

FERTILIZER LEGISLATION



FOREWORD

The Food and Agriculture Organization of the United Nations has had many indications in the recent past of growing interest in many developing countries for enacting or modernizing their legislation on fertilizer production and marketing. The present study has been prepared by Mr. D.M. Mylonas, a consultant, for the FAO Legislation Branch of the Legal Office, in close cooperation with the Soil Resources, Development and Conservation Service of the Land and Water Development Division. It represents an attempt to provide guidance for governments, institutions and individuals responsible for the preparation of fertilizer laws and regulations.

The study was prepared under the supervision of Mr. R. Ricard, Chief, Animal, Plant and Food Legislation Section of the Legislation Branch and Dr. F.W. Hauck, Senior Officer, Soil Resources, Development and Conservation Service. Special thanks are due to Prof. H. Kick, of the Agrikulturchemisches Institut, Bonn University, Federal Republic of Germany, for his valuable collaboration at the drafting stage.

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Each country study has also been submitted for clearance to the government concerned. Of the fourteen governments so consulted nine replied and their comments have been duly taken into account.

As regards the criteria governing the choice of legislative provisions, it should be noted that the purpose has been simply to provide significant examples from among the documentary material currently available at FAO Headquarters. The selection, therefore, in no way purports to convey any appreciation by the Food and Agriculture Organization of the United Nations regarding the merits of certain regulatory or technical systems as compared with others.

The study is issued provisionally as a main document, in English only. Should sufficient interest be generated it would eventually be published in a trilingual - English, French and Spanish - edition. Any further suggestions and contributions to enhance the usefulness of the study would be greatly appreciated.

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INTRODUCTION

The aim of this study is twofold: first, to examine current national fertilizer legislation, in order to highlight the principles that have guided the drafting of provisions governing fertilizer control; second, to make suggestions as to the form and content which national legislation should take if it is to be effective.

In order to achieve the first aim all useful information has been taken into account. The legislative experience of selected countries has, however, been given a certain prominence and discussed in greater detail in the individual country studies. The reason for this, as further explained in the appropriate section, is that these countries are fairly representative of the various national legal systems, social structures, stages of economic development and political systems of today.

In the light of the analysis thus made possible and of the guiding principles specific to this sector, the study concludes with the presentation of the framework for a model fertilizer law.

The survey has been purposely limited to legal texts and provisions mainly concerning the quality control of fertilizers - among which it may be noted that administrative measures relative to the licensing and registration of fertilizers and of fertilizer dealers undoubtedly come within these limits - while financial questions, such as import duties and price control measures, have been disregarded. Technical aspects of the problem are mentioned only where they are indispensable for the comprehension of the legal provisions governing quality control.

Regarding the sources used for this study, consideration has been given as fully as possible to the work of United Nations Specialized Agencies and other international bodies, such as OECD, EEC, ISO, in the fields of standardization of fertilizers, harmonization of fertilizer legislation at the regional level and elimination of the technical obstacles prevalent in the fertilizer trade^{1/}. However these sources have not been given paramount importance, since they go beyond the national context that is part of the raison d'être of the present study.

Two previous publications on fertilizer legislation (OEEC Documentation: Fertilizers Trade Regulations in OEEC Countries, Paris, October 1951, and FAO: Legislation on Fertilizers in Latin America, Rome, September 1955) have indicated useful approaches for the present study. Each, however, is limited to a single continent, and the legislative texts on which they have been based are now in large measure outdated. A third such publication (The 1971 World Fertilizer Legislation and Tariffs Manual, published by the British Sulphur Corporation Ltd., London, 1971), although worldwide in coverage, concentrates only on rates of duty for the importation of fertilizers, and on licences, quotas and exchange control in the importing countries. A fourth study, now largely of historical interest, might also be mentioned here, namely, Le contrôle des engrais dans le monde, published by the International Institute for Agriculture, Rome, in 1928.

The other sources - mainly legal texts of the various countries covered - are given in footnotes.

1/ See for instance: K. Zachmann, Elimination des entraves techniques aux échanges dans le secteur des engrais, Revue du Marché Commun No. 145, juillet-août 1971. It may also be noted that a draft Directive of the Council of the EEC (Proposition de Directive du Conseil concernant le rapprochement des législations des Etats membres relatives aux engrais, Ref. COM (71) 1500 final, Bruxelles, 22 décembre 1971), with annexed listing of standard, single and compound fertilizers, is also to be recommended by the EEC Commission to Associated African States. In this connection, new official methods of analysis for fertilizers are likely to be adopted in the near future by the EEC countries.

PART I - GENERAL

The first part of this study sets out to analyse, in the light of enactments currently in force in the various countries, the main issues dealt with by fertilizer legislation. Central to these introductory considerations is section 4, on the content of legislative provisions, while other sections discuss a number of matters of importance to the study as a whole. Thus, an outline of recent developments and likely future trends in world fertilizer use is followed by considerations pointing to the need for legislation on fertilizer control and by an examination of the form such legislation usually takes. In the same context the content of the relevant texts is also analysed. A fifth section deals with the institutional aspects of fertilizer control.

1. Fertilizers in agricultural development ^{2/}

The data available at present indicate that the world population will probably double during the period 1970 to 2 000, i.e. from about 3 600 million to about 7 000 million, and that the increase will be greater in the developing countries. In order, therefore, to feed the world population adequately, food production during the same period should be approximately trebled. The target increase for agricultural output is 4 percent per year during the second Development Decade.

Experience in countries with highly developed agricultural systems over the last 100 years has shown that 60 percent and more of increased yields are due to the use of mineral fertilizers and manures. In addition to this, inorganic and organic fertilizers have done much to improve the quality of food and have provided the preconditions for agricultural development in the broadest sense. An efficient use of fertilizers has proved to be highly advantageous to the economies of the various countries no less than to the individual farmer.

The possibilities that fertilizer use opens up for agricultural development have gained progressively wider recognition, so that states are encouraging farmers in this direction ^{3/}. Today there is scarcely a country that does not make use of fertilizers, though, of course, there are vast differences between one country and another in present levels and estimated future use.

The world consumption of fertilizers has risen rapidly over the last few decades, as the following figures show (in million tons of N, P₂O₅, K₂O):

1938/39	9.2
1959/60	27.1
1970/71	68.2

According to the FAO Indicative World Plan and in line with the rapidly growing demand for food, the target for 1980/81 is 126.5 million tons.

The share of the developing countries in these world totals has long been a small one, though the rate of increase is accelerating appreciably, as may be seen in the following totals (million of tons N, P₂O₅, K₂O), for 70 developing countries:

1954/55	1.4
1962/63	3.2
1970/71	9.4

^{2/} This section was prepared by Dr. F.W. Hauck, Senior Officer, Soil Resources, Development and Conservation Service, FAO.

^{3/} Cf: UNIDO, Fertilizer Manual, United Nations, New York, 1967, and especially Part One, Chapter I, World Survey: People, Food and Fertilizers.

During the last ten years, some out of the countries in question have reached take-off stage in fertilizer use.

The Indicative World Plan estimates the requirements of fertilizers in developing countries thus (in million tons of N, P₂O₅, K₂O):

1975/76	14.7
1980/81	22.4
1985/86	33.0

The total value of the fertilizer use estimated for 1985 will represent approximately 45 percent of the total value of all current inputs in agricultural production.

Technological progress has resulted in the development of new fertilizer types. The following trends are of immediate interest: High-analysis N, P₂O₅ and K₂O, representing valuable savings in transport costs, are now being produced, together with a wider availability of compound fertilizers in a form ready for application. Formulations of more complex kinds are being introduced, containing, besides N, P₂O₅, and K₂O, important elements such as calcium, magnesium and sulphur and the trace elements manganese, iron, boron, copper, zinc and molybdenum. One may also note a trend toward combining fertilizer with herbicides or pesticides, while there is an increased use of intermediates for dry mixing (bulk blending), liquid mixing and granulation. Novel formulations in nitrogen and phosphate materials have been developed. Controlled-release fertilizers and liquid fertilizers are being more widely employed.

The main difficulty in achieving rational fertilizer use on a national scale lies in the large number of economically weak farmers with small and often remote holdings whose production accounts for the bulk of the country's food crop supply. From such a situation there stems a number of problems which are difficult to solve at the national level, viz:

- a) obtaining information as to the technically and economically correct types and quantities of fertilizers for the respective crops and climate and soil conditions;
- b) getting this information across to the farmers and making sure that they act accordingly;
- c) making certain that, once the demand for fertilizer among farmers has developed, the correct fertilizer reaches them at the right time.

On this last point, experience has shown that the distribution of fertilizers is probably the most difficult and time-consuming problem of all, whose situation calls for an improvement in the infrastructure, including marketing organizations of various types and levels, credit facilities, storage and transport and an appropriate control over the handling of the fertilizers.

Present levels of fertilizer use in the developing countries are unlikely to lead to deleterious effects on the environment, yet the fact that fertilizers are so important for future agricultural production warrants the introduction of a continuous monitoring system so that possible undesirable effects can be avoided.^{4/}

4/ Cf. Effects of Intensive Fertilizer Use on the Human Environment, Report of the Expert Consultation convened at FAO, Rome, 25-28 January 1972, FAO, Soils Bulletin No. 16, Rome, 1972.

2. The need for fertilizer legislation

The importance of fertilizers for agriculture, and thus for both the national economy and the individual farmer, is such that several countries have introduced as early as the end of the 19th century ^{5/} legislative measures designed to control their production and use.

There are many reasons for this. Fertilizer use is an on-going farming practice, with a major influence on yields and earnings. Small farmers are rarely in a position to examine the quality of a fertilizer, so that they have to trust the information supplied by the producer. Given that serious damage can arise from the use of adulterated or incorrect fertilizers, the quality of which cannot in any case be checked after they have been incorporated to the soil, certain means of preventive quality control become necessary. Fertilizer producers have as a rule all facilities necessary for controlling both raw materials and product, and they have no need for special protection from the legislator. Such protection is necessary, however, for the consumer of fertilizers, and consequently fertilizer production and trade need to be controlled by law.

Initially, when production and consumption of commercial fertilizers were limited to a relatively narrow range of types, the purpose of the legislation was mainly to protect the purchaser from possible fraudulent practices on the part of the manufacturer and dealer. Thus, fertilizers sold under a given name were required to contain specified nutrient elements and in such percentages as prescribed by the law (or as declared by the manufacturer himself and accepted by the authorities). Certain variations, within strict limits, were tolerated by law.

Recent scientific and industrial developments in chemistry and agronomy, not to mention commercial competition, have resulted in a multiplication of fertilizer types. This has added a new dimension to the protective role of fertilizer legislation: to provide for the protection of the purchaser against fertilizers which, although they contain the declared elements in the declared percentages, are not suitable for certain soil conditions and for crops. The effective value of some modern fertilizers can be ascertained only after a series of complex and time-consuming experiments, and it is the function of the law to permit the use of these new types only if such experiments have demonstrated their efficacy.

Furthermore, the need arises to guarantee the consumer of agricultural products as high a quality as possible.

Finally, today, when the issue is being discussed in all quarters, protecting the environment from possible polluting effects has become one of the functions of fertilizer legislation.

National fertilizer laws do not always satisfactorily cover all the above-mentioned points. Especially the last one has not yet received sufficient attention, at least not in the main legal texts on the subject. Many developing countries have still not enacted a comprehensive body of legal texts regulating fertilizer production, import or trade. Others still use a legislation bequeathed to them by the former colonial powers, that has ceased to be relevant to the present world situation. It should be borne in mind that the enactment of legislation is the outcome of a strongly felt need in a given national context to regulate a vital sector of the national life and economy, and now that the production, importation and use of fertilizers is developing from day to day, the need will also be felt in these countries for the introduction of modern laws covering the more recent aspects of fertilizer marketing and use.

^{5/} Thus, in France, the fertilizer law, still in force, is that of 4 February 1888 as amended by laws of 19 March 1925 and 28 March 1936.

3. Structure of fertilizer legislation

Fertilizer laws follow a typically linear pattern, from an original enactment of broad scope, drafted in general terms, through a succession of texts amending or rendering more specific what has gone before. The lapse of time between one enactment and the next varies, and rarely does one find the whole sequence of legal texts made in the same year.

A long sequence is the most usual approach. Thus, in the Swiss legislation, the sequence starts with a very broad text, the "Federal Act Relative to the Improvement of Agriculture and the Maintenance of the Peasant Population (Agriculture Act)" of 3 October 1951, the title of which is self-explanatory; then, comes the "Ordinance on Trade in Agricultural Auxiliary Materials" of 4 February 1955, amended by Order of the Federal Council of 3 November 1959, issued pursuant to articles 4 and 70 to 76 of the Agriculture Act which specifically governs trade in agricultural requisites, including fertilizers; finally, the section on fertilizers (Livre des Engrais) in the Handbook of Agricultural Auxiliary Materials, promulgated by the Federal Department of Finance of 31 January 1962, as amended on 26 May 1972, deals exclusively with fertilizers, as do also the two Orders of the Federal Council of 10 July 1964 on the constitution of reserves of phosphate and potassium fertilizers. The Egyptian legislation illustrates the opposite case: here a single Act governing trade on fertilizers (enacted on 15 February 1956) was followed by the Enforcement Regulations exactly one month later.

The two examples illustrate extremes of legislative procedure. However, the number of texts and the time elapsing between the dates on which they were enacted are matters of little consequence. What is important is the division found in all the countries studied, between a basic legal text, usually called Law, Act, Decree, Ordinance, etc., and, as it were, a subsidiary legal text, enacted under the first and by virtue of the powers conferred by it. These are the Regulations under the Law, Act, etc.

The first text sets out the legal principles which govern the manufacture, marketing etc., of fertilizers. It prescribes what must be done and institutes penalties for failure to comply with its provisions.

The second type of texts explain how the principles embodied in the first shall be put into practice. These texts include the technical instructions necessary for the enforcement of the basic law and provide the details which cannot be contained in an instrument the main purpose of which is to establish principles. But, even so, these technical instructions are sometimes rather difficult to incorporate into a legal text. The usual practice is therefore to produce them in annexes to the Regulations. These annexes, or "Schedules" in the English legal terminology, are found more and more frequently in recent legislation, not only in Common Law countries, but in Belgium, the Federal Republic of Germany and others.

Another difference between the basic text and the Regulations concerns the matters they cover. The basic text seldom governs only fertilizers. Usually, it regulates the manufacture, importation and sale of other products intended for agriculture. Thus, in El Salvador, the basic text covers chemical and biochemical products for use in crop and animal husbandry; in Belgium, pesticides and requisites for agriculture, horticulture, silviculture and stockbreeding; in France, fertilizers and pesticides; in India, all the essential commodities; in Kenya, fertilizers and animal feedstuffs; in Malawi, fertilizers, farm feeds and remedies; in Italy, all products essential for agriculture; and in the United Kingdom, fertilizers and feeding stuffs. In Egypt, however, in the Federal Republic of Germany and New Zealand, the basic Act covers only the production of, and trade in, fertilizers.

Regulations on the other hand tend to be different for each item (fertilizer, feedstuff, etc.). In the case of legislation concerning two such items, as for instance in the United Kingdom, different provisions, or different parts of the schedules, or even different schedules, have so far set out the technical points relevant to each item.

A further difference between the two sources of Fertilizer Regulations discussed here (Act, Law, Regulations under the Act) is to be noted in the enacting authority. Thus, while the basic law normally emanates from the legislative body (parliament, general assembly, legislative commission, etc), the Regulations are issued by the appropriate executive organ (council or ministers, federal council minister, etc.) of the country.

4. Content of legislative provisions

As has already been seen, the main reason for the enactment of fertilizer control legislation is the protection of the fertilizer user and through him of the agricultural economy of the nation, which would otherwise have to bear the results of poor agricultural production due to the use of inadequate or the wrong sort of fertilizers. Accordingly, the legislator, having defined fertilizer materials, will concentrate on the control of the various types of products and on guarantees for the purchaser, enforcement and penalties.

Thus, the control of the various types of fertilizers offered on the national market is normally achieved either by requiring the registration of the article offered for sale with a government service (usually the Ministry of Agriculture), or by establishing a comprehensive list of registered fertilizers and restricting production and sales to articles contained in that list. The setting of standards of composition, as well as the requirement of a licence for fertilizer manufacturer or sellers, also offers a means of effective control.

The question of guarantees for the purchaser covers the various provisions regarding the packaging and labelling of fertilizers, as well as the statutory statements and other advice notices which the seller must convey to the buyer at the time of sale. If the farmer is to profit from the new fertilizer varieties, a simple and easily understood description must be given, on the container, of the contents and their use. Furthermore, the fertilizer offered for sale must really contain the elements which the label indicates, and the containers must be of a material that not only protects the product itself against deterioration due to weather conditions, but also protects the user and the environment against possible harmful effects.

Enforcement takes the form of appointing control officers, authorizing the inspection of premises where fertilizers are stored or offered for sale, and establishing methods of sampling and analysis. Lastly, appropriate penalties are provided to punish the contravention of provisions regulating the above matters.

i) Definition of fertilizers

Before any provision regulating these issues is drafted, the legislator must decide what is to be understood by fertilizer or what should be included under that concept. From a technical simplified standpoint, a fertilizer is any substance that is added to the soil to supply those elements which are required for the nutrition of plants.^{6/}

Generally, the term "fertilizer" is used for "fertilizer material or carrier", meaning any substance which contains one or more of the essential elements (nitrogen, phosphorus, potassium, sulphur, calcium, magnesium, iron, manganese, molybdenum, copper, boron, zinc, chlorine, sodium, cobalt, vanadium, silicium).

From a scientific standpoint, fertilizer terminology distinguishes between nutrient elements, nutrients, nutrient materials and fertilizers ^{7/}. Nutrient elements are those chemical elements of the periodic system essential for plant growth: (Nitrogen (N),

^{6/} S.L. Tisdale and W.L. Nelson: Soil Fertility and Fertilizers, Macmillan, New York and London, 2nd Edition, 1966, p. 379.

^{7/} See: Handbuch der Pflanzenernährung, Springer Verlag, Vienna and New York, 1969, Vol. I, Part I, p. 95.

Phosphorus (P), Potassium (K), Calcium (Ca), Magnesium (Mg), Iron (Fe), etc.), and others not yet identified as such. Nutrients are chemical compounds or ions of the nutrient elements which can be absorbed and assimilated by plants (such as Nitrate ion (NO_3), Ammonium ion (NH_4), Phosphate ion (PO_4), Potassium ion (K^+), Magnesium ion (Mg^{++}), etc.). Nutrient materials can be either pure nutrients, or other inorganic or organic compounds of nutrient elements, which can be transformed to nutrients, mostly in the soil, by chemical reaction or by microbial action. Fertilizers (in the meaning of products supplying plant nutrients) are either pure nutrient materials or nutrient materials, mixed or combined with other substances, which can be useful or indifferent to plants but not harmful if suitably employed.

In addition to the above, other materials which are not nutrients can contribute indirectly to the nutrition of plants. These are such organic materials as may improve the quality of the soil. They may be prepared from natural or synthetic organic materials, preparations for soil inoculation, etc.

The definitions of fertilizers adopted by the various national laws are usually (where explicitly given in the legal texts) wider than those listed here. Among the countries which do not provide any definition are Belgium, Egypt, Morocco and Sri Lanka, where (with the exception of Morocco) the adoption of the list of fertilizer types covered by the legislation makes further definition unnecessary.

Japanese law defines fertilizers as being all substances applied to the soil for the purpose of supplying nutrients to the plants, or for producing a chemical change in the soil, thus contributing to the cultivation of plants, or which, when applied to plants, will supply them with plant nutrients. For the Netherlands, on the other hand, a fertilizer is a product which is added to the soil in order to maintain or increase its productive capacity.

Generally speaking, however, for the national legislator fertilizers are substances intended to be used for improving or maintaining the growth of plants or the productivity of the soil. Definitions along these lines are found in the legislation of practically all of the countries studied except those named above.

This rather general definition has led certain countries explicitly to exclude a number of substances and materials. Thus, in the Federal Republic of Germany, such materials are exempted as water, pesticides with fertilizing side-effects, manures, settlement wastes, preparation aids for organic fertilizers, etc. In Kenya and Malawi, manure, compost, wood ash, gypsum, refuse and other substances are not considered to be fertilizers when sold in their original condition and under their common name. In New Zealand, animal manure and other animal or vegetable matter either in fresh or partly decomposed condition are not considered as fertilizers unless they have been dried or treated in any other way assuring that decomposition is arrested until the material is applied to the soil or the plants. In the United States of America, the Uniform State Fertilizer Bill ^{8/}excludes unmanipulated animal and vegetable manures, marl, lime, limestone, wood ash and gypsum as well as any other products exempted by the Regulations.

In a few cases the legislation makes a distinction between fertilizer stricto sensu and materials indirectly contributing to the fertilization of the soil. Thus, Colombian law distinguishes between fertilizers as such, soil amendments and soil conditioners, all of which it defines separately, without providing an overall definition for the term "fertilizer". Ecuadorian legislation defines fertilizers along the general lines mentioned above and further states that its provisions apply only to fertilizers and soil amendments, which it also defines. In the Federal Republic of Germany, the Fertilizer Act explicitly includes under the definition of fertilizers, preparations

^{8/} See Annex IV to this study.

for soil inoculation, soil conditioners and plant growth regulators which it mentions without further defining them. In Switzerland, the legislation also covers bacterial cultures, artificial amendments and compost accelerators, which, although not treated separately, are governed by the same provisions as fertilizers ^{9/}. In certain other countries, however (Belgium, Morocco, Norway), the title itself of the law distinguishes between fertilizers and soil amendments, both commodities being covered in the provisions. This distinction is of considerable practical interest because it makes it clear that substances which from a scientific point of view cannot be considered as fertilizers are nevertheless covered by the fertilizer legislation.

Whenever the national legislation does not give a definition of the term "fertilizer" a comprehensive list, given in, say, a Schedule to the Act or, more often, in the Regulations under the Act, clearly shows the fertilizer materials to which the legislation applies.

ii) Control of types of fertilizers offered on the national market

Although the main reason for such control is to protect the fertilizer consumer - the farmer - control measures also provide protection for the honest manufacturer who otherwise would have to suffer unfair competition from his less honest colleagues. The ultimate aim of the control measures is to secure a product with the correct quality for the intended use. Control measures are therefore primarily quality control measures.

Quality control seeks to achieve as high and as consistent a standard in fertilizers as is compatible with the demands of the market for which it is being produced and the price at which it will be sold ^{10/}. Such a standard represents the average of the quality attributes taken into account, for any particular type of fertilizer, and must be maintained within as narrow tolerance limits as possible. Quality control will be entirely effective only if it can be extended to cover raw materials through the setting of specifications to be met before purchase, the improvement of processing methods, the improvement of product quality, the standardization of the finished product according to label specifications and the orderly operations of stores and warehouses ^{11/}. It should be noted however that fertilizer legislation cannot cover all these points: some of them are dealt with by laws and regulations governing related fields, though standardization of the finished product according to the label specifications is definitely a point which the fertilizer legislation must deal with.

The control of types of fertilizers offered for sale presupposes legal provisions directed toward two main objects: first, that the products offered to the user comply with prescribed standards and, second, that these products are placed on the market by authorized persons, known to the authorities, thus making official control over enforcement possible.

a) Legal provisions regarding the fertilizer

Legal provisions may require either that all articles offered to the user as fertilizers shall be registered with a central service - governmental or under government control - or that only those articles may be offered for sale which are normally listed by the Regulations made under the basic Act ^{12/}.

^{9/} For further details see the relevant country studies.

^{10/} See on this subject: R.H. Schwass, Quality of Fertilizers, ASPAC Food and Fertilizer Technology Centre, Extension Bulletin No. 12, Taipei City, December 1971.

^{11/} Ibid, p. 8.

^{12/} See also: Institut International d'Agriculture, Le Contrôle des Engrais dans le Monde, Rome, 1928, pp. 118, 119; and FAO, Legislation on Fertilizers in Latin America, Rome, September 1955, pp. 61-88.

Under the first method, every person intending to deal in fertilizers must submit an application beforehand to the appropriate service, for registration of the fertilizer under a certain name and under a given composition. This means in effect that registration is necessary, even for fertilizers identical to each other, if only for the reason that they are traded under different names. Applications must generally contain the name and the commercial address of the applicant, the name of the fertilizer-producing industry which the applicant represents, the brand name of the fertilizer produced or sold by the applicant, as well as its formula, (i.e., precise indication, in percentages or by other statutory means, of the nutrient elements contained in the fertilizer, the form in which the primary elements are found and the approximate percentages of minor elements, if any and in certain cases the degree of fineness of certain constituents such as natural phosphates). If the application is made by a corporate body, a certificate of the constitution and a certificate of the legal representation of that body are usually required. The application must be accompanied, in the case of a fertilizer already produced (imported fertilizers, for instance), by a sample of the article.

The registration is valid for a fixed period of time, and provisions are made regarding re-registration and revocation of the registration.

This method is adopted by the legislation of such countries as Ecuador, Colombia, Japan, Germany (under the 1918 Decree), Malawi, New Zealand and Yugoslavia. It is also to be found in the Uniform State Fertilizer Bill in the United States.

Under the second method the legislator lists in Schedules to the Act or to its Regulations a wide number of officially approved and registered fertilizers, giving at the same time their implied definitions, minimum (or, where necessary, maximum) percentage of nutrient elements contained therein, limits of variations and other useful particulars. Fertilizers produced, imported or sold in the country need only be in conformity with the specifications appearing in the schedules; no registration of the fertilizer brand by the individual manufacturer or dealer is necessary and anybody may manufacture, import and market any registered fertilizer.

This method is more liberal and less bureaucratic than the one previously described. It seems to be preferred in more recent European legislation in countries such as the Federal Republic of Germany (1962-1963) and Belgium (1969-1971), and was also adopted by the United Kingdom ^{13/}. Egypt, France, India, Kenya, Netherlands, Switzerland, as well as other countries, have also opted for this method, with or without variations on the basic pattern.

Thus, in Egypt, the fertilizers listed in six tables appearing in Schedules to the basic Act ^{14/} must, in addition, be registered in a special register with the Ministry of Agriculture. The relevant provisions do not mention imported products explicitly, but the requirement that the application for registration must indicate, among other particulars, the country of origin, the names of the exporter and importer, the country of exportation and manufacture, implies that these, too, come under the rule.

In India, registration is necessary only for fertilizer mixtures and "special fertilizer mixtures" (i.e. mixtures of fertilizers prepared for experimental purposes). Upon registration of mixtures and special mixtures of fertilizers, a certificate is issued to the person who has applied for the registration.

^{13/} The Fertilizers and Feeding Stuffs Act of 15 December 1926; and the Agriculture Act of 1970, Part IV.

^{14/} Act No. 41, relative to trade in fertilizers, of 15 February 1956.

In Switzerland, a special licence is necessary for the manufacture and marketing of fertilizers which are not included in the list of approved fertilizers.

In only a few countries does legislation fail altogether to regulate the matter of registration.

b) Legal provisions regarding manufacturers and dealers

While certain countries have set up very strict regulations regarding authorization for the manufacture of, and trade in, registered or approved fertilizers, others do not seem to consider such authorization of particular importance, the matter being closely linked to the country's policy on fertilizer control. If strict control is thought to be necessary, then those directly involved in the production, and import of, and general trading in; fertilizers must be known to a central service, in order that the competent authorities may be able to follow and control their professional activities, and must be duly registered and apply for a licence before undertaking any such activities.

If, on the other hand, control is considered possible without strict administrative measures such as prior licensing or registration, the legislator refrains from imposing them.

There is no uniform procedure among countries regarding licensing or registration of persons or corporate bodies dealing in fertilizers. Thus Colombia, Ecuador, Egypt, India and Japan are among those countries requiring that a licence or certificate of registration be issued to anybody who intends to produce, import or sell fertilizers. In Belgium any person importing, manufacturing or otherwise preparing for sale compound fertilizers or mixed organic amendments must first obtain a licence issued by the Minister of Agriculture. The Federal Republic of Germany, France, Morocco, New Zealand, the United Kingdom, Switzerland and Yugoslavia make no provision whatsoever for administrative formalities regarding licensing or registration of manufacturers, importers and dealers. Kenya and Malawi impose a licence only for the establishment and the operation of plants used for the sterilization of bones and other substances derived from animal carcasses intended for use in the manufacture of fertilizers.

