ovalau, not the main island of Viti Levu. But Ovalau is only 20km off-shore from Viti Levu, enjoys good communications and infrastructure and, moreover, Levuka used to be the national capital. In this context Ovalau must be considered a special case.)

#### HIGH VALUE EXPORTS

Experiments are proceeding in several countries (the Federated States of Micronesia, for example) to harvest and sun-dry beche-de-mer. In others (such as Tuvalu) production is under way and export markets have been established. In the past the ease of harvesting of high export value resources has led to depletion of the beche-de-mer resource on many islands. An important subject of research, therefore, is the sustainable yield, quality assurance, domestic transportation and sound market research are also essential considerations if this product is to be re-established as a significant export from the Pacific region.

A commercial venture in Fiji successfully exports snapper and other high value species to Honolulu, airfreighted. Wholesale prices of up to US\$9 per kilogramme were recorded in a recent survey of the Honolulu fish market. Another commercial venture set up on the Federated States of Micronesia, with a float plane to collect fresh crayfish from remote locations, failed. It is probable that such activities are best carried out on main islands rather than on outer islands, where direct access to international transportation and market intelligence is possible, and supervision to ensure regularity of supply and acceptable export quality is easier.

## IMPLEMENTATION CONSIDERATIONS

Most island administrations agree that any successful initiative in outer island fisheries development must involve an integrated approach. Hardware alone will not work. Nor yet will market development, credit facilities or any other project component in isolation.

Other national programmes are less ambitious in scope but nevertheless recognise that training, extension, credit arrangements, institutional structures, workshops, supply facilities (for fuel, spare parts, fishing gear etc), marketing and distribution infrastructure and inter-island transportation are necessary factors in overall programme implementation.

Institutional structures deserve some comment here. In some places there is precedent for groups of people to come together to establish an economic enterprise: e.g. 'mronron' in Kiribati. In others it is feasible to use existing traditional structures or church organisations as vehicles for investment and innovation. Where this is not the case, cooperatives may be formed as an alternative to socially unacceptable individual enterprise. However, experience in many countries - insular and continental, developing and developed - strongly indicates that:

- . Fishermen tend to be individualists who will only work within a cooperative if they see that it is clearly to their advantage and if it does not intrude too much on their personal autonomy.
- . Cooperatives which are imposed from above rarely work; they must spring from the members' own perception of their needs and be initiated by them.
- . Cooperatives are often not well equipped (any more than Governments are) to take over functions which have traditionally been performed by others: money-lenders, fish wholesalers etc (this is more relevant in an Asian than a Pacific context).

Another factor which is evident in the literature (and has been confirmed in personal correspondence on the subject) is realism in project design, in terms of scale, speed of implementation and compatibility with locally established methods and social organisation.

## MANAGEMENT

### General

Despite the success of these development programmes policy attention in inshore fisheries is likely to focus increasingly on managing the fisheries to reduce risks of over-fishing. Here, the effectiveness of direct government regulations can be only limited. There are in many cases regulations on the sizes of shells, lobsters, crabs etc., which may be taken - these can be effective where the products are easily available for inspection at points of export. Fisheries inspections and information services have in some instances been successful in curbing the worst abuses of illegal fish poisoning and dynamiting. But there is little that governments with limited administrative resources can do to limit small-scale fishing through quotas, licences, gear controls etc., even if they had the information on which to base the establishment of regulations.

Rather, there is increased recognition of the need to have fishing regulations carried out by fishermen's groups, co-operatives and communities themselves. For now, this interest takes the form of study and discussion of methods to identify and formalise forms of regulation of fishing activity, especially through the registration of ownership over inshore fish resources; and the devolution through legislation of authority to provincial community and fishermen's authorities.

### TRADITIONAL

Traditional forms of stewardship have usually been successful in maintaining inshore resources sufficient to meet local subsistence needs. The growing commercial demand threatens to break down these controls. There is already evidence of this effects of fishing in some areas in terms of changes in species composition of catches, reduction in average sizes of fish; and the need for fishermen to travel long distances to fishing grounds in areas of dense populations.

The major advantages of customary rights are that controls are exercised at a local level and not from outside. This promotes self confidence amongst members of the community and creates a harmonious relationship with the government. The system effectively minimises enforcement costs of management measures; as well as social and political conflicts. The fishing community however is likely to have a better understanding and appreciation of management principles if discussed at a local level.

The disadvantages of traditional rights are that they can make it difficult to implement any national policy. Normally the area covered by a traditional management scheme is invariably only a part of the range of any fish stock. For example, consideration of a spawning run of a species may be in the national interest, but this could be locally regarded as a traditional resource.

There are a large variety of traditional fishing rights and management practices in the region; ranging from absolute individual ownership of marine areas and all resources therein; to transitory access rights to particular specified resources or to communal access to all resources. Management powers might therefore be vested with individuals or groups and the management options open to them are in essence no different from those normally imposed by Governments.

In the earlier years, smaller human populations and traditional fishing practices tended to protect the resources. With modern economic development, traditional approaches to conservation are rapidly being eroded and in most cases, cannot be expected to stem the tide of increasing fishing pressure.

The reasons for this may be twofold. Firstly only a handful of administrations have been able to clearly identify the nature and amount of information that should be collected to pinpoint the problems and to provide background for finding possible solutions. Secondly, administrators know that remedial action to improve conservation would require restrictions on traditional fisheries, thereby inviting tremendous mechanical, social and political problems.

