The paper reviews the various fisheries development plans from 1962 to 1985 and highlights major constraints in the development of the Nigerian fishing industry. The objectives of the plans are summarised together with policy measures formulated to achieve them. Major achievements of the plans, causes of failures to achieve plan objectives are given. Recommendations to improve formulation of future plans are summarised.

INTRODUCTION

The fishing industry in Nigeria before the second world war (1939–1945) was largely artisanal using indigenous crafts and gear particularly in inland waters creeks lagoons and brackish waters. The sea was unexploited for commercial fishing.

It was not until 1942 (because of dislocation of imports from Europe due to the war) before the Nigerian government made the first attempt to develop her fisheries (Longhurst 1961). The first step in this direction was to make an institutional arrangement by establishing a Fisheries Development Division under a Department of the Ministry of Commerce and Industry. The division was charged with the responsibility for carrying out trawling surveys off Lagos and the Camerouns. The importance of the role of fish culture in fish production was recognised and a start made by stocking ponds and reservoirs at many places throughout Nigeria. At the same time an experimental Panyan fish farm was constructed between 1951–54.

By 1953 under a new Constitution fisheries organisation in Nigeria was split between Federal and Regional governments. Fisheries development was made solely a regional responsibility while research was concurrent, implying that both the Federal and regional governments were equally competent to engage in it.

The above position which has not much changed has the disadvantage that research efforts are duplicated between the States and Federal governments as testified by Federal and States projects in the four development plans from 1962 to 1985. Summaries of each of the plans and major achievements will now be considered.

FIRST NATIONAL DEVELOPMENT PLAN

The first development plan placed emphasis on marine fisheries, fish farming, manpower development at lower levels fish preservation, Lake Chad, Kainji Lake and riverine fisheries as well as the establishment of inshore infrastructures.

Major projects in the above areas included a systematic hydrological and hydrobiological survey of Nigeria’s coastal water, intensive training of fishermen by establishing a training school in Lagos, experiments with refrigerated road and river transport and storage of fish throughout Nigeria.

In connection with marine fisheries, the construction of an integrated fishing harbour at a cost of £700,000 was planned. For Lake Chad fisheries, the construction of an all season road from Maiduguri to Baga was planned to facilitate transportation of fish from the Lake to heavy consumer centres. Modern fishing techniques using modern equipment and improved methods of fish curing were to be introduced in Lake Chad. By then the most prominent craft was the Kadei built of papyrus and had a short life span, 3–6 months. Nets were made of natural fibres.

The Panyan fish farm was to be used for experimental fish culture and breeding purposes.
ACHIEVEMENTS

A notable achievement in the First Plan was the establishment of the Federal Fisheries School in 1969. The school has grown from mere offering of vocational courses to fishermen to its present state of offering courses in a wide range of disciplines including engineering, nautical science and fisheries leading to the award of the Higher National Diploma.

A major achievement was the establishment of a Fisheries substation at Malamfatori and the development of Lake Chad fisheries.

Superior man-made netting materials e.g. nylon, replaced natural fibres. Effective hanging ratios for gillnets with high catching efficiency were introduced. The Kadei was replaced by well constructed fishing boats and motorisation of fishing boats was introduced to increase their range of operation in the Lake. The use of salt in fish curing was introduced in a package deal as incentive to fishermen. The package involved the provision of fishing boats, nets and accessories and outboard engines to fishermen in groups of 4–6 members. Fishermen paid back the costs of their facilities in instalments from the proceeds of their catches. Complete repayment took 3–5 years after which the facilities became the property of the fishermen. Fishermen operated the loan scheme on the understanding that they would cure their fish by salting.

Various smoking kilns were designed and constructed by FAO experts and fishermen encouraged to use them.

The Malamfatori station which was an outstation of the Federal Department of Fisheries eventually became the present Lake Chad Research Institute.

Another achievement was made in the systematic survey of the shrimp resources in the inshore waters which resulted in the commencement of Commercial shrimp fishing before the Plan came to an end in 1966.

The failure to construct the integrated fishing harbour was a major setback to the early development of industrial fisheries in Nigeria. Nevertheless by 1968 major species of fish in the inshore waters (0–50m) had been identified and their bathymetric distribution in relation to the position of the thermocline determined. Knowledge of the extent of the continental shelf and the relatively low productivity of the inshore waters also became available.

