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DEVELOPMENT OF CURRENT INDUSTRIAL STATISTICS IN AFRICA

(Prepared by the ECA secretariat)

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DEVELOPMENT OF CURRENT INDUSTRIAL STATISTICS IN AFRICA

INTRODUCTION

1. This paper is intended to provide brief comments on some of the methodological problems encountered in the development of systems of current industrial statistics, with particular reference to the conditions encountered in African countries. An attempt has been made to emphasize practical methods rather than theoretical objectives, but the guiding principles which should be observed in the collection, tabulation and publication of a satisfactory body of current data are also stressed.

(a) General Review of Progress

2. Economic planners need reliable facts which can guide them in the selection and promotion of industries that promise to be of optimum value to their country's welfare, and in the avoidance of industries which are apt to become a liability in the national balance sheet. Industrial statistics are of particular importance in providing such guidance in African countries, because their industrial sectors have greater potential for rapid development than in many other parts of the world. The existence of a comprehensive, timely and reliable body of current industrial statistics can, therefore, become a national asset of substantial value.

3. Unfortunately, the inadequacy of current industrial statistics in many African countries has been one of the great handicaps facing economists, industrialists, investors, educators, and other data-users. This is not to say that there are no statistics; on the contrary, many countries supply a large number of figures, sometimes with excessive detail. It has, however, been difficult to incorporate much of these data in reliable economic analyses because of inconsistencies, inaccuracies, lack of consistent definitions and concepts, lack of international comparability, and incomplete coverage of the sectors ostensibly being surveyed.

4. These problems were recognized in the two previous meetings of experts on industrial statistics, held in Addis Ababa in 1962 and 1966. In the 1966 meeting it was recommended that the following steps be taken to improve the status of African industrial statistics:

- (i) Increased integration and co-ordination of statistical systems, and development by the United Nations of more precise and detailed proposals for such systems. The latter point is discussed below under agenda point (d), Standardization of Reporting.
- (ii) Study by African statistical offices of the international recommendations for current surveys, and the development of proposals for modifications of them to conform to African conditions more closely.

(iii) Development by the United Nations of a more detailed standard list of industrial commodities. This work has been done and the results will be discussed under agenda point 5, Recommendations for the 1973 World Programme of Industrial Statistics.

(iv) Planning for a continuing series of meetings of industrial statistics experts to seek solutions to current and future problems. The present meeting is the third in such a series and it is hoped not only to continue the series but to set up a mechanism for the exchange of information on progress between meetings, perhaps on an annual basis.

5. At the time of writing this paper, no general review of the subsequent progress of particular countries in implementing these recommendations has been possible. The brief reports on progress which have been prepared by participants, and which the secretariat expects to receive by 1 December 1969 should provide a basis for summarizing recent progress. Such a summary will be presented at the meeting in the discussion of this point in the agenda.

(b) Introduction of Integrated Systems

6. An integrated industrial statistics system is simply a co-ordinated group of surveys of the industrial sector (mining, manufacturing, electricity, gas and water). Taken together, these surveys constitute the apparatus for recording and presenting data on all aspects of industrial activity. The principal features defining an integrated system as distinguished from a series of independent surveys are:

- (i) The same coding schemes, and the same basic definitions, are employed in all surveys. Perhaps most important is consistency in the classification of establishments and enterprises, which is greatly facilitated by the use of a central register or directory. The register is described more fully in the discussion of agenda point (c), The Directory Problem.
- (ii) Duplication of inquiries is avoided wherever possible.
- (iii) The statistics are reviewed before publication to ensure consistency in the results of the various surveys. If some surveys are more comprehensive than others, their coverage is evaluated individually to provide some basis for comparing their results.

7. Co-ordination is facilitated if all surveys are planned in the central statistical office. If planning is necessarily decentralized, the statistical office should have the responsibility for reviewing and approving all plans and should maintain close liaison with the technical personnel of the various departments conducting statistical surveys. The statistical office should also have the responsibility of maintaining the establishment - enterprise register and supervising its use by other departments.

8. Co-ordination should extend to data on the location and size of establishments, such as are collected in industrial censuses, as well as to monthly, quarterly, annual and other current statistics. In a full body of economic statistics, moreover, co-ordination between surveys of the industrial sector and those covering other sectors (agriculture, trade, construction, etc.) should also be effected. The industrial statistics system should be closely co-ordinated with the national accounts or other less formal assessments of national resources and their uses.

9. Consistency in the coding of statistical units (establishments or enterprises) is an extremely important feature of an integrated system. To ensure the identical coding of statistical units in all surveys, a central register or card file is essential. Such a register provides a single source of descriptive information and code numbers for every establishment and enterprise. It should be used as a basic

reference source for lists of respondents and frames for sampling by all organizations conducting surveys. Under present conditions, there is a considerable amount of duplication of effort and inconsistency in coding which arises because separate lists covering the same respondents are developed and maintained by different ministries or departments.

10. As a minimum, the register should include the name, location, enterprise affiliation, primary industrial activity and size of each establishment. Such a register may be used as a respondent list source for surveys in which the statistical units are either enterprises or establishments. The enterprise is an appropriate statistical unit when the data called for by the survey are of a type commonly maintained in accounting systems for enterprises as a whole rather than for separate establishments.
11. Proper numerical identification of establishments and enterprises is important. A suggested method for assigning such numbers is described below in agenda item (d), The Directory Problem.
12. The register may include all industrial establishments or it may be limited to those above a specified size. If the latter, it is important that information should be systematically available regarding the relative output of the smaller establishments, not only in total but for industry groups, geographic areas, and other classification categories planned for the presentation of data.
13. In many instances in African industrial statistics, the contribution of small establishments has been ignored altogether or has been estimated roughly on an ad hoc basis. In an integrated system, a detailed plan for assessing the importance of small establishments should be established. Such a plan might include complete censuses conducted every 5 or 10 years, supplemented in inter-censal years by surveys based on carefully developed area samples.
14. Similar considerations apply if the register is limited in other ways - e.g. it covers only the establishments in urban areas. In such a case, systematic procedures should be developed for surveying the areas not included in the register.
15. In addition to uniform coding of establishment characteristics, which is facilitated by use of the central register, an integrated system employs standard coding for commodities, materials, stocks, and other codable data on current activity. The various codes are compatible; i.e., there is a logical relationship between them if the subject matter is similar. A frequently encountered example is the commodity classification used for the products of manufacturing establishments, compared with that used in external trade statistics. Differences in detail between such classifications are often necessary, but they should be mutually convertible at a broader level.

