KUWAIT'S POLICY ON BYCATCH REDUCTION

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Introduction

Bycatch has been recognized as an important component in fisheries management world wide. There is widespread national and international recognition that bycatch in many world fisheries constitute as important waste and raised conservation, ecological and

economic considerations that require the attention of fishery management. Increasingly, international treaties and conventions are placing obligations on signatories to address bycatch. For example, the United Nations Food and Agricultural Organization (FAO) has developed a 'Code of Conduct for Responsible Fisheries' that addresses the issue of bycatch and provides a useful blueprint for responsible fisheries management. It is stated in the FAO Code of Conduct for Responsible Fisheries (Paragraph 8.5.1) that the "States should require that fishing gear, methods and practices, to the extent practicable, are sufficiently selective so as to minimize waste, discards and catch of non-target species. Bycatch consists mainly of unwanted species and mostly are discarded back to the sea. Typically, over 90% of the bycatch is discarded overboard either dead or moribund, usually because it is uneconomical to retain or regulations prevent it from being landed.

FAO has recently estimated the discard rate of world's marine fisheries as 8%. Based on this discard rate, in the 1992-2001 periods, yearly average discards are estimated to be 6.8 million tones (Kelleher, 2005). Among various types of fishing, shrimp trawling is the largest contributor with the highest ratio of bycatch to shrimp catch, 5:1 in temperate and subtropical waters and 10:1 in tropical waters, owing to the poor selective of the fine meshed shrimp nets (Slavin, 1982). In a recent standardized shrimp survey in the waters of the western Arabian Gulf, the fish bycatch in the waters of Kuwait was found to be the highest when compared to those of neighboring countries to the south. On average, the capture of 1 kg of shrimp required the capture of 74 kg of fish, most of which were discarded (Table 1) (Bishop et al., 2001).

Table 1. Bycatch to Shrimp Ratio in the Western Arabian Gulf Region from March 1999 to December 2000.

W. Arabian Gulf Localities	Shrimp Catch Rate	Fish Catch Rate	Bycatch - Shrimp Ratio
Kuwait	4.7	350	74:1
Dareen (Saudi Arabia)	5.5	89	16:1
Manifah (Saudi Arabia)	6.0	45	8:1
Kufji (Saudi Arabia)	2.6	36	4:1
Bahrain	4.3	21	5:1

The catch rate for all the stations is standardized (kg/net-h@3.3 knots)
(Bishop, et al. 2001)

It is clear that the major portion of Kuwait's capture fish production is being wasted as bycatch despite the fact that the country's fish production is under stress in recent years. It may be agreed that the reason for depleting trend of fishery resources may not be attributed for bycatch alone. Of course, there are many factors such as ecological, social and economical are considerably responsible for low production. Man made activities including dredging, reclamation and construction activities in and around Kuwait Bay is a potential threat to the marine ecosystem. However, some of the activities are observed to be unavoidable in light of national interest. Public Authority for Agriculture Affairs and Fish Resources is taking up the issues to the appropriate authorities to minimize such manmade activities in the coastal area of Kuwait particularly in and around the Kuwait Bay. Kuwait Bay -the national marine treasure is always considered as the important nursing ground for marine fishes and shrimps of Kuwait. Its coral reefs, miles of seagrasses, and substantial wetlands make the Bay legendary for productive fisheries. From shrimp trawlers to

recreational charter boats, fishing is a way of life in the Kuwait Bay. Hence, the Public Authority for Agriculture Affairs and Fish Resource is implementing various conservation measures for protecting the marine living resources not only in Kuwait Bay but the entire Exclusive Economic Zone of Kuwait waters. The conservation measures include:

- Prohibiting fishing activities in the Kuwait Bay
- Banning of fishing in the three mile coastal zone of Kuwait
- Enforcing closed season during spawning periods of shrimps and fin fishes every year
- Halting issuance of new license for fishing in order to restrict the fishing efforts in Kuwait
- Enforcing the usage of fishing nets with prescribed mesh sizes for fish catch etc.,

Even though the conservation measures are implemented in the right directions to protect and conserve the country's marine living resources, still the conservation measures are far behind to address the issues of bycatch in Kuwait waters. As the nodal organization of the Government for national fisheries development, the Fisheries Department of PAFFR has the prime responsibility to address the issues concern with bycatch. In light of the necessity, the Fisheries Department of PAFFR has proposed a 'Policy on bycatch reduction' for achieving substantial reduction of bycatch in State of Kuwait.

