

Overview of Fisheries Resources in Namibia

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Abstract Off the 1,572 km long coastline of Namibia lies known as the Benguela upwelling system, a very rich source of marine life supporting traditional and modern forms of fishery. Commercial fishing and fish processing is one of the fastest-growing sectors of the Namibian economy in terms of employment, export earnings, and contribution to GDP. The fishing industry has grown to the extent that it is currently Namibia's second biggest export earner of foreign currency after mining (90% of national output is marketed for export). In 2005, Namibia harvested about 552,164 tonnes of fish. The final value of processed products (export value) that year was around US\$ 376.0 million. Besides the marine captured fisheries, Namibia also has a small but vibrant aquaculture sector. Inland captured fisheries exist in the north-east and north-west of Namibia where as commercial freshwater aquaculture of tilapia and catfish is also undertaken. The inland fisheries are mainly subsistence based and typically labour intensive, with low catch per unit effort. However the subsistence fisheries from these regions play a significant role in the lives of rural community. The domestic market for marine fish products is extremely limited due to the small size of the population (2 million). The fishing industry is a source of considerable employment for many Namibians. Huge potential to increase production exists in Namibia, unpolluted high quality marine waters, high natural primary productivity of the seawater, availability of inexpensive fish by-products from established fish processing sector for inclusion in wet aqua-feeds and well-established processing, packaging and marketing systems due to the marine capture fisheries that can be adopted for aquaculture purpose.

Key words : Aquaculture, Benguela, fisheries, Namibia

Introduction

Namibia is an arid country, situated on the Atlantic coast of southern Africa and borders South Africa, Botswana, Angola and Zambia. Water resources are limited to mainly ephemeral rivers and so wetlands and other water bodies tend to be temporary. Perennial rivers exist only at the northern and southern borders (Fig. 1). It has a 1,572 km long coastline with western site of the Atlantic Ocean. The 200 nautical miles EEZ (exclusive Economic Zone) comprises rich fishing grounds with varieties of commercial fish species.

The clean, cold South Atlantic waters off the coast of Namibia are home to some of the richest fishing grounds in the world (Fig. 2.). Commercial fishing and fish processing is one of the fastest-growing sectors of the Namibian economy in terms of employment, export

earnings, and contribution to GDP. The fishing industry has grown to the extent that it is currently Namibia's second biggest export earner of foreign currency after mining (90% of national output is marketed for export). In 2005, Namibia harvested about 552,164 tonnes of fish. The final value of processed products (export value) that year was around US\$ 376.0 million. Despite the abundance of marine fisheries resources of the country, fish consumption in Namibia is among the lowest in Africa, estimated at 13.3 per caput per year. Fish has not been part of the traditional diet of many Namibians. However, the Namibia Fish Consumption Trust has been established by the Ministry of Fisheries and Marine Resources with the objective of increasing domestic fish consumption.

The main species found in abundance off Namibia are pilchards (sardines), anchovy, hake, and horse

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Fig. 1. Map of the Republic of Namibia.

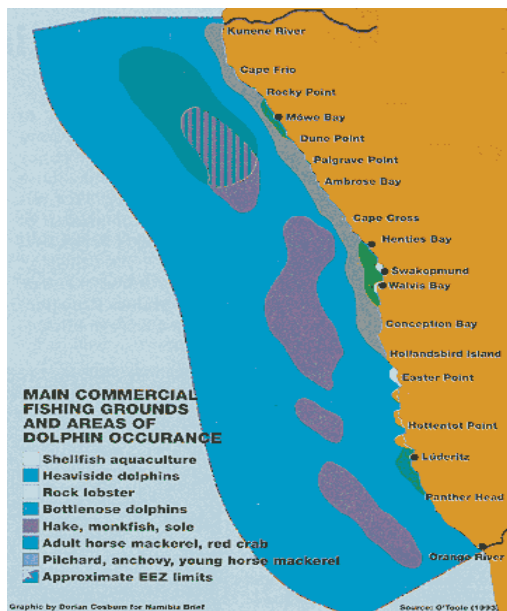


Fig. 2. Main fishing grounds and dolphin occurrence in Namibia.

mackerel. There also are smaller but significant quantities of sole, squid, deep-sea crab, rock lobster, and tuna. However, at the time of independence, fish stocks had fallen to dangerously low levels due to the lack of protection and conservation of the fisheries and the over-exploitation of these resources. This trend appears to have been halted and reversed since independence, as the Namibian Government is now pursuing a conservative resource management policy along with an aggressive fisheries enforcement campaign. Namibia is a signatory to the Convention on Conservation and

Management of Fisheries Resources in the South-East Atlantic (Seafo Convention). The country is also part of the Benguela Current Large Marine Ecosystem (BCLME) program, which is designed to help the Governments of Namibia, Angola, and South Africa manage their shared marine resources in an integrated and sustainable way.

