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**SMOKE CURING OF FISH
(AS A HOUSEHOLD INDUSTRY
IN RURAL JAMAICA)**

IICA/JAMAICA

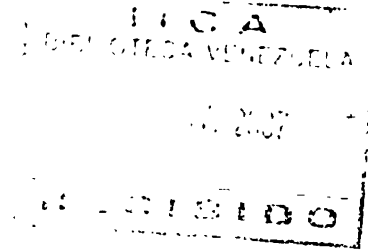
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MISCELLANEOUS PUBLICATION #271

SMOKE CURING OF FISH
(AS A HOUSEHOLD INDUSTRY
IN RURAL JAMAICA)

JICA/JAMAICA





SMOKE CURING OF FISH (AS A HOUSEHOLD
INDUSTRY IN RURAL JAMAICA)

[Faint, illegible handwritten text]

NORMA MUNGUA
PERCY AITKEN-SOUX
ABDUL WAHAB
IRVING JOHNSON

January 1981.

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2. The second part of the document outlines the specific procedures for recording transactions. It details the steps from identifying a transaction to entering it into the accounting system, ensuring that all necessary details are captured.

3. The third part of the document addresses the issue of reconciling accounts. It explains how to compare the company's records with bank statements and other external sources to identify and resolve any discrepancies.

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1. The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that proper record-keeping is essential for the integrity of the financial system and for the ability to detect and prevent fraud. The text notes that without reliable records, it would be difficult to track the flow of funds and identify any irregularities.

2. The second part of the document outlines the various methods used to collect and analyze data. It describes the use of statistical techniques to identify trends and patterns in the data. The text also discusses the importance of using multiple data sources to cross-verify information and ensure the accuracy of the results. The methods described include both traditional statistical analysis and more modern data mining techniques.

3. The third part of the document focuses on the challenges of data collection and analysis. It highlights the need for high-quality data and the importance of ensuring that the data is representative of the population being studied. The text also discusses the potential for bias and the need to take steps to minimize it. Additionally, it notes the importance of having a clear understanding of the research objectives and the questions being asked.

4. The fourth part of the document discusses the ethical considerations of data collection and analysis. It emphasizes the need to protect the privacy and confidentiality of the data and to obtain informed consent from the participants. The text also discusses the potential for misuse of the data and the need to have appropriate safeguards in place to prevent this. Finally, it notes the importance of being transparent about the methods used and the results of the analysis.

5. The fifth part of the document discusses the implications of the findings for policy and practice. It notes that the results of the analysis can be used to inform decision-making and to identify areas for improvement. The text also discusses the need for ongoing monitoring and evaluation to ensure that the interventions are effective and that the data remains up-to-date. Finally, it notes the importance of sharing the results of the analysis with the relevant stakeholders and the public.

- No. IV - 11 IICA/Jamaica "Pilot Hillside Agricultural Project" (PHILAGRIP), Project Document. Vols. I, II and III. June 1980.
- No. IV - 12 A. Wahab, I. Johnson, P. Aitken, H. Murray and H. Stennett "Highlights of the Pilot Hillside Agricultural Project at Allsides", July 1980.
- No. IV - 13 I. Johnson, A. Wahab, P. Aitken, H. Payne "Benchmark for a Project Profile for Developing a Peanut Industry in Jamaica", July 1980.
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- No. IV - 17 P. Aitken, A. Wahab, I. Johnson, A. Sahney and N. Munguia, "Rural Women Survey", Vols. I, II and III, October 1980.
- No. IV - 18 P. Aitken, I.E. Johnson, A. Wahab, "Assessment of Employment Among Small Hillside Farmers of Jamaica", November 1980.
- No. IV - 19 IICA/Jamaica "Pilot Hillside Agricultural Project" (PHILAGRIP), Final Project Document. October 1980.
- No. IV - 20 P. Aitken, A. Wahab, I.E. Johnson, Bo-Myeong Woo, "IICA Evaluation of the First Phase FSB Allsides Project", (Internal Document of Work), November 1980.

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- No. V - 1 N. Munguia, P. Aitken, A. Wahab, I. Johnson, "Smoke Curing of Fish (as a household Industry in Rural Jamaica)", January 1981.