SECOND NATIONAL DEVELOPMENT PLAN, 1970–1974

The main thrust of the second plan was to restrict the importation of fish and increase domestic production estimated then as 120,000 tonnes representing 12% of demand. Imports of fish totalled 150,000 tonnes (17% of demand), giving a total available fish of 270,000 tonnes against the demand of 1 million tonnes.

The Plan therefore had as its major objective the exploration of Nigeria’s fishery resources rapidly for substantial increase in fish production. It considered the construction of a fishing terminal in Lagos as a prerequisite for achieving this objective. Such a terminal was to provide facilities for the development of marine fisheries, foreign fish landings and the growth of a potential valuable export of fish and fishery products. The plan anticipated that a fishing terminal would encourage increased landing of fish by chartered distant water trawlers. By this, the Plan was indirectly discouraging local production of fish by Nigerians.

The Plan identified the following problems as being responsible for very poor yields in fish farming.

- little research into the best species combination ideal for particular environments.
- lack of optimum stocking rates.
- lack of knowledge in fertilizer and feeding combinations
- few training programmes for fish farmers.

There were no concrete plans to solve the above listed problems. The plan merely stated that efforts would be made to explore the possibility of increasing the yield of fish ponds in various states.

As in the first plan the need for fish preservation was recognised. There was therefore a proposal to introduce fish smoking and drying kilns to rural fishermen. This was to be achieved by organising rural fishing communities into cooperatives and encouraging them to build processing kilns. Not much achievement was made in this direction as fishermen still use traditional kilns to smoke their fish.

A major advance made by the second plan was in the direction of fishery administration in Nigeria. Fishery legislation was the responsibility of individual state governments and fishery research was and still is a concurrent subject in the Constitution. The former particularly created a number of problems including lack of policy coordination, duplication of research, and research interests not being necessarily related to visible development needs.

It was therefore decided in the plan to take steps to control policies relating to fishery research by making the Federal Government, through the Federal Department of Fisheries, administratively responsible for all fishery research and training. Little achievement was made as states still carry out their own fishery research and training. As of now some states have their own Fisheries Schools.

On fisheries development, the Federal Ministry of Agriculture and Natural Resources was to take appropriate steps to coordinate development of fisheries in the States. The success of this depended on the fact that the Federal Government made money available to states for development projects it approved.

ACHIEVEMENTS

Unlike the first plan, the second one produced no major achievements. The fishing harbour was not constructed, the major problems identified in fish farming remained largely unsolved at the end of the Plan, and fishery legislation remained the responsibility of individual states while fish preservation showed no marked improvement to reduce wastes. The highest fish production figure within the plan period was 473,220 tonnes in 1974 which represented only 47.32% of estimated demand of one million tonnes of fish.

THIRD NATIONAL DEVELOPMENT PLAN 1975–1980

The third plan which had a total national capital outlay of N101,554 million representing 4.6% of the total national investment in the agricultural sector was comprehensively written. It identified major constraints in the development of the fishing industry, identified development objectives and listed policy measures to ensure their effective implementation.

The constraints identified were as follows:

- inadequacy of capital for fisheries development.
- lack of adequate fishing terminals and other infrastructural facilities.
- shortage of trained manpower at various levels.
- inadequate supply of inputs e.g. boats, outboard engines, nets and accessories.
- poor communication network in the production areas and
- lack of effective fishermen organisations in the artisanal sector to assure success in obtaining government financial assistance.

The plan objectives were:

(a) to increase domestic fish production with a target of 1.2 million tonnes by 1980.
(b) to earn foreign exchange by exporting products like shrimps.
(c) to encourage local manufacturing of fish products like fish meal and dehydrated fish.
(d) to provide employment to Nigerians especially young school leavers in the coastal areas and
(e) to increase the per capital income of indigenous fishermen.

Policy measures to implement the above objectives included:

(a) grants and loans to fishermen cooperatives or individual fishermen to buy motorised boats.
(b) reducing or phasing out over a period of years fishing licences for chartering of trawlers.
(c) government participation in direct fish production through the Nigerian National Shrimp Company and the Nigerian National Fish Company. States were to be encouraged to participate in similar ventures.
(d) non establishment of fish farms built through excavation.
(e) concentration of efforts in applied research in the fields of fishery biology, fish processing, fishing technology and marine pollution.