If the application for a licence is made by an importer of or a dealer in fertilizers, it is often required that it be accompanied by a sample of the fertilizer which the applicant intends to import or sell. Concerning importers of fertilizers, in particular, certain countries require a special licence. In Switzerland, for instance, importers of potassium and phosphate fertilizers are granted an import licence only if they undertake to constitute a permanent reserve of these fertilizers in the country. In Egypt, an official certificate of the government of the exporting country is necessary to the effect that the products are free from diseases and worms harmful to man, animals or plants. A similar provision is found in the Yugoslav legislation.

c) Standards of composition

The way in which the question of standards of fertilizer composition is dealt with in national legislation depends mainly on the method adopted by the country for the control of fertilizers put on the national market.

If the method is that of the comprehensive list of pre-registered fertilizers, then the list itself, in an appropriate column, gives certain indications as to the composition of the product. Thus, in Belgium, the table annexed to the 1970 Order ^{15/} gives in columns b), c) and d) respectively the descriptions, criteria and guaranteed content in active principles of the fertilizers indicated in column a). Column b) indicates the way in which the product is obtained (by chemical or electrochemical or other means, or as an industrial by-product, etc.) together with its content; column c) gives minimum or maximum percentages of the main element or elements contained, degree of neutralizing effect and of fineness (in the case of phosphatic fertilizers) or percent content of organic and other matters (in the case of organic soil amendments), while column d) shows the guaranteed content in active principles for the respective fertilizers.

Similarly, in the Federal Republic of Germany, particulars regarding the composition of fertilizers are given in columns 3, 4 and 5 of the schedule to the 1969 Order. Column 3 states the essential components of the fertilizer, column 4 gives the minimum content in percentages and column 5 the main composition of the product, while the type of the fertilizer is given in column 2. In India, Sri Lanka and other countries such particulars are given in one column ^{16/}. In Switzerland, standards of composition are found in the special part of the Fertilizer section (Livre des Engrais) of the Handbook of Agricultural Auxiliary Materials for each one of the fertilizers defined in the section.

Fertilizers or fertilizer mixtures of a composition other than that prescribed in the relevant list must, as a general rule, be registered separately. In certain cases even fertilizers which do not comply with the established standards of composition may be offered for sale if marked in a special manner and with the qualifier 'non-standard' and provided a special certificate of registration is obtained to that effect ^{17/}.

On the other hand, in countries where the legislation requires registration of fertilizers by the producer or the dealer prior to the manufacture or marketing of the product, standards of composition are not given for each individual fertilizer. Standards in these cases are general standards prescribing minimum and maximum contents of the main nutrients, degree of humidity permitted, fineness of granulated fertilizers, etc. The actual formula of each fertilizer is then established by the manufacturer and must be included in the application for its registration ^{18/}.

iii) Guarantees for the purchaser

The control measures discussed in the previous section can do no more than ensure the conformity of fertilizers with the established standards and their suitability for use. But product conformity by itself is not enough: the ultimate purpose of the fertilizer is that it shall be applied to the appropriate soil, under the appropriate climatic conditions and supply the necessary nutrient elements to the appropriate kind of plant. This will only be achieved if two main points have been taken care of, namely:

^{15/} See Annex II B to this study.

^{16/} Under the title "implied definitions" of the Second Schedule to the 1961 Act in the case of Sri Lanka, under the title "specifications" in Schedule I of the 1957 Order in the case of India against the name of the fertilizer concerned.

^{17/} See country study on India.

^{18/} See country studies on Ecuador, Colombia, New Zealand and Yugoslavia.

1. that the purchaser clearly knows what he is buying - that is to say, the exact type of the fertilizer contained in the package he buys and also the potential uses of the product and what quantities might be used for a certain kind of crop in a given area under given climatic conditions; and
2. that the product, manufactured according to the prescribed standards, will not have lost its specific qualities by the time it comes to be used as a result of bad storage conditions, tampering with, unsuitable containers, etc.

a) Informing the purchaser

The need to inform the purchaser of the quality and the possible uses of the fertilizer he buys can be met in one or other of three ways: by marking the container itself in a manner ensuring that the purchaser will have no problem in identifying the type of fertilizer for the purpose he has in mind; by the seller supplying the purchaser with a written statement on the name, composition, qualities and possible uses of the fertilizer; or both these methods combined. The first case is covered under the heading "labelling", the second under that of "statutory statements and similar declarations".

Labelling: Provisions regarding the labelling of the fertilizer container are found in all of the countries studied.

In some of them only the principle of labelling is stated, the specification of particulars being left to the administrative bodies concerned. This is the case with India. The New Zealand legislation lays down that packages of fertilizers, unless sold to another vendor, must bear in bold and legible characters the registered name and brand of the fertilizer. In Colombia, fertilizers in packages without labels or with illegible labels may not be offered for sale. The law in Egypt is more specific in that it requires, in addition to the name and brand of the product, an indication of the weight in 10-cm figures, and of the component elements in 5-cm figures on the containers of fertilizers. The legislation of Ecuador requires that labels indicate in Spanish the provisional authorization under which the article is sold, its price and its chemical formula and composition.

In other countries the provisions on labelling are even more detailed and specific. It is thus often required that in addition to the name of the fertilizer, name of the manufacturer, packer, vendor or importer, as the case may be, the weight of the article, etc., all relevant particulars be given on the nature, constituent substances or quality of the fertilizer. In Belgium, for instance, the label of packaged fertilizers must contain inter alia the description "fertilizer", "lime fertilizer" or "soil amendment", according to the case; one or more of the names appearing in column a) of the table ^{19/} together with prescribed permitted qualifying phrases; and guaranteed content in active principles, as prescribed in column d) of the table. In Sri Lanka, the label must give the amount of the nutrient elements which, in accordance with the second column of the First Schedule of the 1961 Act, are to be found in the fertilizer. In Morocco, the content in nutrient elements, in the case of fertilizers, and useful ingredients, in the case of soil amendments, as well as their nature or state of combination must be indicated on the label. These contents must be expressed exclusively in terms of nitrogen, phosphoric acid or potassium (in the first case) or calcium, magnesium or humus (in the second case) per 100 kg fertilizer or soil amendment, respectively.

^{19/} See Annex II B to this study.

The weight of nutrient elements in fertilizers is to be expressed in terms of nitrogen (elemental), phosphoric acid (anhydrous) and potassium (anhydrous); that of useful ingredients contained in amendments is to be expressed in terms of calcium oxide, magnesium oxide and humus. In other countries, again, such as Denmark, Ireland and Norway, label information as to contents in plant nutrients must be given in terms of elemental nitrogen, phosphorus and potassium.

Swiss legislation on fertilizers requires that in any publicity - and labelling is considered to be such - must be given the name of the fertilizer, as indicated in the special part of the Livre des Engrais, or a similar name, provided this does not lead to confusion, and the content in principal nutrients. If a fertilizer does not comply with the requirements of the Livre des Engrais the fact must be stated in the immediate proximity of the description, together with the indication of the measure by which it departs from the prescribed standards. Other descriptions such as "organic", "chlorine-free", "lime-free", etc., are also permitted in certain cases 20/.

In Japan, manufacturers or importers of "ordinary" fertilizers are required to attach to the containers guarantee labels containing the following information: a) an indication that it is the guarantee label of the producer or importer; b) name of the fertilizer; c) guaranteed analysis; d) name or commercial name and address of the producer or importer; e) month and year of production or importation; f) for a producer, name and location of the production plant; g) net weight; h) registration, or provisional registration, number; i) where any foreign substance has been added to the fertilizer, the name of that substance and the proportion of it contained in the mixture; j) in the case of a fertilizer that is provisionally registered, an indication to that effect 21/.

The Federal Republic of Germany is a particular case: there are no general provisions on labelling or packaging; instead, a case-by-case method of regulation has been adopted as included in the Schedule to the Fertilizer Order. Provisions specifically regulating the packaging and labelling of a number of fertilizer types are found in the last column of the schedule entitled "special regulations".

It is usually prescribed that labelling be made out in the language of the country. This requirement is explicitly stated in the case of Belgium (French or Flemish, or both), Ecuador (Spanish) and Egypt (Arabic). In one case, however (Malawi), it is provided that the labelling must be made in English, which is the official language of the country, though it is certainly not the one which every farmer reads or understands.

Again, labelling can be made either by way of labels affixed to the container or by direct marking thereon. However, fertilizers transported in bulk obviously cannot be marked in either of these ways. Normally, therefore, the law requires that they shall be accompanied by an appropriate document. If such fertilizers are stored in a factory or storage premises, a notice placed in close proximity gives the data required by the law 22/.

20/ See the relevant country study.

21/ See: The Fertilizer Control Law of Japan in ASPAC Food and Fertilizer Technology Center, Technical Bulletin No. 4, Taipei City, March 1972, p. 9-10.

22/ See the country study on Belgium.

Statutory statements and similar declarations: These can take the form of an independent statement, or an advice note, or an insertion in sale invoices, bills, price lists, etc. Statements of the kind originally issued by the producer or importer of fertilizers and then reproduced by the seller and handed over to individual buyers, as a rule give the information required by law. Cases such as that of Yugoslavia, which requires that additional information be given in the statement, regarding mainly the date of manufacture of the fertilizer and the duration of the declared characteristics, or that of France, which requires detailed information on the content of the fertilizers as well as the nature and the composition of the latter, are rare. Such information has the effect of a warranty by the seller to the purchaser that the particulars contained in it are correct and that at the time of sale the article has the stated qualities 23/.

Indian legislation and that of the Federal Republic of Germany are silent on the matter of statements. In Germany, the earlier law provided for written directions as to the correct use of the fertilizer and the quantities to be applied per hectare and crop to be given by the seller to the purchaser. These provisions have been widely criticised, especially on the grounds of the difficulty of establishing such directions. Nevertheless, it has been decided that such information is useful, and so the relevant directions are now printed on containers as a part of the labelling system 24/.

Egyptian legislation contains a similar provision requiring fertilizer vendors to keep for five years purchase invoices they have given and copies of sales invoices they have issued.

Japanese legislation requires that all manufacturers or importers of, or dealers in, fertilizers shall keep a second book in which they must enter all particulars regarding transactions in fertilizers. These books are to be kept for a period of two years.

Statutory statements must also be supplied to the purchaser of fertilizer mixtures in New Zealand. In Morocco these statements are not necessary in the case of sale of heterogeneous fertilizers or amendments whose composition may vary and which are normally transported in bulk, such as farmyard manure, market waste and in the case of raw materials for the manufacture of fertilizers.

b) Safeguarding product quality

Specific provisions regarding the packaging of fertilizers are found in relatively few countries and even then are not extremely detailed. It is normally prescribed that containers must be firmly closed by means of an automatic machine or by hand and sealed in such a way as to preclude tampering with the contents without breaking the seal (Belgium, Egypt, India). Indian legislation further specifies that bags stitched by hand and containing fertilizers manufactured in India must bear lead seals; if, however, the bags are machine-stitched in such a manner that their content cannot be tampered with without a visible breakage of the stitching, lead seals are not necessary.

23/ New Zealand: The Fertilizers Act of 17 October 1960 Sec. 21; and United Kingdom; The Fertilizers and Feeding Stuffs Act, 1926, of 15 December 1926, Sec. 2 (1-4).

24/ See R. Schöttler: German Fertilizer Legislation, in ASPAC Food and Fertilizer Technology Center, Technical Bulletin No. 3, Taipei City, March 1972, p. 9.

In the Federal Republic of Germany, packaging is regulated in the same way as labelling, i.e., on a case-by-case basis in the column entitled "special regulations" of the Schedule to the Fertilizer Order.

In Colombia, fertilizers may not be offered for sale if the packages are in such a bad condition that the product may deteriorate. In any case, fertilizers may be sold only in their original packages; the repacking of fertilizers is prohibited without the prior authorization of the Instituto Colombiano Agropecuario.

iv) Enforcement

Powers for the enforcement of fertilizer legislation are vested in national government services or administrative bodies and officials. These are sometimes especially appointed for the purpose but more often have functions that are much wider, the quality control of fertilizers being only one of their responsibilities. Appointment of control officers and their relationship with the service responsible for fertilizer control enforcement will be further discussed below under the section entitled "Institutional Aspects".

Enforcement measures consist mainly of three closely related activities: inspection of premises where fertilizers are produced, stored or offered for sale or examination of books and other documents (invoices, statutory statements, etc.) related to the manufacture and trade of fertilizers; sampling of fertilizers; and analysis of the samples thus taken. The various national laws regulate these three activities in a substantially similar way. Inspection, as a rule, is not dealt with in an extensive manner but is covered by provisions contained in the basic laws and the regulations. Sampling is also regulated in these texts but detailed descriptions regarding the method of taking and dividing samples are usually found - if they are given at all - in schedules to the regulations. The same is also true of methods of analysis.

a) Inspection

Fertilizer inspection is assigned to control officers, normally called inspectors, with wide functions and powers. These may at all reasonable times (Japan, Kenya, Malawi, New Zealand, United Kingdom, United States) enter any offices and premises of business where they have reason to believe that fertilizers are manufactured, stored or offered for sale and inspect the equipment, storage facilities, raw materials, finished products, as well as all books or other business documents kept in these premises. Vehicles, ships and any other means of transport may equally be searched by authorized personnel if they are transporting fertilizers or raw materials intended for their manufacture.

Indian law restricts the powers of inspectors by requiring that an inspector may enter and inspect premises if he suspects that a contravention of the provisions of the law has been committed in respect to the fertilizers there produced, stored, etc. ^{25/}. This restriction, however, is more apparent than real since it is implied in any action taken by any inspector. The Colombian legislation on the contrary accords to staff members of the ICA, acting as control officers, the privileges and the prerogatives of the police inspectors.

Inspectors are further authorized to ask any questions relevant to the inspection and require any other information. The owners of the premises or of the business, their representatives, agents or employees may not obstruct in any way the work of the inspectors but rather are obliged to offer all reasonable assistance to them and facilitate the inspection in every way.

25/ India: The Fertilizer (Control) Order, 1957, clause 20(1)(c).

Inspectors are also authorized to make copies or extracts of books or documents of the business and take samples of fertilizers or even seize and remove such documents and fertilizers which they have reasonable cause to believe give evidence of contraventions of the law 26/.

New Zealand legislation provides furthermore that inspectors may require in writing manufacturers or importers of fertilizers to send for inspection and analysis and without payment a sample of any fertilizer in their possession, registered or for which application for registration has been made. Such samples must be of the weight prescribed by the inspector but not in excess of two pounds.

b) Sampling

It is not the intention to make a detailed study at this point of the methods of sampling adopted by the various national fertilizer laws: examples of these methods can be found in the respective country studies. It is, however, of interest to try to see what are the guiding lines of the legal provisions in these matters.

Sampling is the procedure whereby representative amounts of a batch of specific products are taken for analysis by the authorized services. This suggests that samples must be taken in such a way as to ensure that they truly represent the average quality of the sampled product. To that effect the legal texts of the countries studied here (with the exception of Egypt, Japan, New Zealand and Switzerland) comprehensively regulate the sampling procedure. New Zealand law however, leaves the choice of the actual method to the individual inspector, requiring only that he shall inform beforehand the manufacturer, vendor, witness, etc., present at the sampling, of the method he intends to use.

The typical sampling procedure for fertilizers can be summarized as follows: samples are taken from a number of closed containers prescribed by the Regulations, according to the total number of containers in the batch of fertilizers of the same type - detailed tables giving scale of sampling are normally given in the Regulations - or, if the fertilizers are in bulk, a certain number of samples is taken per ton of fertilizers; these samples are thoroughly mixed together in order to obtain an homogeneous bulk sample; the bulk sample is then divided in equal parts one or more of which are discarded and the rest mixed again, further divided and so on, till a sample of a prescribed weight has been arrived at, called average or final sample; the final sample is divided in three or four equal parts, according to the requirements of the law, and packed in the same number of clean, dry, secure containers. These are the test samples, one or more of which will be used for analysis.

Samples are taken separately for the various fertilizer types. The weight of each sample and the number of samples to be taken from a given quality of fertilizer according to whether they are packed or in bulk, solid or liquid, in small or large containers, etc., are established by the relevant provisions of the legal texts. As a rule, samples must be taken only from properly stored and undamaged fertilizers. Damaged lots are dealt with separately (Belgium, Federal Republic of Germany). Stones and foreign matter naturally present in a fertilizer can either be broken up and mixed with the rest of the article, or if they cannot be broken, they are retained in the sample in a proportion representing as far as possible that of the batch from which the sample was taken (Morocco).

Sampling must be carried out whenever possible in the presence of the manufacturer, seller or owner of the fertilizer. If the sampling inspector cannot secure the presence of these persons he may proceed in the presence of another witness (New Zealand).

26/ Kenya: The Fertilizers and Animal Foodstuffs Act, Section 9(1)(b).

During or immediately after the sampling process, the inspector prepares a sampling report giving all relevant particulars (Federal Republic of Germany, Kenya, Morocco, United Kingdom). Copies of this report accompany the test samples. Whenever the law does not require the preparation of such a report, a label or docket is required instead (Belgium, India, New Zealand, Yugoslavia). This must be prepared, signed by the sampler and the owner of the fertilizer or his representative or the witness and affixed to the container or the test samples. United Kingdom legislation further provides that copies of the relevant statutory statements, markings or other documents must accompany the test samples.

The test samples duly sealed and marked are distributed as follows: one (two in Egypt) of the three or (as the case may be) four test samples prepared as described above remains with or is sent to the manufacturer, importer, seller or otherwise owner of the sampled fertilizer; of the others one (two in Belgium, Kenya, the United Kingdom, Yugoslavia; three in Morocco) is sent to the authorized analyst, or to a central service established for the purpose of control and the prevention of fraud; one is kept by the inspector himself (India, Malawi, New Zealand). In the Federal Republic of Germany, a test sample does not have to be left with the owner of the fertilizer.

c) Analysis

The samples sent to an authorized analyst or laboratory are analysed according to officially established methods ^{27/}, usually set forth in the regulations to the basic fertilizer Act of the country (India, Malawi, New Zealand, United Kingdom, Yugoslavia). In the Federal Republic of Germany analysis is made using the method prescribed by the Association of German Agricultural Testing and Research Institute; in Ecuador the methods used are those adopted by the Association of Official Agricultural Chemists (A.O.A.C.) of the U.S.A., while in Belgium analysis is carried out in accordance with "conventional methods approved by the Minister of Agriculture" and in the absence of such methods, or if they cannot be applied, the analysis follows "a traditional method in use in analytical laboratories and government stations". In Switzerland the Agricultural Testing Stations of Lausanne and Liebefeld-Berne, being responsible for enforcement, prescribe the method to be used for analysis.

The purpose of the analysis is to ascertain whether or not the fertilizer sold under a given name meets the standards of composition, implied content, etc., as required by the regulations. Variations are tolerated within certain limits and are generally indicated in the legal texts. Variations exceeding these limits constitute contraventions of the law and are therefore punishable.

The results of the analysis must be made known within reasonable time limits (8 days in Morocco, 10 days in Egypt) by means of a report or certificate issued by the service responsible for analysis and communicated to the owner or vendor of the fertilizer. If the analysis has been made at the request of the purchaser, a copy of the certificate goes to him also (United Kingdom). In Ecuador, the results of the analysis are published in bulletins, periodicals, scientific journals, etc., in order to ensure that the interested parties and the general public are adequately informed.

In certain countries (Egypt, Federal Republic of Germany, Morocco, United Kingdom), appeal by the person concerned against the result of the analysis and the possibility of a second or third analysis are provided for by the law. In Egypt, for instance, a second analysis may be ordered. This is conducted by a panel of three experts in chemistry, chosen from a list established each year by the Ministry of Agriculture on the advice of a fertilizers committee. The Minister and the person concerned each choose an expert, the third being selected by the drawing of lots. The panel

^{27/} For an example of the methods of fertilizer analysis, see Annex III to this study.

analyses the sample submitted by the appellant at the time of contesting the report of the first analysis, and which is one of the test samples left with him after the sampling. The panel must make known its findings within 30 days; the decision, taken by a majority vote, is final.

In the Federal Republic of Germany, if the first analysis shows undue deviation from the prescribed fertilizer standards, one of the remaining two test samples is examined by a second control office designated for this purpose. In case the results of the two analyses differ from each other and do not establish clearly whether the prescribed standards have been followed or not, the remaining third test sample is analysed by a control office designated by the enterprise from which the samples of fertilizers have been taken. The final result is given by the arithmetic mean of the two results that are closest to each other.

v) Penalties

Contraventions of the legislation on fertilizers incur, as a general rule, the punishment of the person responsible, in the form of a fine and/or imprisonment and of administrative proceedings regarding the product itself.

Each of the countries studied here has its own system regarding penalties. It is nonetheless possible to identify two broad categories according to the body responsible for the administration of the penalties, sub-divided into two further categories, according to how sanctions are meted out for the various offences. Special categories of sanctions also exist, viz. the so-called administrative sanctions, and penalties for offences indirectly relevant to fertilizers.

a) Authorities inflicting penalties

Under this aspect, the countries can be divided into two categories: those which establish that contraventions of the fertilizer legislation are tried and sanctioned by the relevant court, and those which leave these sanctions to be applied by government or administrative bodies. The great majority of the countries studied come under the first category and only two (Colombia and Ecuador) under the second.

Colombian legislation provides that violations of fertilizer legislation are punished by means of a decision of the Ministry of Agriculture stating the reasons therefor, on the basis of proofs obtained by the Instituto Colombiano Agropecuario (ICA). The Ministry may further delegate its powers in this respect to ICA wherever it considers it necessary or convenient.

According to Ecuadorian legislation, penalties in respect of fertilizers are decided by resolution of the Minister of Production or of an official of the Ministry of Production authorized by the Minister for the purpose. Persons affected by a ministerial resolution can appeal against it to the Comité Nacional Agropecuario, whose decision is final.

In all the other countries a court decides in cases of contravention of the legislation on fertilizers.

b) Number and amount of penalties

In applying this criterion, countries can be divided into two further categories: those which institute different penalties for the different offences regarding fertilizer legislation and those which provide for the punishment of any of these offences by the same penalty. Egypt, India, Japan, Kenya, Morocco and Yugoslavia, for instance, follow the first system, while Belgium, Colombia, Ecuador, France, the Federal Republic of Germany, Sri Lanka, Switzerland prefer the second.

Thus, to take only a few examples, in Egypt offences under the rules on the labelling and packaging of fertilizers incur the provisional seizure of the produce and the taking of samples for analysis. If the analysis establishes that an offence has been committed, the person responsible is punished with imprisonment for 3 to 6 months and a fine ranging from 50 to 200 Egyptian pounds. Fertilizers involved in such an offence are confiscated. Violations of other provisions of the relevant legislation render the offender liable to a term of imprisonment not exceeding one month or a fine of 10 pounds or both. If, however, heavier penalties are provided for in the Criminal Code or any other enactment, these penalties also apply in contraventions regarding fertilizers.

In Kenya, there are three kinds of punishment in the case of a first offence:

a) either a fine not exceeding 1,000 shillings or an imprisonment not exceeding one month, or both; b) either a fine not exceeding 2,000 shillings, or an imprisonment not exceeding two months, or both; c) either a fine not exceeding 3,000 shillings or an imprisonment not exceeding three months, or both. In the case of a second or subsequent offence under the Act, the maximum penalties are in any case those referred to under c). Punishments referred to under a) are inflicted with respect to offences relating to the importation, manufacture, and/or sale (as the case may be) of fertilizers or of substances derived from an animal carcass, or to the use of certificate of analysis for the purpose of an advertisement. Punishments referred to under b) are inflicted with respect to offences that are committed against an inspector in the exercise of his powers, or that relate to the maintenance of records. Finally, punishments referred to under c) are inflicted with respect to offences affecting the packaging and labelling of approved fertilizers or the declaration and warranty given by the vendor to the purchaser.

In Sri Lanka, the law enumerates in detail the various possible offences and lays down that a person guilty of any of them is liable, on summary conviction, in the case of a first offence, to a fine not exceeding 250 rupies and, in the case of a second or subsequent offence, to a fine not exceeding 500 rupies. In New Zealand, the law contains an extensive list of acts considered as offences followed by a general provision stating that it is an offence to act without lawful excuse in contravention of any of the provisions or regulations of the Fertilizers Act. Any person who commits an offence against the Act, for which no penalty is otherwise provided, is liable on summary conviction to a fine not exceeding 100 pounds.

In Ecuador, violation of the legal provisions concerning fertilizers is punished by fines, varying between one thousand and ten thousand sucres according to the gravity of the violation. Any subsequent offence may be punished by striking from the register the fertilizer in relation to which the offence has been committed.

In the Federal Republic of Germany any person who deliberately or negligently offers, exposes for sale, sells or otherwise puts into circulation other than approved types of fertilizers, omits to furnish to the purchaser the prescribed invoices, or does not comply with the provisions governing inspection and sampling or with any legal order issued by the Federal Minister of Agriculture, if this legal order provides for a penalty, is guilty of an offence and punished with a fine of up to ten thousand German marks. The fertilizers in question are confiscated.

c) Administrative sanctions

These are applied in several cases either to supplement penalties, or irrespective of these. Such sanctions usually take the form of the withdrawal of a licence, suspension of the operations, cancellation of the product from the registry, seizure or confiscation of fertilizers and even the destruction of products where these are known to be spoiled or toxic.

Thus, in Belgium, the final ruling of the Court inflicting a penalty for any offence may entail the withdrawal of the licence, for a time or permanently, by the Minister of Agriculture. The same sanction may be applied after two warnings to businesses resorting to fraudulent procedures designed to mislead control officers. In Ecuador, offences subsequent to penalties imposed for violation of the fertilizer legislation may be punished by deleting from the register the fertilizer in relation to which the offence has been committed.

In Colombia, according to the gravity of the violation, the ICA may order the suspension of the operations of the enterprise concerned for up to six months, and may strike off the product or the name of the importer from the register. The product which has been involved in a penalty may be confiscated without compensation by the ICA officer dealing with the case.

In Switzerland, an Agricultural Testing Station may at any time, but subject to specified conditions ^{28/}, limit the duration of the validity of a licence or make the continuation of its validity conditional upon compliance with certain requirements, or even withdraw the licence altogether.

In Belgium, Egypt, the Federal Republic of Germany and India, fertilizers in respect of which the law has been contravened may be seized and confiscated. In Morocco, enforcement officers may order the destruction of fertilizers known to be spoiled or toxic. The destruction must then be recorded, with all relevant supporting evidence, in a report prepared by the officer.

d) Penalties for acts indirectly relevant to fertilizers

These are also instituted in certain cases. In the United Kingdom, for instance, it is specifically prohibited to disclose information which has been obtained by virtue of Part IV of the Agricultural Act 1970 under certain circumstances, except if the disclosure was made in and for the purpose of the performance of functions thereunder. In the Federal Republic of Germany, the legislation provides for sanctions against any person who discloses, without being authorized, secrets relevant to the manufacture of or trade in fertilizers which came to his knowledge in the exercise of this function as an administrative official or expert appointed under the law. The punishment is more severe if the person has so acted for gain for himself or a third person or in any attempt to harm a third person. The penalty provided for in the last case is imprisonment for a period of up to two years.

From what precedes it will be clear that the main offences contemplated by the various national fertilizer laws and made the object of sanctions are those related to: a) the quality of the fertilizer manufactured, imported or sold (compliance of such fertilizers with the prescribed standards of the labels and the statutory statements which accompany them) and b) the enforcement of the provisions of the law (obstruction of inspectors and sample takers, misleading or false information regarding fertilizers, withholding of relevant documents, etc.).

5. Institutional aspects

The administration of the legislation on fertilizers is, as a rule, entrusted to the Ministry responsible for agriculture in the respective country. (Ministry of Production in Ecuador, Agriculture Division of the Federal Department of Public Economic Affairs in Switzerland).

^{28/} See country study on Switzerland.

In countries with a federal structure, even when the fertilizer legislation applies to the whole of the federal territory, the individual states (Länder in the Federal Republic of Germany, States in India, Republics in Yugoslavia, etc.) are made responsible for the administrative matters resulting from these provisions. The services of the appropriate Ministry are then authorized to appoint the enforcement and control officers such as inspectors, samplers and, less frequently, analysts, to register fertilizers and manufacturers, importers of or dealers in fertilizers and to issue the prescribed licences.