16. Definitions and instructions to respondents must be consistent from survey to survey. In employment statistics, for example, the definition of "operatives" should be similar whether used in a monthly sample survey emphasizing employment trends, in an annual survey which includes an incidental inquiry about employment, or in a comprehensive industrial census calling for a detailed analysis of employees by age, sex, nationality, skill, etc.

17. Survey periods should be standardized. Uniformity is usually not difficult in the case of months and quarters, but the existence of non-conforming accounting periods may complicate the achievement of uniformity in calendar year statistics. This problem has led to considerable delays in the collection of data and it would be useful to have a systematic procedure for dealing with the accounting period problem. One method which has been followed with some success is to permit variations of plus or minus two months (e.g. if the survey year ends on 31 December the use of accounting year ending between 31 October and 1 March would be permitted). Under this procedure the statistical office would make a concerted effort, through field interviews, to obtain estimates of calendar year activity from firms with accounting years ending on other dates.

18. Studies which rely on comparisons of the economies of two or more countries are often considerably handicapped because of basic differences in national data systems. To cite one example, the differences in national accounts methods and concepts between English-speaking and French-speaking countries in Africa have occasioned difficulties. It is hoped that the major differences between the two systems will be resolved when the objectives of the new UN System of National Accounts are generally adopted.

19. Consistency of coverage is an important feature of integrated systems. If one survey is confined to establishments above 10 employees and another to those above 30 employees the results are not comparable. The usefulness of the data will be improved, however, if estimates of the contribution of the smaller establishments are included in the published results in each case.

20. Failure to provide such estimates leads to inconsistencies in industrial data as related to the national accounts framework. International comparability is also affected adversely, and in periodic surveys historical comparability is affected because of changes in the relative output of the smaller establishments.

(c) The Directory Problem

21. A directory or central register of establishments and enterprises is an indispensable aid to the maintenance of control over the operation of industrial surveys. Some of the features of a register which contribute to the efficiency of statistical procedures are discussed under agenda point (b), Introduction of Integrated Systems. Essentially, an establishment-enterprise register is a set of cards with the following minimum requirements:

- (i) Name and location of the establishment, and an identification number assigned to the establishment. It is suggested that this number should be retained permanently, even though the ownership of the establishment is changed. The location should be coded separately.
- (ii) A description of the principal industrial activity of the establishment, and a corresponding code number. To conform to international standards, the latter should be the ISIC four-digit number. Additional digits may be added to this number to provide additional detail needed for the requirements of particular countries, without destroying comparability.
- (iii) Name and address of the central or headquarters office, if the enterprise operates establishments at more than one location. It is recommended that the enterprise should be identified by a unique number, which would appear on all of the cards representing the establishments controlled by the enterprise. In the case of enterprises owning or controlling other enterprises, it is recommended that the identification number refer to the "parent" or top enterprise in the group.
- (iv) Information on the size of the establishment. It is recommended that the number of persons engaged or the number of employees be used for this purpose. The size information should be coded to facilitate selection of establishments of different sizes for sampling or other purposes.
- (v) The source of the information entered on the card, and the date it was acquired.

A suggested questionnaire for recording these five items of information is presented in Annex I.

22. In considering the problems associated with creating an establishment-enterprise register and subsequently keeping its information up-to-date, it is convenient to think of industrial establishments in terms of three broad groups, as follows:

- Group A: Large establishments whose activities are a matter of constant interest to the firms supplying them with materials and equipment, to government departments, to compilers of trade directories, to economists, to investors, and to miscellaneous business groups. Usually, no great difficulty will be encountered in keeping the register current with respect to the names and locations of such establishments, but it may not be easy to keep abreast of changes in their size and the composition of their industrial output.
- Group B: Smaller establishments which operate as industrial enterprises (i.e., are not part of households) but which are less likely to be listed in commercial directories or similar sources. Certain classes of these establishments may be listed in government records and others not. In West African countries, such establishments include many handicraft industries of considerable local importance. With some exceptions, where tax records or other government reports may tend toward complete coverage, direct enumeration is the most satisfactory way of creating a register for this group. The cost of maintaining such a register completely is often prohibitive, and a cut-off must be employed. Usually the cut-off is in terms of size, but it may consist of urban vs. rural or a similar sub-grouping. In such a case Group B-1 would be kept up-to-date completely, while sampling techniques might be employed to assess current changes in the activities of Group B-2.
- Group C: Handicraft manufacturing closely linked with household domestic activities. Part of the output may be consumed in the household and the rest sold or bartered. Such activities have to be investigated by direct enumeration, possibly in connection with household budget surveys or population censuses. It is hopeless to think of maintaining a complete register of household enterprises on a current basis. Probably the best that can be done is to measure their industrial contribution in infrequent base periods. Such data, particularly if a method of extrapolation can be devised, is useful in explaining and evaluating the coverage limitations of monthly, quarterly and annual surveys.

23. Assuming the currently maintained portion of the register will be confined to Groups A and B-1, its completeness and accuracy, and its consequent usefulness for general purposes, will depend in great measure on the sources of information used to maintain it, and their timeliness. The register may be kept up-to-date by use of any or all of the various sources listed below:

- (i) Government records maintained for tax purposes, for labour inspection, licensing, regulation or other administrative programmes.