PROGRAMMES

Programmes for the Third National Development Plan were designed to increase domestic fish production from 740,000 tonnes in 1975 to 1,190,000 tonnes in 1980. This was an increase of 60.81% over the 5-year period. There were also proposal to increase fish imports from 350,000 tonnes in 1975 to 450,000 tonnes in 1980. It was realised that self sufficiency in fish production was impossible during the life of the plan and the ever increasing deficit should be met by import.

The major areas of development were in:

(a) artisanal fisheries comprising coastal canoe fishery, brackish water canoe fishery, fresh water fishery in rivers and lakes.
(b) fish farming.
(c) fish processing and preservation
(d) fish marketing
(e) fish technology
(f) infrastructures
(g) research
(h) manpower training.
ARTISANAL FISHERIES

Under the development of artisanal fisheries, the Federal Government was to provide fishing boats and outboard engines, fishing nets and accessories and facilities for servicing engines to fishermen who were to be organised into 55 cooperative units each consisting of 60 fishermen. Each unit was to be provided 20 boats.

GRANTS, LOANS AND SUBSIDIES

There were special schemes designed to give grants, loans and subsidies to fishermen to enable them purchase modern fishing equipment (Federal Government, Benue Plateau, North East).

CONSTRUCTION OF COLD STORAGE COMPLEXES PROVISION OF INSULATED CONTAINERS AND REFRIGERATED VEHICLES

Governments involved in this included Federal, Benue Plateau, Lagos, South East, North-East and Mid West.

ESTABLISHMENT OF DEMONSTRATION FISH PONDS, ENCOURAGEMENT IN FISH FARMING, FISH FRY AND FINGERLING PRODUCTION IN HATCHERIES

Both the Federal and many States governments were involved in fish farming and its encouragement in rural areas. Hatcheries were to be constructed for production of seeds, and reservoirs were to be stocked with high quality fish seed (fry and fingerlings). (Federal, Benue Plateau, East Central, Kano, North Central, South East, Mid West).

MANPOWER TRAINING

The training of fishermen and the problem of acute shortage of trained personnel of the intermediate grade received the attention of the Federal and State governments. The Federal Government was to expand the facilities of the Federal Fisheries School in Lagos and establish a Fresh water Fisheries School in New Bussa. States involved in the training of fishermen were Benue Plateau, Lagos North West and Rivers.

DEVELOPMENT OF RIVERINE FISHERY INCLUDING INTRODUCTION OF TRAWL FISHING

Few states provided for riverine fishery development. They include East Central for the establishment of fishing gear demonstration units along selected rivers Kwara for the establishment of fisheries stations, along River Niger between Kainji and Jebba and development of trawl fishing downstream Lokoja to Idah.

MARINE FISHERIES

The projects of the Federal government included:

- a scheme to introduce 50 medium sized combination type commercial inshore vessels.
- commencement of deep sea operations by the Nigerian National Fishing Company.

The Mid-West State had a project to establish commercial fishing bases in Warri and Burutu and purchase trawlers to fish the inshore water resources especially shrimps. South East was also to undertake commercial coastal trawl fishery. The West was to build five trawlers for commercial trawl fishery.
VISION OF INFRASTRUCTURES FISHING TERMINALS

The Federal Government was to construct a distant water fishing terminal on Tin can Island in Lagos and undertake feasibility studies for coastal fishery terminals at Oron, Port-Harcourt, Koko, Aiyetoro Igokoda.

The Lagos State proposed the construction of a fishing terminal in Badagry to provide facilities for landing 10,000 – 20,000 tonnes of fish and 1,300 tonnes of shrimps.

The Rivers State also proposed to establish a fishing terminal complex in Bonny for mooring and servicing of fishing vessels. There were to be seven sub terminals to facilitate the distribution of fish in the hinterland.

RESEARCH

The projects of the Federal Government for fishery research included:

- purchase of a research vessel for long range investigations in deeper and more distant waters.
- development of a shallow water mechanized boat capable of beach landing.
- fish products developments based on low grade fish.
- construction of a live fish laboratory marine pollution.

States which had research projects included, East-Central, Kano and South-East. The projects of East-Central were:

- investigations to develop riverine fisheries and fish culture.
- involving the establishment of investigation stations and fishing gear design and triak units along main river systems.
- development of improved processing and preservation methods.