In certain cases, however, some or all of these functions are already delegated, as it were, by the law to specialized bodies or local authorities acting under the supervision of the responsible Ministry.

i) Specialized bodies

The following examples may be quoted:

In Colombia, the Instituto Colombiano Agropecuario (ICA), a government agency, is vested with extremely wide powers for enforcing all legal provisions affecting the agricultural sector, including fertilizers. ICA's powers cover not only enforcement of the legislation but also the issuance of Regulations under the basic law or orders. Fertilizer control, therefore, is a responsibility of the authorized staff of the Institute.

In the Federal Republic of Germany, persons taking samples of fertilizers are appointed by the Chamber of Agriculture of the Administrative Authority of the respective Land. Persons sworn in at the Chamber of Industry and Commerce may also be appointed as official sample takers.

In Switzerland, responsibility for fertilizer control lies with the Federal Agricultural Testing Stations, which report directly to the Agriculture Division of the Federal Department of Public Economic Affairs. The Stations have specialized control officers (inspector, samplers and analysts) vested with enforcement responsibilities.

ii) Local authorities

Here again, it will suffice to quote some examples:

In Japan, inspection of fertilizers can be carried out either by national fertilizer inspectors or by prefectural fertilizer inspectors. The former are attached to one or other of the Fertilizer and Feed Inspection Stations of the Ministry of Agriculture and Forestry and the latter to stations under the control of prefectural governments.

In the United Kingdom, control officers, including agricultural analysts, are appointed by county or borough councils or other enforcement authorities.

In Yugoslavia, the communal administrative authorities for agricultural inspection are responsible for the enforcement of the fertilizer law.

In all cases, however, the functions of the control personnel, whatever the government department to which they belong, are substantially the same as explained above. When no special mention is made in the law, the analysis of fertilizers is performed by the state chemistry laboratories.

PART II - COUNTRY STUDIES

In the following pages are studied and presented in a systematic way representative cases of current national fertilizer legislation. Every effort has been made to maintain a geographical balance, while showing how countries with different legal and socio-economic systems and at different stages of the development process have handled the fertilizer legislation problem. That among the fourteen selected countries, those of Europe should seem to predominate is only natural for it is in that continent that are to be found the widest variety of legal and socio-economic systems. The European countries were also the first to enact fertilizer legislation, and they have made a continuous effort to update it and complete it.

The pattern adopted in preparing these country studies is the same throughout, with a few exceptions as to the arrangement of sections. The main legislative and regulatory texts enacted by the competent national bodies governing fertilizers are given at the beginning of each study. Fertilizer materials covered by the legislation and definitions of fertilizers, whenever contained, in the legal texts constitute a separate section introducing the following one in which rules concerning licence and registration of fertilizers or manufacturers of and dealers in fertilizers are discussed. Standards of composition or other provisions regarding content and composition of fertilizers are then examined under a separate heading. Provisions regarding packaging, labelling and statutory statements are of particular importance, and are accordingly discussed in detail whenever possible. In many developing countries imported fertilizers represent a far greater volume than the national production where it exists at all. In few countries, however, are there to be found specific provisions instituting import control measures. Where they do exist, these are presented before the section on enforcement.

Provisions regulating the enforcement of fertilizer legislation constitute, as a rule, the main part of both the fertilizer laws as such and their Regulations. The appointment and powers of control officers, methods, procedure and administrative formalities regarding inspection of premises where fertilizers are manufactured, stored or offered for sale, sampling of fertilizers and analysis of samples are prescribed in detail by practically every national legislation. They are presented here in detail under the relevant heading. In a subsection are described the provisions putting at the disposal of the purchaser of fertilizer any specific means of protection wherever provisions of the kind are found in the legal texts.

A final section discusses the penalties provided by the law for contraventions of the provisions of the fertilizer legislation.

In order to make the study as simple as possible without neglecting important issues, purely technical points have normally been omitted. Thus, provisions governing import duties, price control, methods of analysis, etc., are not included in the following pages. Examples of the methods of analysis adopted by the American Association of Official Agricultural Chemists (A.O.A.C.) are given as Annex IV of the study.

1. BELGIUM

Source of Regulations

Act Relative to Pesticides and Requisites for Agriculture, Horticulture, Silviculture and Stockbreeding. - 11 July 1969 Moniteur belge No. 137, 17 July 1969, p. 7071 (Published in full in FAO's "Food and Agricultural Legislation" Vol. XIX, No. 1, fasc. 4);

Crown Order Relative to Trade in Fertilizers and Soil Amendments - 12 September 1970. M.B. No. 11, 16 January 1971, p. 577;

Ministerial Order Relative to Trade in Fertilizers and Soil Amendments - 14 September 1970. M.B. No. 11, 16 January 1971, p. 598.

Fertilizer materials

Those products whose marketing is permitted by law are listed in a table annexed to the Crown Order of 12 September 1970 1/.

The Minister of Agriculture may waive the provisions of Art. 4 of the Order and, subject to such conditions as he may determine, permit the marketing of products not so listed. In exceptional cases, the Minister may also permit the marketing of products which, while listed in the above mentioned table, do not, due to accidental causes, conform to the prescriptions of the Order 2/.

Rules concerning licence, registration, etc.

Any person importing, manufacturing or otherwise preparing for marketing compound fertilizers or mixed organic amendments must first obtain a licence issued by the Minister of Agriculture 3/. Applications for a licence are to be addressed to the Minister accompanied by specimens of labels and seals it is proposed to use. Applications are granted only if the fertilizers are manufactured or prepared with appropriate mechanical apparatus consisting at least of a mixer and grinder offering perfect homogeneity of the product mix. Similarly, manufacture and storage must be done in premises conducive to good conservation of the product 4/.

Standards of composition

Fertilizer materials covered by law are required to be "of sound, merchantable quality". They may not have been subjected to treatment modifying their nature or quality to such an extent that their composition ceases to confirm that of the normal product. In addition, they must be homogeneous and free from poisonous or noxious substances, harmful insects or other contaminants. They may not contain sand or earth in excess of the level normally associated with the raw materials used 5/. The imported guaranteed content in active principles for the respective fertilizers are indicated in column d) of the table annexed to the Crown Order. Composition standards are given in column c) 6/.

Labelling (statutory statements, etc.) and packaging

The Act of 11 July 1969 empowers the Crown to determinate marks, seals, stamps, union labels, labelling, certificates, attestations, notices, signs, packaging, descriptions and other indications or documents establishing that the provisions of the law have been complied with 7/. These various provisions are set out in the Order of 12 September 1970.

Generally, it is prohibited to offer guarantees, to use qualifying phrases or make claims as to product qualities on packages, labels, waybills, and commercial and advertising documents, unless such guarantees, phrases or claims are prescribed or permitted by law or unless authorization therefore has been obtained from the Minister of Agriculture, subject to such conditions as he may prescribe. It is also prohibited to make use, on such packages etc., of any statement or sign likely to mislead the purchaser as to the nature, origin, purity or use of the fertilizer materials concerned 8/.

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- 1/ See Annex II B.
 - 2/ Crown Order Art. 5.
 - 3/ Ministerial Order Art. 6.
 - 4/ Ibid, Art. 13.
 - 5/ Crown Order Art. 8.
 - 6/ See also Annex II.
 - 7/ Act Art. 2, para. 1 and 3.
 - 8/ Crown Order Art. 20.

i) Packaged fertilizers

The following information must be given on the package or on a label affixed thereto in the case of packaged fertilizers:

- a) the description "fertilizer", except in the case of "magnesium sulphate", "Kieserite" or "calcium sulphate", (unless the word fertilizer appears in the product description if the product is listed in Chapter I of the table or, the description "lime fertilizer" or "soil amendment", as the case may be, and as provided for in the table annexed thereto);
- b) one or more of the names appearing in column a) of the table, together with the prescribed or permitted qualifying phrases;
- c) guaranteed contents in active principles, as prescribed in column d) of the table;
- d) the name and address of the manufacturer, formulator or vendor and, also, where imported products are concerned, the name and address of the importer 9/

The same provisions apply to cases where fertilizers are transported or delivered by container-trucks or tankers which have been officially sealed 10/. They do not apply, however, to other than compound fertilizers in cases where these are purchased by the farmer for the needs of his farm and have been packed in his presence or that of his representative and immediately removed from the place where those operations were performed. If, however, the sale concerns an amount exceeding 50 kg, the vendor is required to furnish the purchaser, along with the product, a document bearing the above listed items of information 11/.

ii) Bulk fertilizer

Where fertilizers are transported for the purpose of sale in bulk, they must be accompanied by a document showing in a readily legible manner the information mentioned under i). In the case of liquid fertilizers delivered in amounts exceeding 100 litres, the document must also indicate the number of kilograms of each active principle guaranteed per 100 litres of fertilizer 12/.

In the case of fertilizers in bulk and located at a factory, packing plant or storage premises, each batch must be indicated in such a way as to preclude any confusion by means of a notice giving in a legible manner the following information:

- a) one or more names appearing in column a) of the table, together with any prescribed or permitted qualificatives;
- b) guaranteed contents of major constituents as prescribed in column d) of the same table.

The same provision applies in the case of packed fertilizers where the packaging has not yet been supplied with a label or has been opened for the sale of smaller quantities, as well as in the case of liquid fertilizers held in tanks from which they are subsequently to be pumped. In the last mentioned case, the notice must indicate, in addition to the name, the number of kilograms of each active principle guaranteed for 100 litres of fertilizer. A conversion table, to be affixed in the vicinity of each pump, must indicate for the respective fertilizers the number of kilograms corresponding to each of the active principles per 100 litres of fertilizer 13/.

9/ Crown Order Art. 9.
10/ Ibid.
11/ Ibid. Art. 10, para. 3.
12/ Ibid. Art. 10, para 1 and 4.
13/ Ibid. Art. 11.

iii) Other provisions

The information required as described above must also be entered on invoices and price lists 14/, on labels or packages or other documents in an easily visible manner, without abbreviations and in indelible and legible writing, in French or Flemish, or both languages. The same information is mandatory even if the product has been prepared in accordance with the purchasers' instructions or specifications 15/.

With all packaged products, a seal must be affixed in such a way as to ensure closure and retain the label. The seal must bear the name or mark of the person whose name appears on the label or the package 16/.

In addition to the guarantees prescribed in column d) of the table, others may be required in respect of e.g., the maximum moisture content or chlorine content for all fertilizers listed on the table, together with their minimum contents in specified substances 17/. The specific description "compound fertilizers" must be followed by a statement of the contents in the respective active principle; expressed in whole numbers. The statement must be of the form: $x + y + z$, where x represents nitrogen, y phosphoric acid (anhydrous) and z potassium oxide.

Where a given element is lacking or the content fails to reach the prescribed minimum, the figure 0 must be inserted in the place assigned to the element in question 18/.

The description "organic compound fertilizer" may be employed where the guaranteed content in organic matter is at least 25 percent. In such case the guaranteed amount must be indicated together with the nature of the substances providing in the main such organic matter and in decreasing order of the quantities present 19/.

Import control

None of the enactments contains special provisions governing importation of fertilizer materials, though this does not mean that the law has no express concern in this field, since importation is comprised in the concept of marketing 20/ while importers of fertilizers are included among those persons who may legally carry on their trade only if licenced by the Minister of Agriculture 21/.

Enforcement

i) Control officers

Neither the Act nor the orders for its application call for the appointment of special staff responsible for enforcing the provisions of the enactments discussed here. Accordingly, reference must be made to the general law 22/. The Act cited vests enforcement in the police (including the gendarmerie and the police of the communes) and, in appropriate cases in the civil authorities having powers in the specific fields regulated by the Act and the orders issued thereunder.

14/ Crown Order, Art. 11

15/ Ibid. Art. 13.

16/ Ibid. Art. 14 and 15.

17/ As indicated in Crown Order Art. 16, 17 and 19.

18/ Ibid, Art. 21.

19/ Ibid.

20/ Ibid. Art. 1(f).

21/ Ibid. Art. 6.

22/ Act, Art. 6.

The powers of the enforcement officers in question and other authorities cover inspection of premises where fertilizers are produced, prepared or stored and of transport vehicles. The exercise of such powers find expression in the taking of samples for analysis.

The Ministerial Order of 14 September 1970 lays down in this connection that the officers of the Raw Materials Inspection Service of the Ministry of Agriculture are especially charged with taking samples of fertilizers, soil amendments and any other products covered by the Crown Order of 12 September 1970 23/.

ii) Inspection, samples, analysis

The authorities and agents referred to above enjoy freedom of access, in the exercise of their powers, to factories, warehouses, depots, offices, watergoing crafts, firms' buildings, vehicles and plant located in open spaces. They may carry out inspections of premises not open to the public before five a.m. or after nine p.m. only if in possession of a warrant issued by a magistrate or police court. A similar warrant is required before they may inspect premises given over to dwelling purposes.

Agents may, in addition, require all information and all documents necessary in the exercise of their duties, and report all pertinent facts. For the purpose they may call in the services of experts whose names appear on a panel kept by the Minister of Agriculture 24/.

Generally speaking, samples are to be taken from lots of 50 tons at the most for packaged products. If, however, it is not convenient to divide the total quantity into lots of 50 tons or less, the samples may be taken from larger lots. In the latter case, care must be taken to ensure that the actual samples at the final stage are sufficiently representative of the total amount of fertilizer in question. Furthermore, if a batch shows spoilage or is damp or differs appreciably from the normal product in quality, then the sample must be taken from the spoiled part, etc., and from that part of the lot which is in normal condition; and the approximate proportions of each must be indicated in the report together with any other information deemed necessary 25/.

There are detailed provisions for the sampling procedure in order to ensure that the samples are as representative as possible of the total amount of the product concerned. Distinction is made, in this connection, between bulk and packaged products, and liquid and solid fertilizers 26/.

The preparation of the final sample is likewise regulated in detail, with a view to obtaining four homogeneous samples of approximately 250 g each. The samples are placed in appropriate receptacles, which must be dry, clean and airtight. A docket forms part of the sealing of the receptacle in such a way that neither can be opened without the seal being broken. The docket in question must bear the name of the person taking the sample, the name of the service for which he works, the sample number and the date and place where it was taken, together with the name under which the fertilizer is marketed and a specification of the research work or analysis required. The control officer signs the docket 27/.

- 23/ Ministerial Order Art. 1.
- 24/ Act, Art. 6.
- 25/ Ministerial Order, Art. 4.
- 26/ Ibid. Art. 5 to 8.
- 27/ Ibid. Art. 9.

The four samples so obtained are redistributed as follows: one to the person holding the fertilizer, to be kept available to the person responsible for the conformity of the product with guarantees and the regulations; one (to be dispatched as quickly as possible) to the laboratory for analysis; and two to the central office of the Raw Materials Inspection Service. Where necessary, one of these will be forwarded by this office to the Public Prosecutor's Office and the other held in reserve. If any samples are taken elsewhere than at the premises of the person deemed to be responsible for the conformity of the fertilizer with the requisite guarantees and with the regulations, the person concerned is to be notified without delay by the sampler and a sample left at the place where it was taken for six months from the date that it was so taken 28/. The person holding the fertilizer must be invited to be present but his actual presence is not required for the validity of the sampling procedure 29/.

iii) Analysis

Sample analysis is carried out in accordance with conventional methods approved by the Minister of Agriculture. Where such methods do not exist or cannot be applied the analysis follows a traditional method in use in analytical laboratories or government stations 30/. The laboratory indicates on the analysis docket the state in which the sample was received and gives information serving to identify the sample. If there is any material surplus to analysis requirements that can suitably be preserved, this is kept at the laboratory for twelve months at the disposal of the Minister of Agriculture 31/.

iv) Rights of the purchaser

There are no specific provisions in the fertilizer laws as regards the rights of purchasers, though the matter is covered implicitly by the labelling rules and the principles governing the means of control and the authorities responsible therefrom.

Penal provisions

Offences under the fertilizer legislation are subject to prosecution and to the penalties provided for in the Act of 11 July 1969.

i) Penalties

Under the Act 32/, any person guilty of adulteration or misrepresentation, or who knowingly makes use of a false document or object, or makes use of a description that does not belong to him is punished with a term of imprisonment of from 15 days to three months or a fine of from 100 to 2,000 francs or both. The same penalties apply to any person who adulterates or causes to be adulterated a raw material or sells such a material knowing it to be adulterated, or who adulterates or causes to be adulterated any sample, or who imports, manufactures or in any way markets fertilizers without official approval or who resists the inspection, control, seizure or the taking of samples etc., by authorized officers or gives such officers incorrect information. In those cases where the Criminal Code or the Act on traffic in poisonous, soporific, narcotic, disinfectant and antiseptic substances, of 24 February 1921, provide for heavier penalties for similar offences, then their provisions apply 33/.

28/ Ministerial Order, Art. 10

29/ Ibid. Art. 2.

30/ Ibid. Art. 11.

31/ Ibid. Art. 12.

32/ Act, Art, 8.

33/ Ibid.

Minor offences other than those referred to above are punished with a fine of from one to 25 francs or imprisonment for one to seven days, or both. For repeated offences within two years of being sentenced for such an offence, the individual is liable to the penalties provided for in the Act 34/.

ii) Administrative sanctions, seizure, etc.

The final ruling of the court inflicting punishment for any of the offences described may entail the withdrawal, for a time or permanently, by the Minister of Agriculture of the licence issued in accordance with the legal provisions. The same sanction may be applied after two warnings, by Ministerial decision, with the reasons stated therefor, to individuals or corporations resorting to fraudulent procedures designed to mislead control officers and who, at least three times, within a period of six months, have presented for control fertilizers that it has been necessary to reject, or who, being required to perform any service for which fee has been laid down, refuse or fail to pay the fee in question without serious cause, or to supply the information necessary for establishing such fee 35/.

Any person who incurs any of the administrative sanctions provided for by law may, within 15 days of notification thereof, file an appeal. The appeal, however, does not entail a stay of execution, though the Minister may quash or reduce the penalty on the advice of the court hearing the appeal, with reasons stated therefor. Pending receipt of this advice, the Minister may suspend the penalty 36/.

Where an offence has been committed, the fertilizers may be seized by the control officers 37/. In the event of the offender being sentenced, the court may order the confiscation and destruction of the fertilizers so seized. It may likewise order the publication of the judgment in one or more newspapers and its posting for a stated period of time. Destruction, publication and posting are at the expense of the offender 38/.

Fertilizers presumed to be not in conformity with the provisions of the Order of 12 September 1971 may be seized by the control officers as an administrative measure for a period not to exceed 30 days. Seizure is lifted by order of the control officer or by the expiration of the period in question 39/.

2. COLOMBIA

Sources of regulations

Presidential Decree No. 2420 of 24 September 1968, in ICA's (Instituto Colombiano Agropecuario) Boletín Informativo No. 1, Enero - Febrero - Marzo 1970, p. 24.

Ministerial Decree No. 843 of 26 May 1969, in ICA's Boletín Informativo, No. 1, p. 52.

Resolution No. 786 of 19 September 1969, in ICA's Boletín Informativo No. 1, p. 73.

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- 34/ Act, Art. 9.
35/ Ibid. Art. 10.
36/ Ibid.
37/ Ibid. Art. 11.
38/ Ibid. Art. 12.
39/ Ibid. Art. 13 and Crown Order Art. 26.

Fertilizer materials

The Ministerial Decree makes a distinction between three kinds of fertilizer materials: fertilizers as such, soil amendments and soil conditioners. Fertilizers are considered to be all those products that are applied to the land or to plants in order to supply them with one or more nutrient element necessary for the growth and development of the plants. Soil amendments are those substances the fundamental action of which consists in modifying the physico-chemical conditions of the soil and especially its pH. Soil conditioners, on the other hand, are those substances the main action of which consists in modifying the physical conditions and particularly the structure of the soil 1/.

Rules concerning licence, registration, etc.

All those - whether individuals or co-operate bodies - desirous of engaging in the production or importation of fertilizer materials must be registered with the Instituto Colombiano Agropecuario - ICA 2/. The registration is made at the request of the manufacturer or the importer, if he is a natural person, or of the legal representative in cases where the registration is requested by a corporate body.

The application must contain the name and the address of the applicant, and must be accompanied, further, in the case of a corporate body by the certificate of the constitution and certificate of the legal representation of the company 3/. If the manufacturer does not have his own laboratory for the quality control of his products, he must also attach a copy of the contract which he has to effect with a laboratory registered with ICA, and finally a certificate of the Ministry of Public Health, stating that the manufacturer's installations comply with the required standards in order to prevent any risks for the health of the personnel employed 4/.

In addition to registration, manufacturers and importers of fertilizer materials must comply with any other conditions which the ICA may impose regarding the installations and the technical personnel as well as those established by the authorities responsible for public health 5/.

Registration is also required for the fertilizer materials themselves before these may be brought into trade. The registration is made, again, with the Instituto Colombiano Agropecuario 6/. The application is addressed to the Institute and must be accompanied by the information and the documents which the latter considers necessary for each specific case 7/.

Generally, the application must contain the following:

- a) Name and address of the applicant;
- b) The label it is planned to use and prepared in accordance with ICONTEC (Instituto Colombiano de Normas Técnicas) Standard No. 40;
- c) The trade mark of the product;
- d) The guaranteed content of the product (ICONTEC Standard No. 34);
- e) The formula of the product (ICONTEC Standard No. 34);

1/ Ministerial Decree, Art. 2 c) e).

2/ Ibid. Art. 1 and Resolution, Art. 1.

3/ Ibid. Art. 3.

4/ Resolution Art. 2, e), f).

5/ Ministerial Decree, Art. 4, for details see: Resolution, Art. 3.

6/ Ibid. Art. 5.

7/ Ibid. Art. 6.

- f) A description of the packing, including the kind of the material used and its capacity;
- g) The method of the analysis (qualitative and quantitative) used for the internal quality control;
- h) A certificate of efficacy of the product issued by the relevant service of the ICA.

Furthermore:

- i) If the product is manufactured in the country, the application must carry the signature of the Technical Adviser of the producing company as guarantee that all technical aspects have been examined, revised and approved by him;
- j) The minimum guaranteed amount of total nitrogen, available phosphorous, expressed as P_2O_5 and potassium soluble in water, expressed as K_2O , must be 35 percent in compound chemical fertilizers and 15 percent in strengthened organic fertilizers;
- k) Natural organic fertilizers may only be registered under their precise name; and moreover their moisture content may not exceed 14 percent;
- l) In natural organic and strengthened organic fertilizers the use of inactive materials is prohibited;
- m) Where the product to be registered is not manufactured by the applicant, a certificate stating that it will be manufactured by a registered producer must be attached to the application 8/.

The Institute may grant or refuse the registration which, if accepted, has the effect of a licence for the product concerned 9/.

Registration as manufacturer or importer is valid indefinitely - unless it is cancelled 10/. The registration of fertilizer materials is valid for five years, renewable 11/.

Standards of composition

The composition of the fertilizer materials covered by the Decree must conform to the standards established by the Instituto Colombiano de Normas Técnicas (ICONTEC). Until such standards have been established, the composition of the fertilizers must comply with the definitions, methods of analysis permitted divergencies in guaranteed contents and residue tolerances developed by the Institute 12/.

Labelling, statutory statements, etc., and packaging

The labelling and packaging of fertilizers is regulated by the Colombian legislation in a rather limited way. Thus, it is stated that fertilizers may be sold only in their original packages, and the repacking of the product is prohibited without the previous authorization of the ICA 13/. Such authorization may be given by the Institute in special and exceptional cases and for a fixed period of time 14/.

Fertilizer packages which are in a bad condition and thus likely to impair the quality of the product may not be offered for sale. It is also prohibited to offer for sale packed fertilizers without labels or with illegible labels 15/.

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- 8/ Resolution, Art. 9.
 - 9/ Ministerial Decree, Art. 9
 - 10/ Ibid. Art. 10.
 - 11/ Ibid. Art. 11.
 - 12/ Ibid. Art. 26.
 - 13/ Resolution, Art. 17 b).
 - 14/ Ministerial Order, Art. 39
 - 15/ Resolution, Art. 17 c), d).

Import control

The importation of fertilizer materials is subject to prior approval of the ICA acting in the name of the Ministry of Agriculture 16/.

Imported fertilizer materials are for all other purposes governed by the general provisions given above.

Concerning registration of importers of fertilizer materials, the application must state, in particular - in addition to the name and the address of the applicant - the kind of product they propose to import. Where the importer is a corporate body, certificates of the constitution and of the legal representation of the company, issued by the Chamber of Commerce, must be attached. The importer must have his own warehouse; otherwise he must attach to the request a copy of the contract he has entered into with the management of such warehouses enabling him to make use of them 17/.

Enforcement

Official control of fertilizer quality is the responsibility of the personnel of ICA 18/

Authorized staff of the Institute may see that the law is enforced and inspect premises where fertilizers are stocked or sold 19/. The inspecting officer prepare at the end of each inspection a report in which he records - in addition to the name and address of the establishment inspected - a list of the fertilizers found in the premises indicating their number in the official registry, the state of the packages, the conditions of storage and any other observations he considers necessary 20/.

The controlling officer may take samples of fertilizers for analysis 21/. These samples are taken in the manner prescribed by the relevant ICONTEC standards 22/. Staff members of the Institute acting as control or enforcement officers in applying the provisions of the Decree are to have the full support and protection of the civil and military authorities; for this purpose they have the privileges and the prerogatives of police inspectors 23/.

No special provisions are found in the Decree referring to specific rights of the purchaser of fertilizer materials.

Penalties

Violations of the fertilizer legislation are punished by decision, with the reasons stated therefor, of the Ministry of Agriculture and on the basis of proof obtained by the Institute 24/. The Ministry can delegate its powers in that respect to the Institute, whenever it considers it necessary or convenient 25/.

16/ Ministerial Decree, Art. 35.

17/ Resolution, Art. 5.

18/ Ibid. Art. 18.

19/ Ibid. Art. 17, f), 19.

20/ Ibid. Art. 21.

21/ Ministerial Decree, Art. 37 and Resolution, Art. 20, 22.

22/ Resolution Art. 22.

23/ Ministerial Decree, Art. 32.

24/ Ibid. Art. 27 and Resolution Art. 23.

25/ Ibid. Art. 29.

The following penalties may be applied according to the gravity of the violation:

- a) Successive fines up to 5 000 pesos, which can be converted to corresponding terms of imprisonment;
- b) suspension of the operations (production, sale, importation, etc.) of the enterprise concerned for up to six months;
- c) cancellation of the product from the registry;
- d) cancellation of the product or of the importer from the registry.

In all cases the products which have been the object of a sanction may be confiscated without compensation by the officer of the Institute of the place where the offence was committed 26/.

3. ECUADOR

Sources of regulations

Order No. 859 of 4 December 1969 - Registro Oficial No. 357 of 27 January 1970, p.2671.

Order No. 681 of 21 July 1969 - R.O. No. 364 of 5 February 1970, p. 2705.

Agricultural and Forestry Development Law No. 962 of 30 June 1971 - R.O. No. 259 of 5 July 1971, p. 6.

Decree No. 1692 of 20 August 1969 - R.O. No. 262 of 10 September 1969, p. 1979.

Fertilizer materials

Ecuadorian legislation considers as fertilizers those substances or mixtures or substances which may be absorbed by the soil or the foliage of the plants and can stimulate their growth, raise plant production, improve the quality of the crops or the conditions of the soil. Order No. 859 applies only to fertilizers and soil amendments 1/.

These fertilizers are defined as those mineral or organic materials or mixtures of substances which, if applied to the soil, may enrich it in active chemical elements; they may be either inorganic or organic substances (mixed or unmixed but other than sand or soil), containing any of the three primary nutrient elements (nitrogen, phosphorus, potassium), or any of the secondary nutrients such as calcium or magnesium or any minor elements. All materials which can be directly applied to the plants with a view to improving production are included in this category. According to the number of the elements contained in them, fertilizers are further distinguished into simple and compound fertilizers 2/.

Soil amendments are those materials which improve primarily the physical conditions of the soil and secondarily its chemical conditions, such as limestone and sulphur or any other substance covered by this definition, the control of which is considered necessary by the government 3/.

26/ Ministerial Decree, Art. 28

1/ Order No. 859 Art. 1.

2/ Ibid. Art. 2.

3/ Order No. 859, Art. 3.

Rules concerning licence, registration, etc.