- (ii) Industrial directories compiled and maintained by commercial organizations and sold on a subscription basis.
- (iii) Directories compiled by manufacturers associations, chambers of commerce, trade publications, and similar organizations.
- (iv) Listings in telephone directories.
- (v) News stories about industrial establishments in trade journals and the daily press.

24. In contemplating the use of any of these sources of information, it should be assumed at the outset that the lists obtained will be incomplete and inaccurate. The first question to be answered is whether the source is accurate and complete enough to be worth using as the nucleus of a register, or in keeping an existing register up-to-date.

25. The accuracy of records of these types can usually be tested at little cost by comparing one set of records against another set purporting to cover the same class of establishments, and investigating discrepancies between them by correspondence or by field checks. Investigation of the completeness of a set of records can sometimes be performed in the same way, but a more thorough review would be accomplished by enumeration of the industrial establishments in sample areas under standard conditions, then comparing the source records for the same areas with the field enumeration findings. This procedure reveals inaccuracies as well as incompleteness. An important item of information in such an enumeration is the date each establishment began operations, so that the up-to-dateness of the source records can be estimated.

26. When the economic importance of small establishments below the cut-off level is known only approximately, it is reassuring to remember that a large error in estimating their output may have only a small effect on the total. For example:

	<u>Total</u>	<u>Large</u> <u>Establishments</u>	<u>Small</u> <u>Establishments</u>
Actual Output:	1090	1050	40
Estimated Output:	1110	1050	60

In this example, although the estimate for small establishments is 50 per cent in error (60 instead of 40), the total estimate is in error by less than 2 per cent (1,110 instead of 1,090). An error of this magnitude is probably within the tolerance limits expected even in complete coverage surveys.

27. Such optimism is not generally justified, however, if the small establishments accounted for more than about 10 per cent of total output in the base period. If their contribution was substantial, the use of sampling techniques to gauge their current performance should be investigated. Ignoring changes in the output of the small establishments may result in statistics which are so inaccurate as to be misleading and useless to economic planners. However if base period output is known, a low-cost survey based on a very light sample may be sufficient to measure current trends, if the number of survey categories is small.

28. Some countries have attempted to maintain registers containing a large amount of detailed information about each establishment. It should be kept in mind that the completeness of the register, and the accuracy of the five basic items listed above, are far more important for statistical purposes than the inclusion of additional details. If funds for the maintenance of the register are limited, as they usually are, the primary emphasis should be on the completeness and accuracy rather than on the amount of detail included.

29. When used within the central statistical office or by other government departments for statistical purposes, there is no necessity for publishing the contents of the register. An industrial directory, however, can serve a wide variety of useful purposes if it is reasonably accurate and complete. Many African countries have published industrial directories. The value of most of them would be greatly increased if their limitations were more completely spelled out, and their scope described in terms of the types and sizes of establishments included in the listing. Suggestions as to the minimum content of a published directory are given in Annex III.

30. The establishment-enterprise register, as noted above, is simply a set of cards. It may be kept on punched cards or on electronic tape, if available. In general, it contains only the latest information available and does not include historical data. Some countries have found that an extension of the register, a file of historical information, is also useful. Such a file would be maintained quite separately from the register, but it would contain the same basic information with dates showing when changes in the status or characteristics of the establishment or enterprise took place. Even though the file contained data initially only for the largest establishments, say those with 30 or more employees, many uses would be found for it in the processing of statistical reports of all kinds. Use of the file should be restricted to statistical purposes and the information contained in it kept confidential. Otherwise, it may be found that business enterprises will be reluctant to supply the necessary information.

(d) Standardization of Reporting

31. The importance of integrated systems and a central feature of them, the establishment-enterprise directory, are described above under agenda points (b) and (c). In this section, the actual contents of four standard questionnaires are set forth provisionally for discussion by the Working Group, and some of the details concerning appropriate plans for coverage of establishments and enterprises by use of these questionnaires are discussed. The inquiries included are only those needed for the minimum requirements of national programmes in developing countries. Their adoption generally would, of course, also assist in increasing the comparability of industrial statistics on a regional and world basis.

32. The first example questionnaire is intended for use in connection with the creation and maintenance of a general-purpose register, and the other three in connection with establishment surveys of the type sometimes referred to as "industrial structure" surveys, which provide data on such subjects as employment, certain other costs, and the output of commodities and services. The standardization of questionnaires for use in connection with other surveys of the industrial sector (commodity surveys, for example) may well be worthy of consideration, but has not been attempted in these examples.

33. The nature of activity questionnaire presented as Annex I is primarily for use in the creation and maintenance of an establishment-enterprise register. It covers the basic items of information described above under agenda point (c), The Directory Problem. Although designed for use in field interview surveys conducted for the express purpose of creating a register, the example questionnaire could be readily adapted for use in transcribing information from miscellaneous sources such as government records and privately compiled directories. With minor adaptations, it could also be used as the first section of questionnaires used for industrial censuses and other surveys of industrial establishments, since all or most of the basic items would be needed for those purposes.

34. The annual establishment questionnaire, long form described below is designed for the collection of data from establishments which normally maintain the accounting records adequate for answering all of these inquiries. These constitute the largest establishments, and the group is usually defined by an arbitrary size limit. While this limit may vary from country to country, in African countries it is usually ten employees. If the co-operation of management in a high percentage of the enterprises can be secured, a postal survey of this group with field follow-up of the more difficult cases should be successful. For some of the enterprises with establishments in this size group, namely those which do not maintain extensive accounting records for their individual establishments, the fourth example, the enterprise questionnaire, is more appropriate. Use of the long form questionnaire may be extended to smaller establishments if a sampling plan is adopted in which the long form is confined to those small establishments which maintain the necessary records.