[The page contains extremely faint and illegible text, likely bleed-through from the reverse side of the document. The text is scattered across the page and does not form any recognizable words or sentences.]

FOREWORD

This is another in the series of publications prepared under the aegis of the Rural Women's Programme for IICA in Jamaica.

This contribution forms a part of the continuing effort of IICA/Jamaica to assist the country in meeting the government's objectives in relation to production, income and employment, particularly in rural areas.

The preparation of this publication is timely with respect to the national efforts being made towards the development of the country's fish industry. It underscores the necessity for adaptive research in refining measures for utilizing raw materials for meeting development objectives of the country.

It is hoped that the publication will be of material assistance to Home Economics Officer in developing a number of multi-disciplinary projects.

We welcome this addition to our list of publications.

Percy Aitken-Soux
Director

The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry should be supported by a valid receipt or invoice. This not only helps in tracking expenses but also ensures compliance with tax regulations.

In the second section, the author provides a detailed breakdown of the monthly budget. It includes categories such as housing, utilities, food, and transportation. Each category is further divided into sub-items, allowing for a granular view of where the money is being spent.

The third section focuses on the analysis of the budget. It compares the actual spending against the planned budget for each month. This comparison helps in identifying areas where spending has exceeded the budget and where it has been kept within limits.

Finally, the document concludes with a summary of the overall financial performance. It highlights the key findings from the budget analysis and offers suggestions for future improvements. The author suggests that regular budget reviews and adjustments are essential for maintaining financial stability.

SMOKE-CURING OF FISH

BACKGROUND

Smoking has been used for many centuries, in many different parts of the world, as a method of preserving fish. Recently and especially in the industrialized countries where refrigeration, modern transport and distribution facilities exist, flavour has been accorded more importance than preservation in the smoking process. Nevertheless, in many developing countries smoke-curing is still one of the favoured methods pursued for conserving and flavouring fish.

In Jamaica, smoke-curing of fish is not as cultural and traditional a practice as it is in other countries. Nevertheless, Jamaicans through many generations of association with England have acquired a liking for "Red Herring", a smoked fish imported from abroad.

JUSTIFICATION OF A PEASANT TECHNOLOGY FOR SMOKE-CURING FISH

At the National level, efforts aimed at import substitution should include the potential for the extended use of smoke-curing processes. This is particularly relevant since it has direct implications vis a vis rural households. The reasons for this are as follows:

- although it might not be possible to produce the "Red Herring" which Jamaicans are fond of eating, a similar or an acceptable substitute can be locally produced;
- many rural homes do not have refrigeration facilities to store fresh foods, and some waste does occur because of natural spoilage;



- smoke-curing is a simple and relatively cheap method of preserving fish in edible forms for a sustained period;
- smoked fish could be made available to small farmers as a "household product".

SMOKE-CURING OF FISH

There are different methods of smoke-curing fish, ranging from very traditional and primitive processes during which there is little control over the conditions, to very modern and sophisticated smoking units where the temperature, density of the smoke and humidity are continuously controlled.

As an activity of the Rural Women's Programme in Jamaica, a simple unsophisticated smoking unit was built and tested. This unit was constructed from an oil drum following removal of its base and lid, after which horizontal wooden rods were inserted through holes at the upper sides of the drum. The fish to be smoke-cured was then suspended from these rods thus hanging in the drum in a vertical position. A loose fitting lid was built to cover the top (Figure #1).

Initially, several different types of marine fishes were smoked. These included snapper, herring, parrot and jack. The products obtained were reported to have been of good taste and quality. However, due to the initial high cost of the fish (J\$5.00/lb) and the weight-loss caused during the smoking process the cost of the end product was considered to be too high and so African Perch, a fresh water fish produced in inland ponds, was purchased at J\$1.20 - J\$1.50 per pound, and used as an alternative source of raw material.



DESCRIPTION OF THE PRE-SMOKING PROCEDURE

In all tests fresh fish was cleaned and chilled over ice in a refrigerator pending processing. Chilling was done to maintain the fish in a fresh state.

One sub-sample of the fish was left intact, another was kippered (split in two), while a third sub-sample consisting only of large and fatty units was filleted.