The manufacture, import and export of fertilizers and in general trade therein are strictly regulated. Thus, any person or corporate body dealing with fertilizers must be licensed by the Land Department, of the Ministry of Production (formerly the Ministry of Agriculture) and any fertilizer material must be registered with the same Department. Upon written application accompanied by a sample of the fertilizer material and the following data, registration is made in a special register which is kept by the Department:

- a) Name and commercial address of applicant;
- b) name of the fertilizer producing industry which the applicant represents;
- c) the trade mark of the fertilizers which he produces or sells;
- d) precise indication in percentages of the nutrient elements contained in the fertilizers;
- e) the form in which the primary elements (nitrogen, phosphorus and potassium) are found in the fertilizers;
- f) the presence of minor elements, if any, indicating their approximate percentages;
- g) in the case of natural phosphates (phosphate rock, Thomas slag), the degree of fineness.

Materials which in the opinion of the Ministry of Production meet with the necessary requirements are registered as fertilizers and may be sold as such 4/. In no case may compound fertilizers in which the amount of total nitrogen, phosphoric acid and potassium is less than twenty percent of the whole be registered under the Order 5/. All licences are valid until 31 December of the year in which they are issued, and therefore have to be renewed annually.

The Law finally requires that every establishment in which fertilizers are sold must have the services of chartered agricultural engineers 6/.

Labelling (statutory statements, etc.) and packaging

Fertilizer materials offered for sale must bear, in Spanish and in a clearly visible form on their containers, the provisional authorization under which the article is sold, the price of the article and its chemical formula and composition.

The chemical formula and composition of the article must be given on a label attached in a visible place on the cover of the container or the wrapper 7/.

At the time of sale the seller must insert on the sale invoice all marks and particulars of the fertilizer materials, in particular, the percentages of each of the fertilizing elements contained in it.

It is formally prohibited to use designations which may mislead the purchaser as to the origin, quality or value of the fertilizers 8/.

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- 4/ Order No. 859, Art. 4
 - 5/ Ibid. Art. 12.
 - 6/ Ibid. Art. 14.
 - 7/ Ibid. Art. 4 and Decree No. 1692 Art. 1.
 - 8/ Order No. 859, Art. 4.

Import control

Imports of fertilizers are governed by Article 4 of Order No. 859. Importers of fertilizer materials must be licenced for the purpose and the materials registered as above. Fertilizers are imported into the country at reduced import rates (80 percent of the normal rate) 9/.

Enforcement

i) Control officers

The enforcement of the Order is the responsibility of authorized inspectors and sample takers appointed by and reporting to the Land Department of the Ministry of Production. The Order does not qualify them as inspectors or sample takers 10/ but refers to them in the first case as persons "commissioned" by the Department 10/ and in the second case as "authorized agents" 11/. The overall responsibility for control and enforcement lies with the Land Department.

ii) Inspection, samples, analysis

In the performance of their duties, inspectors have free access to plants, warehouses or shops and enjoy the support and protection of the relevant authorities.

Manufacturers of fertilizers are required to give inspectors any information they need relating to the plant, the raw materials they use or the finished products. Importers and sellers of fertilizers are also required to supply the inspectors with any information regarding the articles they import or sell 12/.

The authorized agents of the Land Department of the Ministry of Production may take samples of fertilizers for analysis from plants, warehouses, shops, etc. 13/.

Samples are taken in the following way:

- a) Samples are to be taken from at least twenty containers in such a way as to include as many points as possible of the stocked fertilizers;
- b) in sampling a lot of less than twenty containers, a sample of at least one pound is to be taken from each and, after these samples have been mixed together and divided into parts and again mixed and divided, the procedure is repeated until four parts of approximately one pound each is obtained;
- c) in sampling lots of more than twenty containers, samples are taken from not less than twenty and not more than fifty containers, one each for every ton of fertilizer, and the rest of the procedure prescribed under b) is then followed.

Of the four samples thus obtained, one will be sent to the laboratory of the Land Department, one to the manufacturer or seller of the stock so sampled, one to a referee, and the last sample will be kept at the Land Department to be used in case of any appeals against the certificate of analysis 14/.

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- 9/ Agricultural and Forestry Development Law of 1971, Art. 22.
 - 10/ Order No. 859, Art. 9.
 - 11/ Ibid. Art. 5.
 - 12/ Ibid. Art. 10.
 - 13/ Ibid. Art. 5.
 - 14/ Ibid. Art. 6.

The analysis is carried out according to the methods and the definitions adopted by the American Association of Official Agricultural Chemists (A.O.A.C.).

As far as nitrogen, phosphorus and potassium are concerned, tolerated variations in the composition of fertilizers are given in Art. 7. These are limited to between 0.75 and 1.25 percent above or below the indicated percentage of these elements, depending on whether this percentage is less than 10 percent or more than 15 percent of the total quantity of the fertilizer.

The results of the analysis are published in bulletins, periodicals, scientific journals etc., in such a way as to ensure that interested parties and the general public are adequately informed 15/.

iii) Rights of the purchaser

The price of fertilizers, whether manufactured in the country or imported, are established annually in January by the Ministry of Production on the basis of cost, etc., or on the basis of the prices indicated on the import permits and those of the world market 16/.

Except as regards the above, no other specific provisions are found in the legislative texts governing fertilizer use regarding the rights of purchasers.

Penalties

Fines and administrative measures are provided for in respect of any violation of the provisions of the Order. Fines vary between one thousand and ten thousand sucres, according to the seriousness of the offence. Subsequent offences may be punished by the deletion from the register of the fertilizer, simple or compound, in relation to which the offence has been committed.

These sanctions are applied by resolution of the Minister of Production (formally Minister of Agriculture and Stock-breeding), or of an official of this Ministry authorized by him to that effect. All decisions regarding sanctions have to be communicated beforehand to the persons concerned, the latter are allowed eight days to present their defense.

Any person affected by a ministerial resolution can appeal to the Comité Nacional Agropecuario, whose decision is final 17/.

4. EGYPT

Sources of regulations

Act No. 4 Relative to Trade in Fertilizer Materials - 15 February 1956 - Journal Officiel No. 14 bis, 19 February 1956 - published (without schedules) in Répertoire permanent de la Législation égyptienne. Chap. Engrais, p. 37.

Regulations for the enforcement of the Act No. 41 of 15 February 1956 - 15 March 1956 J.O. No. 24 and RPLE, Chap. Engrais, p. 39.

15/ Order No. 859, Art. 5.

16/ Ibid. Art. 13.

17/ Ibid. Art. 15.

Fertilizer materials

Egyptian law distinguishes two classes of fertilizer materials: fertilizers as such and soil amendments. Fertilizers are divided into: 1. single (containing one chemical element); 2. compound (containing more than one element); and 3. organic and natural. Soil amendments are divided into 1. materials used to improve the soil; 2. materials contributing to increased yields by their addition to the soil or to seed, or in any other manner. The lists covering these classes of fertilizers and amendments are given in six tables appearing as schedules to the Act.

Rules concerning licence, registration, etc.

i) Licence

Trade (defined as importation, sale or offer for sale) in fertilizers requires a licence from the Minister of Agriculture. In the case of single, compound or organic fertilizers 1/, the application for such a licence must indicate the name, first name, age, occupation, domicile and nationality of the applicant. In the case of a firm or institution, the application must indicate the registered name and address and list the members of the board of directors and managers and the domicile and nationality of each, as well as specifying the address of the company's trading offices, storage premises, branches or warehouses located within a given customs area, together with the names, first names, address and nationality of the owner of the premises occupied by the offices.

Accompanying the application there must be a photocopy of the articles of association of the company together with its statutes and all documents vouching for the status of the members of the board or the managers, a photocopy of the deed of registration of the company in the Companies Register, a sketch of the premises given over to trading in or storage of the fertilizers, and an undertaking to comply with the instructions of the Ministry of Municipal and Rural Affairs concerning industrial and commercial establishments.

The complete file constituting the application is addressed to the Ministry of Agriculture, Chemistry Section. The latter informs the applicant of the grant or refusal of the licence within two months 2/.

A licence granted in this way is valid for five years, renewable. Applications for renewal must be filed two months before the date of expiry 3/. Any changes in the data appearing in the file must be notified to the Ministry within ten days of their occurrence, by registered letter, accompanied by the licence itself in order that the relevant alterations can be made, without which the licence may be cancelled 4/.

No publicity may be made for a fertilizer before the licence is granted 5/.

ii) Registration

All fertilizer materials listed in the six tables must, furthermore, be entered in a special register kept at the Ministry of Agriculture 6/. The application for registration must indicate the name and trade name of the fertilizer, trade mark, component elements and their percentages in the product, country of origin, the names of the exporter and importer, the country of exportation and of manufacture.

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- 1/ Act, Art. 3.
 - 2/ Regulations, Art. 1.
 - 3/ Ibid. Art. 3.
 - 4/ Ibid. Art. 2.
 - 5/ Act, Art. 4.
 - 6/ Ibid. Art. 7.

It must be accompanied by a sample of at least 1 kg weight. The Chemistry Section of the Ministry is required to give its decision as to registration within 60 days 7/. Registration requires approval by a fertilizer committee of the same Ministry having as chairman the Under-Secretary for Agriculture, and as members, four senior officials of the Ministry, together with three leading farmers and three producers or importers of fertilizers, who are appointed for one year, renewable 8/.

Fertilizers not mentioned in the first three, or sixth, tables (single, compound and organic fertilizers and materials conducive to improved yields, as referred to earlier) may not be imported into the country or placed on sale there without an authorization to that effect from the Ministry issued on the advice of the fertilizer committee 9/. Organic and natural fertilizers and materials used as soil amendments or improvers may be sold only under their correct name and in the unmixed state. The Minister may prohibit the sale of the former if the fertilizer committee decides that they are unsuitable 10/.

Standards of composition

The Egyptian legislation contains no provisions on this matter.

Labelling (statutory statements, etc.) and packaging

Single, compound and organic fertilizers must be sold in closed packs bearing information as to their content in active principles 11/. No such materials may be sold or offered for sale if the contents do not possess the properties stated on the package. Tolerances, however, are laid down in the case of elements deemed to be harmful to soils or plants 12/.

Sacks used for the sale of fertilizers must be strongly sewn in both directions at the opening or closed by means of an automatic machine and a lead seal applied. Any pack over 5 kg weight must bear, in Arabic, the official name of the product, the trade mark and an indication of the weight, in 10-cm figures, and of the component elements in 5-cm figures 13/.

Persons trading in fertilizers must obtain from the importer or producer an approved official invoice indicating the contents in active principles, and themselves provide their customers with an invoice stating those contents and any other statutory information 14/. Purchase invoices and sales invoices must be kept by tradesmen for five years 15/.

Import control

In addition to the general rules described above concerning the requirement of a licence for trading in fertilizer materials and the registration of the latter, Egyptian law has special rules governing imports of such materials. Accordingly, the importation of organic and natural fertilizers and materials conducive to improved yields, requires the presentation of an official certificate of the government of the exporting country certifying that the materials are free from diseases and worms harmful to man, animals or plants 16/.

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- 7/ Regulations, Art. 6.
 - 8/ Act, Art. 2.
 - 9/ Ibid. Art. 8.
 - 10/ Ibid. Art. 13.
 - 11/ Ibid. Art. 10.
 - 12/ Ibid. Art. 11.
 - 13/ Regulations, Art. 9 and 10.
 - 14/ Act, Art. 12.
 - 15/ Regulations, Art. 4 and 11.
 - 16/ Act, Art. 9.

Single, compound and organic fertilizers must be accompanied on importation by a statement by the exporter containing the following information: name and country of origin of the fertilizer, the nature of the fertilizer and any particular specifications, its composition, the amount of fertilizer in the batch, and the names of the exporter and importer. Such a statement may be made on an invoice approved by the forwarding agent. A special authorization of the Ministry of Agriculture, Chemistry Section, is necessary for the batch to be cleared by the customs. The customs must in any case inform the Section by telegram within 24 hours of the arrival of any batch not covered by the requisite statement. In such cases a sample is taken within 24 hours for analysis, and the fertilizer is made over to the importer only after the results of the analysis, which must be carried out within ten days of the sample being taken, have been communicated to the customs 17/.

Fertilizers not listed in the first three, or the sixth, tables (see above - Rules concerning licence, registration, etc.) but which are subject to a special import authorization procedure may be imported only in limited quantities (not exceeding two tons). A licence must be obtained from the Minister through the same procedures (as above) but within 15 days 18/.

Enforcement

i) Control officers

Experts of the Ministry of Agriculture, especially appointed for the purpose, are responsible for enforcing the Act on fertilizers and the regulations issued for its implementation. As such they have the status of agents of the judicial police 19/. The persons chiefly concerned are the staff of the Chemistry Section, the inspectors of the Ministry and their deputies, and agricultural experts of the same Ministry 20/.

ii) Inspection, samples, analyses

The control officers referred to above are empowered to enter for inspection purposes any premises where fertilizers are held or offered for sale (but not to parts of such premises actually occupied as dwelling accommodation) and to take samples of fertilizers so held there 21/.

Sample taking must be carried out in the presence of the person concerned or of his representative, and formally reported. Where sampling is done subsequently to seizure as a result of an offence under the Act (see below - Penalties) the report must also contain a statement of the number of sacks, etc., so seized 22/. The number of samples to be taken is laid down by Reg. 4 of the Regulations, as a percentage of the number of sacks to fertilizer. The number may in no event be less than two or more than forty.

Unlike enactments of certain other countries in this field, the Egyptian regulations contain no provisions governing procedure as to the dividing and mixing of the samples in order to obtain a correct final sample. The final samples are placed in four jars which are to be sealed with sealing wax and sent, one within 24 hours to the Chemistry Section for analysis, and one to the Ministry of Agriculture as a reference sample, while two are left with the person concerned 23/.

17/ Act, Art. 6 and Regulations, Art. 5.

18/ Ibid. Art. 8ss 2 and Regulations, Art. 8.

19/ Ibid. Art. 16.

20/ Regulations, Art. 12.

21/ Act, Art. 16.

22/ Regulations, Art. 13.

23/ Ibid. Art. 15.

The Chemistry Section analyses the sample and within ten days communicates the findings, in writing, to the person concerned. The latter may contest the analyst's report and demand a second opinion 24/.

The second opinion is obtained by means of an analysis conducted by a panel of three experts in chemistry chosen from a list established each year by the Ministry of Agriculture on the advice of the fertilizer committee. The Ministry and the person concerned each choose an expert, while the third is chosen by the drawing of lots. The panel analyses the sample submitted by the person concerned at the time of contesting the first analyst's report (the sample in question being one of the two left with him at the time of the original sampling operation) and makes known its findings within 30 days. The decision is taken on a majority basis and is final 25/.

iii) Rights of the purchaser

Egyptian law on fertilizers contains no special provisions as regards the rights of the purchaser.

Penalties

Offences under the Act where procedural arrangements for the importation of, or trade in, fertilizers are concerned incur liability to administrative proceedings and penalties. Thus, if any person engages in the sale of single, compound or organic fertilizers without the authorization of the Ministry of Agriculture, or sells fertilizer materials which there is reason to suppose have not been registered, is punished with the closure of his sales premises and the provisional seizure of the merchandise 26/. Once it has been established that these offences have in fact been committed, the person concerned is liable to a term of imprisonment of from one to three months or a fine of from five to fifty Egyptian pounds, or both such imprisonment and fine 27/.

Offences under the Act relative to rules concerning labelling and packaging of fertilizer materials incur the provisional seizure of the materials and the taking of samples for analysis. The seizure is lifted if the analysis established that no offence has been committed or if the findings of the analysis are not notified to the person concerned within the ten-day period prescribed by the Act 28/. Offences duly established are punished with a term of imprisonment of from 3 to 6 months and a fine of from 50 to 200 Egyptian pounds. Fertilizers involved in such offences are seized and confiscated. The judge may also order the closure of the establishment where the offence was committed for a period not exceeding three months.

Violations of other provisions of the Act render the offender liable to a term of imprisonment not exceeding one month or a fine of 10 pounds, or both. If heavier penalties are provided for in the Criminal Code or any other enactment, these apply 29/.

24/ Regulations, Art. 16 and Act, Art. 18.

25/ Act, Art. 19.

26/ Ibid. Art. 16 and 17.

27/ Ibid. Art. 15.

28/ Ibid. Art. 17 and 20.

29/ Ibid. Art. 16.

5. FEDERAL REPUBLIC OF GERMANY

Sources of regulations

Act on Trade in Fertilizers (Fertilizer Act), of 14 August 1962 - Bundesgesetzblatt I No. 35 of 24 August 1962, p. 558; Amended by the Introductory Act to the Act on Irregularities, of 24 May 1968, Bundesgesetzblatt I No. 33 of 30 May 1968, p. 481.

Order concerning the Admissibility of Fertilizer Types (Fertilizer Order) of 21 November 1963. Bundesgesetzblatt I No. 63 of 26 November 1963, p. 805; consolidated text, up to 31 March 1971, in Das Deutsche Agrarrecht, Vol. 1, III/8, p. 35.

Six Order amending the Fertilizer Order, of 3 June 1969. Bundesgesetzblatt I No. 45 of 11 June 1969, p. 483.

Seventh Order amending the Fertilizer Order, of 33 April 1970. Bundesgesetzblatt I No. 37 of 28 April 1970, p. 417.

Eight Order amending the Fertilizer Order, of 25 March 1971. Bundesgesetzblatt I No. 27 of 31 March 1971, p. 271.

Ninth Order amending the Fertilizer Order, of 28 February 1972. Bundesgesetzblatt I No. 16 of 3 March 1972, p. 255.

Tenth Order amending the Fertilizer Order, of 12 February 1973. Bundesgesetzblatt I No. 12 of 15 February 1973, p. 103.

Fertilizer materials

Under German legislation those substances are considered to be fertilizers which are intended directly or indirectly to promote the growth, increase the yield or improve the quality of useful plants, together with preparations for soil inoculation and soil conditioners. Water, pesticides with fertilizing side-effects, stable manure, liquid manure, compost and other farmyard manure, peat, sludge and settlement wastes, such as garbage, sewage, nightsoil, unmixed or mixed with each other or with water, and preparation aids for organic fertilizers are not considered as fertilizers within the meaning of the Act ^{1/}.

Fertilizer materials are classified in eight groups in the following order:

I - Single Nutrient Fertilizers

- A - Nitrogenous fertilizers
- B - Phosphate fertilizers
- C - Potassium fertilizers
- D - Calcium and Magnesium fertilizers

II - Multi-nutrient Fertilizers

- A - NPK Fertilizers
- B - NP Fertilizer
- C - NK Fertilizer
- D - PK Fertilizer

III - Organic Fertilizers

IV - Organic-inorganic Fertilizers

^{1/} Fertilizer Act, Para. 1.

V - Fertilizers with trace elements

- A - Addition of trace elements to fertilizer types specified under Nos. I-IV.
- B - Addition of trace elements to other fertilizers
- C - Fertilizers which, as value determining ingredients, contain only trace elements.

VI - Preparations for Soil Inoculation

VII - Soil conditioners

VIII - Plant growth regulators 2/

Under each one of these headings a detailed list of particular fertilizers appears in the schedule of the Order in a table which, in addition to the type of fertilizer and its consecutive number, also gives in separate columns: the essential components, the minimum or the fixed content, the composition in terms of principal nutrients, the manufacturing process of the fertilizer as well as special provisions, if any. The eight groups in this way comprise nearly 230 types of fertilizers.

Rules concerning licence, registration, etc.

Fertilizers may be offered or held for sale, sold or otherwise put on the market only if they correspond to an approved fertilizer type contained in the schedule of the 1963 Fertilizer order. This does not apply to fertilizers prepared for export, to flower and lawn fertilizers, labelled as such 3/.

The Federal Minister of Food, Agriculture and Forestry may authorize by order and with the consent of the Bundesrat the marketing of types of fertilizers which promote the growth, increase the yield or improve the quality of useful plants, and which when correctly used do not impair soil fertility or the health of human beings or domestic animals. The Federal Minister must exclude certain fertilizers which owing to their secondary components might endanger the health of human beings or domestic animals; he may also determine maximum amounts for the content of certain secondary components 4/. This matter has been dealt with by the Fertilizer Order of 1963. The fertilizers listed in the Schedule to this Order are the only approved types that may be put on the market under the terms of the Act 5/.

Standards of composition

The main composition of the various types of fertilizers is given in the respective column of the Schedule to the Fertilizer Order.

Labelling (statutory statements, etc.) and packaging

Fertilizers are put on the market in packages or containers of a specific kind for the various types and marked in a special manner 6/.

The kind of containers and the labelling are prescribed for a wide range of fertilizer types in the column entitled "special regulations" of the Schedule to the Fertilizer Order.

2/ Fertilizer Order of 1963. Schedule, Classification (see extracts in Annex II-A to this study). It should be noted that in future, for administrative reasons, group VIII will be classified under legislation for plant protection.

3/ Fertilizer Act, Para. 2.

4/ Ibid. Para. 3.

5/ 1963 Order Para. 1 (2)

6/ Cf. Act Para. 3 (3)

The Federal Republic alone has adopted a virtually case-by-case regulation of the packaging and labelling of fertilizers. The main reasons for this are the protection of persons dealing with fertilizers containing substances which may be prejudicial to their health or to protect the fertilizers themselves from spoilage (hygroscopic materials) or loss. The following examples illustrate the way in which packaging and labelling are dealt with in the regulations.

- a) Ammonium Nitrate: The fertilizer must be offered commercially only in closed containers which protect it against humidity.
- b) Organic Nitrogen fertilizer (dried blood, horn meal): This type of fertilizer may be labelled dried blood if it is made from blood only. It may be labelled horn meal if the fertilizer is made from animal horn but dried blood may be added.
- c) Boron fertilizer: The fertilizer must be put on the market in closed containers. Attention must be drawn by an indication, printed on the outside or a label enclosed in the package, to the times of application (frequency, stage of growth) and to the quantity to be applied per unit area. Every container must also be marked with the note: "Caution: Excessive dosage is dangerous".

The seller of a fertilizer must inform the purchaser in writing of the name or the trade name and the address of the fertilizer producer or the distributing agency and of the fertilizer type together with the essential components. This information must be given at the latest when the goods are made over to the purchaser. When, on the other hand, the account is rendered the seller must inform the purchaser of the actual content of the essential components if the materials in question are an inorganic fertilizer ^{7/}. The seller must also supply on delivering a fertilizer all additional information regarding the correct application of the product according to the types and the quantity of the plants for which it is intended together with directions for its correct use as prescribed by the Schedule to the Act ^{8/}.

These provisions do not apply to fertilizers produced for export, to lawn fertilizers or to quantities under 50 kg, with the exception of preparations for soil inoculation, soil conditioners and fertilizers containing trace elements ^{9/}.

Import control

The legislation of the Federal Republic contains no provisions regarding imports of fertilizers.

Enforcement

i) Control officers

The only control officers provided for by the Fertilizer Act are the fertilizer inspectors, although the Act itself does not identify them under this specific term. The functions of these inspectors are entrusted to the authorized personnel of the agencies designed by the Land Governments for the control of trade in fertilizers ^{10/}

^{7/} Act, Para. 4 (1)
^{8/} 1963 Order, Para. 1 (3)
^{9/} Act, Para. 4 (3) see also Order, Para. 1 (3)
^{10/} Ibid. Para. 5 (1) and (2)

Officially authorized sampling agents may be appointed by the Chamber of Agriculture or the Administrative Authority of the Land. Persons who have been sworn in at the Chamber of Industry and Commerce may also be assigned official sample taking duties 11/.

ii) Inspection, samples, analysis

1. Authorized personnel may enter the offices or premises in general of businesses which offer, hold for sale, sell or otherwise bring fertilizers into the trade. They may inspect and check business documents, ask for or take samples and ask for information concerning the origin of goods from which samples have been taken. The owners of the business or their agents are obliged to furnish the samples requested or allow them to be taken, supply the required information, produce the business documents for control and permit entry into their premises or offices. The basic right to the inviolability of residence according to Art. 13 of the Federal Constitution is to this extent restricted. However, persons asked for information may refuse to answer questions if to do so might expose themselves or their dependents to the risk of a prosecution or proceedings under the Act on Irregularities 12/.

2. Sampling

As a rule, samples must be taken only from properly stored fertilizers. Damaged lots must be dealt with separately. Samples must be taken from batches of one ton in the case of fertilizers in bulk and from five undamaged original packages in the case of packed fertilizers. From small packages of not more than 40 kg no samples are taken with the exception of preparations for soil inoculation, soil conditioners and fertilizers containing trace elements. In this case one to three undamaged original packages are used for the average sampling.

For fertilizers in the liquid state samples are taken from a number of small casks (up to 1 litre), which must be undamaged original packages. Sampling from a tank car requires the complete homogenization of its contents. This being difficult in most cases, partial samples must be taken at short intervals throughout the unloading processes. These partial samples must then be put together and mixed well to obtain the average sample 13/.

The average sample is obtained from not less than ten and not more than twenty-five partial samples.

From non-liquid fertilizers at least one partial sample per ton (per two tons in the case of nitrogenous and nitrogenous compound fertilizers), but at least ten per batch, must be taken, if necessary.

In order to take samples from liquid fertilizers in ten or twenty litre cans (or out of a larger tank filled during unloading from a tank car) the liquid must be well shaken so that a good mixture is obtained. Then with the help of a pipette about one litre is taken out in single portions 14/.

11/ See Recommendations of the Federal Ministry of Food, Agriculture and Forestry to the Federal States for the Control of the Fertilizer Trade, para. 3, German text in Das Düngemittelrecht mit fachlichen Erläuterungen, Ausgabe 1972, p. 149. English text in ASPAC Food and Fertilizer Technology Centre, Technical Bulletin No. 3, Taipei City, March 1972, p. 49.

12/ Act, Para. 5.

13/ Recommendations, Para. 4.

14/ Ibid. Para. 5.

The partial samples are then mixed thoroughly to obtain an average sample. From this sample three test samples are taken each amounting to at least 200 g. These are then hermetically sealed in test containers with an official seal and marked with the appropriate specifications. Test samples of liquid fertilizers are sealed in bottles each of about 250 ml which must be filled to the top if possible 15/. A sampling report in triplicate is prepared at the end of the sampling procedure 16/.

One of the test samples together with the original of the sampling reports is sent without delay to the competent control office. The two other samples together with one copy each of the sampling report are kept for possible additional examinations if the results of the analysis of the first sample do not correspond to the requirements of the law 17/.

3. Analysis

The control office examines the samples, applying the methods prescribed by the Association of German Agricultural Testing and Research Institutes (Verband der Deutschen Landwirtschaftlichen Untersuchungs - und Forschungsanstalten) 18/

If the examination shows undue deviation from the prescribed standards, one of the other two samples must be examined by a second control office designated for this purpose. Where the two examination results differ from each other and do not establish clearly whether the prescribed standards were complied with or not, the third sample must be examined by a control office which may be designated by the firm from which the samples of fertilizers were obtained. The final result is given by the arithmetic mean of the two examination results that are closest to each other 19/.

iii) Rights of the purchaser

No specific provisions are contained in the legislative texts regarding the rights of the purchaser.

Penalties

Any person who wilfully or out of negligence offers, holds or exposes for sale, sells or otherwise puts into circulation types of fertilizers which have not been approved according to the provisions of the Act or omits to furnish to the purchaser with the prescribed invoice or does not comply with the provisions governing inspection and sampling or with a legal order issued by the Federal Minister where such order provides for a penalty is guilty of an offence. Offences may be punished with fines up to ten thousand German marks. Fertilizers which are involved in a contravention of the provisions of the Act can be confiscated 20/.

In addition to penalties for contravention of the provisions of the Act or of the Fertilizer Order, the legislation of the Federal Republic provides for penalties for the divulging of industrial or commercial secrets related to fertilizers. Thus, any person who discloses such secrets without being authorized to do so in his capacity as administrative official or expert appointed under the Act is punished with imprisonment for up to one year or a fine or both such imprisonment and fine. If he has acted against payment or in order to enrich himself or another person or in an attempt to harm another, he is punished with imprisonment for up to two years. A fine may also be imposed.

Proceedings may be instituted only at the request of the aggrieved person or business 21/.

- 15/ Recommendations, Para. 7.
- 16/ Ibid. Para, 8.
- 17/ Ibid. Para, 9.
- 18/ Ibid. Para, 10.
- 19/ Ibid. Para, 12.
- 20/ Act, Para. 7 and Order, Para. 2.
- 21/ Act, Para. 6.