Fisheries production, consumption and trade

Marine fisheries

Namibia has one of the most productive fishing grounds in the world, based on the Benguela Current System known, one of the four eastern boundary upwelling systems in the world (the others are off North – West Africa, off California and off Peru) (Fig. 3) [3]. These systems support rich populations of fish, which form the basis for the Namibian marine fisheries sector (Fig. 4).

Namibia’s 200 nautical mile Exclusive Economic Zone (EEZ)’s commercial biomass contain about 20

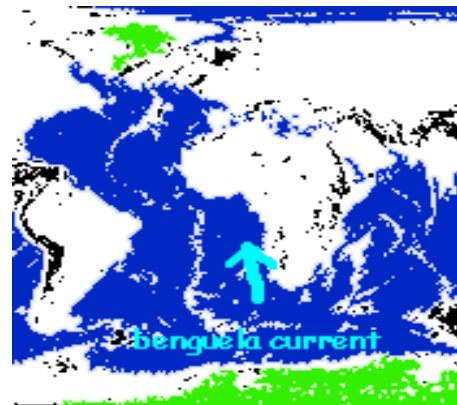


Fig. 3. Ocean currents and tides.

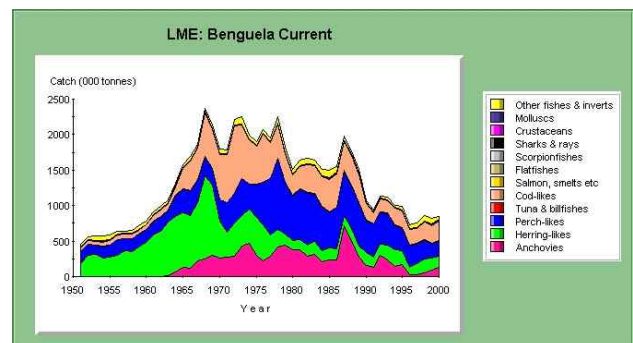


Fig. 4. Catch statistics of the major fish species of Benguela current.

different species consisting primarily of small pelagic species (pilchard, anchovy, horse mackerel and mackerel) and lobster along the shallower onshore waters on the continental shelf, as well as large pelagic species including adult mackerel, demersal hake and other deep-sea species (monkfish, sole and crab) in the waters further offshore. Out of the 20 fish species commercially exploited in Namibia, eight species are regulated through TACs (Total Allowable Catch). The orange roughy is another of Namibia's marine resources. This fish, often referred to as the 'diamond of the sea', is a rare, high-priced addition to Namibia's exports in this sector. Only commercially exploited in 1994, Namibia has become the world's second largest supplier of Orange roughy, however the catches of the species have been small in recent years. Other marine exports include rock lobster; crab; oysters; monk; tuna; pilchards, seaweed, anchovy, redeye, snoek, sole, kingklip, panga, John dory, angelfish, shark, swordfish, kob, barbel, squid, cardinal fish, Cape guarnard, grenadier, Jacopever, chub mackerel, octopus and mullet.

The state of the stocks is fair for most of the species, despite declining landings in recent years. However it is the pilchard stocks that are of much concern to the nation. The pilchard population was seriously reduced during the 1990s due to negative environmental circumstances between 1993 and 1995 (so-called 'Benguela-Niño') and the negative effects of over-fishing in the period before independence. In 2001, the stock assessment was indicating less than 100,000 MT. The Ministry of Fisheries and Marine Resources made the decision to set zero quotas for pilchard in 2002 in order to allow the rebuilding of the stocks. In October 2003, the adult stocks of this short-lived species were estimated to be 300,000 MT. The harvest from mariculture, aquaculture and other types of fish farming in Namibia are shown in Figure 5.