#### CURRENT DEFICIENCIES

On the whole there are general deficiencies in the current programmes of research in support of management. The main deficiencies are:

- . lack of statistics. Very few countries operate systems of catch statistics which can measure changes in total production, in catch rates and the species composition of the inshore fisheries. Others have attempted various systems with the help from outside organisations. The major downfall of most systems are that most are complex and expensive; or that the routine collections of information has been given a very low priority.
- . lack of clear cut alternatives for management of the fisheries. There is extreme difficulty in arraying factual information in a manner that would convince decision makers and the fishing interests. In small scale fisheries involving major segments of the populations of many Pacific Island countries, it is essential to develop broad public support for any management measures. It would seem impossible to gain such support unless the nature of the action were clearly specified; unless its consequences could be predicted with considerable accuracy; and unless the action had a high likelihood of bringing about visible improvements for the common good. It is one thing to make a qualitative observation that a fishery is too intense because of sizes of certain species is too small; or because of other sound biological observations; it is quite another thing to say that if a fishery were closed for a certain period, quantifiably greater catches of larger fish would result within a given length of time. Methods to provide such assessments are simply not available to island fisheries officers.

- . lack of programme emphasis on inshore small scale fisheries. Since it is unlikely that practical management measures could be taken, administrations have been discouraged from undertaking work on the inshore fisheries thus creating a vicious circle. As remedial actions are so often difficult to implement, there is no incentive to devote effort to the problems, and because the problems are not addressed, they get worse.

#### PROBLEMS OF IMPLEMENTATION

I do not wish to under-emphasize the difficulties likely to be encountered in getting management programmes to work effectively. Although there is a large volume of literature on management methods for fisheries covering the theoretical and practical applications, there have been relatively few success. Many methods cause conflict and confusion and many are costly to implement. Most importantly, failures of management schemes have occurred in developed countries, which have the means to obtain the required data for management through research, the manpower and skills to develop management policies and the resources to implement management measures.

This suggests the Pacific island governments will face difficult tasks in making management decisions applicable to their respective fisheries situations and having them accepted socially and politically. It is thus important to take note of the key reasons for the lack of success when considering possible management methods to use, as outlined below:

- . timely implementation to prevent serious overfishing.
- . difficulties in enforcement which often arise due to lack of funds to meet costs of enforcement, the lack of appropriate legal powers and a lack of manpower to enforce management measures.
- . evasions of management measures by fishermen arise from conflicts between government management objectives and the fisherman's profit motive.
- . excessive costs of administration and implementation of management measures arising from unduly complex management systems.
- . inappropriate and inadequate policies and objectives arising from ambiguous management plans, formulated as a result of conflicting administrative and political considerations.
- . ignorance of the impact of control measures, leading to misunderstanding and misinterpretations of management objectives.
- . division of authority and lack of coordinations between numerous government departments, ministries or other organizations involved in fisheries development and management.

- . inadequate statistics and information upon which to base management objectives, coupled with a lack of appreciation of the usefulness of statistics and data required for either fisheries management or stock assessment.
- . undue political interests causing the administration to make incorrect management decisions; the most notable problem being a lack of political will on the part of government to accept sound management advice and to make appropriate decisions.

### MANAGEMENT OPTIONS

There is a good deal of excellent scientific work being done on concepts of small scale fisheries management. However there is a major gap between the world of concepts and the practical expression of these concepts in island management programmes., Such a gap should not be viewed negatively. With its history of cooperation between countries, and between administrations and outside technical agencies, the Pacific Island region would seem to be in an ideal situation to blend concepts with practices. This would serve as a means of bringing together the conceptionalist, the practitioners and the people effected by management decisions.

Any management system adopted for the Pacific region must be cost-effective. It must produce results that are commensurate with the value of the resources both in economic terms and in the eyes of the people. It is important that the management system selected is one which the organisation can operate. Adequate funds and equipment are required.

It would be better to operate a modest monitoring programme and assessment in a few selected areas than to over-extend resources by attempting an ambitious, country-wide coverage. Work programmes can breakdown because of equipment failures. Care needs to be taken that essential equipment is vigorously maintained. Alternatively, the programmes need to be independent of the equipment.

The fisheries administrations of the region recognized at an early stage the need to change or orientate directions of development programmes towards management. Already some countries have expressed concern about the likely effect of fisheries growth, particularly in coral reef areas adjacent to towns and villages. The likelihood of problems occurring depends on whether or not development agencies recognize the biological finiteness of the resources.

Outlined below are some points that administrators in the region are beginning to take account of in the formulation of management regimes.

- . recognition that sooner or later investment in development schemes has to cease in order to avoid overexploitation of the resources.
- . an attempt to inform fishermen of the reasons for halting development or incentive schemes, preferably well before it happens.

- . fishermen need to be convinced that the fish resources are not infinite. This is being done through education and training programmes.
- . fishermen need to understand why it is necessary and desirable to impose management measures.
- . efforts to obtain information required for stock assessment and management should ideally be initiated at the inception of the scheme.
- . entry of fishermen, vessels or capital into the developing fishery should be controlled from the start and additional entries prevented when the catch rates have declined to half of the initial catch per unit effort.
- . in fisheries where the resource is obviously over exploited incentives should be offered to reduce the effect by a stimulating redirection of effort elsewhere.
- . there is a lot to be learnt from similar problems elsewhere - thus a need for better regional exchange and problem solving especially for small countries with limited capacities and in isolation.

Much of the economic, social and political distress that occurs when the fishery is overcapitalized can then be avoided.

Administrations have made efforts to understand the social and political setting of the fishing communities to which management programmes would apply and take these factors into account when formulating management systems. This would ensure acceptance and greater participation by the communities. It is important to note that the social and political setting of a fishing community is not a problem; rather, it is a "situation". It would prove very costly and time-consuming to try to change that "situation".

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