6. INDIA

Sources of regulations

The Essential Commodities Act, 1955, Act No. 10 of 1 April 1955 - The India Code, Volume VIII, Sixth Replacement Series, Part V - Trade, p. 41.

The Fertiliser (Control) Order 1957, of 23 April 1957 - Gazette of India, No. 18, Part II, 4 May 1957, p. 879.

(The consolidated text of the 1957 Order incorporating the various amendments up to 30 November 1971 and followed by the Essential Commodities Act, 1955, was issued in a booklet by the Fertilizer Association of India, 1971).

Fertilizer materials

Fertilizer materials covered by Indian legislation are any substances used or intended to be used as a fertilizer of the soil, including mixtures of any fertilizers with any substance which is not a fertilizer 1/. Fertilizers are listed in Schedule I of the 1957 Order.

Rules concerning licence, registration, etc.

i) Fertilizers and mixtures of fertilizers

Indian legislation does not require the registration, prior to manufacture or sale, of fertilizers which comply with the standards prescribed by Law (Schedule I to the 1957 Order and any other relevant provisions) 2/. Mixtures of fertilizers and special mixtures of fertilizers must, however, be registered with the competent registering authority (see below) and a certificate of registration must have been issued to that effect 3/.

- ii) The Fertiliser (Control) Order of 1957 provided that all dealers selling fertilizers should be licensed to that effect. This provision has been amended by the Fertilizer (Control) Amendment Order G.S.R. 2558 of 1969. The amended provision requires that all dealers in fertilizers are to be registered and are to carry on their business in accordance with the terms and conditions of the certificate of registration granted to them under the Order 4/.

Retail fertilizer dealers in certain areas may be exempted from the obligation of being registered, by notification in the Gazette published by the State Government 5/.

Persons desiring to be registered as dealers in fertilizers and to obtain a certificate of registration under the Order are required to make an application to the Registering Authority within fourteen days of commencing the business of selling fertilizers. The application is made in duplicate on a printed form (Form 'A') in which the applicant gives full details concerning the period for which he has already been dealing in fertilizers, the situation of his premises where the fertilizers are stored or sold, the quantities of fertilizers in his possession, the fertilizer manufacture, wholesaler or agent whom he will represent, etc. 6/.

- 1/ Consolidated text of the 1957 Order Clause 2 (d) and (i).
2/ Ibid. Clause 13 (1) (a) and Clause 2 (d).
3/ Ibid. Clause 10.
4/ Ibid. Clause 5 (2).
5/ Ibid. Clause 5 (2).
6/ Ibid. Clause 6 and Form 'A' in Appendix.

The Registering Authority grants the certificate if the applicant has not been convicted for an offence under the Essential Commodities Act of 1955, or any of the Orders made under that Act within the three years preceding the date of the application. The certificate is issued on a printed form (Form 'B') which states the terms and conditions under which the dealers must carry on their trade in fertilizers 7/

Certificates of registration are valid until 31 March of the year following their issuance unless previously cancelled or suspended. They may be renewed by the registering authority if the holder of the certificate applies before the date of expiry or within a grace period to that authority by filling in a printed form (Form 'C') and against a prescribed fee. The certificate may also be renewed against the payment of an additional fee if the holder applies to that effect within a month after the date of expiry or the grace period. If the application for renewal of the certificate is not made within the prescribed limits, the certificate is deemed to have expired on 31 March and any business carried on after that date will be in contravention of the Order 8/.

If the certificate of registration has been obtained by misrepresentation of a material particular or if a provision of the Order or a condition of the certificate has been contravened, the Registering Authority may cancel or suspend the certificate after giving opportunity to the holder of that certificate to defend himself 9/

The Registering Authority is a State Authority appointed by the State Government by notification in the Official Gazette. The authority is competent not only for issuing certificates of registration of dealers but also for registering mixtures of fertilizers 10/.

iii) Dealers in fertilizer mixtures

This same authority is empowered to issue certificates of registration to persons who desire to engage in the preparation of fertilizer mixtures including special mixtures in fertilizers. These persons must complete in duplicate a printed form (Form 'D' or Form 'DD') if they apply for a certificate of registration for any mixture of fertilizers or for any special mixture fertilizers, respectively; the certificate cannot be granted unless they possess the qualifications prescribed for the purpose by the State Government or unless they employ a person possessing such qualifications 11/.

Central to this provision is the concern that the fertilizer mixture shall be prepared by a person who has the prescribed qualifications or by a person working under the control, direction and supervision of such a qualified person. The applicant himself, in any case, is responsible for any deficiency in the components of the mixture 12/.

Certificates of registration for the preparation of special mixtures can be granted only to those persons who already hold a certificate of registration for the preparation of fertilizer mixtures. Such certificates are valid for three months from the date of issue. This period of validity can be extended by the registering authority up to six months 13/.

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- 7/ Consolidated text of the 1957 Order Clause 7 and Form 'B' in Appendix.
8/ Ibid. Clauses 8 and 9.
9/ Ibid. Clause 17.
10/ Ibid. Clause 16.
11/ Ibid. Clause 11 (1) and (2).
12/ Idem. Subclause (3).
13/ Ibid. Clause 11 A.

Whenever the registering authority refuses to grant the certificate, the reasons for this refusal must be recorded and a copy of the relevant order passed must be given to the applicant 14/.

Standards of composition

Standards of composition for mixtures of fertilizers are to be established by the State Governments and published in the Official Gazette. Such standards will more precisely regard fertilizers containing nitrogen, total and water soluble phosphoric acid and water-soluble potash. Following the notification of these standards in the Official Gazette, no person may carry on the business of selling fertilizer mixtures, unless such mixtures comply with the established standards 15/.

Labelling (statutory statements, etc.) and packaging

Fertilizers which are not in conformity with the prescribed standards can be sold, offered for sale, etc., if the container of such non-standard is consequently superscribed with the words "non-standard" and with the sign "X", both in red. A special certificate of registration for sale of such fertilizers can be delivered by the registering authority on written request (on Form 'F'). The unit price of these fertilizers is fixed by the registering authority 16/.

Fertilizer manufacturers must comply with the legal provisions regarding the marking and packaging of fertilizer containers. Every container in which a fertilizer is packed must bear the particulars specified by the Controller of Fertilizers (appointed by the Central Government). Fertilizer containers must be so packed and sealed that the contents cannot be tampered with without breaking the seal. More specifically, bags stitched by hand and containing fertilizers manufactured in India must bear lead seals, but if the bags are machine-stitched in such a manner that their content cannot be tampered with without a visible break in the stitching, sealing is not necessary 17/.

The Controller of Fertilizers may, by order notified in the Official Gazette, further specify the requirements regarding packaging and marking of containers of any specified type or description of fertilizers manufactured in India or imported 18/.

The law cites two cases in which sale of unpacked fertilizers is permitted: sale in bulk quantities by a manufacturer of fertilizers to a manufacturer of compound fertilizers or mixtures of fertilizers 19/ and sale by fertilizer dealers who are allowed to retain at any time one bag or container of each variety of fertilizers open and unsealed for the purpose of retail sale 20/.

Import control

Indian legislation contains no specific provisions regarding imported fertilizers.

Enforcement

i) Control officers

The only control officers whose appointment is provided for by Law are the inspectors of fertilizers. Such inspectors are appointed by the State Governments and by

14/ Consolidated text of the 1957 Order Clause 12 (1).

15/ Ibid. Clause 10A (1).

16/ Ibid. Clause 13B.

17/ Ibid. Clause 14 (1).

18/ Ibid. Clause 14 (2).

19/ Ibid. Clause 14 (1A).

20/ Ibid. Clause 13 (2).

notification in the Official Gazette. The number of the inspectors depends on the needs of each State: the area within which each inspector exercises his powers is defined in the notification of the appointment 21/. Schedule II of the Order mentions the existence of State Fertilizer analysts whose appointment is not regulated by the legislative texts studied here.

ii) Inspection, samples, analysis

An inspector may enter and search all premises where fertilizers are manufactured, stocked or exhibited for sale if he has reasons to believe that a contravention of the provisions of the Law has been committed in respect of these fertilizers; he may also require any fertilizer manufacturer to give all information in his possession relevant to the production and disposal of articles manufactured by him, take samples of fertilizers and seize or detain any fertilizer in respect of which he has reason to believe that a contravention of the fertilizer legislation has been committed. If the owner or any other person in charge of the fertilizer seized by an Inspector is known, the latter must give him a proper receipt. Inspectors must be given, on request, all necessary assistance in the exercise of their powers 22/.

The sampling procedure is established in the Schedule II of the Order. This Schedule prescribes that the following measures and precautions shall be observed in the drawing of samples.

- a) Samples shall not be taken at a place exposed to weather.
- b) The sampling instruments shall be clean and dry when used.
- c) The material being sampled, the sampling instruments and the containers for samples shall be protected from adventitious contaminations,
- d) To draw a representative sample, the contents of each container selected for sampling shall be mixed as thoroughly as possible by suitable means.
- e) The samples shall be placed in suitable, clean, dry and air-tight glass or other suitable container,
- f) The sample containers shall be of such size that they are almost completely filled by the sample.
- g) Each sample container shall be sealed air-tight after filling, and marked with full details of sampling, the date of sampling and other important particulars of the consignment.
- h) Samples shall be stored in shade 23/.

Detailed provisions of Schedule II determine the way in which samples are taken from packages and containers or from bulk in heaps or on wagons, the scale of sampling in proportion to the quantities of fertilizers to be sampled, the preparation of composite samples and the preparation of test samples. These final test samples are prepared and put in suitable containers. Each container is then duly labelled with a label giving all appropriate particulars, and sealed with seals of both the inspector and the manufacturer, dealer or purchaser, as the case may be. Of the three samples one

21/ Consolidated text of the 1957 Order Clause 19.

22/ Ibid. Clause 20 (1) and (2).

23/ Ibid. Schedule II A.1.

is sent to the State Fertiliser Analyst for analysis, the second is given to the manufacturer, dealer or purchaser to whom the sampled fertilizer belongs; the third is kept as reference sample by the Inspector for production in court if necessary 24/.

The analysis of the sample is made by the State Fertilizer Analyst according to the methods adopted by the American Association of Official Agricultural Chemists (A.O.A.C.) as reproduced in Section B of Schedule II.

iii) Rights of the purchaser

The 1957 Order 25/ prohibits the manufacture, sale, etc., of fertilizers which do not comply with the prescribed standards of composition, and the provisions regarding labelling. Otherwise no special provisions are to be found regarding the protection of the purchaser.

Penalties

Any fertilizer manufacturer, importer or dealer who does not maintain or does not produce for inspection the prescribed books, accounts and records relating to his business is guilty of an offence and may be punished with imprisonment for up to one year and a fine. All other contraventions of the fertilizer legislation are punished with imprisonment for a term of up to five years and also render the contravenor liable to fine. In the case of a first offence, if the Court is of the opinion that a sentence or fine only will meet the ends of justice, it may not impose a sentence of imprisonment; the reasons of such a decision must be appropriately recorded. In the case of a second and subsequent offence the Court must impose a sentence of imprisonment for a term of not less than one month 26/.

Fertilizers in respect of which a contravention of the Law has been committed, their containers and any animal, vehicle, vessel or other conveyance used in carrying them may be declared forfeit to the Government if the court is of the opinion that such an action is necessary 27/.

7. KENYA

Sources of regulations

The Fertilizers and Animal Foodstuffs Act - Laws of Kenya, Chapter 345, Revised edition 1964 (Printed and Published by the Government Printer, Nairobi).

The Fertilizers and Animal Foodstuffs (Commencement) Order 1967, 4 August 1967 - The Kenya Gazette, No. 43, Kenya Gazette Supplement No. 66 (Legislative Supplement No. 39), 18 August 1967.

The Fertilizers and Animal Foodstuffs (Sampling) Rules, 1972, 24 March 1972 in The Kenya Gazette Special Issue, Kenya Gazette Supplement No. 73 (Legislative Supplement No. 54), 30 October 1972, p. 380.

The Fertilizers and Animal Foodstuffs (Records and Returns) Rules, 1972, 24 March 1972 - Ibid. p. 413.

The Fertilizers and Animal Foodstuffs (Analysis) Rules, 1972, 11 April 1972 - Ibid. p. 383.

24/ Consolidated text of the 1957 Order Schedule A.4.

25/ Ibid. Clause 13 (1).

26/ The Essential Commodities Act, 1955, Sect. 7 (1) and 3 (1), (h), (i).

27/ Ibid. Sect. 7 (1) (b).

The Fertilizers and Animal Foodstuffs (Sterilization of Bones) Rules, 1972, 24 May 1972 - Ibid. p. 377.

The Fertilizers and Animal Foodstuffs (Declaration and Warranty) Rules, 1972, 25 May 1972 - Ibid. p. 410.

The Fertilizers and Animal Foodstuffs (Packing of Approved Fertilizers) Rules, 1972, 25 May 1972 - Ibid. p. 367.

The Fertilizers and Animal Foodstuffs (Approved Fertilizers) Rules, 1972, 22 June 1972 - Ibid. p. 365.

Fertilizer materials

For the purposes of the Act, fertilizer means any substance or mixture of substances which is intended or offered for improving or maintaining the growth of plants or the productivity of the soil. Manure, compost, wood ash, gypsum or refuse are not considered as fertilizer materials when sold in their original conditions and under these names; organic fertilizers, other than lime, are not covered by the Act 1/.

Fertilizers the manufacture, compounding, mixture, manufacture, import and sale of which are permitted in Kenya are given in the Schedule to the Fertilizers and Animal Foodstuffs (Approved Fertilizers) Rules, 1972 2/.

Regulations concerning licence, registration, etc.

No licence is required for the manufacture, import or sale of fertilizers 3/

A licence is necessary, however, for the Establishment or operation of a plant to sterilize bones or other substances derived from an animal carcass to be used in the preparation of fertilizers.

Any person who desires to set up a sterilizing plant for that purpose must apply to the Director of Veterinary Services, who will issue the licence, on payment of a prescribed fee, if he is satisfied that the applicant is a suitable person to engage in such activity. The licence thus issued is valid until 31 December of the year of issue, unless cancelled earlier. The Director of Veterinary Services may cancel the licence if the person who has received it contravenes the requirements prescribed by the Act or the Regulations 4/

Standards of composition

It is provided that standards of composition, efficacy, fineness and purity of fertilizers will be prescribed by the Regulations to be made under section 19 of the Act.

Labelling (statutory statements, etc.) and packaging

Packed approved fertilizers may be offered for sale in containers of 25 kg of more weight of a weather-proof material sufficiently strong to withstand reasonable handling without tearing, bursting or falling open 5/.

1/ Act Sect. 2 (b).

2/ Ibid. Sect. 3 (1) and Schedule to the said Rules.

3/ Act Sect. 3 (2).

4/ Ibid. Sect. 5 (1). See the Application Form in the Schedule to The Fertilizers and Animal Foodstuffs (Sterilization of Bones) Rules, 1972.

5/ The Fertilizer and Animal Foodstuffs (Packing of Approved Fertilizers) Rules, 1972, Rule 2.

Containers and packages must bear a securely fixed label showing the following particulars 6/:

- a) the prescribed name of the fertilizer;
- b) the weight in kilogrammes of the fertilizer;
- c) technical information regarding such matters as the minimum guaranteed percentage of specific elements contained in the fertilizer soluble in water, citric acid or mineral acid, the minimum guaranteed content of certain substances, etc. (for instance, in the case of Soda phosphate, the minimum percentage of phosphorus pentoxide soluble in 2 percent citric acid which the vendor in the declaration and warranty guarantees the fertilizer to contain; in the case of ammonium sulphate nitrate, that it contains at least 2 percent nitrogen).

Sale of approved fertilizers in quantities of less than 25 kg are allowed if the fertilizer is taken in the presence of and with the knowledge of the purchaser, from a container duly branded or marked, and is transferred to an empty container or package meant to hold quantities of 25 kg or more of the same fertilizer 7/.

Vendors of approved fertilizers are required to provide the purchaser with a written declaration and warranty in respect of any sale involving 500 kg or more of any one kind of an approved fertilizer. The same obligation applies for any sale of approved fertilizers for resale purposes, regardless of the quantity involved 8/.

The declaration and warranty thus required must contain 9/:

- a) the name and full address of both the vendor and the purchaser;
- b) sufficient details of the marks on the containers or packages of the fertilizer or particulars shown on the labels attached thereto;
- c) the weight of the fertilizer, in tons and kilogrammes as the case may be;
- d) the name under which the fertilizer is listed in the list of approved fertilizers;
- e) the minimum or maximum percentage of the guaranteed constituents of certain fertilizers (provided that, if the constituent is nitrogen in a compound fertilizer, the form in which this nitrogen is found must be stated). The completion of any transaction involving the sale of an approved fertilizer implies that the vendor has made to the purchaser the declaration and warranty required by the Act 10/.

Import control

No special licence is required for fertilizer imports. However, fertilizers may not be imported into the country unless they are included in the list of approved fertilizers issued by the Minister and unless they conform to the prescribed standards or specifications 11/.

The Act expressly prohibits the import of any fertilizer which contains bone or any other substance derived from any animal carcass for the purpose of manufacturing a fertilizer, unless it can be proved by an official document that such substances have been effectively and completely sterilized and are free from pathogenic organisms 12/.

6/ The Fertilizer and Animal Foodstuffs (Packing of Approved Fertilizers) Rules, 1972, Rule 3.

7/ Ibid. Rule 4.

8/ The Fertilizers and Animal Foodstuffs (Declaration and Warranty) Rules, 1972, Rule 2.

9/ Ibid. Rule 4.

10/ Ibid. Rule 7.

11/ Act Sect. 3 (1) and (2).

12/ Ibid. Sect. 4 (1).

The sterilization must have been done in conformity with standards laid down by the relevant subsidiary legislation 13/.

Enforcement

i) Control officers

Two kinds of control officers are provided for by the Act: Inspectors and Analysts appointed by the Minister, by notice in the Official Gazette, from among suitably qualified persons. During their period of appointment they may not engage in any business connected with the manufacture, sale or distribution of fertilizers or animal foodstuffs 14/.

ii) Inspection, samples, analysis

Inspectors may at all reasonable times and on production, if requested, of their warrant, enter and inspect any premises, places of vehicles in which they have reasonable grounds for believing that fertilizers are manufactured, stored or on sale or that documents pertaining to the importation, manufacture or sale of fertilizers are kept. They are also allowed to inspect and, if they consider it necessary, to seize and remove any fertilizer or documents related to fertilizers which they have reasonable cause to believe give evidence of a contravention of the provisions of the Act or of the regulations made under it 15/.

Inspectors may take samples, of any fertilizers that they consider necessary to submit for examination and analysis; in so doing they may call upon the occupant of the premises, etc., to provide them with any reasonable assistance 16/ and must inform the owner of the fertilizer, before or as soon as possible after taking the samples, of their intention to have the samples analysed 17/.

Samples are to be taken in portions as near as equal as possible, each of not less than 280 g, from evenly distributed parts of the whole. They must be drawn from sound containers or packages whose seals are intact, which are marked in accordance with the requirements of the appropriate Kenyan legislation, or from open containers or packages from which fertilizers have been sold in quantities of less than 25 kg 18/. Where the fertilizer being sampled is in a single container and weighs 25 kg or less, the entire package is to be taken as the sample 19/.

Detailed rules establish the number of containers or packages to be sampled, as well as the number of samples where more than one container is involved 20/.

Appropriate tools, if available, must be used to assist in the drawing of the samples. If valid objections are raised to the use of any particular tool on account of its unsuitability for sampling, the tool in question may not be used in the taking of the sample 21/.

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- 13/ The Fertilizers and Animal Foodstuffs (Sterilization of Bones) Rules, 1972, Rules 2 and following.
- 14/ Act Sect. 8.
- 15/ Ibid. Sect. 9 (1) (a), (b).
- 16/ Ibid. Sect. 9 (1) (c).
- 17/ Ibid. Sect. 9 (3).
- 18/ The Fertilizers and Animal Foodstuffs (Sampling) Rules 1972, Rule 3.
- 19/ Ibid. Rule 4.
- 20/ See Rules 5, 6, 7, 8 Ibid.
- 21/ Ibid. Rule 9.

Where the fertilizer to be sampled is in cakes or in large lumps, single cakes or single lumps may be taken as individual portions of the sample; if they are in fluid or semi-fluid condition, they must first be well mixed by stirring or shaking 22/

The samples thus obtained from each kind of fertilizer are then mixed, subdivided, reduced in weight by rejection of a half, and again mixed and subdivided until it reaches a weight of between 1.5 and 3 kg. It is then divided into three similar parts, known as the official samples. Each of the three official samples shall be placed in a clean, dry bottle or other container with a close fitting lid, cover or seal, which, in the case of a fertilizer likely to undergo change on exposure, must be air-tight 23/. These containers must be so secured or placed in a sealed package that their content cannot be reached without breaking the seal, the container or the package 24/.

Where the main sample readily separates into a number of distinct fractions that do not readily mix together, the fraction is to be sub-sampled separately and the official samples prepared by adding the sub-samples of each fraction to the sub-samples of the other fractions, in an amount proportional to its amount in the main sample 25/. Liquid main samples must be mixed thoroughly and the three official samples drawn directly from several well spaced points 26/.

Where the fertilizer clearly is adulterated with stones, pieces of iron or other objects, no sample is to be taken, but the Inspector may seize and hold in safe custody any quantity of the material he thinks fit 27/.

On each official sample the Inspector affixes a certificate signed by him and stating: his name, full address and the authority under which he acts; that the sample was taken according to the prescribed procedure; the particulars marked on the containers from which the sample was drawn; the date and place where the sample was taken; the name and full postal and business addresses of the manufacturer, if known, and the seller or the person in possession of the fertilizer at the time of taking of the sample; the name and full postal and business addresses of the person, if any, under whose instructions the sample was taken; the observations on the conditions under which the fertilizer was being stored at the time of taking the sample 28/.

One official sample with the certificate attached is to be despatched by the Inspector to an authorized analyst, and one, under registered cover, to the person holding the fertilizer for sale or who last sold the fertilizer; the third sample is to be forwarded to the Government chemist 29/.

Whenever an inspection takes place, the Inspector must take all practical steps to secure the presence of the owner of the fertilizer or the presence of the occupant of the inspected premises 30/.

The analysis of the official sample is carried out according to the method described in the Fertilizers and Animal Foodstuffs (Analysis) Rules, 1972. The results of the analysis are reported in a certificate of analysis, prepared and signed by the

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- 22/ The Fertilizers and Animal Foodstuffs (Sampling) Rules 1972, Rules 10, 11, 12.
23/ Ibid. Rules 15, 16.
24/ Ibid. Rule 20.
25/ Ibid. Rule 17.
26/ Ibid. Rule 18.
27/ Ibid. Rule 22.
28/ Ibid. Rule 21 (1).
29/ Ibid. Rule 21 (2). See also Act Sect. 9 (4).
30/ Act, Sect. 9 (2).

authorized analyst 31/. Copies of the certificate of analysis are to be sent by the analyst to the Inspector, who drew the sample, to the person in possession of the fertilizer at the time of taking the sample to the person, if any, under whose instructions the sample was collected, and also to the person who last sold the fertilizer 32/.

Penalties

The importation, manufacturing or sale of other than approved fertilizers or of approved fertilizers not conforming to the prescribed standards or specifications constitutes an offence 33/. Thus, any person who sells approved fertilizers in containers or packages which do not comply with the rules regarding packaging and labelling of fertilizers is guilty of an offence and liable to a fine not exceeding three thousand shillings or to imprisonment for a term up to three months or to both 34/. Likewise, any person who imports any fertilizer which contains bones or any other substances derived from an animal carcass, or who imports such substances for the purpose of manufacturing a fertilizer, or who uses them where they have not been imported as prescribed or not duly sterilized, is guilty of an offence 35/. The same applies to any person who uses or sets up a sterilizing plant for bones and substances derived from an animal carcass for the purpose of the manufacture or sale of fertilizers without the prescribed licence 36/. Similarly guilty of an offence is any person who uses or permits to be used in an advertisement a copy of an analyst's certificate obtained under the Act 37/.

Persons found guilty of the above offences are liable, for the first offence, to a fine not exceeding one thousand shillings or to imprisonment not exceeding one month, or to both; for a second or subsequent offence they are liable to a fine not exceeding three thousand shillings or to imprisonment not exceeding three thousand shillings or to imprisonment not exceeding three months or both 38/.

Any person who obstructs, hinders, deceives or misleads an Inspector in the exercise of his powers or the performance of his duties under the Act or the rules made under the Act is guilty of an offence and liable, for a first offence, to a fine not exceeding two thousand shillings or to imprisonment not exceeding two months or both and, for a second or subsequent offence, to a fine not exceeding three thousand shillings or to imprisonment not exceeding three months or both 39/.

Also guilty of an offence are all those persons who sell approved fertilizers without complying with the requirements of the rules governing the declarations and warranties to be issued to the purchaser by the vendor of such fertilizers. They are liable to a fine not exceeding three thousand shillings or to imprisonment 40/. Persons who fail to keep and maintain the prescribed records for the prescribed period of time are likewise guilty of an offence and liable for the first such offence to a fine not exceeding two thousand shillings or to imprisonment for a term of up to two months or both, and for a second and subsequent offence to a fine up to three thousand shillings or to imprisonment for a term not exceeding three months or both such fine and imprisonment 41/.

31/ See The Fertilizers and Animal Foodstuffs (Analysis) Rules, 1972.

32/ Ibid. Rule 18.

33/ The Fertilizers and Animal Foodstuffs (Packing of Approved Fertilizers) Rules 1972, Rule 5.

34/ Act Sect. 4 (3) and Sect. 7.

35/ Ibid. Sect. 5 (1).

36/ Ibid. Sect. 11 (3).

37/ Ibid. Sect. 16.

38/ Ibid. Sect. 13 (a), (b).

39/ The Fertilizers and Animal Foodstuffs (Declaration and Warranty) Rules, 1972, Rule 9.

40/ The Fertilizers and Animal Foodstuffs (Records and Returns) Rules, 1972 - Rule 5.

41/ Act Sect. 15 (1), (2).

Manufacturers, importers or sellers of fertilizers are liable for the acts or omissions of their employees unless they can prove that they are entirely dissociated from, or took all reasonable steps to avoid, such an act or omission, or that the act or omission of the employees is not, in any case within the scope of their authority. Employees who are guilty of an offence are in any case liable to the prescribed penalties, as well as, where appropriate, their employer.

8. MALAWI

Sources of regulations

The Fertilizers, Farm Feeds and Remedies Act, No. 12 of 24 March 1970 - Malawi Government Gazette Supplement, No. 1.c of 7 April 1970

Government Notice No. 142 : The Fertilizers Regulations of 1970 - M.G.G. No. 34, Supplement No. 29 of 14 July 1970, p. 251.

Government Notice No. 234 : Composition of Fertilizer Mixtures and Straight Fertilizers - M.G.G. No. 62, Supplement No. 50A of 13 November 1970, p. 483.

Fertilizer materials

For the purposes of Malawi legislation any substance is considered to be a fertilizer which is intended or offered for improving or maintaining the growth of plants or the productivity of the soil. Farmyard, stable manure, kraal manure, compost, wood ash, gypsum, town refuse or night soil when sold in their original condition and under their names cannot be considered as fertilizers 1/.

The third and fourth schedules to the 1970 Regulations give more detailed information about the composition of certain fertilizer, as does also the 1970 Government Notice regarding, inter alia, various kinds of fertilizer mixtures.

Rules concerning licence, registration, etc.

Fertilizers may not be sold in Malawi unless they are registered with the Ministry of Agriculture and Natural Resources 2/.

Applications for the registration of a fertilizer are to be made in triplicate and submitted together with the label or the reproduction of the label under which the fertilizer will be sold. The application must give in addition to the name and address of the applicant, the brand name of the product, the name of the fertilizer and detailed data regarding the total and percent content of various essential elements. In the case of fertilizers containing any substance of animal origin, it must be accompanied by a certificate stating that such substance has been sterilized in the manner prescribed in the Fertilizers and Farm Feeds (Sterilization of Animal Products) Regulations 1970. If, in the opinion of the registering officer, the fertilizer is suitable, he registers it and issues a certificate of registration which is given to the applicant 3/.

The registering officer also decides, after consulting the Register of Trade Marks, whether the fertilizer may be registered under the brand proposed by the applicant. He may refuse the registration under that brand if it is of an insufficiently distinctive nature or if it is so similar to a brand already used as to mislead the public 4/.