Bycatch

Generally, fishers use their skills and experience to catch commercially valuable fishes. While targeting such valuable fishes, the untargeted fishes are incidentally captured as bycatch in which, most of them are being discarded back to the sea either because it has no

value or regulations preclude it being retained. Regardless of whether a species is kept or discarded, objectives of fisheries legislation provide for the sustainable management of all resources. While the term bycatch may refer to all non-targeted catch, including discards, the present policy will deal specifically with those aspects of bycatch that are not currently subject to the fishery management provisions of Kuwait.

Bycatch status in Kuwait

By catch quantity has always been focused with shrimp trawl catch in State of Kuwait as the shrimp trawlers are the major contributor of bycatch. Though the earlier research finding in Kuwait waters are showing different pictures on the discard ratio of bycatch to shrimp, the estimated quantity of discards were found to be higher than the other countries of Arabian Gulf (Table 1). Ye et al., (2000) reported that the bycatch to shrimp ratio as high as 30 to 1 in Kuwait waters. In a recent shrimp survey conducted in the waters of the western Arabian Gulf, the ratio of bycatch to shrimp has been reported as 74:1 (Bishop et al., 2001). The bycatch in Kuwait waters are mainly represented by Guitar fishes (*Rhinobatidae*), sea cat fishes (*Arius* spp), cat sharks (*Chilloscyllium griseus*) and other 'mixed fishes' (Table 2). Grantham (1980) reported 150 species in the bycatch in Kuwait waters, while Ye et al.(2000) reported 43 species in which, the percentage composition of major 10 species are given in Table-3.

Table 2. Discards by Category of the Kuwait Shrimp Fishery

Discard Category	*Discards (10^3 t)*			*Average*
	1987/88	1988/89	1989/90	
Mixed fish	19.85	18.38	29.28	53.61
Arius spp. (Sea catfish)	10.99	10.17	16.2	29.68
Chilloscyllium griseum (cat shark)	5.06	4.68	7.46	13.66
Mixed guitar fish (Rhinobatidae)	1.13	1.05	1.67	3.05
Total	37.03	34.28	54.63	100

Table 3. Top ten species of landed bycatch from Kuwait's Industrial shrimp fishery from 1987/88 to 1989/90

Species Common Name	*Scientific Name*	*Percentage*		
		1987/88	1988/89	1989/90
Newaiby	*Otolithes rubber*	24.1	33.1 (1)*	27.4(1)
Maid	*Liza sp.*	9.5	5.9 (4)	14.9 (2)
Kasoor	*Saurida undosquamis*	6.8	4.9(6)	
Hamam	*Jacks*	5.4	2.1(10)	
Jelaijlee	*Johnius belangerii*	5.3	6.1(3)	7.6 (4)
Bassi	*Nemipterus sp.*	5.3	6.3(2)	13.5 (3)
Lissan Al-Thor	*Cynoglossus arel*	4.9		
Wahar	*Platycephalus indicus*	4.5	3.6 (8)	
Khobat	*Scomberomorus guttatus*	2.7		
Mazlaq	*Euryglossa orientalis*	2.6	2.2 (9)	3.9 (5)
Hamoor	*Epinephelus coioides*		5.2 (5)	3.3 (6)
Duwailmee	*Sphyraena chrysotaenia*		4.3 (7)	
Sawayah	*Ilisha compressa*			3.2 (7)
Hamrah	*Lutjanus malabaricus*			2.2 (8)
Zobaidy	*Pampus argenteus*			2.1 (9)
Ghazal	*Polydactylus sextarius*			2.1 (10)
Total		71.1	73.7	80.2

After Ye et al., 2000; *Numbers in parentheses indicate ranking order

Further, it is evident from the earlier findings in Australian waters (Liggins and Kennelly, 1996) that bycatch consists of more juvenile fishes that could be harvested at later date by other type of fishing gears and crafts (fisheries). At present, no such data is available on juvenile fish mortality of bycatch in Kuwait waters and it is assumed that similar mortalities are occurring with bycatch discarding (Isaksen et al., 1992). It is obvious that the fine-meshed shrimp trawlers will capture juveniles of commercial important fishes because shrimp trawling grounds are in shallow waters adjacent to Kuwait Bay and the three – miles limit zone. This is evident from the observations during the trawl net sampling for KISR's current research project 'Stock assessment of Zobaidy in the Northern Gulf' (Al-Husaini et al, 2004). The trawl nets have captured Zobaidy juveniles in areas outside of Kuwait Bay and the three mile limit zone, which indicate that the present conservation measures are inadequate and it needs to be revised for efficient management of Kuwaiti's fishery resources.