Aquaculture sector

Besides the marine captured fisheries, Namibia also has a small but vibrant aquaculture sector. Marine aquaculture enterprises currently produce abalone, oysters, mussels and seaweed in Luderitz sea lagoons and salt-pond of Walvis Bay and Swakopmund. Inland captured fisheries exist in the north-east and north-west of Namibia, where various types of tilapia species and catfish are harvested from rivers and flood plains. Commercial freshwater aquaculture of tilapia and catfish

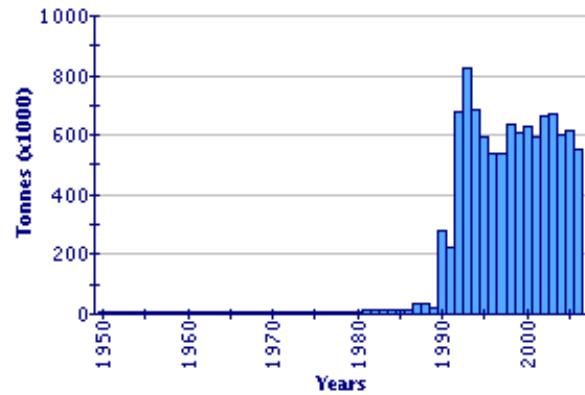


Fig. 5. Total fish production in Namibia (1950-2006) [1].

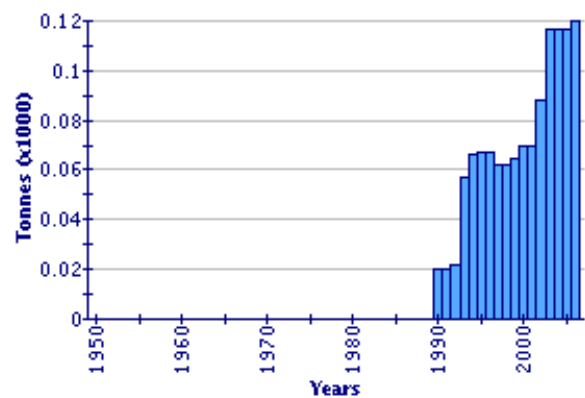


Fig. 6. Aquaculture production in Namibia (1950-2006) [1].

is also undertaken. Aquaculture production in Namibia is shown in Figure 6.

Capture fisheries

The Namibian fishing sector is divided into marine capture fisheries, inland capture fisheries and marine and freshwater aquaculture sector.

Marine capture fisheries (industrial fisheries)

Namibia's marine capture fisheries sector is exclusively industrial. The demersal fishery targets mainly hake in deep water and monkfish, sole and kingklip inshore. The mid-water trawlers target horse mackerel, purse-seiners target pilchard, juvenile horse mackerel and anchovy. Other fisheries at the industrial level include tuna fishing, rock lobster fishing, deep-sea red crab fishing and line-fishing (kob and west steenbras).

Marine catches are landed at two major ports: Walvis Bay and Luderitz. Because of its strategic location in the middle of the fishing grounds, most of the landings

and processing plants are located in Walvis Bay. Currently a total number of 30 marine resources processing plants operate in Namibia. Because of the emphasis placed on creation of employment, catches are almost entirely industrial and onshore processing particularly for wet fish including hake is promoted. The industry involves catching, processing and marketing of fish and fish products. About 85 per cent of the fish landed is processed in Namibia and then exported.

Inland capture fisheries

Namibia has no noteworthy natural freshwater bodies suitable for capture fisheries exploitation. Some rivers on the borders to Angola, Zambia, Zimbabwe and Botswana in the Caprivi and Okavango region are used for limited fishing activities. There are no significant lakes either, the only permanent water bodies being man-made dams and sinkhole lakes. The perennial rivers along the border provide over 1 million hectares of flood-plain wetland with fisheries potential, varying by season at around 2,800 tonnes per annum. The capture fisheries production is shown in Figure 7.

Marine aquaculture

Mariculture is currently dominated by oyster production in Walvis Bay, Swakopmund and Luderitz. Both Pacific oyster (*Crassostrea gigas*) and European oyster (*Ostrea edulis*) are grown. There are eight companies involved in farming oysters in Namibia, which until 2006 was selling 70% of their production to South Africa. Total production has increased from 247 tonnes in 2004 to 302 tonnes in 2005 when new markets were discovered in Asia. It is projected that production could double in 2006 considering the growing demand for Namibian oysters in Asia.