1/ Act, Sect. 2.

2/ Ibid. Sect. 3 (a).

3/ Fertilizer Regulations, Reg. 3.

4/ Ibid. Reg. 4.

All registrations of fertilizers are valid until 31 March of the year following the year of registration, unless they are cancelled before that date 5/. Cancellation is decided by the registering officer if the applicant fails to comply with any condition subject to which a fertilizer has been registered or if a fertilizer does not comply with any regulation made under the Act 6/. When an application for the registration of a fertilizer has been refused by the registering officer, or accepted but under a number of conditions which are not acceptable to the applicant, or when the registering officer decides to cancel a registration, the applicant may appeal against such decision to the Minister of Agriculture. The Minister may uphold the decision of the registering officer or make an order instructing the latter to register the fertilizer or to cancel or modify the conditions imposed or to restore the registration 7/.

The same provisions apply to the registration of plant used for the sterilization of bones or other substances derived from an animal carcass and used for the manufacturing of fertilizers 8/.

Standards of composition

Although the Malawi legislation does not mention the standards of composition of fertilizers, the manufacturers are asked to remain within the maximum tolerances which are stipulated in the fifth Schedule to the 1970 Regulations, and, for all practical purposes, this should be considered as a standard composition.

Labelling (statutory statements etc.) and packaging

Containers in which fertilizers are sold must be durably and legibly marked or labelled in English with the brand or name under which the fertilizers are registered, the information required by the Third Schedule to the 1970 Regulations as to the percentage of fertilizer elements contained, the name and the address of the person who has registered the fertilizer. Figures or numerals used for representing the chemical composition of a fertilizer must be preceded or followed by the appropriate symbol 9/.

Sellers of fertilizers must give to the purchaser at the time of delivery or send to him at the time of dispatch, an invoice setting forth the weight of the fertilizers sold, the brand or name under which the fertilizer is registered and the information required by the Third Schedule to the Regulations as to the percentage of fertilizing elements contained 10/.

Import control

Imported fertilizers must comply with the relevant provisions of the Malawi legislation. If an examination, analysis, or test of samples of imported fertilizers shows that they do not comply with these provisions, the Minister may order either their destruction without compensation or, at the option of the importer, their removal from Malawi within a specified period and subject to such conditions as he may impose 11/.

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- 5/ Act, Sect. 8 (3).
 - 6/ Ibid. Sect. 9 (a), (b).
 - 7/ Ibid. Sect. 10.
 - 8/ Ibid. Sect. 8 ff.
 - 9/ Regulations, Reg. 6.
 - 10/ Ibid. Reg. 7 and Act, Sect. 5.
 - 11/ Regulations, Reg. 14.

Enforcement

i) Control officers

Two kinds of control officers are provided for by the 1970 Act: Inspectors and analysts. Both appointed by the Ministry of Agriculture 12/.

ii) Inspection, samples, analysis

1. General

Inspectors and other officers specially authorized by the Minister have the right to enter at all reasonable times and inspect all premises, places, vehicles, etc., in which fertilizers are kept or sterilizing plants are operating. They can also inspect all materials or books, records or documents found in the course of their inspection and seize anything that appears to be evidence of a contravention of any provision of the Law, in the quantities necessary for the purpose of examination or analysis.

In all cases the authorized officers must give a receipt to the person from whose custody a quantity of fertilizer or a book, record or document has been taken for analysis or examination. Such objects must be returned immediately after it has been decided that no prosecution will be instituted or the trial of the relevant person has been concluded, unless they have been declared forfeit 13/. Any quantity of a fertilizer found in the premises, place or vehicle at the time of the sampling is, until the contrary is proven, deemed to be of the same composition, to have the same degree of efficacy and to possess in all other respects the same properties as the sample 14/.

2. Method of sampling

Where the fertilizer is packed in containers, samples are taken at random from different parts of the whole quantity in the following way:

- a) If the quantity of packed fertilizer does not exceed three tons, samples are taken from not less than two unopened containers per ton or part of ton;
- b) if this quantity exceeds three tons, from one additional unopened container for every additional ton or part of ton.

In no case need samples be taken from more than twenty containers.

Where the fertilizer is not packed in containers, not less than six and not more than fifty samples are taken from different parts of the whole quantity in the ratio, if possible, of two samples per ton or part of ton.

Samples are taken by means of a sampling probe not less than one inch in diameter or, in the case of fertilizers in bulk, by such other means as will ensure as far as practicable that the sample will be representative.

The samples thus taken must form a bulk sample not less than ten and not more than twenty-five pounds in weight, which, after it has been thoroughly mixed, is formed into a flattened heap and quartered. One quarter is then discarded and the remainder remixed and requartered. The same procedure is repeated until the original bulk sample

12/ Act, Sect. 11.

13/ Ibid. Sect. 12 (1), (2).

14/ Ibid. Sect. 14 (1) (a).

has been reduced to approximately three pounds in weight. In the case of liquid fertilizers, the samples are taken by such means as will ensure a representative sample 15/.

The final sample is divided into three parts, each of which is closed, sealed and labelled or marked in a suitable manner. One part is then transmitted to an analyst together with a certificate signed by the sample-taker. The second, with a copy of the certificate is handed or forwarded to the owner or seller of the fertilizer or to his agent. The third part is retained by the sample-taker. During the sampling procedure the presence of the person in charge of the fertilizers or his representative is required 16/.

The owner of the fertilizer from which the sample has been taken may claim from the Minister the market value of the sample 17/.

3. Analysis

The analyst to whom one part of the sample has been transmitted analyses it according to the method of set out in the Sixth Schedule to the 1970 Regulations. The result of the analysis is stated in a certificate in which the percentages of fertilizer elements found in the fertilizer are compared to those resulting from the analysis made at the time of the registration of the product. A fertilizer is deemed to comply with the provisions of the Law if the composition is found not to differ from the specified composition by more than the variations accepted by the Law and set out in the Fifth Schedule of the 1970 Regulations 18/.

iii) Rights of the purchaser

The purchaser of a fertilizer may request an inspector to take samples of that fertilizer and have them analysed in the prescribed manner. The purchaser in that case pays the appropriate fee 19/.

Penalties

Any person who contravenes any of the provisions of the Act on fertilizers is guilty of an offence and liable to a fine of 100 pounds and to imprisonment for a period of six months. The Act specifically provides for certain cases such as obstruction of enforcement officers in the exercise of their powers, tampering with samples, false or misleading statements in connection with fertilizers, selling of fertilizers which do not comply with the required standards, etc. 20/, but obviously all contraventions even not specifically mentioned are punishable under the Act.

On the other hand, persons failing to comply with any of the requirements of the 1970 Regulations are equally guilty of an offence and liable to a fine of 100 pounds and to imprisonment for three months 21/.

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- 15/ Regulations, Reg. 8.
16/ Act, Sect. 12 (3).
17/ Ibid. Sect. 12 (5).
18/ Regulations, Reg. 11 and 12.
19/ Ibid. Reg. 9.
20/ Act, Section 13 (1) (a).
21/ Regulations, Reg. 16.

9. MOROCCO

Sources of regulations

Vizierial Order Regulating Trade in Fertilizers and Soil Amendments, 4 November 1942 (25 Chawal 1361)*;

Order of the Director of Agricultural Production Relative to Sampling of Fertilizers and Soil Amendments by Officers of the Service for the Prevention of Fraudulent Practices, and to the Analysis of Samples - 12 December 1942*;

Dahir Relative to the Prevention of Fraudulent Practices in the Sale of Goods and of the Adulteration of Foodstuffs and Agricultural Products *, 14 October 1914 (23 Kaada 1332) (as amended to 26 December 1951)*;

Vizierial Order Relative to the Implementation of the Dahir of 14 October 1914 (23 Kaada 1332) Relative to the Prevention of Fraudulent Practices, 6 December 1928 (22 Jumada 1347)*;

Dahir Relative to the Prevention of Offences under Dahirs/Vizierial Orders Relevant to Fraudulent Practices, 26 July 1930 (29 Safar 1349)*.

Fertilizer materials

Fertilizer materials affected by Moroccan legislation are: single fertilizers; mixed fertilizers; compound fertilizers and soil amendments, whether in powder, lump, paste or liquid form. The enactments cited above contain no definition of fertilizer materials or detailed lists thereof.

Rules concerning licence, registration, etc.

Moroccan legislation requires no prior licence or registration for the production, importation, sale or other form of marketing of fertilizers or soil amendments, nor does it prescribe the registration of fertilizers. As a result, the production and marketing of these materials are free from restrictions. The only procedures required in their regard are the same as those applicable to the carrying on of any industrial or commercial activity in general.

Standards of composition

No standards are prescribed in the texts here cited.

Labelling (statutory statements, etc.) and packaging

While the Vizierial Order does not concern itself with the packaging of fertilizers as such, it nevertheless contains very full details regarding labelling and marking of packages which are applicable to these products. The use under whatever form of any indication or sign likely to mislead the purchaser as to the nature, provenance, content in nutrient elements or useful ingredients, or as to the nature of the combination of the latter, is prohibited. This also holds good for containers, packaging, labelling, commercial notepaper and any publicity, as covered by the Vizierial Order ^{1/}

* Published in Recueil de la réglementation marocaine en matière de répression des fraudes et des falsifications issued by the Ministry of Agriculture and Forests, Inspectorate for the Prevention of Fraudulent Practices - undated (latest enactment included is of September 1954).

^{1/} Vizierial Order of 1942 Art. 6.

i) Labels

Every manufacturer or Vendor of fertilizers or soil amendments is required to affix to packages, sacks or other containers used for these materials a label to be held in the closure system employed. The said label is to bear information as to the weight of the goods within, the name under which they are sold, their natural or industrial origin and their content in nutrient elements, in the case of fertilizers, and useful ingredients in the case of soil amendments, as well as the nature or state of combination of the latter. Thus, the contents of a given fertilizer in nutrient elements must be expressed as so much nitrogen/phosphoric acid/potash per 100 kg fertilizer and in no other way. The contents of a soil amendment in useful ingredients must be given exclusively as so much by weight of calcium/magnesium/humus per 100 kg amendment. The weight of nutrient elements in fertilizers is to be expressed in elemental nitrogen, phosphoric acid (anhydrous) and potash (anhydrous). The weight of useful ingredients of amendments is to be expressed in terms of calcium dioxide, magnesium (anhydrous) and humus 2/.

Article 1 of the Vizierial Order also prescribes in detail the manner in which information is to be given as to the nature or state of combination of nutrient elements or useful ingredients.

All the above-prescribed information must be given in lettering, all of the same appearance and dimensions. Only the following information may be given, in addition to the foregoing, on sacks, packages and containers: name and address of the addressee; name, trade name, trade mark and the address of the manufacturer or vendor, and, where appropriate, the syndical guarantee mark. This restriction, however, does not apply to printed literature placed inside the sacks, provided the text concerns only instructions for the use of the fertilizer or amendment or precautions to be observed to ensure their proper keeping 3/.

ii) Invoices

The same information as prescribed above must be given in the detailed invoice made over by the vendor to the purchaser at the moment of sale or delivery of the merchandise. In the case of shipped consignments, the vendor is allowed a period of eight days to send the invoice.

If shipment takes place from a depot or factory having no commercial sales service, the vendor's representative is required to deliver or cause to be delivered to the purchaser without delay a descriptive docket or waybill containing all the information prescribed above, together with the price of the consignment. The final invoice in such cases must be sent to the purchaser within one month of dispatch of the merchandise, and may contain only the information appearing on the waybill relative to the sale of the fertilizer or amendment so dispatched, together with details as to its origin, content in nutrient elements or useful ingredients, and the nature or state of combination of the latter.

At the same time, references must be given on the invoice whereby the merchandise may be identified without possibility of confusion, together with a means of distinguishing such information from that given on the relevant delivery note 4/.

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- 2/ Vizierial Order of 1942, Art. 4, 3 and 1.
3/ Ibid. Art. 4.
4/ Ibid. Art. 3.

Detailed information relative to the content of fertilizers in nutrient elements, or of amendments in useful ingredients, must also be given by the vendor in the contract of sale or on the commission copy made over to the purchaser at the time of sale, if the sale entails the making over of either of these documents 5/.

The foregoing provisions do not apply to heterogeneous fertilizers or amendments whose composition may vary or where the content in nutrient elements or useful ingredients is low, and which are normally transported in bulk, such as farmyard manure and animal excreta in general, market refuse, etc. Nor do they apply to raw materials for the manufacture of fertilizers or amendments which cannot be used in that state for application to land, provided they are dispatched directly to fertilizer manufacturers and used by them exclusively for the needs of their industry. Similarly unaffected by the above provisions are garden fertilizers sold in amounts not exceeding 5 kg per container, provided the content in nutrient elements is stated on the label affixed to the latter 6/.

Import control

Moroccan legislation makes no provisions for import control where fertilizer materials are concerned.

Enforcement

i) Control officers

The following persons are vested with powers to inspect, take samples of, and, where appropriate, seize fertilizer materials;

- chief inspectors and inspectors of the Central Office for the Prevention of Fraudulent Practices (Bureau central de la répression des fraudes);
- commissioners of police and commissioners of the special ports polices;
- chief inspectors of the Sûreté and chiefs of brigade of the Gendarmerie;
- officers of the customs and states monopolies, and officers of the Weights and Measures Service in the exercise of their duties;
- officers of the State Importation and Exportation Agency;
- agents specially authorized by order 7/.

ii) Inspection, samples, analyses

1. Inspection. The above-mentioned officers and agents may freely inspect and take samples at any place of manufacture, storage or sale of fertilizers or soil amendments, and on vehicles and at ports of departure or arrival, markets and fairs 8/. Members of the forces of public order are required to afford them all assistance necessary in the carrying out of their duties 9/.
2. Sampling procedure. The procedure for taking samples of fertilizers and soil amendments is laid down in detail, taking into account the nature of the product to be sampled, in Art. 1 of the Order of the Director of Agricultural Production, dated 12 December 1942. The provisions of this Article aim basically at ensuring: a) that

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- 5/ Vizierial Order of 1942, Art. 2.
 - 6/ Ibid. Art. 5.
 - 7/ Vizierial Order of 1928, Art. 3.
 - 8/ Ibid. Art. 4.
 - 9/ Ibid. Art. 5.

the samples shall be representative of the average quality of the merchandise; b) that samples shall be homogeneous. Thus, several samples are to be taken from several containers, or from different parts of the pile in the case of bulk goods. The samples so taken are to be carefully mixed so as to produce the final sample. Stones and foreign matter are not to be removed from the sample but are to be retained in it in a proportion representing as far as possible that of the batch from which it was taken. The less homogeneous the merchandise the larger the sample must be - as much as from three to four kg, if necessary 10/.

In the manner described 4 samples are taken, identical as far as possible in all respects, and closed under a seal placed on a docket which can be divided and the two parts matched again 11/. The docket consists of: i) a counterfoil to be removed only by the chemist at the analytical laboratory after having checked the seal, and containing the following information: name under which the product is marketed, date of sampling, and a number under which the samples are logged; and ii) a leaf section containing the log number, the name and address of the owner or holder of the merchandise, or, in the case of samples taken while such merchandise is being transported, the names and addresses of the consignor and consignee 12/.

One sample is retained by the owner or holder of the fertilizer or amendment; the three others are sent within 24 hours by the officer or agent who took them to the Central Office for the Prevention of Fraudulent Practices, accompanied by a report on the operation (see below). The office registers receipt of the samples and the report, and within 24 hours forwards the sample with the counterfoil attached to it to the state chemical laboratory at Casablanca. The leaf portion of the docket is separated and attached to the report. The two other samples are kept at the Central Office 13/.

3. Sampling report. The officer taking the sample is required there and then to draw up a report (fiscal stationery is not required) on the following:
- i) his own name, first name, rank and address;
 - ii) date, hour and place of taking the sample;
 - iii) name, first name, occupation, domicile or residence of the person at whose premises the sample was obtained. If the sample was taken from merchandise in transit, the names and other information necessary for identifying the persons named in the waybill and of the consignor and consignee of the merchandise;
 - iv) the name of the fertilizer or amendment, together with information as to its natural or industrial origin, its content in nutrient elements or useful ingredients and its state of combination.

The above report must also state whether the information so given has been regularly entered by the vendor on the following documents:

- a) contract of sale or commission copy handed to the purchaser at the time of the sale, in those cases where the transaction entails the making over of either of these documents;
- b) the invoice that the vendor is required to send to the purchaser at the time of delivery of the fertilizer or amendment, or where no descriptive docket or delivery note is prescribed by law.

10/ Vizierial Order of 1942, Art. 1 B.

11/ Vizierial Order of 1928, Art. 8.

12/ Ibid. Art. 10.

13/ Ibid. Art. 12 and 13.

Finally, the report must contain the same information as that appearing on the labels affixed to the packaging, sacks or containers, together with an indication of the gross weight of the packages from which the samples were taken.

The owner or holder of the merchandise or, where appropriate, the representatives of the transport company, may demand the inclusion of any statement he deems pertinent in the report.

The report is signed by the officer by whom it is made out and by the person from whom the sample was obtained. If the latter refuses to sign or to receive his sample, this circumstance is recorded in the report 14/.

4. Analysis. The laboratory receiving the sample for analysis is required to make a report within 8 days giving the results of the examination and analyses to which the samples have been subjected. Where the report does not lead to the establishment of fraud, attempt at fraud or adulteration, the person concerned is informed without delay and, if he so requests, is paid for the samples. If the merchandise has been placed under prohibition of sale, the prohibition is removed forthwith 15/.

Where the report establishes fraud, attempt at fraud or adulteration, the report and the samples lodged with the Central Office for the Prevention of Fraudulent Practices are transmitted to the Crown Prosecutor 16/. The Vizierial Order of 6 December 1928 provides for appeal by the person concerned against the analyst's report and for contesting the findings of that report by demanding a second analysis, in the case of imported merchandise, and a second expert's opinion at the judicial inquiry or trial stage. The findings by the second expert from the analysis, which are ordered by the judge, are final 17/.

iii) Rights of the purchaser

The general law of the country concerning the prevention of fraudulent practices has the broad objective of protecting purchasers and consumers against malpractice by producers or tradesmen. No specific provisions exist as to the rights of the purchaser of the materials considered here.

Penalties

Offences under the Dahir of 14 October 1914 or Vizierial Orders issued thereunder incur punishment in the form of a fine or imprisonment, or both. Any person who performs or attempts to perform any of the acts prohibited by these enactments is punished with a fine of from Francs 500 to 1,000 (1914) or a term of imprisonment of from 3 months to 2 years, or both such fine and imprisonment. If the offence is repeated within five years, imprisonment and fines may be double these maxima 18/.

In addition, any person obstructing or preventing enforcement or control officers in the performance of their duties is punished with imprisonment for 3 months to 1 year, or a fine of from Francs 100 to 5,000 (1914), or both such imprisonment and fine. For a repeated offence of this kind, established according to the same rules and committed within 3 years of the second sentencing, the court of summary jurisdiction tries the case and the fine is from sixteen Francs to one thousand Francs.

14/ Vizierial Order of 1928, Art. 9 and 12 and Order of the Director of Agricultural Production Art. 1 A.

15/ Vizierial Order of 1928, Art. 18 and 19.

16/ Ibid. Art. 20.

17/ Ibid. Art. 21 to 25.

18/ Dahir of 1914, Art. 11.

The same penalties are incurred by any person who offers for sale or sells, without waiting for the results of a pending official control, any merchandise which is subsequently established as entailing fraudulent practice or adulteration 19/. Enforcement officers who are witnesses to flagrant offences of adulteration, fraudulent practice or the offering for sale of spoiled or toxic substances, are required to report the matter immediately and seize the goods in question. A formal report is made out mentioning any circumstances conducive to establishing before the judicial authorities the truth of the statements made. This report is sent within 24 hours to the Crown Prosecutor, copy to the Director-General for Agriculture, Commerce and Land Settlement. The goods seized are sealed and forwarded to the Prosecutor if this is feasible; otherwise, they are left in the safe-keeping of the person concerned or, in the event of his refusal, at a place determined by the enforcement officer.

In the case of goods known to be spoiled or toxic, the officer may order their destruction, his decision to that effect to be entered, with supporting evidence if appropriate, in the report 20/.

10. NEW ZEALAND

Sources of regulations

The Fertilisers Act of 17 October 1960, No. 33 of 1960.

The Fertilisers Amendment Act of 6 December 1962, No. 66 of 1962.

The Fertilisers Regulations 1969, 19 May 1969 - Statutory Regulations 1969, vol. 1, p. 422.

The Fertilisers (Fees) Regulations 1961, 14 June 1961 - S.R. 1961/62.

Fertilizer materials

Fertilizers as defined by the New Zealand legislation are any substances suitable for application to land or plants for the purpose of increasing the growth or productivity of beneficial plants. They must contain, in the aggregate, not less than three percent of fertilizing elements. Animal manure, or animal or vegetable matter either in a fresh or in a partly decomposed condition are not included unless they have been dried or otherwise treated in a way assuring that decomposition is arrested until the material is applied to land or plants.

By fertilizing elements are meant nitrogen (N), phosphorus (P), potassium (K) and any other chemical element which the Governor-General declares by Order in Council to be a fertilizing element 1/.

Rules concerning licence, registration, etc.

1) Registration

Fertilizers may not be sold unless they are registered. Applications for registration are made to the Director-General of Agriculture on a special form stating the name and address of the owner or importer of the fertilizer, the name of the fertilizer and a facsimile of its brand. They must also give the percentage in water-soluble nitrogen,

19/ Dahir of 1930.

20/ Vizierial Order of 1928, Art. 6 and 7.

1/ Act, Sect. 2 (1).

total nitrogen (expressed to the nearest whole number), phosphorus soluble in a solution of citric acid, total phosphorus and potassium soluble in water (both expressed to the nearest whole number) and at the option of the owner or importer, water-soluble phosphorus present in the fertilizer. The application for registration must also indicate the common names of the components of the fertilizer and the proportions of which they are contained in it, expressed in pounds and ounces per ton where the proportion is less than one hundredweight per ton, or as percentages where the proportion is more than one hundredweight per ton. The fineness of grinding of the fertilizer must be indicated where a standard of fineness of grinding is prescribed by regulations. If a fertilizer is phosphate rock or guano, its geographical source should be stated. Furthermore, the name of every fertilizer is to contain an indication of the fertilizing elements and, if so required by the Director-General of Agriculture, of any additive present in the fertilizer 2/.

Products containing nitrogen, phosphorus or potassium cannot be registered unless they are chemically combined in a substance suitable as a fertilizer 3/.

A registration is valid for five years. The certificate of registration of a fertilizer, unless sooner revoked, expires on the last day of the registration period for which it was granted. However, the owner or importer of any registered fertilizer may apply for re-registration at any time not later than twenty-eight days before the end of the period of registration in respect of which the fertilizer is registered. The application for re-registration is made in the same manner as for the original application, and the provisions of the law apply to it in all respects as if it were an original application 4/.

The registration of a fertilizer may be refused if the brand of the fertilizer is the same as the brand of any fertilizer that is already registered or if it is so similar as to be misleading for the public. It may also be refused if the substance is not a fertilizer within the meaning of the legislation or if the brand or name of the fertilizer includes the word "special". If any additive present in the fertilizer is unnecessary or is present in excessive or inadequate quantity, or if its presence in the fertilizer is harmful, the registration may likewise be refused. The same holds in the case of a fertilizer mixed with an agricultural chemical if the Agricultural Chemicals Board recommends that the fertilizer shall not be registered. Lastly, the registration can be refused for any other reason which appears to provide sufficient grounds for such refusal 5/.

ii) Revocation of registration

During the period of registration of any fertilizer the Director-General of Agriculture may by notice in writing to the owner or importer, revoke the registration if he has reason to believe that the fertilizer ought not to be registered 6/.

Appeal may be made within 28 days after the date of decision of the Director-General refusing or revoking the registration, to an Appeal Authority consisting of a Magistrate and two assessors, of whom one is appointed by the Director-General and one by the appellant 7/.

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- 2/ Act, Sect. 5 and Regulations, Reg. 5.
 - 3/ Regulations, Reg. 3.
 - 4/ Act, Sect. 6 and 7.
 - 5/ Ibid. Sect. 8.
 - 6/ Ibid. Sect. 9.
 - 7/ Ibid. Sect. 10.

* One Hundredweight = 1/20 of a ton.

Fertilizers mixed with an agricultural chemical and registered as such are exempt from registration under the Agricultural Chemicals Act 1959 8/.

Standards of composition

Standards of quality and of fineness of grinding of substances used as fertilizers are prescribed in Part III, sections 31 and 32 of the Regulations.

Special mixtures of fertilizers may be prepared by manufacturers registered as manufacturers of special mixtures and in accordance with the instructions of the person who intends to use them. These instructions must be made in writing and signed by the person intending to use the mixture, or his agent, and contain all relevant particulars. A special mixture may not be sold to any person other than the one on whose instructions it has been prepared, or his authorized agent. Such mixtures may not contain any agricultural chemicals which the Director-General of Agriculture by notice in the Gazette has declared shall not be used as an ingredient of a special mixture. The purchaser of a special mixture may not sell it unless he registers it according to the provisions of the Law (see below), in which case the mixture becomes a normal fertilizer. Otherwise the provisions of the Act relating to the registration do not apply to special mixtures 9/.

Labelling (statutory statements, etc.) and packaging

Every package of fertilizer sold by a vendor to any person other than another vendor must show in bold and legible characters the registered name and brand of the fertilizer 10/.

On the delivery of any fertilizer, other than a special mixture, the vendor must immediately deliver to the purchaser an advice note setting out his full name and business address, the registered name and brand of the fertilizer, the quantity of fertilizer comprised in the sale, the date of dispatch, as well as the particulars stated in the application for registration 11/.

In the case of special mixtures, the vendor must deliver to the purchaser an advice note stating his full name and business address, the quantity, the date of dispatch, the particulars which would be required if an application for registration were to be made either in respect of the complete mixture or of each component 12/.

If the fertilizer is delivered, on the instructions of the purchaser, to a person other than the purchaser, the advice notes must be given to the latter but a copy of it must be sent to the purchaser within fourteen days after the delivery. The purchaser is not obliged to deliver any advice note upon the sale of the fertilizer to the person who has already taken delivery of the fertilizer as mentioned above 13/.

In every sale of a fertilizer a warranty is implied by the seller to the purchaser that the particulars stated in the advice note or on the package are true in substance and in fact. There is also an applied warranty by the owner (whether or not he is a party to the sale) to the purchaser that at the time of the sale the ingredients of the fertilizer are evenly distributed throughout the product 14/.

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- 8/ Act, Sect. 11.
9/ Ibid. Sect. 14.
10/ Ibid. Sect. 13.
11/ Ibid. Sect. 17.
12/ Ibid. Sect. 18.
13/ Ibid. Sect. 20.
14/ Ibid. Sect. 21.

Import control

No special provisions regarding import controls are found in the Act except one dealing with the reports to be submitted by manufacturers and importers of fertilizers. Under it, importers of fertilizers must whenever required to do so, furnish a report giving particulars in respect to the quantities of importer fertilizers received, disposed of, or held in stock by them 15/.

Enforcement

i) Control officers

The 1960 Act provides for two kinds of Control Officers, Inspectors and Analysts 16/. Inspectors are vested with wide powers regarding inspection of premises where fertilizers are stored or sold, and sampling 17/.

ii) Inspection, samples, analysis

1. Inspection

An inspection related to fertilizers may be made at all reasonable times. The Inspector may enter all premises where he believes that fertilizers or any other substance he believes to be a fertilizer are prepared for sale or consignment and take without payment samples of them. He also may require any person to produce books or documents relating to manufacturers or sale of fertilizers and have copies or extracts made of them. The Inspector may inspect any consignment, forwarding note, record or other document enabling him to identify the consignor of the fertilizer or substance, the consignee, the date of consignment and the quantity of the fertilizer or substance, and to take copies of any such document. It is an offence to obstruct an Inspector in the exercise of his powers 18/.

Inspectors may furthermore ask, in writing, the manufacturer or importer of a fertilizer to send for inspection or analysis and without payment a sample of any fertilizer in his possession which is registered, or for which application for registration has been made. The sample must be of the weight specified by the Inspector but may not exceed two pounds 19/.

