THE STRUCTURAL ADJUSTMENT PROGRAMME AS IT RELATES TO

DEVELOPMENT/ADAPTATION OF TECHNOLOGY IN NIGERIA

(PAPER PRESENTED AT THE WORKSHOP ON SAP, NIPSS,

KURU, JOS PLATEAU STATE 20TH SEPTEMBER, 1988)

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1. **Abstract**

The Structural Adjustment Programme (SAP) was put in place in 1986 along with its main implementation strategy, the Foreign Exchange Market (FEM). Amongst other objectives, the programme is geared to reduce dependence on the external sector and eliminate price distortions induced by an overvalued currency.

In this paper an attempt was made to show the impact of the Structural Adjustment Programme in the development and adaptation of technology in Nigeria. Industrial establishments in Anambra State were surveyed to find out how they have been coping with the programme since inception. Thirty six out of 52 establishments responded to a questionnaire prepared for the purpose. Most of the establishments were found to be privately owned, small to medium scale enterprises. Their production capacity increased after SAP and the extent of dependence on foreign raw materials also attenuated. Local sourcing of raw materials increased and inducement of technological changes was found to have appreciably increased. Also extent of reliance on local spares increased and the industrialists believe that SAP has favourable impact on industrial activities and the economic development of Nigeria. It was thus concluded that SAP has provided the opportunity for development/adaptation of technology in Nigeria and evidence further showed that the process has begun. SAP or its implementation strategies, was recommended to

be continued to induce the necessary technological breakthroughs for self reliant growth and development.

2. **Introduction**

Following the collapse of oil prices and the apparent ineffectiveness of stringent exchange control measures to check the escalating deficit in the external sector, foreign exchange earnings dwindled and external debt obligations considerably increased.

In a determined effort to solve the problems that arose, a structural adjustment programme (SAP) was adopted in the second half of 1986. The aim of the programme is to "alter and restructure the consumption and production patterns of the economy as well as eliminate price distortions and heavy dependence on the export of crude oil and the import of consumer and producer goods"[1]. The specific objectives of the programme are as summarized below:[2]

(a)   Restructure and diversify the productive base of the economy in order to reduce dependence on the oil sector and on imports.

(b)   Achieve fiscal and balance of payments viability over the period.

(c)   Lay the basis for a sustainable non-inflationary or minimal inflationary growth.

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(d)   *Reduce*
·Lesson the dominance of unproductive investments in the public sector, improve the sector's efficiency and intensify the growth potential of the private sector.

The main strategy utilized for the programme of adjustment includes:

(a)   The adoption of a realistic exchange rate policy coupled with the liberalization of external trade and payments system.

(b)   Adoption of appropriate pricing policies in all sectors with greater reliance on market forces and reduction in complex administrative controls.

(c)   Further rationalization and restructuring of public expenditures and tariffs.

The adoption of a realistic exchange policy for the naira is the main implementation strategy of SAP. More severe exchange control measures of 1982, 1983 and 1984 starting from the Economic stabilization (Emergency Provisions) Act of 1982 were geared to reduce the following foreign exchange malpractices resulting from the overvaluation of the naira: over-invoicing of imports, under-invoicing of exports, non-surrender of export proceeds, smuggling, black marketing etc. through which Nigeria was alleged to have lost several billion naira of foreign exchange proceeds in four years of civil rule (1979-1983). Thus the Foreign Exchange Market (FEM) was introduced to check some of the above

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malpractices and achieve additional objectives as follows: achieve simple equilibrium rate for the naira, achieve optimal allocation of resources, attract inflow of capital into Nigeria, achieve convertibility of the naira, attract funds to finance industrial growth and development, and eliminate illegal trans-border traffic in currency and commodities[3].

Falegan[4] Okoli[5] Ezenwe,[6] Ike[7] showed that FEM would help achieve the above objectives if well implemented in Nigeria. Further the untoward practices during the regime of import li-censing, the under-invoicing of exports, the over-invoicing of imports, corruption and bureaucratic delays would be drastically reduced if not completely checkmated. The objectives of SAP and its major fulcrum FEM seem to be in consonance with the develop-ment/adaptation of technology in Nigeria. The high price of foreign produced goods would reduce their demand and lead to adaptation of domestic prototypes utilizing domestic raw materi-als as to meet with the budget constraints of domestic consumers. The present consumer resistance to high imported prices is an indication that this adaptive response is consistent with the demand pattern of ordinary Nigerian consumers and as such is a pointer to the future direction of growth and development of the Nigerian economy.