35. The contents of the long form questionnaire are:

Inquiry 1: Identification and nature of activity: This inquiry includes the basic items on the Nature of Activity Questionnaire, except the number of employees.

Inquiry 2: Number of employees in 4 or more periods of the year, to provide data for computation of reliable annual averages; for highly seasonal activities, it may be necessary to collect data for as many as 12 periods. This inquiry should distinguish operatives or production workers from clerical, managerial and other employees. In the interest of simplicity and to facilitate the data collection process, it would be well to hold the employment inquiry to as few separate categories as possible. But groups of persons associated with the enterprises and with distinct characteristics should be recognized if their numbers are significant. Unpaid workers should be segregated if they constitute an important group because they receive no regular wages and therefore are not represented in Inquiry 3. The same considerations often apply to working proprietors. It may be desirable to separate casual workers or part-time employees from the others if there are many of them and their average weekly wages are very much less than that of regular employees.

The terms "operatives" or "production workers" are defined as employees engaged in production or related activities. Working supervisors and clerks closely associated with production are included, as well as messengers, stokers, cleaning staff, warehousemen, packers, repairmen, shipping clerks, truck drivers, maintenance staff, and the like. "Other employees" include the general managerial staff, clerks and bookkeepers not directly associated with production processes, salesmen, night watchmen, and laboratory workers.

Inquiry 3: Annual wages and salaries paid, distinguishing separately the categories of Inquiry 2.

Inquiry 4: Number of man-hours worked by operatives or production workers. If these data are not generally available, a substitute inquiry regarding the length of the normal work week, and the number of weeks of operation, helps to approximate the effective labour input. In this connection, where part-time work or casual labour is important, it would be desirable to obtain separate data on such labour in Inquiries 2 and 3.

Inquiry 5: Total delivered cost of materials and supplies: In a postal survey it would be desirable to obtain separate data on the quantity and cost of the major materials used. These data are not only useful in commodity flow analysis but tend to improve reporting of the total cost of materials. Without some particularization of this inquiry there is a tendency for respondents to omit significant parts of the materials and supplies. To be of maximum usefulness in national accounts computations, this inquiry should relate to the cost of goods consumed or put into production.

In practice, it is customary to request the data in terms of goods purchased or received. In the calculation of value added an adjustment for inventory change may be made either by the respondent or by the statistical office after receipt of the completed questionnaire.

Inquiry 6: Cost of Fuels. This inquiry includes all fuels (including fuels for vehicles), except fuels such as coal or petroleum used as raw materials for products (e.g. coal used in making coke).

Inquiry 7: Quantity (and value where appropriate) of electricity purchased, generated and used, and generated for sale.

Inquiry 8: Cost of industrial services performed by other establishments.

Inquiry 9: Capital expenditures, usually distinguishing between

- (i) structures and land improvements including expenditures for minerals exploration.
- (ii) vehicles and other transportation equipment and
- (iii) all other machinery and equipment. Where significant, the value of self-produced fixed assets should be included.

Purchases of land are usually excluded from capital expenditures because in national accounts terms, land is a non-reproducible asset and is not included in aggregate fixed capital formation. The acquisition of second-hand assets and those acquired from abroad are commonly treated separately where they are significant. The fixed assets are defined in international standards (e.g. Series M, No. 48, page 44, paragraph 120) as those expected to have a productive life of more than one year. There are various definitions employed in private accounting systems, however, and as a practical matter the respondent to this inquiry will probably report whatever data are carried in his own capital accounts.

Inquiry 10: Value of inventories. In accounting systems, inventories are commonly summarized as (i) materials and supplies, and (ii) finished products. In the manufacturing industries a third category is sometimes added, "work-in-progress." Methods of inventory valuation may have a marked effect on the apparent magnitude of inventories. Some of the common accounting methods employed are described as "actual cost"; "average cost", first-in-first-out", and "last-in-first-out". If there are significantly different methods employed in the country, occasional studies of valuation practices may provide useful guides to the interpretation of changes in inventories.

In annual surveys, it is desirable to ask for inventory data both at the beginning and the end of the inquiry year. If this is done, it is more likely that both beginning and ending inventories will be valued by the same accounting method.

Inquiry 11: Gross output of goods and services. The value of gross output in principle is (i) the value of final products made during the year, whether shipped or transferred to inventory, plus (ii) the value of industrial services rendered to other establishments. In recognition of accounting practices, it is more realistic to request the value of products shipped plus payments for industrial services. The sum of these figures, adjusted for inventory changes, approximates the gross output of the establishment. As with the input of materials, better reporting and useful output information is obtained by requesting data on the value of shipments (and quantity, where feasible) of shipments of important individual products. In designing such an inquiry, reference should be made to the UN publication Standard List of Products and Materials, ST/STAT/45. In countries where multi-establishment enterprises are important, especial care should be taken to ensure the inclusion of products and services transferred to other branches of the same enterprise (intra-company transactions) as well as those sold to others.

36. In some manufacturing industries, merchantile operations are a normal part of plant activity. Whether the establishment is classified in manufacturing or distribution depends on the relative importance of each activity. In countries where such mixed operations are common, an item should be added to Inquiry 11 to account for the value of goods sold in the same condition as purchased. A companion item, the cost of such goods, should be added to Inquiry 5 and the difference between these two figures, the gross sales margin, should be included in value added.

37. The annual establishment questionnaire, short form described below is designed for the collection of data from small establishments which operate as industrial enterprises (i.e., they are not part of households) but which do not normally maintain accounting records adequate for the preparation of the long form. Such enterprises occur in large numbers in some African countries. It is usually not possible to obtain responses from this class by mail, and field interviews are necessary. Because of the cost of field enumeration, annual coverage of these establishments can usually be most efficiently accomplished through sampling techniques. A discussion of the problems involved in designing samples of industrial establishments under African conditions, which may be of some value in this connection, is contained in the Report of the Seminar on Sampling Methods, June 1968 E/CN.14/CAS.6/4, particularly pages 20-27.