2. Sampling

Samples are taken by inspectors in the prescribed manner and in the presence of the vendor, if he is available or, if not, of some other witness. If the sample is taken in the premises of the vendor, the vendor must supply the necessary labour if so required by the Inspector. When a sample of a fertilizer is taken on the premises of the vendor the provisions applying to the sale of fertilizers must be applied as if the taking of a sample were a sale of fertilizer by the vendor to the Inspector. The relations therefore between the Inspector and the vendor are the same as those of a buyer and seller respectively and two copies of the advice note must thus be handed to the Inspector 20/.

15/ Act, Sect. 30.

16/ Ibid. Sect. 36 (2) (d).

17/ Regulations, Reg. 11 and 13.

18/ Act, Sect. 23.

19/ Ibid. Sect. 22.

20/ Ibid. Sect. 24.

Every sample must be taken in such a manner as to be, as far as practicable, representative of the whole of the material sampled 21/. The method of sampling is determined, subject to the Regulations of the Fertilisers Act, by the Inspector. The Inspector must, however, before taking the sample, inform the manufacturer, vendor or witness of the method he proposes to use and take into account the objections they may raise; if agreement cannot be reached, the Inspector must take written note of the objections raised and the explanations given and inform the Analyst to whom the portion of the sample is sent 22/. Samples may not be taken from damaged or contaminated fertilizers, unless this fact is properly recorded on the label affixed on the sample 23/.

The scale of sampling of fertilizers in packages (in fine division or in coarse condition), in bulk (in fine division and in coarse conditions), in fluid condition (in small or large containers) and the procedure for sampling shoddy or other waste materials (in packages or in bulk) are given in sections 18-26 of the 1969 Regulations.

Having taken the sample, the Inspector divides it into three approximately equal parts in the presence of the vendor, his agent or any other witness; he then seals each part separately in the appropriate containers (glass bottles or other suitable containers provided with air-tight stoppers for samples of liquid fertilizers). One of these parts is left with or sent to the vendor or his agent; the second part and one copy of the advice note are sent to the Analyst and the third part as well as the second copy of the advice note are retained by the Inspector. This third part in addition to being sealed by the Inspector may also be sealed by the vendor or his agent, if present, in the manner he desires 24/. To each part of the sample a label shall be affixed by the Inspector in such a manner as to ensure that the detail of the label is visible without breaking the seal. The label must state the name of the proprietor of the fertilizer, the name and brand of the fertilizer and contain any details necessary for the identification of the consignment from which the sample has been taken; it must give the date and place of the sampling and be initiated by the Inspector and the vendor, or other witness, if present and contain any other relevant particulars 25/.

3. Analysis

The sample sent to the Analyst is divided into two approximately equal representative portions one of which is closed and sealed in a container for production in any possible proceedings and the other analyzed in the prescribed manner. The Analyst then sets out the result in a certificate of analysis (in the form given in the Fifth Schedule to the Regulations) of which one copy is forwarded to the Inspector. Should the analysis disclose discrepancies exceeding the prescribed limits between the result of the analysis and the particulars in the application for registration or in the advice note, the Analyst will forward without payment a copy of the certificate to the vendor. If no discrepancy is disclosed, the vendor may obtain a copy of the certificate of analysis on payment of the prescribed fee 26/.

In any proceedings related to fertilizers, the Court may order that the part of the sample retained by the Inspector be divided into two parts in the presence of the vendor or his agent and that each be submitted to an independent analyst for his report 27/.

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- 21/ Regulations, Reg. 12.
22/ Ibid. Reg. 13.
23/ Ibid. Reg. 14.
24/ Act, Sect. 25 and Regulations, Reg. 28 and 29.
25/ Regulations, Reg. 30.
26/ Act, Sect. 26.
27/ Ibid. Sect. 29.

iii) Rights of the purchaser

Purchasers of fertilizers sold in packages may at any time within 21 days after delivery notify an Inspector in writing that they desire a sample of the fertilizer to be taken. The Inspector (or a person authorized by him in writing) must within seven days take a sample in the prescribed manner and deal with it (see below), giving at least a four days' notice to the vendor at the time and place of the sampling; the vendor or his agent has the right to attend. Before taking the sample the Inspector must verify that the packages containing the fertilizer are in good condition, that they have been properly stored and that they have not been opened or tampered with. The sample is then analysed and the Analyst issues a certificate in the prescribed manner (see below) of which a copy is forwarded to the purchaser and to the Inspector 28/.

As a means of protection of the purchaser, the New Zealand legislation prohibits any sale of fertilizers in respect of which a certificate of registration has not been issued 29/.

Penalties

Any person who knowingly and fraudulently tampers with a fertilizer or substance, so that a sample or any part of a sample taken of it is not a fair sample according to the law, commits an offence under the Act 30/. A vendor commits an offence under the Act if he marks or permits to be marked with a brand or name any package of fertilizer the particulars of which do not materially correspond to the particulars registered as those of the product to which the brand or name relates; if he sells, otherwise than in packages, any fertilizer of which the registered particulars do not materially correspond with the particulars of the fertilizer sold; if he causes or permits any package marked with a brand or name, without first effacing the latter, to be filled with fertilizer of which the particulars are not the same as those registered under the brand or name of fertilizer to which they relate. The vendor also commits an offence if upon the sale of any fertilizer he gives on advice note the particulars of which are not the same as those of the fertilizer; if he sells a fertilizer which fails to conform to any prescribed standard of quality, purity, etc., or of which the components do not comply with any such standard and if he sets out particulars which do not conform with the true particulars of the fertilizer or substance on the advice note he gives when an Inspector takes a sample 31/.

In general, it is an offence to act without lawful excuse in contravention of any provisions of the Act or any regulations thereunder; to fail or refuse to furnish any return; or knowingly to make any false or misleading statement or any material omission on such a return.

Any person who commits an offence under the Act for which no penalty is otherwise provided is liable on summary conviction to a fine not exceeding 100 pounds 32/.

28/ Act, Sect. 27.
29/ Ibid. Sect. 5 (4).
30/ Ibid. Sect. 33.
31/ Ibid. Sect. 34.
32/ Ibid. Sect. 35.

11. SRI LANKA

Sources of regulations

The Fertilizers Act No. 21 of 1961, of 25 April 1961 - Supplement to Ceylon Government Gazette, Part II, 28 April 1961.

Fertilizer materials

The articles coming under the fertilizers legislation are, generally, those intended for use as "fertilizers of the soil". The articles specifically affected by the Fertilizers Act are those listed in the two schedules thereto. Column I of the First Schedule enumerates the 31 classes of fertilizers which are subject to certain provisions governing the statement of their composition, while the Second Schedule gives 39 definitions implied on the sale, under certain names, of the articles specified in Column I of the First Schedule.

Rules concerning licence, registration, etc.

The Act does not impose a licence on manufacturers, importers or traders in fertilizers, nor does it require the registration of fertilizers. Generally, it imposes no restrictions on manufacturers, importers or sellers of fertilizers other than that of compliance with the implied definitions given in the above mentioned Second Schedule.

Labelling (statutory statements, etc.) and packaging

Whenever any of the articles listed in Column I of the First Schedule is sold for use as a "fertilizer of the soil", it must be accompanied by a written statement issued by the seller, specifying:

- a) the name under which the article is sold; and
- b) such particulars on the nature, substance or quality of the article, and the amount of any ingredient of the article, as are mentioned in relation to that article in Column II of the First Schedule.

In particular, the written statement must specify the amount of those nutrient elements which, as required by Column II of the First Schedule, are to be found in the article 1/.

Such a statutory statement must be issued to the purchaser on or before delivery of the fertilizer material or as soon as reasonably practicable thereafter 2/. If so issued, it has the effect of a written warranty by the seller that the particulars contained in the statement are correct and that the article has the stated qualities. Variations may be accepted if they are within certain prescribed limits 3/.

These provisions apply to sales of the listed articles when sold separately. They do not apply to the sale of two or more single articles mixed at the request of the purchaser before delivery to him, or to the sale of small quantities (not exceeding fifty-six pounds) of such articles, if they are taken in the presence of the purchaser from a parcel duly marked, indicating the particulars required to be specified in the statutory statement 4/.

1/ The Fertilizers Act, Sect. 6.
2/ Ibid (1).
3/ Ibid. Sect. 7.
4/ Ibid. Sect. 6 (1).

Parcels containing any of the fertilizers mentioned in Column I of the First Schedule must be marked, indicating the particulars required to be contained in the statutory statement 5/. The Regulations may prescribe the manner in which parcels of articles are required to be marked, and the nature of the marks 6/. Here again, these provisions do not apply to a parcel of two or more such fertilizers which are mixed at the request of the purchaser before delivery to him 7/.

The proprietor of the business where the parcels are sold, as referred to above, must keep in such form as may be prescribed, a register of marks in which are specified the particulars indicated by the marks used on parcels 8/. The marks with which the parcel is marked must also be recorded in the statutory statement issued at the time of the sale of the parcel. If the parcel is not on the premises of the seller, he must include in his statutory statement any marks which are contained in the statutory statement given to him by the person to whom he sold the parcel 9/.

Standards of composition

Standards of composition are found in some cases in the implied definitions of the Second Schedule which give the required percentages of nutrient elements that the article must contain. Thus, bone meal is defined as "commercially pure bone, raw or degreased, which has been ground or crushed, and which contains not less than 3 percent nitrogen or less than 22 percent phosphoric acid".

Enforcement

i) Control officers

The following officers and servants are entrusted with the enforcement of the Fertilizers Act: (1) Fertilizer Inspectors; (2) Fertilizer Analysts (who may also act as Fertilizer Inspectors); (3) the Chief Fertilizer Analyst (who may also act as Fertilizer Analyst or as Fertilizer Inspector); (4) Deputy Chief Fertilizer Analyst; (5) any such other officer or servant as may be appointed under the Act. The Chief Fertilizer Analyst is the Chemist of the Department of Agriculture 10/.

ii) Inspection, samples, analysis

1. General

A Fertilizer Inspector may at all reasonable times enter any premises, in which he has reasonable cause to believe that there is any fertilizer specified in the First Schedule which has been prepared for sale, consignment or use, and take samples in the prescribed manner. However, this power may not be exercised in respect of a mixture of two or more such articles prepared at the request of the purchaser 11/.

2. Sampling

The Fertilizer Inspector divides the sample into three parts, and place each part in a bottle or container, adequately closed or secured and marked and sealed in the prescribed manner. He then sends two of the parts to a Fertilizer Analyst, together with a signed statement that the sample was taken in the prescribed manner.

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- 5/ The Fertilizers Act, Sect. 9.
6/ Ibid. Sect. 24 (1) (b).
7/ Ibid. Sect. 9 (1) (proviso).
8/ Ibid. Sect. 9 (2).
9/ Ibid. Sect. 9 (4) and (5).
10/ Ibid. Sect. 2 - 5.
11/ Ibid. Sect. 14.

The third part is delivered or sent to the seller or owner as may be prescribed 12/. The Regulations under the Act may prescribe the manner in which samples are to be taken and dealt with 13/.

3. Analysis

The Fertilizer Analyst analyses one part of the sample and keeps the other for a prescribed period of time. If the person by or on whose behalf the sample has been taken or the owner or seller of fertilizers objects to the result of the analysis, he is entitled, on payment of a prescribed fee, to have the other part of the sample submitted to the Fertilizer Analyst, who will analyse it and issue a certificate on the result of the analysis 14/.

In that case, together with the sample, the statutory statement or the warranty relating to the article sampled, or (in case the samples have been taken from a parcel) a copy of the particulars indicated by the registered marks with which the parcel has been marked, must be sent to the Fertilizer Analyst 15/.

The methods of analysis to be followed for determining the percentages of particular substances may be prescribed by the Regulations under the Act 16/. The results of the analysis are communicated by the Analyst within 21 days to both the person who has requested the analysis and the owner or seller of the article. If the name and address of the owner or seller are unknown to the Analyst, the certificate is sent to the person who has requested the analysis, who will transmit it to the owner or seller. If the person in question is not the purchaser of the article, the certificate must also be sent to that purchaser. If the sample has not been taken in the prescribed manner, the certificate is sent to the person who submitted the sample 17/.

iii) Rights of the purchaser

The purchaser of any fertilizer listed in the First Schedule or for which a warranty, express or implied, has been issued by the seller, is entitled to have a sample of the products taken by a Fertilizer Inspector, for analysis by a Fertilizer Analyst. He is obliged, on the other hand, to furnish to the Fertilizer Inspector, together with its application for sampling, a copy of the statutory statement or warranty relating to the article. Samples must be taken at the time of the delivery to the purchaser of the article or at the time of despatch of such article by its seller to the purchaser 18/.

Penalties

The fact that the particulars indicated by the registered marks of a parcel of fertilizer material are false to the prejudice of the purchaser, or do not include any particulars which have to be specified in the statutory statement, constitutes an offence. The seller of the product or in certain cases the person having the parcel in his possession or disposition for the purpose of sale, or consigning the parcel or exposing it for sale, is guilty of that offence unless he can prove that he took all reasonable steps to prevent the commission of the offence and that he acted without intent to defraud 19/.

12/ The Fertilizers Act, Sect. 15 (1).

13/ Ibid. Sect. 24 (1) (d).

14/ Ibid. Sect. 15 (2) and (3).

15/ Ibid. Sect. 15 (4).

16/ Ibid. Sect. 24 (1) (e).

17/ Ibid. Sect. 15 (6) and (7).

18/ Ibid. Sect. 8.

19/ Ibid. Sect. 9 (6) and 10.

A person is guilty of an offence if, without reasonable excuse, he fails to provide the statutory statement required for the sale of any fertilizer material, or if he provides a statutory statement the particulars of which differ from those of the registered marks of the parcel, or of the statutory statement received by the seller unless, again, he proves that he took all reasonable steps to prevent the commission of the offence and that he acted without intent to defraud 20/.

A person is likewise guilty of an offence if he fails to keep a register of marks of fertilizer materials or statutory statements issued in respect of such materials or if he fails to preserve them or to produce them at the request of an inspector 21/. The same applies to any person who refuses to allow an inspector to take samples of fertilizer materials or otherwise wilfully delays or obstructs an inspector in the execution of his duties 22/.

A person is also guilty of an offence if he knowingly or fraudulently tampers with an article in a way that a sample of it, taken or submitted for analysis, incorrectly represents the articles, or if he tampers with any sample taken or submitted for analysis 23/.

Proceedings for an offence under the Act may be instituted only with the written sanction of the Chemist of the Department of Agriculture 24/.

The person guilty of an offence, is liable, on summary conviction, in the case of a first offence to fine not exceeding 250 rupees and in the case of a second or subsequent offence to a fine not exceeding 500 rupees 25/.

A Fertilizer Inspector may not disclose any information obtained by him in connection with the exercise of his powers except to persons acting in an official capacity and in so far as such information is necessary for the exercise of their duties. Inspectors contravening this provision are guilty of an offence under the Act 26/.

Note: Future Prospects

According to a letter forwarded to FAO, dated 4 April 1973, by the Chairman, Ceylon Fertilizer Corporation, the Fertilizers Act No. 21 of 1961 has not yet come into operation and no regulations have been made thereunder. A Working Group on Fertilizers has been appointed by the Ministry of Agriculture and Food, with representatives of the Ministries and Institutions concerned with the use of fertilizers, which is actively considering the question of either revising the Act or enacting legislation.

It is proposed that provision should be made in the Act for:

- i) licensing and/or registration of fertilizer processors and fertilizer products;
- ii) the introduction of a requirement that no fertilizer parcels should be distributed unless they carry on the labels the following information:
 - a) the name and address of the processor;
 - b) the brand name;
 - c) the name of the product (e.g. Urea);
 - d) the name of the mixture (e.g. Paddy Basal Mixture/Chillie Mixture, etc.);
 - e) the guaranteed analysis; and
 - f) the guaranteed weight.

20/ The Fertilizers Act, Sect. 11.

21/ Ibid. Sect. 13.

22/ Ibid. Sect. 17.

23/ Ibid. Sect. 16.

24/ Ibid. Sect. 20.

25/ Ibid. Sect. 19.

26/ Ibid. Sect. 18.

12. SWITZERLAND

Sources of regulations

Federal Act Relative to the Improvement of Agriculture and the Maintenance of the Peasant Population (Agriculture Act), 3 October 1951. Recueil des lois fédérales, 1953, p. 1095.

Ordinance on Trade in Agricultural Auxiliary Materials, 4 February 1955. R.O., 1955, p. 151.

Amended by: Order of the Federal Council, 3 November 1959. R.O., 1959, p. 1014;
Order of the Federal Council on the Constitution of Reserves of Raw Phosphate, 10 July 1964. R.O., 1964, p. 631;

Order of the Federal Council on the Constitution of Reserves of Potassium Fertilizers, 10 July 1964. R.O., 1964, p. 629.

Handbook of Agricultural Auxiliary Materials (Fertilizers Section) - (Livre des Engrais) 26 May 1972. R.O., 1972, p. 1045.

Fertilizer materials

Within the meaning of the Federal laws, fertilizers are understood to be those substances which are intended to produce a direct or indirect effect on the soil or on the plant with a view to increasing the yield of, or in any other way improve, agricultural crops. Such substances do not include, for example, preparations that promote the "taking" properties of grafts, retard germination or prevent the premature fall of fruit, nor, again, compost accelerators 1/.

Fertilizers are divided into three main categories: a) micro-elements, comprising the three principal nutrients: nitrogen, phosphoric acid, and potassium, together with calcium, magnesium and sulphur; b) trace elements, viz., boron, copper, iron, manganese, molybdenum and other micro-nutrients, and c) one secondary element, sodium 2/.

The Livre des Engrais has a special section which contemplates a further distinction between fertilizers not subject to declaration 3/ and fertilizers subject to declaration 4/, the former group covering single fertilizers, which the Livre defines and for which it lays down the respective minimum or maximum composition standards, and the latter consisting of inorganic or organic fertilizers containing more than one nutrient, organic amendments to which fertilizer materials have been added, waste-recovery products, liquid fertilizers for application to the soil, bacterial cultures, artificial amendments and compost accelerators.

Rules concerning licence, registration, etc.

Fertilizers defined in the Livre des Engrais may be marketed without prior licence. A licence, however, is required for the sale of any fertilizers not listed therein 5/.

i) Application for licence

Application for licence may be made by any person producing, manufacturing, importing

- 1/ Ordinance Art. 2.
- 2/ Livre des Engrais, Art. 2.
- 3/ Ibid. Art. 8 to 82.
- 4/ Ibid. Art. 83 to 99.
- 5/ Federal Act, Art. 73 and Ordinance, Art. 8.

or processing fertilizers by way of trade, provided such person is domiciled, or has a branch establishment in Switzerland. The application is addressed to the appropriate "Station" (see below: Enforcement) which issues the licence if the product in question is suitable for the intended use and if, when applied as provided for in the instructions for such case, it is unlikely to produce highly serious secondary effects 6/.

Applications are normally submitted on official forms supplied free by the Station 7/ and must give the name and address of the applicant, precise and complete information on the composition of the fertilizer, its content in those substances determining its value, and on its intended purpose, applications and method of use, together with evidence demonstrating that the product is suitable for the intended use. The Station may further require information as to the place of manufacture in those cases where the fertilizer is produced, manufactured or offered for sale in new packaging, or processed in the country; an indication of the name under which it is intended to market the product or the reference number that will be used; the filing of the application within a specified time limit, if necessary in connection with analyses and tests during the current year.

All applications must be accompanied by two samples of the product.

These formalities must be complied with by a reasonable date prescribed by the Station; otherwise the application is rejected 8/.

ii) Effects of licence

No fertilizer may be advertised or sold by way of trade unless a licence has been issued for the purpose 9/.

However, in those cases where, due to causes that cannot be ascribed to the applicant, the processing of the application is likely to be protracted in time, the Station may permit the marketing of the product as soon as it is satisfied that the fertilizer is suitable for the intended use 10/. Conformity with the properties contemplated in the licence is a further condition to which the marketing of the fertilizer is subject 11/. Where such properties are absent a fresh licence is necessary. The Station may, nevertheless, permit certain waivers without recourse to a fresh licence, provided the efficacy of the product is not affected. Licences are personal and may not be assigned to third parties 12/.

Inorganic or organic fertilizers containing more than one nutrient, organic amendments to which fertilizer materials have been added, waste recovery products, liquid fertilizers for application to the soil, bacterial cultures, artificial amendments and compost accelerators defined in the Livre des Engrais 13/ must be declared to the appropriate Station by whoever produces, manufactures, imports or processes these requisites by way of trade. The declarant must also supply the Station, on demand, with his address, the name of the product, its composition, contents in nutrient ingredients, applications and method of use. The Station may also require the supply of two samples free of charge. To be valid, the declaration here referred to must be made by persons or firms having their domicile, or a branch, in Switzerland 14/.

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- 6/ Ordinance, Art. 9.
 - 7/ Ibid. Art. 10.
 - 8/ Idem.
 - 9/ Ibid., Art. 13.
 - 10/ Ibid. Art. 12.
 - 11/ Ibid. Art. 13.
 - 12/ Idem.
 - 13/ Livre des Engrais, Art. 83 to 99.
 - 14/ Ordinance, Art. 15.

Standards of composition

Generally, fertilizers must be packed in such a way that their strength is not impaired in any of the nutrients making up the merchantable quality of the product. Again, such fertilizers must not, when applied correctly, cause damage or produce an undesirable effect on the odour or taste of the harvested product 15/.

The Livre des Engrais makes a distinction in a "Special Part" 16/ between single fertilizers, mixed fertilizers and complex fertilizers (i.e. inorganic or organic fertilizers containing more than one nutrient element).

Mixed fertilizers are those resulting from a mechanical mixture of single fertilizers 17/ with or without the addition of waste-recovery products, trace elements, sodium or inert matter; complex elements are nutrient-based products obtained by chemical means with or without added organic materials 18/.

Mixed fertilizers and compound fertilizers which contain only one principal nutrient must contain that nutrient to a level of at least 12 percent in the case of nitrogen or phosphoric acid, and 18 percent in the case of potash. Fertilizers with two or three main nutrients must contain these to a total level of not less than 17 percent and not less than 3 percent of each case 19/.

Labelling (statutory statements, etc.) and packaging

Agricultural auxiliary materials must be suitably described in order for them to be marketed. Descriptions likely to mislead as to the nature, composition, contents or use of any such agricultural requisite are prohibited. The Federal Department of Public Economic Affairs is empowered to prescribe that certain auxiliary materials shall be brought into trade only if "accompanied by the necessary descriptions as to their properties and potential uses" 20/.

The Livre des Engrais lays down 21/ that in any "publicity" (on sacks, labels on sacks, advertisements, publicity by word of mouth, etc.) there must be given clearly the name of the product, as indicated in Arts. 8 and following of the Livre, or a similar name that does not lead to confusion, and the contents in the principal nutrients contemplated in Art. 7 ib. Made-up names may be used only if accompanied by a statutory description. Where a fertilizer fails to comply with the requirements of the Livre, the fact must be mentioned in the immediate proximity of the description, together with an indication of the measure by which the product departs from the prescribed standard.

The same indications must be placed on fertilizer packaging materials or on labels affixed thereto. This rule, however, does not apply to fertilizer sold on the basis of an analysis communicated in writing to the purchaser 22/.

The following descriptions are also permitted 23/:

- a) "organic", where a fertilizer contains not less than 25 percent organic matter;

15/ Livre des Engrais, Art. 3.

16/ Ibid. Art. 8 to 99.

17/ As defined Ibid., Art. 8 to 82.

18/ Ibid. Art. 83.

19/ Ibid. Art. 84.

20/ Act, Art. 72.

21/ Livre des Engrais, Art. 5

22/ Idem, para 4.

23/ Ibid. Art. 6.

- b) "wholly organic", where a fertilizer contains not less than 60 percent organic matter of animal or plant origin, without added foreign inorganic matter;
- c) "chlorine-free", "contains no chlorine", where a fertilizer contains not more than 2.5 percent of that element;
- d) "lime-free", "contains no lime", where a fertilizer contains not more than 2 percent of that element;
- e) "without alkaline effect", where a fertilizer contains not more than 2 percent active basic reactants;
- f) "completely water-soluble", if for the strongest recommended concentration there is no significant residue upon solution in cold water.

The Federal Stations are empowered by law 24/ to keep the public informed as to the use of auxiliary materials and their properties. In doing so they may, for example, rectify data relative to given agricultural requisites - among them fertilizers - in advertisements, publicity, etc., and on packaging materials, if such data are incorrect or incomplete or suppress information on product peculiarities, or are such as to mislead purchasers as to their nature, composition, contents and potential use. The person responsible for such data may himself rectify them as instructed by the Station 25/.

Import control

Provisions were issued in 1964 (see under Sources of regulations above) concerning the importation of potassium and phosphate fertilizers. The First Article in the respective Order lays down that these products and compound fertilizers containing potash or phosphoric acid may be imported only by special authorization by the Imports and Exports Service of the Division of Commerce.

The granting of import licences is conditional upon the entering into, and performance of, a contract whereby the importer undertakes to constitute a permanent stock of these fertilizers in Switzerland. Where very small amounts are involved, permits may be issued without the importer being obliged to constitute the stocks described, though other conditions apply which take into account the terms of the storage contract 26/.

Enforcement

i) Control officers

Responsibility for fertilizer control lies in the first place with the Federal Agricultural Testing Stations reporting to the Agriculture Division of the Federal Department of Public Economic Affairs. Decisions of these Stations may be appealed to the Agriculture Division and, in the last resort, to the Federal Department of Public Economic Affairs, after which all legal remedy is exhausted 27/.

The Agricultural Testing Stations of Lausanne are responsible for the French-speaking parts of the Confederation and the Agricultural Chemistry Station at Liebefeld-Berne for the rest of the country 28/.

24/ Act, Art. 75.

25/ Ordinance, Art. 7.

26/ Ibid. Art. 3.

27/ Idem and Act, Art. 109.

28/ Ordinance, Art. 4 as amended by the Order of the Federal Council of 3 November 1959.

The Stations have specialist control officers vested with statutory enforcement responsibilities where the various regulations are concerned 29/.

ii) Inspection, samples, analyses

Under the general provisions of Swiss law, inspection and sample taking where fertilizers are concerned are the responsibility of the control officers of the respective Stations. The officers in question have free access to premises where fertilizers are produced, sold or stored. No obstruction may be placed in their way in the exercise of their functions. On demand, all persons concerned must supply any information the officers may require and any supporting documentary material 30/. Canton and local police, customs officers and servants of the railway and water transport companies and the post office are required to lend enforcement officers their support in the carrying out of their task 31/.

The fertilizer control services may, furthermore, take or require samples and analyze them or have them analyzed by third parties. If a request to that effect is made, payment must be given for samples at the going rate for the product in question. The Stations also may demand and analyze each year one sample of fertilizers subject to licence or declaration, at the expense of the producer, importer or trader. Firms required to supply samples and submit to analysis bear all costs in connection therewith, even where the product proves entirely satisfactory. As a general rule, the Stations charge the official fees and related costs for such sampling, etc.

No detailed provisions appear in the various enactments as to sampling methods and procedures 32/.

iii) Rights of the purchaser

There are no specific legislative provisions defining the rights of purchasers of fertilizers.

Penalties

Any person who knowingly brings into the trade without authorization any fertilizer for which authorization is required, or knowingly fails to make the requisite declaration in connection therewith, is punished with imprisonment or a fine not exceeding Swiss Francs 1,000. Where the offence is due to negligence, the person is punished with a fine not exceeding Francs 300 33/.

In other than serious cases, i.e., those involving the ignorance or carelessness of the person concerned, the judge may simply impose a reprimand 34/. In serious cases, subsidiary penalties may be imposed, in the form of restrictions on, or withdrawal of, such authorizations as have been granted 35/. When the offence is committed in the way of business of a body corporate, company or partnership, the penal sanctions apply to those persons who have acted, or who should have acted, in their name, while the body corporate or company is liable corporately for fines and costs. Subsidiary penalties also are imposed on such companies, etc. 36/.

29/ Ordinance, Art. 17.

30/ Idem.

31/ Ibid. Art. 20.

32/ Ibid. Art. 18.

33/ Act, Art. 112.

34/ Ibid. Art. 113.

35/ Ibid. Art. 114.

36/ Ibid. Art. 115.