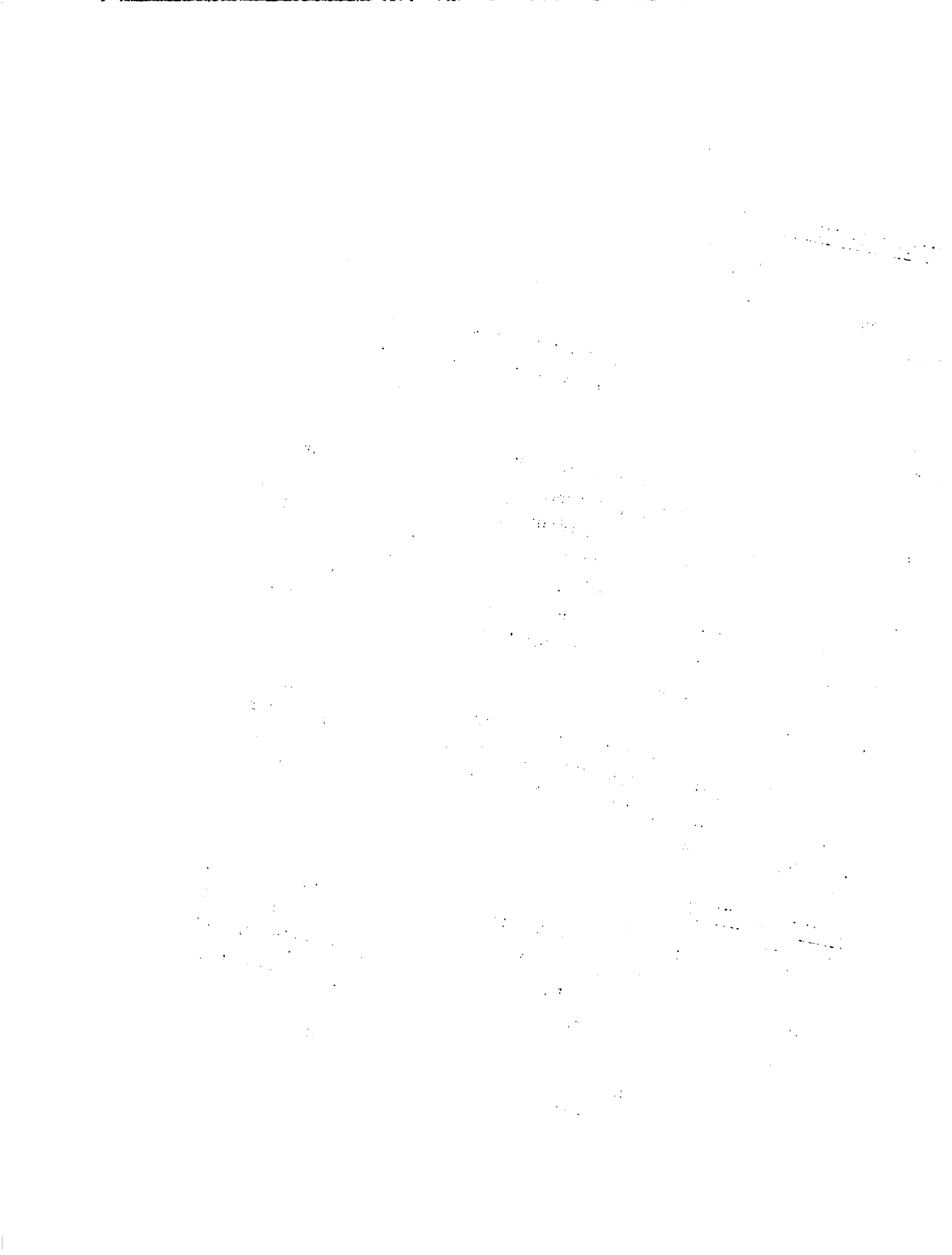
The fish was then immersed in a brine solution consisting of 10.5% Sodium Chloride (at which density an Irish Potato is bouyant). Immersion time varied from 14 to 25 minutes, depending on the size of the fish. Soaking in brine assists in the dehydration process. This procedure also assists in the inhibition of bacterial action and in imparting a characteristic flavour to the product. Curry powder and paprika were added to the brine solution to improve the flavour and colouring of the fish.