38. In terms of the establishment Groups A, B and C defined above under agenda point (c), The Directory Problem, the short form is applicable to the part of Group B which is characterized by the absence of accounting records. Whether or not the enterprise keeps records can perhaps be determined by direct inquiry, or assumptions about record-keeping could be made relative to size, and Group B divided into two parts, a larger-sized group assumed to have records, and a smaller-sized group with little or no records. In the specific sampling plan described in Annex II, in which both long and short forms are employed, it is assumed that the matter of record-keeping will be settled in a preliminary survey, in which the question "Do you maintain records of the income and expenses of this establishment?" will be asked. Depending on the answer to this question, the establishment will become part of universe B-1, from which the long form sample is to be selected, or universe B-2, the short form universe.

39. The contents of the proposed short form questionnaire are as follows:

Inquiry 1: Name and address of establishment

Inquiry 2: Primary industrial activity, and secondary activity, if any.

Inquiry 3: Principal products of the establishment during the past month

1. _____

2. _____

3. _____

Inquiry 4: Is the activity conducted by members of a household on its premises? ☒ yes ☐ no

Inquiry 5: Number of persons engaged in the operation of the establishment during the past month.

Inquiry 6: Total wages and salaries paid during the past month.

Inquiry 7: Total cost of raw materials, fuels and electricity consumed or purchased during the past month.

Inquiry 8: Value of sales of products or services during the past month.

Inquiry 9: Number of weeks establishment was in operation during the past quarter.

40. In order to produce statistical results on an annual basis which are unbiased with respect to seasons, surveys using this questionnaire would be conducted on a continuous basis, with interviewers contacting different groups of sample respondents throughout the year. When the results covering an entire year's interviews are assembled with the proper weights, an annual survey of this group of respondents will have been conducted. As pointed out in the example of a specific sample design given in Annex II, care must be taken in selecting area or other sample units so that seasonally concentrated activities are not given undue emphasis or de-emphasis.

41. The annual enterprise questionnaire described below is designed to provide some establishment data for those multi-establishment enterprises which do not maintain full accounts for each establishment. A situation frequently encountered among such enterprises is that profit-and-loss statements are prepared for the enterprise as a whole but not for individual locations.

42. The content of the annual enterprise questionnaire is as follows:

Inquiry 1: Name of company and address of headquarters or central office.

Inquiry 2: Company affiliation. This inquiry is indential to Item 4 on the nature of activity questionnaire.

Inquiry 3: Form of ownership. Indicates whether enterprise is privately owned or government-owned. Other categories such as co-operative, limited corporation, etc. may be appropriate in particular countries.

Inquiry 4: Industrial establishment data. The inquiry requests the following information for each establishment:

- (i) Name and physical location.
- (ii) Principal products or activities, in order of importance.
- (iii) Number of employees in 4 or more periods of the year, distinguishing operatives or production workers from other employees.
- (iv) Total annual wages and salaries paid, distinguishing separately operatives from other employees.
- (v) Man-hours worked by operatives.
- (vi) Cost of fuels.
- (vii) Quantity (and value where appropriate) of electricity purchased, generated and used, and used, and generated for sale.

Inquiry 5: Central office or headquarters data. This inquiry calls for the number of employees of the central office or offices and their total salaries.

Inquiry 6: Delivered cost of materials and supplies. This is similar to Inquiry 5 on the establishment long form. But whereas in the discussion of the establishment form it is merely suggested that separate data for the major materials would be desirable, here it is essential to segregate materials of distinctly different kinds. This will avoid the undesirable effects of combining figures for unrelated industries which happen to be under the same ownership. For example, let us assume an enterprise operates a textile mill and a sugar factory, and for some unusual reason does not maintain separate financial records for each establishment. It would be essential here to obtain separate data on the materials and supplies used in the textile mill (fibres, yarns, etc.) and those used in the sugar factory (sugar cane or beets).

Inquiry 7: Value of Inventories. This is similar to Inquiry 10, but here again separate figures should be requested for the materials and products corresponding to unrelated activities of the enterprise.

Inquiry 8: Gross output of goods and services. This is similar to Inquiry 11 on the establishment long form. As suggested in the discussion of that inquiry separate figures on the major products should be obtained. The major difference on the enterprise form is that goods shipped from one establishment to another (intra-company transactions) would normally be omitted.

43. In the tabulation of results of the annual survey, decisions would have to be reached on how to handle the statistics resulting from the use of the enterprise form. Usually, it would be desirable to combine the results with those obtained from the establishment questionnaires rather than to present the results separately. One method that has been followed is to create artificial establishment reports in the statistical office, by allocating and estimating figures where necessary, and then processing these establishment reports along with the other long forms obtained directly.

44. It should be noted that Inquiry 6, central office or headquarters data, provides figures which could be allocated to establishments if considered desirable. If instead it is planned to present separate data for such central offices, the data in Inquiry 6 should also be collected from central offices of enterprises which report on the establishment long forms.

(e) Compilation of commodity statistics

45. The "commodity statistics" discussed here are the monthly, quarterly and annual statistics on output of the industrial sectors: Mines, manufacturing industries, and power, gas and water plants. Data on external and domestic trade are not discussed as such, but it should be noted that net exports of commodities plus their domestic consumption reflect their output, and are sometimes used as a substitute for output statistics collected directly. In industries which convert a single class of raw materials into finished products, input data may often reflect output directly; an example of such statistical substitution is in oilseed processing.

46. Many statistics as well as other facts are needed to guide decisions in the fields of trade, finance, investment, industrial development and other commercial activities. Commodity data play an important role in such decisions, because up-to-date knowledge of commodity supply and demand influences decisions to buy and sell. Statistics on the changes in stocks of commodities often have a strong influence on their market prices.