Need of the Policy

The primary reason for a national bycatch policy is to ensure that direct and indirect impacts of bycatch on Kuwaiti's aquatic systems are taken into account in the development and implementation of fisheries management regimes. The basic principle of the policy is to ensure substantial reduction of bycatch in Kuwait waters and the bycatch reduction activities are conducted in a consistent manner with the ecological sustainable development. Reduction of discards, particularly non-target catch and juveniles of commercially valuable species, is expected to enhance the productivity of Kuwait fisheries and maintain the integrity of Kuwait's aquatic ecosystems. By taking action to reduce bycatch, all groups of the fishery sectors will benefit through sustainable catch levels and reduced damage to target catch. It will be useful for the shrimp and dhow boat operators because they may experience shorter sorting times, less gear damage and lower fuel consumption. Moreover, national bycatch policy is necessary for sensitizing the fishing operators in Kuwait because bycatch and its discard ratio are always found to be higher than that of the other countries of Arabian Gulf. Despite wasting its own bycatch resources,

the county is annually importing more than 8500 tones of fishes from other countries in addition to its own fish production of about 5000 tones (Table 4).

Table 4. Fish Supply in Kuwait

(Quantity in tones and value in KD)

Year	Fish Production		Fish Imports		Fish Exports		Fish Supply
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity
2000	7437.00	8062066	6491.00	7785734	626.847	1579448	13301.00
2001	6041.00	5949625	5222.00	5940797	452.123	964855	10811.00
2002	5929.00	6446126	7308.00	8496848	342.514	2941257	12894.00
2003	4425.00	6642460	8892.00	10936980	216.500*	2500000	13100.00

Source: Central Statistical Office, Ministry of Planning, Kuwait
* From Fisheries Department

Hence, the Fisheries Department has proposed this Policy on bycatch reduction with the expectation that it would be the guiding principles to address the bycatch issue in a focused and coordinated manner with the cooperation of all stakeholders of Kuwait fisheries.

Stakeholders

All Kuwaiti including future generations are stakeholders. Specific interest groups include:

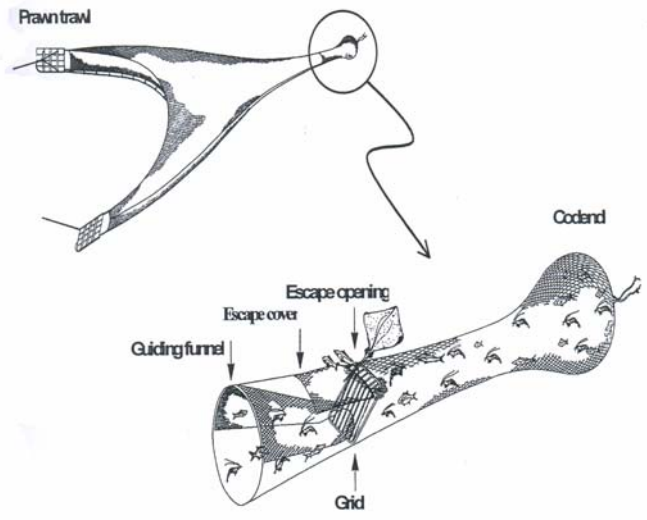
- Public Authority for Agriculture Affairs and Fish Resources
- Public Authority for Environment
- *Public Authority for Ports and shipping*
- Industrial fishing sectors
- Artisanal fishing sectors
- Recreational fishing sectors
- Charter fishing sectors

- Fisheries Companies
- Environment and conservation groups (non-government organizations)
- Consumers
- Seafood processors, marketers and retailers
- Fishery management and conservation agencies
- Research agencies

Bycatch Reduction Devices:

Installation of Turtle Excluder Device (TED) and Bycatch Reduction Devises (BRDs) in shrimp trawlers are reported to be the most efficient way to reduce bycatch in shrimp fisheries (Brewer et al., 1998). In a recent research project of KISR entitled 'Application of By-catch reduction devices to Kuwait shrimp fishery', Al- Ayoub et al., (2005) have tested the TED (Turtle Excluder Device) and BRDs (Bycatch Reduction Devises (FE- Fish Eye; SMC- Square Mesh Codend) in shrimp trawler and dhow boats in Kuwait waters. The TEDs and BRDs are designed in a manner to facilitate escape of larger untargeted fishes, sharks, rays and turtles from the shrimp trawl nets. The design details of these devices are briefly mentioned here as theses details are more significant to this present policy note on bycatch.