Upon removal from the brine solution, the fish was allowed to air-dry by hanging on open racks for one hour at ambient temperature, prior to initiating the smoke-drying process. This facilitates the smoke-drying process.

SMOKING TREATMENT

The fish was hung inside the oil drum as described earlier. The hooks were made of nails placed at three to five inch intervals on the rods near the top of the drum (Figure #1). Depending on size, the fish was fastened to the hooks through the eye, the mouth or jaw.

A fuel mound was made by placing shredded coconut husks, which were then covered with coconut coir and then firmly packed.



The coconut husks were ignited and following the emission of a steady flow of smoke, the drum was lifted and placed over the smoking mound. In one of the smoke-curing trials, pimento leaves were mixed with the coir dust to ascertain the effects of the pimento flavoured smoke.

The drum was maintained in a tilted position by means of a small stone placed at the bottom in order to allow some air to enter, thereby providing a draft for the smoking process.

Fish was left to smoke for approximately eight to 10 hours, depending on size of units. Additional coir dust had to be added every four to five hours, since the size of the drum does not permit the inclusion of enough smoking material to last for the entire period of the smoking process.

RESULTS AND DISCUSSION

As was mentioned previously, the sea water fish that were used initially provided good results. The African Perch also acquired a pleasant flavouring, but many comments were received about fish having too many bones and not enough flesh. In a second trial with African Perch, larger fishes were used and only a few negative comments were received in relation to the bones or the lack of flesh. When paprika was added to the brine solution, positive comments were received concerning the comparative flavour of the fish with that of the Red Herring, a popular food among Jamaicans.

Experimental data indicated that the final weight of the smoked fish was between 66% and 70% of the weight before the pre-smoking process, or between 52% and 58% of the original weight, before the fish were gutted and cleaned.

The results so far obtained from the trials suggest that a reasonably high quality of good flavoured smoked fish can be obtained through this smoking procedure, as reported by the Consumer Affairs



Unit (Appendix #1). More trials should be conducted to ascertain the following parameters:

- (1) optimal concentration of brine;
- (2) soaking and smoking time period;
- (3) amounts and types of flavouring to be added; and
- (4) adapting the product to satisfy the tastes and preferences of consumers.

Nevertheless, two important factors to consider are sale price and the demand for the product, both of which are inter-related.

Although the smoking process is a rather simple one and the cost of the initial investment is negligible, the smoked fish product has a considerably higher cost than the fresh fish.

The final weight of the smoked product was found to be approximately 55% of that of the original uncleaned and ungutted fish. This means a doubling of the cost, not considering the cost of labour and materials. The African Perch was purchased fresh at J\$1.20/lb. uncleaned and ungutted. Once smoked it would cost around J\$2.80/lb., labour cost not included.

When the above cost is compared to the current market price of "Red Herring" (J\$2.60 - 3.00 per lb), the smoked fish would only be preferred as a substitute to "Red Herring", if the latter is unavailable due to import restrictions. It would thus be necessary to conduct a market study to determine the demand for the locally smoked African Perch.

CONCLUSIONS AND RECOMMENDATIONS

Given the relatively high price of smoked fish and the local preferences for salted fish, smoking fish using our relatively

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simple technology does not seem feasible at this time as an income generating activity. Nevertheless, consideration should be given to transmitting this processing technology as a means of preserving the storage life of fish, where refrigeration facilities are lacking. This technology is valuable as an import substitute because it can produce a local product that is being imported at present.