47. The importance of current commodity statistics, particularly monthly data, to commercial interests has led to the establishment of regular periodic surveys by banking organizations and other private groups, or by quasi-governmental organizations. Such surveys are usually limited in coverage to the larger producers, and the output of commodities such as prepared foods, where there are typically large numbers of small producers, are not surveyed by commercial organizations. The main reason is that the cost of collecting the data would be too great in relation to its commercial uses. Governments, however, may be interested in commodity data for consumer goods, such as foods, beverages and clothing, because of their importance in measuring the progress of social programmes. Such surveys are frequently not under the control of the central statistical office but are conducted by government agencies with administrative or regulatory functions. Under these circumstances, integration and co-ordination of monthly and quarterly commodity surveys with the industrial surveys conducted by the central statistical office may be difficult to achieve.

48. Annual commodity statistics are usually of secondary importance in commercial decision-making, and are used chiefly by economic planners and other government groups. Regional studies comparing commodity output among countries are apt to depend heavily on annual data, and the international comparability of commodity categories used in annual surveys then becomes of major importance.

49. This leads to the thought that the commodity data included in annual industrial surveys of the type now conducted more or less regularly in about 30 African countries,^{1/} can contribute to the integration and

^{1/} Some of these are quarterly or semi-annual, but are of the "annual industrial survey" type.

co-ordination of national commodity statistics generally. These annual surveys provide an opportunity to cover all of the country's output, not just the commodities for which the data are easy to collect or which are needed for some special administrative purpose. Commodity statistics cannot be divorced from those relating to total production, particularly in countries where such statistics are in an early stage of development. Figures collected at monthly or quarterly intervals, if they are to be of any real use, must be consistent with the more comprehensive data compiled in annual industrial surveys.

50. The attainment of comparability at the international level, although highly desirable from the point of view of compilers of world and regional statistics, presents many difficult problems. Certain commodities may be unimportant in each of several countries, and thus from the national point of view not warrant the effort of collecting separate statistics concerning them. Yet collectively these commodities may be of considerable importance at the regional level, and their omission may handicap users of regional data. In Africa, data on production of tyres and tubes are of this type. At the regional level, therefore, one problem is whether commodity statistics should be concerned with the important products of individual countries (which is consistent with national requirements, but results in incomplete regional totals), or whether an effort should be made to collect data from all countries for a limited list of commodities which are important in at least one country. At the world level, other problems arise because any list of categories and their definitions developed for worldwide use probably will not fit the needs of any particular region or country precisely.

51. As shown in Annex IV, commodity data are collected as part of annual industrial surveys in 30 African countries. The relationship between the categories and definitions employed in these surveys and the United Nations standards contained in the document ST/STAT/45: List of Products and Materials is being analyzed and will be presented in a later report. Studies of the relationships between the annual survey categories and those employed in monthly and quarterly commodity surveys (private, semi-private, and governmental) would provide useful information, particularly in that they would shed light on the extent of co-ordination and consistency between total production figures and the component commodity series. It is suggested that members of the Working Group could undertake such studies for inclusion in the progress reports planned for the end of 1970.

52. Where commodity statistics are to be used in the construction of input-output tables, additional problems arise because of the need for standardization and co-ordination of the categories of raw materials, semi-finished goods, and finished products. The cross-classification of commodity statistics by industry, necessary when the data are to be used in commodity flow analysis, may also present problems.

(f) Construction of Index Numbers of Production

53. A description of a complete system of index numbers co-ordinated with the objectives of national accounting is contained in reports of the recent Seminar on Statistics of Prices and Quanta. ^{1/} The present discussion will center on indexes of industrial production. Such indexes are part of the complete system, and also have independent uses as indicators of current changes and trends in the industrial sector. The major objectives of indexes of industrial production are to reflect current changes in the physical output of ISIC major groups 2, 3 and 4, both in detail and collectively.
54. A study of country practices in the construction of index numbers was made early in 1969, and the results published in Country Practices in the Gathering of Data on Prices and Quanta and the Calculation of Related Index Numbers, E/CN.14/NAC/34. This study revealed that 14 African countries construct industrial production indexes. Most of these are monthly or quarterly but in four countries only annual indexes are prepared. The study suggests that quantity output data provide the most important source for index construction. The weights used are either value added or a combination at different levels of gross output and value added. The Laspeyres formula (base-year weighting) is almost universally employed.
55. Separate surveys of employment are conducted by some countries, and there is evidence in the study cited above that employment data have been used in the construction of some indexes of production. Although employment statistics are designed primarily to reflect changes in the size and composition of the labour force, and other subjects of social significance such as the magnitude, character and location of unemployment, employment data in the industrial sector are sometimes used in the construction of production indexes. The man-hours of operatives or production workers are most commonly used for this purpose, and these figures serve as short-term substitutes for direct measurement of quantity output. The limitations of man-hour figures as a substitute for direct measurement of quantity output lies in the facts that labour productivity and changes in the stocks of capital are not taken into account. These factors are seldom important in the short run; in a monthly or quarterly index series which is benchmarked annually to physical output data, they may be ignored.
56. Among other sources of short-term data for the construction of production indexes may be mentioned value series; input series, or data on the consumption of materials; and synthetically derived production series constructed by subtracting imports from exports, and adding domestic consumption. Value series are those in which quantities are unobtainable; suitable price indexes must be available on a timely basis in order to convert such series to constant values or the index equivalent of physical quantities. Input series are useful only where

^{1/} Addis Ababa, 13-21 October 1969.

simple conversion is involved, such as oilseed converted to oil plus cake and meal, or in abattoirs where the relation between livestock consumption and output of meat products and by-products is fairly constant.