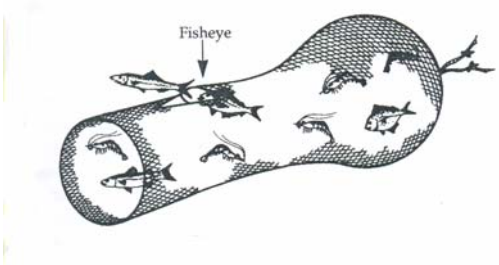
Turtle Excluder Device



Turtle Excluder Device is fitted between the mouth of the trawl net and cod end and consist of an inclined aluminum grid, an escape opening, and an escape cover. As the potential catch reaches the TED, the inclined grid forces large animals from the net through an escape opening located either in the top or bottom of the net. Small animals pass through the bars of the grid and enter the cod end. The TED is oval in shape and measured approximately 1.2 m high 1 m wide and has a bar spacing of 80 mm.

Fish Eye

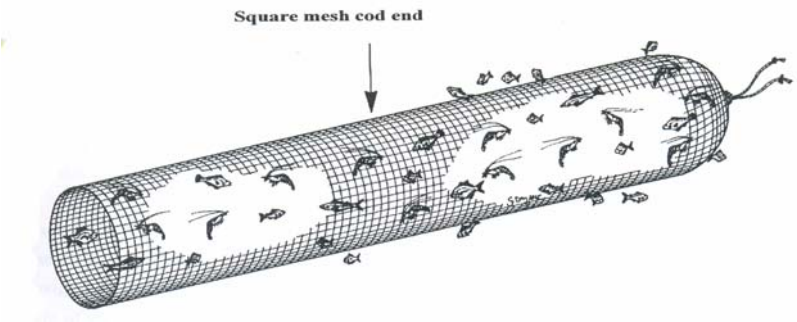
The Fisheye is a Bycatch Reduction Device that takes the advantage of fish behaviour to reduce by-catch by allowing the active swimming fishes to escape from the trawl. The 'Fisheye' consists of a simple metal frame with the elliptical-escape opening of 450x150 mm size and it is attached with the top of the cod end through which the fishes swim and escape.



Square mesh cod end

Square mesh cod end is another BRD that utilizes swimming behaviour to allow small fish and other animals to escape from the trawl. This device consists of a cylinder of square meshes replacing the typical diamond-shaped meshes of the cod end. The material used in the construction of this device was knotless nylon netting with a bar- mesh size of 45 mm. During the fishing operation, the square meshes remain open and small animals can escape

from the cod end. Larger animals cannot pass through the mesh and are trapped inside the net.



Observations on BRDs

- While ascertaining the economic assessment, it has been mentioned that that average gross economic return for an industrial vessel using two standard nets was KD 156/h. Assuming that the same trawlers is fitted with BRD, the reduction of revenue is ranging from 10 to 13%. The revenue loss is minimal when compared to other benefits. These include cleaner catches and a higher percentage of undamaged shrimp due to less by-catch volume. With less bycatch, sorting time is reduced, and this allows the shrimp to be placed on ice quicker. Further, the usage of Square-Mesh Codend (SMC) is allowing the small shrimps to escape from the trawl nets and facilitating their survival up to their harvestable size. With theses intangible benefits taken into consideration, the 10 to 13% losses are negligible and the TED and BRDs are actually yield an economic advantage.

- The TED fitted nets captured larger size of shrimps (*Metapenaeus affinis* and *Parapenaeopsis stylifera*) than those captured by control nets. This indicates that

the TED net was successful in releasing smaller shrimps while maintaining an equivalent weight caught by the control net.