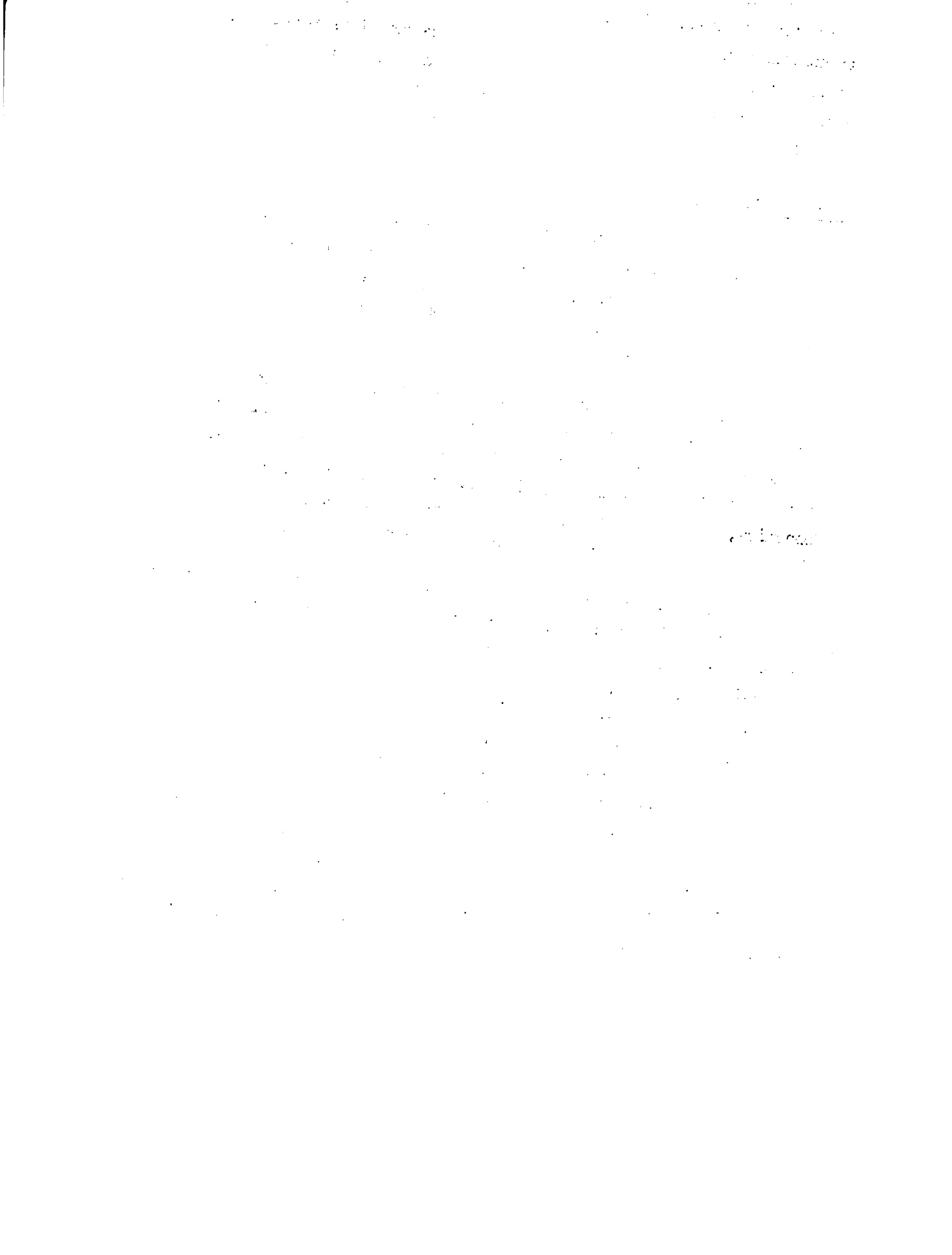
OTHER COMMENTARIES

An activity such as described above is compatible with the Home Economics Programme of the Ministry of Agriculture in its area of "Food for the Family". The purpose of this activity would be to transfer to the rural household, ways by which they can preserve fish and add variety to their diet.

The idea of using African Perch was pursued because of its low price in the market. In the process of obtaining the fish for the experiments, a flow of information was obtained; also a dialogue among IICA, Inland Fisheries, Ministry of Agriculture and Home Economics, Ministry of Agriculture Western Region developed. These dialogues found areas of common interests and possible collaboration.

Also, it should be mentioned that the Government of Jamaica, through the Ministry of Agriculture and with the assistance of USAID has been promoting the development of Inland Fisheries as a means of improving family diets and incomes. The Home Economics Officers, through their contacts with families and with Rural Women Programme's assistance, can participate in the promotion of the programme by explaining the benefits that a fish pond would provide to the family and by demonstrating the different ways in which the fish can be prepared and preserved.