57. No objective appraisal of the quality of the indexes published in African countries is available, nor information on the reasons why no indexes have been constructed in certain countries. It appears that some index number series purporting to represent entire industrial sectors are in fact based only on the few statistical series that are readily available and which measure the output of a limited number of commodities. In some countries, indexes are based solely on the performance of large establishments and no comment or allowance is made concerning changes in the relative importance of the smaller units. Such indexes may well be inaccurate and misleading indicators of trends in whole industrial sectors. A soundly constructed index should reflect short-term movements in the minor as well as the major elements of each industry, and in the overall index every significant industry should be represented. Effective use of the alternative data sources suggested above may make this possible even though adequate physical output series are not available. The importance of reliable production index numbers in the national accounts and as guides to economic planning in other ways may in some cases even justify the initiation of new surveys solely for the purpose of strengthening index number construction.

58. In a situation where the needs of planners call for monthly or quarterly index numbers, and some or all of the short-term expedients mentioned above are brought into play, an annual comprehensive survey of the industrial sector can provide extremely valuable benchmarks. Such annual surveys normally include inquiries on employment, payrolls, services and materials consumed, and the output of commodities and services. These data should be measured in value terms with quantities as well wherever logical and feasible. The annual series should reflect year-to-year changes in the performance of entire industries, including their output of services as well as goods, and their secondary as well as primary products. In some countries, annual surveys of employment have been conducted with greater coverage than the annual comprehensive survey, thus in effect singling out employment as the key measure of progress in industries. Annual benchmark data provide the basis for revising the previously compiled monthly or quarterly index number series. A careful review of the magnitude of such revisions should lead to improvement in the methods employed for the construction of the short-term indexes. In countries where annual surveys of the type described are conducted, little difficulty should be experienced in following international recommendations with respect to base-years for weighting or publication purposes.

CENTRAL STATISTICAL OFFICE
STANDARD NATURE OF ACTIVITY QUESTIONNAIRE

(Legal authority for
requesting this
information)

Item 1 -

Name of Establishment _____

Address of Establishment _____

FOR OFFICE USE ONLY

Establishment Identification Number -
____/____/____/____/____/____/____/____/____/____

Enterprise Identification Number -
____/____/____/____/____/____/____/____/____/____

Geographical Code Number -
____/____/____/____/____/____/____/____/____/____

Size Code -
____/____/____/____/____/____/____/____/____/____

Date Code -
____/____/____/____/____/____/____/____/____/____

Item 2 - Nature of activity (tick one box representing the principal activity
of this establishment)

☐ Mining

☐ Manufacturing

☐ Repair

☐ Construction

☐ Retail store

☐ Other (describe) _____

Principal products or services manufactured, mined or sold (list in
order of importance) _____

Item 3 - Form of ownership of this establishment (tick one box)

☐ Private company or owner, single location

☐ Private company, two or more locations. Enter name of company and
address of headquarters or central office:

Name _____

Address _____

☐ Government-owned. Enter name of government agency _____

☐ Other ownership (describe) _____

Item 4 - Company affiliation

(a) Does this company own or control another company? ☐ yes ☐ no

(b) Is this company owned or controlled by another company? ☐ yes ☐ no

If the answer to either (a) or (b) is "Yes", enter below the names
and addresses of the controlled or controlling companies:

Item 5 - Approximate number of persons engaged in the operation of this establishment

as of _____: Number
Date

(a) Proprietors or partners _____

(b) Operatives, clerical workers,
supervisory, sales and other
managerial employees _____

Total number of persons engaged

(sum of (a) and (b)) _____

Item 6 - Name of person supplying information for this questionnaire:

Name _____

Title (e.g. owner, manager, etc.) _____

Date _____

ANNEX II

OUTLINE OF A SAMPLING PLAN FOR ESTABLISHING A SPECIFIC ANNUAL INDUSTRIAL SURVEY

(1) The plan outlined below has been adapted from a report of a series of meetings held in Nigeria in 1968 on the occasion of the visit of the ECA Regional Adviser on Sample Surveys.^{1/} In its entirety, the Nigeria report covers planned surveys of several sectors, including a census of population. A pertinent fact is that in connection with the 1963 population census, the entire country had been divided into enumeration areas (EAs). The areas were, however, not clearly demarcated and the report recognizes the need for giving top priority to creating clearly defined EAs in preparation for the next census. In the plan outlined below, it is assumed that this has been done and EAs can be used as valid statistical units in the sampling procedure.

(2) Little experience is available to guide the development of surveys of small industrial establishments in West African countries. In view of this lack of background knowledge, it would be desirable to carry out pilot studies and modify the plan in the light of their findings. It should be useful, however, to sketch in outline the survey procedures which might be followed tentatively in establishing an annual industrial survey.

(3) Since the plan is presented in rather specific terms, it is necessary to assume certain conditions, as follows:

- (i) An establishment-enterprise register exists, limited to establishments with 10 or more employees. The register is nominally complete for this size group. The original register was created by the use of license applications to a government department and by consulting chambers of commerce. It has been kept up-to-date by use of the same sources and by systematic field checks. It has been decided to survey the establishments listed in the register by mail.
- (ii) The importance of household industries was determined in the recent past, in connection with a sample survey of households. They were found to be of negligible importance except for a few industries such as pottery work, wood carving, raffia weaving, and similar handicrafts. It is assumed that sufficient knowledge exists concerning their location and industrial importance, and it is not planned to collect reports from this group in the annual survey.
- (iii) Industrial establishments (as distinguished from household enterprises) with less than 10 employees, on the other hand, are assumed to be of considerable economic importance in many industries. It has been decided that this group must be represented in order to produce valid statistical results from the annual survey. Estimates of the cost of collecting data

^{1/} "Program of sample surveys in Nigeria", Lagos, 15 Nov. 1968, Federal Office of Statistics and Economic Commission for Africa.

from these small establishments have been made, and it has been determined that the funds available are not sufficient to allow for complete coverage of them. It has been decided, therefore, that sampling techniques must be employed to represent the group.