Kano State had a project on the productivity of the Tiga Lake to be carried out with the collaboration of the Federal Department of Fisheries and the Ife University. There was also to be a research into fish culture.

South-East was to conduct a fishery inventory survey into fish and shrimp resources of the State as well as research into methods of fish processing.

ACHIEVEMENTS

Plan achievements will be considered against plan objectives one of which was to achieve domestic production of 1.1 million tonnes by 1980. The plan did not achieve 50 per cent of the target. Production rose from 466,233 tonnes in 1975 to 604,014 tonnes in 1980 peaked at 536,435 tonnes in 1979 and declined to 430,751 tonnes in 1980. Production at the end of the Plan fell short of 1975 figure by 35,485 tonnes (7.61%) represented 35.89% of the target.

A second objective of the plan was to earn foreign exchange by exporting fishery products. The measure of achievement in this direction was low and disappointing. Total earnings from fishery exports at the beginning of the plan in 1975 was N2,514,430 rising to N2,632,521 in 1970 but declined to N1,754,762 in 1979 and hit the rock bottom at N476,455 in 1980 according to figures compiled from the Federal Office of Statistics and the Nigerian Trade Summary Data. (Tabor, 1985).
The objective of local manufacturing of fish products e.g. fish meal and dehydrated fish was not achieved. Through research at the Nigerian Institute for Oceanography and Marine Research, Lagos, several fishery products were developed from miscellaneous fish. They include fish meal, frozen fish fillets, fish cakes and fish sausages. These products were produced on a pilot scale but their production on a commercial scale is yet to be taken up by the private sector.

The fourth objective of providing employment to Young School leavers in the coastal areas, cannot be said to have been realised. Young Nigerians even from the traditional fishing communities will hardly make fishing a career after leaving school as long as rural areas lack social amenities e.g. good roads, electricity and pipe borne water.

The fifth objective of increasing Per capital income of fishermen cannot be objectively assessed for lack of statistics on the earnings of fishermen. It may however be guessed that the decline in domestic fish production meant decline in the earnings of fishermen.

**REASONS FOR LOW ACHIEVEMENT LEVEL**

Poor performance in the Third Plan could be attributed to the policy measures adopted to achieve objectives. Successful direct public sector involvement in fish production is difficult to achieve as shown by the experience of the private sector to produce fish.

The giving of grants and loans to Fishermen cooperatives or individuals to buy motorised boats can be a successful measure only when strong fishermen cooperatives combining production with marketing activities exist to ensure repayment of loans. Most individuals given loans often direct the loans to uses other than fish production.

It is difficult to reconcile the policy of phasing out fishery licenses for chartering of trawlers with the plan to increase fish imports by 28.57% over the Plan period. Equally difficult to understand was the policy of discouraging fish farming in the Plan until its viability was established.

The review of achievements of the Fourth Plan noted that only about 50% of Federal programmes was completed by the end of 1978/79 and that States achieved between 19% in Lagos and 57% in Imo State.

**THE FOURTH NATIONAL DEVELOPMENT PLAN 1981–1985**

Problems of shortage of trained manpower, inadequate supply of nets and accessories, boats and engines, lack of effective fishermen organizations and of fishing terminal facilities and infrastructures persisted into the fourth plan. The plan also identified a new problem; that of inadequate fisheries extension services.

The objectives and policies were little different from those of the third Plan. There were however two new policy measures:

(a) the establishment of an appropriate marine fisheries development agency for the promotion of industrial fishery. This was not implemented.

(b) the second policy measure was the introduction and enforcement of fishery Regulations both for sea and inland waters. The limited success in the implementation of this policy measure particularly for inland waters could be attributed to the efforts of the Kainji Lake Research Institute.