- Similarly the Square-Mesh Cod End (SMC) has been found to be well performed as it is reduce the bycatch while maintaining shrimp catch. It never reduces the shrimp catch (weight), instead of that it catches larger shrimp species as it is evident from length frequency analysis.

- The net with 'Fisheye' device always caught less shrimp and less by-catch and no significant difference was observed between the catch of FE equipped net and that of the standard net for both shrimp and bycatch.

- The research findings recommend that **"serious considerations should be given to introducing TED (Turtle Excluder Device) and BRDs (Bycacth Reduction Devices) to Kuwaiti's fishery"**. The TED performed exceptionally well; the overall performance of the TED-fitted net did not reduce the larger shrimp or major species of fin-fish. The SMC (Square Mesh Codend) also performed well and it reduced the bycatch, while maintaining the catch of shrimp and valuable fish. However, 'Fisheye' device has not been recommended as it needs more testing to improve the results.

- Even though, it is emphasised to acquire additional information about the performance of the devices, the research finding strongly recommends the installation of TEDs and BRDs in Kuwait shrimp trawlers and dhow boats. This could be possible with the wholehearted involvement of all stakeholders of Kuwait fisheries. With due consideration of these observations and recommendations, the Fisheries Department of the Public Authority for Agriculture Affairs has presented this Policy note on bycatch in a draft form.

Policy on Bycatch

1. Correct assessment on bycatch is more important for formulating suitable strategies for efficient management of fishery resources in State of Kuwait. At present, there is no standard system for actual estimation of bycatch. It is aware that the available statistics on bycatch are project based and don't have continuity. Hence, the PAAFR is intending to create monitoring facility for bycatch estimation in a continuous manner with the technical cooperation of KISR, Fishing operators and other stakeholders of Kuwait fisheries.

2. In order to minimize bycatch in Kuwait waters, PAAFR is intend to consider introducing Fish catch quota system in Kuwait as it is implemented by many western countries. Implementation strategies for quota system will be worked out in consultation with the stakeholders

3. For ensuring consistent and reliable data on bycatch estimation, fish catch observers shall be engaged onboard. Observers shall monitor and record catch data including bycatch composition, fishing effort, discard details etc. It is realized that observers could provide unbiased and impartial data about bycatch which will determine an overall amount of bycatch that reflects an acceptable and sustainable level of take, using the best available knowledge of average bycatch composition. This level can be set as either a) a fishery-wide quota, the reaching of which would close the fishery, or b) an individual vessel quota, the reaching of which would disqualify a particular vessel from fishing. Bycatch quotas provide the ability to manage fisheries.

4. In order to conserve the country's shrimp resources, the enforcement for shrimp closure period will be continued in future. PAAFR is sticking to this policy with the intention that the bycatch species are survived for some extent at least in the closure season.

5. The historic focus on shrimp trawl bycatch has excluded most other gear types, unfairly shifting the regulatory burden to only one aspect of the problem. Since all gear types including gillnets, longlines, gargoor traps etc are expected to produce some levels of bycatch, the estimation must include all commercial and recreational types of fishing gear.

6. All the shrimp trawlers and dhow boats should be fitted with Bycatch Reduction Devices (BRDs) (Turtle Excluder Device and Square Mess Codend) within the specified period of time stipulated by the Fisheries Department, PAFFR.

7. PAAFR will regulate the designs and specifications of the Turtle Excluder Device and Square Mesh Codend.

8. PAAFR will renew licences only those shrimp trawlers and dhow boats fitted with Bycatch Reduction Devices

9. PAAFR will pay subsidy for only those shrimp trawlers and dhow boats fitted with Bycatch Reduction Devices

10. PAAFR will seek common consensus for these conservation measures with the stakeholders and these will be amended based on those consensus in the existing rules and regulations of Kuwait for implementation.

11. Kuwait Shrimp trawlers are using fine-meshed trawl nets and capture juveniles of commercial important fish species. Because shrimp trawling grounds are located in the shallow waters adjacent to Kuwait Bay and the three-miles limit zone. This is evident from the recent findings from the research KISR project “Stock assessment of Zobaidy in the Northern Gulf”. In view of the observations, **PAFFR is intending to prohibit commercial fishing activities up to 5 miles zone from the coastal line of Kuwait toward the Kuwait Sea area.**

12. PAFFR will ensure to achieve a common consensus about these conservation measures and these shall be amended in the existing fishery rules and regulation of Kuwait for implementations.

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