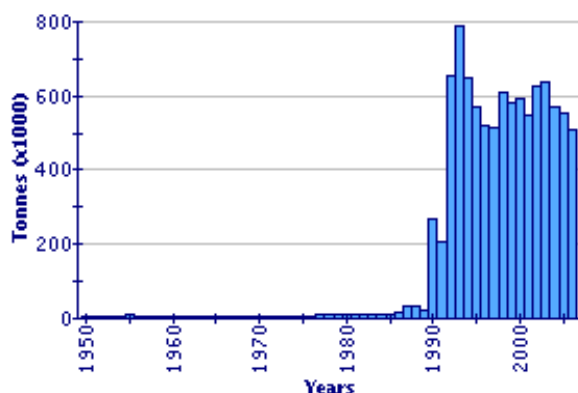


Fig. 7. Capture fisheries production (1950-2006) [1].

Inland aquaculture

Namibia's aquaculture sector is in its infancy, although aquaculture activities are believed to have started in the late 1800's with the introduction of carps, bass and tilapia. Studies show that good freshwater aquaculture development potential exists along rivers such as the Okavango, Kunene, Orange and Zambezi, as well as in dams. Commercial freshwater aquaculture of tilapia and catfish is already undertaken in Hardap. In addition, the Ministry of fisheries and Marine Resources and the Ministry of Trade and Industry have developed six community-based intensive freshwater aquaculture facilities in Omusati, Okavango and Caprivi region producing tilapia and catfish for local distribution. Fingerings are also being produced and distributed to small scale farmers in the north for their own production.

The production of freshwater and brackish water species in the Oshikoto Region is also being considered for future development. The long-term strategy of this activity is to apply the lessons learned to other regions. Local species already adapted to culture requirements shall be the first priority (e.g. *Oreochromis andersonii* and *Clarias gariepinus*). The Ministry is also aiming to adopt a two-pronged approach for the development of this sector. One is freshwater aquaculture, aimed at alleviating poverty, creating employment and satisfying local consumption needs. The second approach involves seawater aquaculture, which includes the culture of oysters and other molluscs for export.

Marine sub-sector

Means of fishing / production

The development of the Namibian marine fishing was made possible following the independence of Namibia in 1990, by the declaration of an EEZ of 200 nautical mile and the full control obtained over the marine resources. A total of 283 vessels were licensed for commercial fishing in Namibian waters for the 2005 fishing season, compared to 302 and 312 in 2003 and 2004 respectively. It is estimated that the fleet is more than 80% Namibian owned with the bulk of the catches exploit by the following fisheries (Table 1):

Demersal fisheries: Around 121 demersal trawlers (19-77m length) are currently licensed. Their principal target species is hake (*Merluccius capensis* and *M. paradoxus*).

Table 1. Harvest of the main commercial species, 2001-2005(tonnes) [2].

Species	2001	2002	2003	2004	2005	2006
Pilchard	10,763	4,160	22,255	28,605	25,128	22,255
Hake	173,277	154,588	189,305	173,902	158,060	189,305
Horse mackerel	315,245	359,183	360,447	310,405	327,700	360,447
Monk	12,390	15,174	13,135	8,961	10,466	13,135
Kingklip	6,607	7,210	6,603	7,067	5,567	6,603
Tuna	3,198	2,837	3,371	3,581	3,654	3,371
Crab	2,343	2,471	2,092	2,400	2,480	2,092
Rock lobster	365	361	269	214	248	269
Other fish species	30,810	77,407	33,644	31,997	18,934	33,644
Total fish harvest	554,998	623,391	631,119	567,133	552,164	
Seals	44,223	40,000	34,000	31,971	64,167	N/a
Seaweed (Gracilaria Collection)	800	500	288	N/a	N/a	N/a

Mid-water fishery: Fifteen (15) mid-water trawlers in the 62-120 m length range are licensed to fish for horse mackerel (*Trachurus capensis*). This sub-sector has the largest number of foreign flag vessels, between 12-15 operating at any one time. However, of these, at least 8 are wholly owned by Namibian nationals, but retain foreign flag in order to facilitate work permits for the largely eastern-bloc crews.