The other policy measures revolved round the encouragement of cooperative societies, provision of inputs, subsidies and infrastructures.
PROGRAMMES

The total plan allocation for fisheries programmes was ₦170,989 million almost double the Plan allocation in the Third Plan. Projects were essentially the extension of those in the previous Plan except that they were given ponderous titles like the National Accelerated Fish Production Programme, "Integrated Rural Fisheries Development Project" the "Mechanized Fishing Extension and Training Project and the Integrated Federal Fisheries Extension Services"

ARTISANAL FISHERY

The National Accelerated Fish Production Programme was designed to modernize artisanal fishing while the Integrated Fisheries Extension Services was to serve all the maritime States and provide fishing crafts and gear and improved maintenance workshops in Lagos, Benin and Ikor Abasi. The Integrated Rural Fisheries Development Project was aimed at linking the economic, social and infrastructural needs of the fishing communities to increase their productive efforts and supply of fish. It involved the provision of cold stores, i.e. plants, workshops, together with equipment fishing boats and nets, schools, health and community centres water and power supply to fishing communities. There is no doubt that its scope was ambitious.

The mechanized fishing extension and training project was designed to establish three coastal centres to train technicians and fishermen, the maintenance of fishing gear, outboard and inboard engines to support mechanized fishing operations.

AQUACULTURE

The importance of aquaculture was realised in the Fourth Plan and a plan allocation of ₦12,500 million representing 14% of the total Federal Government allocation to the Fisheries Sub sector was made. The main thrust of the aquaculture project was the construction of breeding/hatchery centre to produce 5 million fingerlings annually for stocking dams and reservoirs. It was also proposed that 50 ha. pilot fish farms would be built in eleven states for demonstration purposes. States proposed similar projects to build demonstration farms and produce fish fingerlings.

FISH PROCESSING, STORAGE AND MARKETING

Projects on fish processing, storage and marketing in both Federal and States government were concerned with construction of cold stores ice-making plants, dehydration plants, smoking kilns and provision of refrigerated badges, insulated fish boxes and refrigerated fish trucks and vans.

FISHERY INFRASTRUCTURES

A total of as much as ₦41,500 million representing 45% of the total Federal Government capital allocation to the fishery sub sector was earmarked for provision of a fishery harbour complex for vessels up to 5,000 GT in Lagos and fisheries terminals for vessels up to 200 GT in the Rivers, Ondo Bendel, Cross River and Ogun States.

The States, on the other hand proposed the establishment of fishery workshops for servicing fishery equipment boats and engines. There were proposals to establish a training centre to train various cadres of fishery personnel and a fish mill plant to serve both government and private fish farms.

MANPOWER TRAINING AND RESEARCH

There was a project to establish 200 ha farm in Erise Ijebu for Research, training and production of 250 tonnes of fish annually.
The fourth Plan was crippled with dwindling funds after 1982 creating a situation which seriously incapacitated plan execution and achievement of targets. Two fishing terminals one at Igbokoda and the other in Port Harcourt were however completed and commissioned. The choice of Igbokoda was unfortunate for its seasonal accessibility and long distance from the sea. Increase in fish production was minimal or negative. It rose from 496,211 tonnes in 1981 to a maximum of 515,249 in 1983 and then declined to 344,618 tonnes in 1984. Generally none of the objectives set for the Fourth Plan were realised as actual production fell, earnings from shrimp exports sharply declined and no fishery based industries were established.

MAJOR REASONS FOR FAILURE OF EFFORTS TO ACHIEVE DESIRED RESULTS

Most of the plans for over two decades focussed attention on the following areas of fisheries development: resources survey, fish farming, fish preservation and processing, development of infrastructures, modernization of fishing crafts and gear, man power training and development. Development in each of these areas has been slow and short of planned targets as already highlighted under each plan. The following reasons are considered responsible for the failure of development efforts to achieve plan objectives.

WEAK AND INEFFECTIVE FISHERMEN COOPERATIVES

Without well organized cooperatives, financial assistance and other forms of assistance to fishermen become ineffective in ensuring the realisation of the objectives for such assistance. Fishermen derive little benefit from their labour because of the activities of middle men and therefore lose the incentives to produce more fish. Productions achieved in all the plans were thus not justified by the quantity and quality of facilities provided fishermen at highly subsidized rates.

LACK OF RELIABLE DATA ON WHICH TO FORMULATE PROJECTS

There seems to be no effective mechanism for nation wide collection of fisheries statistical data. No one for instance can give, with confidence the number of Nigerians engaged in the fishing industry, the number and type of fishing canoes and gear, or the production figures from inland fisheries by sectors. It was not until 1983 that the Nigerian Institute for Oceanography and Marine Research, Lagos was able to design and implement a statistical method for the collection of production figures for fish farming. Production figure for that year was 20,500 tonnes and for 1984, 22,012 tonnes. Before then, production from fish farming was often quoted as "negligible".