At the present early stage of development of the Inland Fisheries programme, there is no evident need of providing the families with training in methods of conservation of fish because the fish are



left in the pond until they attain maturity. Nevertheless, some fish farmers already find themselves having to remove the immature fish from the pond and market it because of experiences of "praedial larceny". As the programme expands and more families become involved in this programme, the participation of the Home Economics officers in the promotion as well as in the demonstration of methods of preparing and preserving fish to the beneficiaries will facilitate and assure a greater success of the programme.



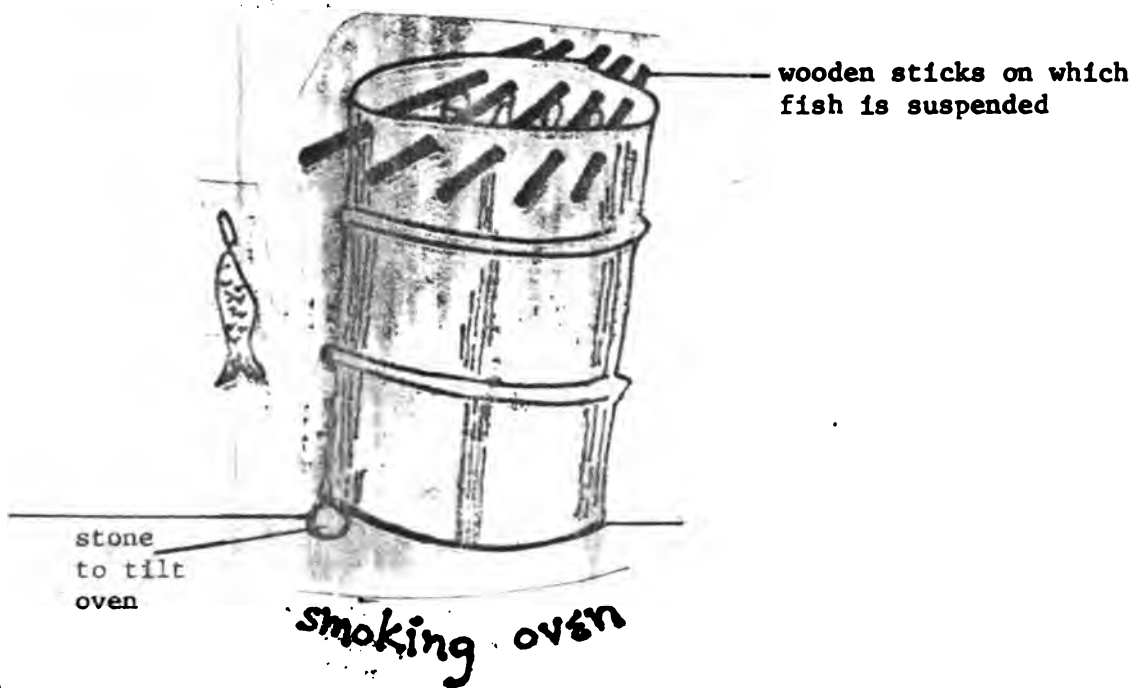


Figure 1. Simple smoking oven (oil drum) used for smoke-curing of fish (IICA/Jamaica).

M E M O

TO: Director of Consumer Affairs

FROM: Desna Robinson, Consumer Education Officer

DATE: 3.11.80

SUBJECT: Smoked salted dried African Perch

APPEARANCE: Grey. In the raw stage slightly resembles codfish

ODOUR: Quite fishy more like that of red herring

COOKING: Can be boiled for about 5-7 minutes but no longer because of the tenderness of the flesh of the product. If overboiled it tends to become soggy. However, the product performs very well when fried.

TEXTURE: Quite firm when it is not overcooked. It resembles that of a traditional salted mackerel. When fried it performs like red herring.

TASTE: Quite palatable with a unique flavour

RECOMMENDATIONS: A very good substitute for any of the salted fish products on the market if they can be produced and sold at a reasonable price to the consumer. Larger size perches could be reared, slit in half down the center, salted, and the skin taken off for a better appearance.

/s/ Desna Robinson
Consumer Education Officer