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3.   Method of Study

A survey of 52 Industrial establishments in and around Enugu, Anambra State Capital was made to determine the extent to which the SAP has induced development/adaptation of technology in their production processes.   The industrial establishments repre-sent a full count, not a random sampling of such establishments in and around Enugu.   However, only 36 of the 52 (69%) establish-ments responded by filling appropriately the questionnaire used (see Appendix 1 for the questionnaire and Appendix II for Indus-trial Establishments surveyed).

Using the pre-SAP and post-SAP data $\overset{collected}{\cancel{generated}}$ statistical tests of hypothesis regarding development/ adaptation of technol-ogy in the sample area were made.   Inferences were thus made for Nigeria as a whole assuming that the Enugu locality is represen-tative of the Nigerian situation.   The data were further analysed in terms of dependence on imported raw materials post and pre-SAP, whether local raw materials compare with imported ones SAP's inducement of technological changes, extent of reliance on local spares, pre and post SAP production capacities etc.   Conclusions were made on the impact of SAP in developing and adapting tech-nology to Nigerian conditions.

4.   Analyses and Findings

(a)   Type of Ownership and Scale of Operation

Thirty-one out of the thirty-six establishments or 86%

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are privately owned. Only one is a public limited liability company and none is owned by the Government. 10(28%) are large scale producers while 26(78%) are medium to small scale producers by virtue of their individual self categorization and the size of their capital investment (Investment of N2,000,000 and above is adjudged large scale and below, medium to small scale).

(b)   Pre-SAP and Post SAP production capacity.

Table I. Production Capacity

Production Capacity	No. Pre-SAP	No. Post SAP
100%	1	0
75 - 99%	7	4
50 - 74%	8	18
49 - 30%	11	9
Bellow 30%	9	5
T O T A L	**36**	**36**

As shown above one industrial establishment has a Pre-SAP production capacity of 100% and none achieved that capacity in the post-SAP period. Altogether 16 industrial establishments or 44% of the respondents had achieved 50% plus production capacity

pre-SAP and 22 (61%) of such establishments attained the same production capacity (50%) Post-SAP. Thus it seems that SAP has some effect in increasing attainable levels of capacity utilization in industrial establishments during its maturation. This is a tentative conclusion as statistical test would be made to attest to the significance of this tendency.

(c)   Dependence on Imported Raw Materials

Table II. Dependence on Imported Raw Materials

Extent of Dependence%	No. Pre-SAP	No- Post SAP
100% - 76%	12	3
75 - 51%	16	6
50 - 30%	7	15
Less than 30%	1	12
T O T A L	**36**	**36**

Twelve of the industrial establishments (33.3%) depended on imported raw materials to the extent indicated in table II i.e 100% - 76% in the pre-SAP period, while only 3 of such establishments had the same extent of dependence in the post-SAP period showing a relative significant improvement in independence. Since production capacity increased this relative independence cannot be due to reduced production but must be ascribed to

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increased local sourcing in the regime of SAP. Altogether 28 establishments or 77% depended on imported raw materials to the extent of 51 - 100% in the pre-SAP period and 9 establishments 25% had the same extent of dependence in the post-SAP period. While 8 (23%) of the establishments depended on imported raw material to the extent of 0-50% in the pre-SAP period, 27 (75%) has that extent of dependence in the post-SAP period. Thus SAP seems to have reduced dependence on raw materials and increased local sourcing. The statistical significance of this tendency ^{test} would be shown later.

(d) **General Effects of SAP on Sourcing Local Raw Materials**

Table III. SAP and Local Sourcing

No.	No of Responses			Total	Percentage	
	Criterion	Yes	No		Yes	No
1.	Induced Local Sourcing	34	2	36	95	5
2.	Prospects of domestic raw materials meeting production plans	30	6	36	83	17
3.	Compares Favourably with imports	30	6	36	83	17

Thirty four of the respondent companies said that SAP has induced them to look for local raw materials sourcing. This is

95% of the respondent companies and this is highly significant. It seems the high cost of imported raw materials has induced this change to benefit from lower cost domestic substitutes.