DEVELOPMENT PLANS WERE NOT BASED ON THE POTENTIAL YIELD OF THE VARIOUS BODIES OF WATER

Ajayi (1984 pers. comm.) put the potential yields of the major fisheries as follows:

- Inshore fisheries: 201,000 tonnes
- Offshore fisheries: 33,900 tonnes
- Inland fisheries: 288,500 tonnes

Tabor, (1985) unpublished put potential yield from fish farming at 656,815 tonnes, a figure which exceeds the total for the above three sub sectors. Emphasis placed on some sub sectors of the fisheries was therefore unrelated to their potential yields. An example is fish farming which has greater potential than artisanal fisheries for increasing production, yet emphasis on it in all the plans has been lower than that on artisanal fisheries. Development priority was thus on areas least capable of promoting increase in fish production.
COMMUNICATION GAP BETWEEN DEVELOPMENT GOVERNMENT INSTITUTIONS AND RESEARCHERS

Development Institutions rarely consult researchers during the formulation of development plans. Most projects are therefore formulated without adequate research inputs and reasonable data base.

POLICY MEASURES FORMULATED FOR THE REALISATION OF PLAN OBJECTIVES ARE OFTEN UNREALISTIC, VAGUE OR AT WORST UTOPIAN

Involvement of the public sector in direct fish production has already been given as an exercise in the ineffective use of scarce resources. Another example is the establishment of a development agency to promote industrial fisheries, which appears unrealistic.

LEVEL OF FUNDING TOTALLY UNRELATED TO PLAN ALLOCATION

The size of capital fund release for development projects always show progressive decline with years within the plan period. This has the effect of disrupting planned targets of completion and failure to achieve set objectives.

INADEQUATE SUPPLY OF TRAINED PERSONNEL TO SUPERVISE THE EXECUTION OF PROJECTS EFFECTIVELY

The area in which acute shortage of trained personnel is most felt is in industrial inshore fisheries. Nigerian capable captains and marine engineers to man trawler vessels are few and the industry still depends on expatriates to operate and maintain the fishing fleet.

THE FISHING INDUSTRY IS HEAVILY DEPENDENT ON IMPORTS FOR NEARLY ALL FISH MATERIALS AND EQUIPMENT AND ENGINE SPARE PARTS

Nets and accessories, trawlers, hooks and lines, inboard and outboard engines, are few examples. Imports result in heavy outflow of foreign exchange. Orders placed for engine spare parts or netting materials take long time to materialise and result in the loss of many fishing days. This in turn affects the completion period of projects.

MANAGEMENT PROBLEMS AND INADEQUATE CAPACITY TO COPE EFFECTIVELY WITH PROJECTS

Shortage of experienced fisheries managers and field officers contribute immensely to failure to cope effectively with many projects.

Monitoring of projects was lacking in many cases resulting in reports of achievements which could not be authenticated.

UNPREDICTABLE CHANGES IN POLICIES AFFECTING INCREASE IN FISH PRODUCTION

A typical case is the duty of 20k/kg paid on crabs, lobsters, oysters, caught and landed by vessels owned or chartered by Nigerian companies or citizens. This duty was once removed and then reimposed. Duty on fish landed by Nigerian generates revenue to the government but increases the cost of the above items to consumers and creates disincentive in the promotion of the fishing industry. One wonders why agricultural products are exempted from such duties.
RECOMMENDATIONS

(1) Development of national capability in fisheries data collection for effective plan formulation.
(2) Development of effective extension services and adequate monitoring of projects to ensure their proper execution.
(3) Establishment of proper mechanism for consultations between development government agencies and research institutions at the early stages of plan formulations.
(4) Adequate incentives to trained and experienced fishery personnel to ensure their retention in the fishery sub sector.
(5) Recognition of traditional technologies, social and cultural practices of fishermen communities in formulating projects for artisanal fisheries.
(6) Upgrading the capacity of the Federal Fisheries School, Lagos to train skippers for industrial fishing.
(7) Introduction of short term projects capable of being completed in 2–3 years at minimum costs.
(8) Improvement in the funding of projects to prevent interruption in their execution.
(9) Establishment of objective criteria for assessing level of achievements in capital projects.

REFERENCES