Purse-seine fishery: a fleet of 36 purse-seiners (21-47 m length range) target pilchard (*Sardinops ocellatus*) for canning. Juvenile horse mackerel and anchovy (*Engraulis capensis*) are also caught for fishmeal.

Deep-water fishery: Five deep-water trawlers are currently licensed to target orange roughly (*Hoplostethus atlanticus*) and alfonsino (*Beryx splendens*). The fishery commenced in 1994 but low catch levels have since reduced the value and importance of the fishery.

Tuna fishery: a fleet of 73 tuna vessels in the 6-79 m length range utilising long-line and pole-and-line gear are licensed to target albacore (*Thunnus alalunga*), bigeye (*Thunnus obesus*), swordfish (*Xiphias gladius*) and skipjack (*Katsuwonus pelamis*). Pelagic sharks are also taken. Namibia is an active member of ICCAT and participates fully in regard to regional assessment and management of these species.

Rock lobster fishery: the fishery for rock lobster (*Jasus Ialandii*) is based in the southern port of Lüderitz. 34 (7-21 m) rock lobster trap fishing vessels are currently licensed.

Deep-sea red crab fishery: deep-water traps are used to target red crab (*Chaceon maritae*).

Linefish vessels: a fleet of 16 industrial linefish vessels operate offshore and target kob, snoek and steenbras. Some ski-boats also take recreational fishermen out on a charter basis.

Recreational fishery: The recreational fishery targets many of the species targeted by the 'line-fish' fishery: kob also known as kabeljou (*Argyrosomus* spp.), west-coast steenbras also known as white fish, (*Lithognathus aureti*), galjoen (*Dichistius capensis*), blacktail also known as dassie, (*Diplodus sargus*), and snoek (*Thyrstites atun*). Other important recreational species include barbel (*Galeichthys feliceps*) and sharks (principally cow shark (*Notorynchus cepedianus*), bronze whaler (*Carcharhinus brachyurus*), spotted gullyshark (*Triakis megalopterus*) and smooth hound (*Mustelus mustelus*).

Cape Fur Seals: Cape fur seals (*Arctocephalus pusillus*) are also harvested around Cape Cross, Walvis Bay and Atlas Bay. Harvests have declined from 42,223 seals in 2001 to 31,971 in 2004. The TAC for 2006 is set at 80,000 seals.

Seaweed: Seaweed, predominantly kelp, is harvested at a number of locations. Production in 2003 was 288 tonnes, representing a decline of 36 % from 500 in 2002.

Inland sub-sector

Means of fishing production

Namibia's arid climate means that inland freshwater fisheries sector is relatively small. Only in the north-

eastern and north western regions of Caprivi, Okavango, Omusati, Ohangwena, Oshikoto and Oshana are sizeable freshwater fisheries found. Perennial rivers provide over 1 million hectares of flood-plain wetlands with fisheries potential, estimated at approximately 2,800 tonnes per annum worth \$ US 3 million (N\$ 22 million) at average value of US\$ 1.25/kg, consisting mostly of tilapias and catfish. About 50% of the rural population live in the northern regions and derive food, income and informal employment from inland fish resources.

The inland fisheries are mainly subsistence based and typically labour intensive, with low catch per unit effort. Catches are mainly consumed by the fishers, their immediate families and extended families or within their communities. Very little surplus is sold outside the communities in the towns markets. However the subsistence fisheries from these regions play a significant role in the lives of rural community.

In Kavango and Caprivi Region more than 100,000 people depend on this resource for their daily protein needs. Freshwater fish consumption in the Caprivi region ranks over beef, game and poultry and also has a significant economic value for the communities. The most important fish species are silver catfish, squeaker, bulldog, tigerfish, and tilapia, silver robber, dashtail barb and sharptooth catfish. The recreational fishery is also a major business sector in the Caprivi region. The importance of freshwater fish resources is emphasised especially during periods of drought when the crop fails and the people rely on fish catches from the river. In Omusati, Oshana, Ohangwena and Oshikoto, the fishing season is seasonal and only occurs during when the Cuvelai plains are flooded during the rainy season. The quantity of fish caught depends on the extent of the flood.