On whether the domestic raw material substitutes compare favourably with the imported ones 30 respondents or 83% said yes. Further 30 respondents (83%) feel that the domestic raw material sources will meet with their production plans. In effect, domestic raw materials are seen as adequate in quantity and quality to substitute for the erstwhile foreign variants. Thus from the point of view of respondents there will be no loss of quality and quantity of goods produced as a result of SAP on the economy except in the significant substitution of domestic for imported raw materials.

On the extent of utilization of local raw materials post-SAP 34 (95%) of respondents said this has gone up and only 2 (5%) said it has gone down. Thus from the point of view of the respondents, SAP has generally induced increased substitution of local raw materials.

(e) SAP's Inducement of Technological Changes in Industrial Activity

Thirty-five of the respondent industrial establishments or 97% believe that SAP has induced technological changes in their companies' industrial activity. The nature of technological changes as responded can be categorised as follows:

(i) Prevention of importation and acceptance of locally produced goods.

(ii) Encouragement of experimentation and implementation of new ideas.

(iii) Necessary for breakthrough in industrial development

(iv) Induced manufacturing of spare parts locally

(v) Change in product line which can be produced by locally constructed machines.

Thus in all of the above ways technological changes have been induced in their industrial production activities. Local products are now accepted because of their relative cheapness and comparable quality. This has encouraged experimentation and implementation of new ideas for local fabrication and manufacturing. Spare parts are increasingly produced locally and locally constructed equipments are now being increasingly sought to substitute for erstwhile imported machines.

(f) Extent of Reliance on Local Spares and Effect of SAP on Industrial Activities and Economic Development

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Table IV. Extent of Reliance on Local Spares.

Percentage Reliance on Local Spares	No. Pre-SAP	No. Post-SAP
100% - 76%	4	6
75 - 51%	7	17
50 - 30%	8	8
Less than 30%	17	5
T O T A L	**36**	**36**

Six respondents relied on local spares to the extent of 76 - 100% of their production activities Post-SAP while 4 did same pre-SAP. Altogether 11 (31%) relied on local spares to the extent of 50 to 100% of their production activities pre-SAP and 23 or 64% of the respondent companies depended to the same extent on local spares after SAP. Thus a significant adjustment in favour of local spares occurred after SAP. This will encourage indiginization of technology through local production of spares and components which was not the case in the pre-SAP period.

On the extent of the scarcity of spare parts and fabrication materials 18 (50%) of the respondent firms said they are coping well while 15 (42%) said they are not coping well and 3 (8%) were not sure. Thus we cannot say conclusively that local spares are available in quantity and quality to satisfy local producers. This is because it takes time to adjust to production of such

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equipments and the period of SAP has not provided enough time for such adaptation and adjustment. Capital and equipment require more than the present 2 years of the genesis of SAP for proper adjustment.

On the evaluation of the effect of SAP on industrial activities and economic development of Nigeria, 27 respondent firms (75%) believed SAP has a favourable impact while 8 respondents (22%) believed the impact is unfavourable. Only one respondent firm was not sure.

Thus we could say conclusively that the respondent firms believe that SAP has a favourable impact on industrial activities and economic development of Nigeria.

(g) **Tests of Significance on capacity Utilization and Dependence on Imported raw Materials**

Table V. Capacity Utilization

Level of Capacity	Pre-SAP(M)	Post-SAP(M)	M-M	$(M-M)^2$	$(M-M)^2/\bar{M}$
75 - 100%	8	4	+4	16	2
50 - 74%	8	18	-10	100	12.5
30 - 49%	11	9	+2	4	0.36
Less than 30%	9	5	+4	16	1.77
		Observed X^2 =			16.63

The degrees of freedom of the above distribution is (4 - 1) which is 3 and given the level of significance which is 5%, the theoretical X^2 value is 7.815. Since the theoretical X^2 is less than the observed X^2 which is 16.63 we reject the null hypothesis that there is no significant change in production capacity post SAP is accepted at the 5% significance level.