- (iv) In connection with the last population census, the country has been divided into clearly mapped enumeration areas (EAs). Reports from area supervisors are available which indicate the characteristics of each EA. Based on these reports, it has been decided to eliminate large numbers of EAs from the annual survey universe, on the assumption that they have no industrial activity. This applies particularly to EAs in agricultural and other rural sections of the country.
- (v) It is known through earlier studies that large numbers of the establishments with less than 10 employees do not keep regular records of their income and expenses, and for this and other reasons would not respond at all well in a postal survey. It has been decided, therefore, to survey this group by field enumeration of a sample of the EAs considered to be likely to include industrial establishments.

(4) It is proposed to select the sample of EAs after dividing them into three groups: Group I, heavily industrialized; Group II, moderately industrialized; and Group III, little industrialization. To the extent possible, establishments with 10 or more employees will be ignored in this grouping. The classification of each EA will be based on whatever statistics are available, supplemented by consultation with government experts, industrialists, economists, and chambers of commerce. A considerable amount of effort will be expended on trying to classify each EA properly, because the efficiency of the sampling plan will thereby be greatly increased. The sample of EAs will include all of Group I, a fraction of those in Group II, and a smaller fraction of those in Group III. These fractions will be determined after consideration of the costs of collection and the amount of acceptable sampling error.

(5) It is likely that more small than large establishments will be found in the field enumeration, yet the larger establishments are of greater interest in that they contribute more to the economy. It would almost certainly be wasteful to collect detailed information from all the smaller establishments in the sample EAs, and it would be desirable to take a larger sampling fraction among the larger establishments (5-9 employees) than the smaller (less than 5 employees). Thus, rather than collect detailed information in the first visit it appears more efficient to adopt a two-stage sample design, stratified at the second stage by size of establishment, with unequal sampling fractions in the strata, and to conduct two distinct field operations. In the first stage, the establishments would be listed by use of a simple nature-of-activity questionnaire covering name and address, enterprise affiliation, description of business activity, and approximate number of employees. For the purposes of the further stratification described

below, it is also planned to ask the question, "Do you maintain records of the income and expenses of this establishment?" In the second stage, a sample of establishments would be revisited to collect detailed information on their activities.

(6) Another characteristic for which stratification appears desirable is the record-keeping practices of the establishments. Those which keep good accounts are obviously in a position to furnish more reliable and more detailed information than the rest. It is proposed, therefore, to use both a long form and a short form in the second stage of field enumeration. Both forms will cover the subjects of employment, cost of materials and supplies, and the value of output. The long form will not only request more detail with respect to these subjects, it will also include additional inquiries such as those dealing with inventories and expenditures for machinery and structures. Establishments keeping good records should be sampled more heavily, and it is planned to survey a large part, if not 100 per cent, of such establishments within the sample EAs.

(7) Thus, a stratification scheme as follows is planned tentatively:

<u>No. of employees</u>	<u>Keeps accounts?</u>	<u>Sampling fraction within selected EAs</u>	<u>Questionnaire</u>
0 - 4	No	Small	Short form
5 - 9	No	large, perhaps 100%	
0 - 9	Yes	Probably 100%	Long form
10 and over	Assumed yes	100%	Long form

(8) Most of the establishments in the 10 and over category are listed in the register and will be surveyed by mail with the long form. Field enumerators will be furnished with a list of such establishments in their areas and will be instructed not to contact them. In the course of enumeration, they will encounter establishments not on the list which in fact have 10 or more employees and these will be enumerated. This enumeration will provide correction factors for the normal, or postal, segment of the 10-and-over operation.

(9) The long form calls for data covering an entire calendar year. In recognition of the well-known fact that the proprietors who do not maintain records can remember data for only a short period, the short form covers the month just prior to the interview. It follows that coverage of the short form sample should be spread throughout the year, while the long form would be used shortly after the end of the calendar year.

(10) It seems certain that many difficulties, some of which cannot be foreseen, will be encountered in implementing a plan such as the above. Before the full-scale project is launched, therefore, pilot studies will be conducted in a limited number of sample EAs to test the adequacy of the procedures, to reveal weaknesses in the questionnaires, to verify the preliminary cost estimates, and in general to try to perfect the system as much as possible before large sums are invested.

(11) If the plan as outlined above is found to be feasible, the timing of the various elements of data collection in the full-scale project covering the year 1970 are as follows:

<u>Date</u>	<u>Operation</u>
1-31 December 1969	List establishments in sample EAs; classify them by size and in accordance with record-keeping practices.
1 February 1970	Begin survey of short form cases in sample EAs accounting for approximately 1/12 of the number of such establishments; ^{1/}
1 March 1970	Begin survey of short form cases in <u>second</u> group of sample EAs.
1 April 1970	Begin survey of short form cases in <u>third</u> group of sample EAs.
.....	Etc.
.....
1 January 1971	Begin survey of short form cases in <u>twelfth</u> group of sample EAs.
1 January 1971	Mail long form to establishments listed in register.
1 February 1971	Begin enumeration of long form cases in all sample EAs

The fact that the first stage, the listing and classification of establishments, is performed only once during the year is predicated on the finding in pilot studies that the percentage of establishments going into and out of business is low, and it is consequently unnecessary to repeat the listing operation more frequently than annually. If, however, it is found that the birth-rate and mortality of establishments is high, the listing and sampling operations could be carried out twice in the year, taking half of the EAs (selected randomly) on each occasion.

^{1/} The sample EAs will be divided into 12 groups in such a way that each group contains approximately 1/12 of the total number of short form cases to be surveyed. Care will be taken to see that the sorting of EAs into groups does not over- or under-represent industries with sharp seasonal variations in activity.