The total productions of inland fisheries in Namibia have not been documented in a consistent manner because of the fact that it is highly subsistence oriented and in other parts occur seasonally. The figures vary from year to year and production is estimated at 2,800 per annum.

Post harvest use

The total production from marine fisheries in 2005 was recorded at about 552,164 tonnes. The Namibian catches not transshipped at sea are landed in Lüderitz or Walvis Bay for processing and value addition.

Processing activities include filleting, canning, steaks, heading and gutting, fishmeal and fish oil production.

Fish trade

Domestic market

The domestic market for marine fish products is extremely limited due to the small size of the population (2 million). In addition, the traditional diet in Namibia is meat based. It is estimated that only 10% of Namibian fish is consumed in the local market.

International trade

The country exports more than 90% of its fisheries production in various product forms, primarily to international markets including EU, USA, the Far East as well as African markets. Fish exports account for around 15% of total exports in Namibia, valued at around US\$ 520.6 million in 2005 (Table 2) [1].

Contribution of the fisheries sector in the national economy

The marine fisheries sector is a major contributor to the national economy. In 2005 the sector contributed US\$ 372.2.1 million to GDP, compared with US\$ 97.8 million in 1996. Contribution to GDP from fisheries has declined over the last five years from 7 % in 2002, 7.8 % in 2003 to 6.2% in 2005. Despite decline in fisheries contribution to the GDP, the Namibian fishery has experienced growth in landed value of the catches year on year. The value of landings has risen from US\$ 365 million in 2001, US\$ 395 million in 2004 to US\$ 489 in 2005. Direct revenue generated from the sector has risen from US\$ 12 million in 2001 to US\$ 16 million in 2005 [5].

The fishing industry is a source of considerable employment for many Namibians. It is currently estimated that the total employment in the fishing industry is about 13,700. Of this total, approximately 5,575 is

Table 2. Namibian Fish Trade value in US\$ 1,000 [1].

Year	Export		Import	
	MT	US\$ 1,000	MT	US\$ 1,000
2003	341,610	332,257	16,555	9,394
2004	335,072	362,361	24,376	19,675
2005	295,147	375,616	19,282	21,878

employed on-board vessels, 68% of which are Namibians while 7,925 are involved in onshore processing, of which nearly all are Namibians.

Main areas for opportunities

The Namibian marine fisheries are considered well managed and development has taken place since independence in 1990. However, areas that need further development include:

- Aquaculture: The Government foresees the role of aquaculture of freshwater species to enhance food security and improve livelihood of the rural people.
- Value added products: Innovation of the value addition in the fish processing sector could substantially improve.
- Potential for upgrading production: Value addition could lead to higher earnings from exporters of high quality product that command good prices in the international markets.

Major constraints to development

The main constraints to further development of the marine fisheries as identified by government and the fishing industries are:

- Lack of investment incentives for the fishing sector.
- Lack of access to financing for the aquaculture sector.

Management applied to the main fisheries

Namibia's fishing grounds of 200 nautical miles are amongst the most productive in the world. Over 20 commercially important fish species are landed using various fishing methods [4]. To prevent over-exploitation and to promote economic viability in the industry, the Ministry issues rights of exploitation, fishing vessel licenses, and in some fisheries, TACs and individual catch quotas and closed seasons.

Legal Institutional Framework

For the sustainable management of the fisheries resources, the government amended the 'Namibia's

Fisheries Act of 1992 (Sea Fisheries Act, 1992) which is based on the strategy to provide for the conservation of the marine ecosystem and responsible utilization, conservation, protection and promotion of marine resources on a sustainable basis can act. To prevent overexploitation and to promote economic viability in the industry, the Ministry issues rights of exploitation, fishing vessel licenses, and in some fisheries, TACs and individual catch quotas.

Conclusion

Huge potential to increase production exists in Namibia including the 1,500 km long coastline, unpolluted high quality marine waters, high natural primary productivity of the seawater, availability of inexpensive fish by-products from established fish processing sector for inclusion in wet aqua-feeds and well-established processing, packaging and marketing systems due to the marine capture fisheries that can be adopted for aquaculture purpose. However, proper attention would give the further expansions and development of this sector.

Acknowledgement

This research was partially supported by a grant from the Fisheries Technicians Training Program for African Countries of the Overseas Fisheries Cooperation Center, KOICA, Korea.

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