Table VI. Dependence on Imported Raw Materials

Level of Dependence	Pre-SAP	Post-SAP	M-M	$(M-M)^2$	$(M-M)^2/\overline{M}$
75 - 100%	12	3	+9	81	6.75
51 - 74%	16	6	+10	100	6.25
30 - 50%	5	17	-12	144	28.8
Less than 30%	3	10	-7	49	16.3
Observed X^2			-		58.1

The degrees of freedom of the above distribution is (4-1) which is 3. Since we are interested in 5% level of significance the theoretical X^2 is 7.815 while the observed X^2 as calculated from table VI is 58.1. As the observed is higher than the theoretical X^2 we reject the null hypothesis that there has been increased dependence on imported raw materials post-SAP. We accept the alternate hypothesis that there has been reduced

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dependence on imported raw materials post SAP. This is significant at the 5% significance level showing statistically significant adjustment to local raw material usage as a result of SAP.

(h)   Development/Adaptation of Technology in ASUTECH

The Anambra State University of Technology has made technological break-throughs in the era of SAP which include the following:

Production of motor-vehicle pistons, palm kernel cracking and separating machines, ASUTECH computer series, groundnut dehusking machines, cassava shredding machines, paper shredding machines, corn shelling machines, dish washing machine, button pressing machine, exhaust gas silencer, rice, wheat and straw ceiling board, university mace, supreme court mace etc.

The majority of these break-throughs are in the area of processing local raw materials which is a pointer to future technological development in Nigeria. This is in keeping with our findings of increased indiginization of technology in consequence of SAP. Research institutes like PRODA, Enugu and other private organisations are following in the same footsteps.

5.   Summary and Conclusions

Anambra State is assumed to be a microcosm of the larger

Nigerian polity. [Economy] A significant proportion of industrial estab-
lishments are privately owned and are shown to be small to medium
scale enterprises. The large scale producers are still in the
minority. Thus technological adaptation would decidedly be
labour using and capital saving since medium to small scale
enterprises are known to be short of capital. With time and the
accumulation of capital Nigeria can transform to a labour saving
and capital using economy.

Production capacity post SAP was shown to have increased
substantially and local sourcing of raw materials has equally
significantly increased. Thus opportunities for increased
technological acquisition are made possible by these positive
tendencies.

SAP has been shown to induce technological changes in indus-
trial activity. These changes are in terms of acceptance of
locally manufactured goods, increased experimentation and imple-
mentation of new ideas, induced manufacturing of machines and
equipments. The industrialists believe that the above orienta-
tion in their production activities is as a result of SAP.

On fabrication of spares and equipments, the result of the
enquiry is not clear cut. It shows that there is increased
fabrication of spares, but the quantity and quality of these
spares and equipments can not be conclusively said to be satisfy-
ing the requirements of local producers. Production of spares

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and equipments take time and the time horizon of the germination of SAP has not provided the opportunity for adequate adjustment in this sphere.

Thus opportunities are created for development/adaptation of technology as a result of SAP through increased production capacity, local sourcing of raw materials, inducement of technological changes and extent of reliance on local spares. In all these areas SAP has provided the opportunity for adequate adjustment in this sphere.

Thus opportunities are created for development/adaptation of technology as a result of SAP through increased production capacity, local sourcing of raw materials, inducement of technological changes and extent of reliance on local spares. In all these areas SAP has provided the opportunity for indiginisation of technology. It is now left for Nigeria to develop the relevant technology through first stage development and/or adaptation of existing technology to local circumstances. From the above study such adaptive response has well begun. In Anambra State University of Technology, Research Institutions and private organisations technology is being developed and adapted to suit local conditions.

Thus evidence point to the beneficial impact of SAP in terms of development/adaptation of technology. In consequence, it is

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recommended that SAP should be continued, at least its implementation strategies until the nation acquires sufficient technology for self reliant growth and development. Also increased expenditure in R & D in Universities, Polytechnics and Research Institutes would ensure that these induced technological changes are sustained and amplified.

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