Administrative sanctions are provided for in certain cases. Thus, a Station may at any time invoke such sanctions by limiting the duration of the validity of licence or declare its continued validity to be conditional upon compliance with certain obligations or other term or, again, withdraw the licence altogether. Such procedures may be involved: a) where the licence has been granted on the strength of false information; b) where the description of the product does not conform to statutory requirements; c) where the holder of the licence interrupts, for not less than two years, deliveries in Switzerland; d) where the product is notably less suited for the intended use than the Station had ascertained, or assumed, at the time of issuing the licence; and e) where new products of undoubted superiority appear on the market 37/.

The fertilizer control services may order the seizure of products not conforming to the provisions of the law and any objects which may be useful in the procedure for establishing such failure to conform. However, fertilizers covered by specifications agreed by supplier and purchaser may not be seized.

Products seized may be confiscated by order of the judge pursuant to Article 58 of the Criminal Code 38/.

13. UNITED KINGDOM

Sources of regulations

The Agriculture Act, Part IV - Fertilisers and Feeding Stuffs, made on 29 May 1970, entering into force in the latter half of 1973; Statutes 1970, c.40.

(Note: These provisions apply, with minor variations, also to Northern Ireland. The Regulations thereunder are not yet available at the time of preparing this study).

Fertilizer materials

For the purposes of the United Kingdom legislation, fertilizer is defined as meaning fertilizer used for the cultivation of crops or plants including trees. This includes foliar spray and fertilizers used in hydroponics 1/. Furthermore, material for use as fertilizer is deemed to include material sold as an ingredient of a fertilizer 2/.

The legislation contains details as to what constitutes "sale" of fertilizer material. Thus, in order to ensure that fertilizers supplied under spreading contracts fall within the scope of Part IV of the Act, it is provided that the appropriation (i.e. supply) of material under contracts of service or joint-enterprise arrangements also constitute sale 3/. On the other hand, Part IV of the Act does not apply to the sale of material which is to be delivered to purchasers outside the United Kingdom, an exemption which relates only to those obligations concerning the sale of goods delivered abroad (e.g. the giving of statutory statements, the warranted correctness of names and expressions, etc.) and not to the pre-sale obligations (e.g. to mark goods held for the purpose of sale) 4/.

Rules concerning licence, registration, etc.

The Act does not impose a licence on manufacturers, importers or on traders in fertilizers, nor does it require the registration of fertilizers. Generally, it imposes no restrictions on manufacturers, importers or sellers of fertilizers other than that of compliance with the implied definitions which will be given in the Regulations.

37/ Ordinance, Art. 14.

38/ Ibid. Art. 19.

1/ Agriculture Act of 1970, Part IV, Sect. 66 (a).

2/ Ibid. Sect. 66 (2).

3/ Ibid. Sect. 66 (5).

4/ Ibid. Sect. 85.

Labelling (statutory statements, etc.) and packaging

Whenever any material of a description prescribed by the Regulations is sold for use as a "fertilizer", it must be accompanied by a written statement issued by the seller, specifying as prescribed in the regulations :

- a) certain particulars as to the nature, substance or quality of the material;
- b) information or instructions as to the storage, handling or use of the material 5/.

In addition, the fertilizer materials referred to above must be marked, indicating the matters required to be contained in the statutory statement. The marking must take place as soon as practicable after the materials have been made ready for sale (that is, when packed, or when ready for packing, as the case may be, as far as packed fertilizers are concerned). The materials must also be marked by subsequent sellers if unmarked on receipt by them 6/.

However, if the regulations so provide, a "symbol" mark may be used, denoting the full particulars which are required to be marked on any material. The meaning of such a mark will then be ascertained by reference to a register, kept in such a manner and form and preserved for such a period as may be prescribed by regulation 7/.

Furthermore, if claims as to the nature or quality of a material are included in a statutory statement or other document or are marked on the material, prescribed particulars concerning the attributes in question must be included in the statement, document or mark 8/. The object here is that, if claims concerning the nature or quality of the goods are made, purchasers should receive sufficient information to enable them to assess the significance of the claim 9/. Such a statutory statement must be issued to the purchaser on or before delivery of the fertilizer material, except in cases prescribed in the Regulations, where it may be given later 10/. If so issued, it has the effect of a warranty by the seller that the particulars contained in the statement are correct and that the article has the stated qualities 11/. Variations may be accepted if they are within certain limits prescribed by the Regulations 12/.

These provisions do not apply to the sale of two or more materials mixed at the request of the purchaser before delivery to him, or to the sale of small quantities (not exceeding fifty-six pounds or the equivalent prescribed metric units), of such materials, if they are taken in the presence of the purchaser from a parcel duly labelled and marked, indicating the particulars required to be specified in the statutory statement 13/.

Standards of composition

Standards of composition will be found in some cases in the implied definitions to be contained in the Regulations.

Import control

Provisions of Part IV of the Act do not apply to the sale of materials which at the time of delivery are not in the United Kingdom ("delivery" in the case of CIF contracts) or of materials which, having been imported, have not been released from customs control.

5/ Agriculture Act of 1970, Part IV, Sect. 68 (1).

6/ Ibid. Sect. 69 (1) and (2).

7/ Ibid. Sect. 69 (6) and (7).

8/ Ibid. Sect. 70.

9/ Ibid. Sect. 71.

10/ Ibid. Sect. 68 (3).

11/ Ibid. Sect. 68 (6).

12/ Ibid. Sect. 74.

13/ Ibid. Sect. 68 (2).

The purpose is to exempt from the obligations of the Act goods to which sellers have not had physical access and have thus been unable to test (CIF sales, etc.) 14/.

Further, in order to cater for the special problems of newly imported materials, there are powers to modify by regulations the requirements of the Act which apply to the marking of the fertilizer materials prepared for sale and to the use of names and expressions with prescribed meanings 15/.

Enforcement

i) Control officers

The following officers are entrusted with the enforcement of the control measures regarding fertilizers: agricultural analysts, deputy agricultural analysts and inspectors. These officers are appointed by the council of each county, county borough or other enforcement authority or (in Scotland) of each town council. Two or more enforcement authorities may appoint such officers jointly. The Minister of Agriculture, Fisheries and Food (or, in Scotland, the Secretary of State) may also appoint inspectors to exercise the powers exercisable by inspectors appointed by any enforcement authority. The latter provision is aimed at spurring on those councils that insufficiently exercise their powers under the Act 16/. In addition, the Government Chemist is the officer responsible for the performance of check analysis 17/.

ii) Inspection, samples, analysis

1. General

An inspector appointed by a council may at all reasonable times enter any premises, situated either in the area for which he is appointed or in another area if the enforcement authority for that other area has consented thereto, in which he has reasonable cause to believe that there is any fertilizer which is ready for sale or which has been purchased. He may also take samples in the prescribed manner on those premises (including any material in a vehicle) 18/.

Inspectors may take on to premises to be inspected any necessary assistants and equipment, and require purchasers to notify them the name and address of the seller and to produce statutory statements, documents or marks 19/.

If a sample is taken from a parcel which is exposed for sale by retail and does not weigh more than fourteen pounds (or the equivalent in metric units), the retailer may demand that the inspector purchase the parcel on behalf of the authority for whom he acts 20/.

2. Method of sampling

According to the definition of "sampled portion", the Regulations may prescribe the part of the whole quantity present from which a sample is to be taken 21/.

14/ Agriculture Act of 1970, Part IV, Sect. 85 (a).

15/ Ibid. Sect. 69 (3) and 70 (3).

16/ Ibid. Sect. 67.

17/ Ibid. Sect. 78.

18/ Ibid. Sect. 76 (1).

19/ Ibid. Sect. 76 (2) and (3).

20/ Ibid. Sect. 76 (5).

21/ Ibid. Sect. 66 (1).

Samples taken for analysis by an inspector are divided into three parts, of as near as may be equal size. Each part must be marked, sealed and fastened up in the prescribed manner. One of the parts is sent to the agricultural analyst, accompanied by a signed statement to the effect that the sample was taken in the prescribed manner, and by a copy of the statutory statement, markings or other document. Another part is sent to the seller, or his agent, or to the person on whose premises the sample was taken, as the case may be. The third part must be retained by the inspector for nine months 22/.

Where the seller is not the manufacturer of the material, the sample must be divided into four instead of three parts; one part is then sent to the manufacturer, provided that he has an address in the United Kingdom and his name and address are either known or easy to discover by reasonable enquiry within fourteen days 23/.

3. Analysis

The Agricultural analyst analyses the part of the sample which is sent to him. He may send the sample to a colleague for analysis in cases where he is unable to undertake the task himself - for instance if he does not have the necessary equipment 24/.

The method of analysis will be set forth in the Regulations under the Act.

The results of the analysis are communicated, as the case may be, to the purchasers and/or to the person to whom a part of the sample had been sent 25/.

iii) Rights of purchaser

The purchaser of any fertilizer material for which a warranty, express or implied, has been issued by the seller, is entitled to have a sample of the product taken against payment by an inspector, for analysis by an agricultural analyst. He is obliged, on the other hand, upon request, to furnish to the inspector the name and address of the seller, as well as the statutory statement of warranty relating to the material, or copies of these documents. Samples may be taken up to six months from the delivery to the purchaser of the material or the receipt by the purchaser of the statutory statement or warranty, whichever is the later 26/.

iv) Check analysis

Elaborate machinery is provided for obtaining check analysis not only in the case of parties whose interests may be affected by "civil" sampling at the purchaser's request, but also where prosecutors are concerned, in cases involving analytical evidence 27/.

Institution of proceedings, defences and penalties

Before proceedings may be taken, the Minister must be given notice of intended prosecution and a summary of the facts on which the charge is founded. A certificate of the Minister shall be conclusive evidence that the requirements have been complied with 28/.

22/ Agriculture Act of 1970, Part IV, Sect. 77 (1) and (3).

23/ Ibid. Sect. 77 (2).

24/ Ibid. Sect. 77 (4) and (5).

25/ Ibid. Sect. 77 (4).

26/ Ibid. Sect. 75.

27/ Ibid. Sect. 78.

28/ Ibid. Sect. 80 (2) and (3).

It should also be noted that, for instituting proceedings, a by-passing procedure is provided, for use when the commission of an offence under Part IV is due to the fault of someone other than the person who actually committed it. Prosecution may therefore take place against the person responsible, without the necessity of taking proceedings against the technical offender 29/.

In proceedings for certain offences under Part IV, a defence of accident, mistake, etc., is provided, as shown in the table below. Such a defence involves the allegation that the commission of the offence was due to a mistake of the person charged, or to reliance on information supplied to him or to the act or default of another person, or to an accident or some other cause beyond his control. The person charged must prove that he took all reasonable precautions and exercised all due diligence to avoid the commission of such an offence by himself or any person under his control 30/.

In other proceedings a defence of impracticability is provided, whereunder the person charged must prove that it is not practicable to comply with the requirements of the Act by the time prescribed.

The penalties and defences provided by Part IV in respect of fertilizers may be summarized as in the following table:

Reference to the 1970 Act	Description of Offence	Maximum Rate of Penalty	Defence
Sect. 68 (4) (a)	Offences relating to statutory statements which are not in the prescribed form, or which have not been given within the time required	A fine up to £400 and/or (for subsequent offences) imprisonment up to 3 months	None
Sect. 68 (4), (b) and (c)	Offences relating to statutory statements or labels which are incomplete or false with regard to certain particulars	- d ^o -	Defence of mistake, accident, etc. (except where the particulars in question relate to the storage, handling and use of the material)
Sect. 69 (4), (b) and (c)	Offences relating to marking which is not in the manner required, or which is incomplete or false with regard to certain particulars	- d ^o -	- d ^o - plus defence of impracticability
Sect. 69 (7)	Offences relating to the preservation or production of registers	A fine up to £50	None

29/ Agriculture Act of 1970, Part IV, Sect. 81.
30/ Sect. 82.

Reference to the 1970 Act	Description of Offence	Maximum Rate of Penalty	Defence
Sect. 70 (2)	Offences relating to the sale of material which contains, in its designation or marking, names and expressions not according with their prescribed meaning	A fine up to £400 and/or (for subsequent offences) an imprisonment up to 3 months	Defence of mistake, accident, etc.
Sect. 71 (9)	Offences relating to the statement of certain attributes as prescribed, where these are claimed to be present	- do -	- do - (only where the offence relates to the statement of false particulars)
Sect. 76 (2)	Failure of purchaser to comply with a requirement imposed on him by an inspector	A fine up to £50	A reasonable excuse
Sect. 79 (10)	Tampering with fertilizer material, or tampering or interfering with samples	A fine up to £40 and/or (for subsequent offences) or imprisonment up to 3 months	None
Sect. 83 (2)	Wilfully obstructing an inspector	A fine up to £50	None
Sect. 83 (3)	Impersonating an inspector	A fine up to £200 and/or (for subsequent offences) imprisonment up to 3 months	None
Sect. 83 (4)	Disclosing to manufacturers or sellers information which has been obtained under certain circumstances by virtue of this Part of the Act	A fine up to £400	The disclosure was made in and for the purpose of the performance of functions under this Part of the Act (e.g. disclosure of the results of "informal" samples or details or the place where a sample was taken)

14. YUGOSLAVIA

Sources of regulations

Basic Act on Quality and Quantity Control of Fertilizers, No. 243 of 18 April 1964, Sluzbeni List No. 28 of 29 April 1964*

Regulations on the Registering and Labelling of Fertilizers, No. 513 of 30 July 1964 S.L., No. 36 of 2 September 1964

Regulations on Minimum and Maximum Components and other Characteristics of Specific Types of Fertilizers and Method of Analysis, No. 509 of 31 July 1964, S.L., No. 35 of 19 August 1964.

Fertilizer materials

Yugoslav legislation defines fertilizers as determinate chemical combinations or mixtures of those combinations used for plant nutrition, regardless of their state of aggregation 1/. Fertilizers may be simple, mixed or compound. Simple fertilizers contain only one active nutritive element, i.e., nitrogen, phosphorus, potassium or calcium or a micro-nutrient. Mixed fertilizers are mechanical mixtures of simple fertilizers or may be double or triple according to the number of main active nutritive elements, i.e., nitrogen, phosphorus and potassium. Compound fertilizers are determinate chemical combinations and may be binary or ternary on the same criteria 2/.

Rules concerning licence, registration, etc.

Yugoslav legislation requires the registration of all fertilizers which are produced, imported and sold in the country. The register is kept by the Federal Ministry of Agriculture and Forestry. Applications for registration must be accompanied by a sample of the fertilizer material and contain the following information:

- a) name of producer or importer;
- b) the brand name of the fertilizer and its formula, if any;
- c) the characteristics of the fertilizer (quantity and type of active nutrients, the P₂O₅ solubility in stated media, contents in free harmful acids and other elements; humidity, particle size, keeping properties of declared characteristics, etc.). For mixed and compound fertilizers the components and active elements (micro-elements and pesticides) are to be mentioned;
- d) method of storage and conservation 3/.

Fertilizers produced or imported in determinate quantities and not containing harmful elements in excess of the permitted amount may be traded for special reasons without registration if they have been authorized by the Federal Ministry for Agriculture and Forests and the Federal Ministry for Industry. Fertilizers produced or imported for experimental purposes need not be registered 4/.

* On 31 December 1971, the Act ceased to be in force as a Federal Act. It continues, however, to be temporarily applied in all the Republics, except in the Socialist Republic of Bosnia-Herzegovina and the Socialist Autonomous Province of Voivodina, which have already passed their own laws on fertilizers. These laws contain no essential differences with regard to the Basic Act of 1964.

1/ Basic Act, Sect. 1.
2/ Ibid. Sect. 5.
3/ Regulations on Registering, Reg. 2.
4/ Basic Act, Act 9, Sect. 9.

Standards of composition

A fertilizer must contain a determinate minimum percentage of active nutrient elements and must not contain harmful components in excess of the stipulated amounts 5/.

Chalk, soft limestone, dolomite and magnesium may be used in the production of mixed fertilizers. The maximum amount of these elements which the final product may contain is 5 percent 6/.

The stated nutrient elements must be capable of producing their fertilizing effects for at least six months if the fertilizer is kept in a dry place, the containers undamaged and stored in layers not more than 2 m high 7/.

The 1964 Regulations on minimum and maximum components etc., contain detailed provisions on minimum contents (in percentages) of nitrogen, phosphorus and potassium, respectively, in simple fertilizers. Detailed provisions are also made on the maximum degree of moisture permitted and particle size. Mixed fertilizers must not contain sand or gravel. The amount of single active nutrient elements in compound fertilizers is determined by the producer, but the total may not be less than 30 percent 8/.

Labelling (statutory statements, etc.) and packaging

Fertilizer containers must bear a written label, readily visible, clear and legible, specifying:

- a) the name under which the product is offered for sale;
- b) the name of the producer or importer;
- c) gross and net weight of the product;
- d) the active nutrient elements which, according to the registered name, should be contained in the article and the amount given in a percentage 9/.

A statement, slightly different from the one mentioned above, must be inserted in the invoice stating:

- a) the name of the fertilizer;
- b) the name and address of the producer or importer;
- c) the date of production;
- d) amount of active nutrient elements, form and solubility of the phosphorus component; moisture content; fineness of grinding, amount of free acids and other harmful elements;
- e) number and date of registration;
- f) duration of declared characteristics;
- g) the quantity of the fertilizer corresponding to the invoice.

The seller must give one copy of the statement to the purchaser of the fertilizer 10/.

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- 5/ Basic Act, Sect. 6.
 - 6/ Regulations on Minimum and Maximum Components, Reg. 7.
 - 7/ Ibid. Reg. 9.
 - 8/ Ibid. Reg. 1 and 7.
 - 9/ Regulations on Registering, Reg. 7.
 - 10/ Ibid. Reg. 8.

For compound fertilizers the label or statement must also contain the form of nitrogen, phosphorus and potassium components and the grade of solubility of the phosphorus component.

Import control

Only those fertilizers which meet the requirements of Yugoslav legislation may be imported. A certificate from the authorized services of the exporting country must accompany the imported product 11/

Enforcement

i) Control officers

The enforcement of the Basic Act is vested in the commune administrative authorities for agricultural inspection. Exceptionally, the republic (state) or federal administrative bodies for agricultural inspection may carry out quality control operations, in which case they must inform the above-mentioned authorities 12/ Yugoslav legislation apparently contemplates only one kind of officer dealing with inspection and sampling in relation to fertilizers, viz., the agricultural inspector. The appointment of these officers is not, however, regulated by the fertilizer legislation itself.

ii) Inspection, samples, analysis

Agricultural inspectors are authorized to enter premises where fertilizers are manufactured or stored and take samples of fertilizers from stores, vehicles and other places and forward them to the authorized institute or laboratory for analysis 13/ control records of production and other relevant documents, if necessary; prohibit the sale of fertilizers which do not conform to the quality and labelling required by law, or order modification of a statutory statement if the fertilizer does not have the quality stated.

Institutes and laboratories for analysis are designated by the republic administrative authority for agriculture together with the republic administrative authority for industry 14/.

Normally a sampling probe is used 15/. Sample taking from the various places is regulated as follows:

- a) from one wagon, truck or other vehicles, in at least 10 different places;
- b) from more than one wagon or other vehicles, in quantities and places decided by the person who takes the samples;
- c) from tugs or ships, with quantities of up to 500 tons, 25 samples;
- d) from tugs or ships, with more than 500 tons, 1 sample from every 30-50 tons 16/ Samples must be taken from upper, middle and lower layers.

The total amount of samples thus collected must be crushed and thoroughly mixed. From this amount of fertilizer the final sample is then taken which must be at least 6 kg for granular fertilizers, and at least 3 kg for powdered and crystal fertilizers.

11/ Basic Act, Sect. 11.

12/ Ibid. Sect. 12.

13/ Ibid. Sect. 13.

14/ Ibid. Sect. 15.

15/ Regulations on Minimum and Maximum Cont., Reg. 20.

16/ Ibid. Reg. 21.

The final sample is then divided into three approximately equal parts and each one is placed in a glass bottle or plastic container, which is then hermetically sealed. Two parts of the sample are sent to the authorized institute for analysis; one is analysed and the second held for three months for further examination, if necessary. The third part is sent to the producer or importer of the fertilizer 17/. The containers with the parts of the sample must be accompanied by two copies of a label - one attached to the container and the other put inside it - giving the following information: name of fertilizer; name and address of the producer, importer, seller; the registration number of the transport vehicle, or the origin of the sample; signature or seal of the authorized person who took the sample; date and place of the sample taking 18/.

Reg. 10-17 of the Regulations on minimum and maximum content list methods of analysis for the respective kinds of fertilizer.

iii) Rights of the purchaser

In the 1964 Basic Act there is only a general provision concerning the rights of fertilizer purchasers. If the analysis shows that if the fertilizer does not have the prescribed or declared characteristics, the purchaser is entitled to compensation under the Act 19/.

Penalties

Provisions on penalties are found in Sect. 21-25 of the Basic Act. Fines of up to five million Dinars* are prescribed for enterprises of producers/importers/sellers who market fertilizers not conforming to the quality required by law or as stated on the label. The person responsible for this offence is fined up to 10,000 Dinars. For other offences, the maximum amount of the fine is two million and 75,000 respectively.

It is also an offence to put on the market fertilizers which have not been registered or which are not accompanied by the required statutory statement. The fine prescribed for this offence is up to one million Dinars for the enterprise (producer/importer/seller) in question and a maximum of 5,000 Dinars for the person responsible.

The producer/importer/seller, as well as the enterprise which uses the fertilizer, commit an offence if they do not allow an authorized inspector to take samples or examine the sales ledger and other accompanying documentation. The fine prescribed for this offence is up to 30,000 Dinars for the enterprise and 30,000 Dinars for the person actually responsible.

If a fertilizer is imported without the prescribed certificate the importer will be fined 300,000 Dinars.

17/ Regulations on Minimum and Maximum Cont., Reg. 24 and 26.

18/ Ibid. Reg. 27.

19/ Basic Act, Sect. 17.

* Amounts indicated here are expressed in 1964 Dinars. In 1965 a new Dinar was introduced equivalent to 100 old Dinars. Between 1965 and today other changes have occurred regarding this currency.

PART III - GUIDELINES FOR FERTILIZER LEGISLATION

This part is a natural outcome of the previous two parts. Thus, as a sequel to the general discussion on the broad trends in current fertilizer legislation, and in the light of the practice of the specific countries studied, suggestions are now made as to the lines that model fertilizer legislation might appropriately follow. By "model", however, no claim is intended that these suggestions constitute a major improvement on existing laws or that better solutions are thereby proposed for the problems that the legislation described in the country studies seeks to deal with. The purpose, rather, is to highlight the most important matters that fertilizer legislation must cover, to emphasize those issues which, as evidenced by the foregoing studies and the experience gained in the application of the laws there described, should be catered for in future texts, and to show how the legislator should take special account of the progress that has been, and is still being, made in the scientific and technical fields.

Many countries, among them those referred to as "developing", do not yet have comprehensive fertilizer legislation. Some have regulated certain aspects only; others still place reliance on laws introduced at a time when the production, marketing and use of fertilizers were in the beginning stages, so that the regulations may by now be outdated or incomplete in their coverage. It is to these countries chiefly that the following pages may have useful suggestions to offer in order to clarify the issue and help make good such gaps as may exist in the respective laws.

1. Definitions

An essential part of a fertilizer law is the definition of the term "fertilizer" or "fertilizer material". If too broad a definition of the term is adopted, then an impossible situation may be created where a wide range of substances will need to be covered by the law. If fertilizers are simply defined as any substance which may be added to the soil in order to supply the elements required for the nutrition of plants, then materials such as water, ashes, town waste, etc., are certainly included. But the legislator is not concerned with the regulation of trade in and use of these materials which traditionally have been used by the farmers to improve the fertility of their land. Fertilizer legislation has become necessary (as seen above) because of the great developments in the production, marketing and use of commercial fertilizers, particularly mixed and compound fertilizers, a situation in which the uninformed user is in danger of being exploited through the fraudulent practices of the producer or trader. It is these products therefore, that are of concern to the legislator and must be covered by the legal provisions. Even so, the definition must show clearly whether products such as soil amendments, plant growth regulators, preparations for soil inoculation, soil conditioners etc., are included under the terms fertilizers for the purposes of the law. If necessary, certain items should be explicitly excluded from (or contrariwise explicitly included under) fertilizers and treated as such.

2. Preventive administrative measures

The problem can be stated in simple terms as follows: is it preferable to leave the authorities to decide on the types of fertilizers which alone may be produced, imported or sold in the country, or to allow the manufacture, import and sale of any fertilizer as long as it complies with the standards of composition agreed upon, certified and registered beforehand with the competent authorities? Again, is it necessary for fertilizer manufacturers, importers and sellers to be licenced and registered?

The answer to each of these questions will depend on the policy of the respective country and on the situation prevailing there as regards the use of fertilizers, the degree of development of the processing industry, analysis and other facilities and the availability of agricultural services generally. As has been seen above, the comprehensive list/prior registration approach offers considerable advantages, eliminating bureaucratic procedures in the way of separate registration for each and every fertilizer and every single

manufacturer and dealer; it also gives a clear picture to both the consumer and the manufacturer/dealer, enabling the first to know what kinds of fertilizers he can expect to find on the market and the second what products he can manufacture, import or sell in the country without further authorization for his wares.

This system, however, may have a number of disadvantages, especially in countries which rely mainly on imported fertilizers for their needs. Under the present circumstances, the various fertilizer producing countries offer for sale varieties which often differ from one another, thus multiplying almost indefinitely the types of fertilizers available on the world market. It should therefore be made possible not to exclude a priori the production in the country or the marketing of new kinds of fertilizers there, provided they are first duly registered.

It is clear, then, that the system adopted by modern fertilizer legislation should be that of the comprehensive list of previously registered fertilizers, allowing for additions to that list, following analysis and registration, at the request of licenced manufacturers or importers. The list of the types approved and registered must be as detailed as possible. The classification of fertilizer types to be found in the German legislation and the schedule containing the specification of the various types of either the German or the Belgian laws are exemplary. Thus, in addition to the serial number of the product, there must be given in the appropriate part of the legislation (usually a schedule to the regulations) its type, essential components, minimum content, main composition and essential properties for use and process of manufacture. Furthermore, new types of fertilizers should be approved and registered as having a minimum content of plant nutrients or other guaranteed components, and not as a specific product of a specific producer (brand basis). The purpose here is to avoid continual extension of the list.

As regards licences for manufacturers, importers and sellers of fertilizers, the answer, again, can only be dictated by the respective national context. However, for enforcement and control reasons, it is preferable to require a licence. Persons or enterprises dealing in fertilizers should be known to a central service responsible for the enforcement of the law, thus making control reasonably feasible at any time. Licences should be issued only to persons or enterprises offering certain guarantees as to compliance with the law. Applications for licences should be made on special forms which state the reason for which the licence is requested - manufacture, import or sale of fertilizers. These forms should be prepared in such a way as to give the authorities all the necessary information concerning the applicant's equipment, facilities, premises, warehouses, etc. The licence should be granted for a reasonable, fixed period of time (say, one year), and be renewable upon application made on another special form. Special licences must be provided for dealers wishing to prepare non-standard mixtures of fertilizers at the request of the purchaser. These licences must state explicitly that the fertilizer mixture will be prepared by a qualified person, and only where no standard type of fertilizer is to be had that could be used for that specific purpose.

Particular attention is needed in the case of licences concerning the importation of fertilizers. In certain fertilizer producing countries, the law makes a distinction as to control measures between fertilizers produced for home consumption and those produced for export ^{1/}. This, in effect, means that fertilizers imported from such countries may well not be in conformity with the domestic standards. Any importation of fertilizers should therefore be explicitly prohibited in the importer's licence if it is not accompanied by a certificate from the competent authority of the exporting country guaranteeing the quality of the product and its compliance with the standards prescribed by the national legislation. This, however, should in no way result in limited enforcement control measures in the important country itself.

^{1/} See, for instance: Federal Republic of Germany, Fertilizer Act, para. 2 (2) 1.

3. Guarantees as to quality

Included under this heading are the legal provisions governing the packaging and labelling of fertilizers, as well as those relative to "statutory" or equivalent statements.

In order to make the fertilizer law as brief but also as comprehensive as possible, detailed provisions in respect of packaging and labelling might appropriately be relegated to a schedule to the regulations. This is in accordance with current practices. Here again, the German legislation could be used as an example in that it allows of regulating separately cases in which special procedures are necessary for packaging or labelling. Thus, the law itself can state the principle as regards packaging and labelling, and leave the regulations to prescribe the procedures.

In drafting these provisions, consideration should be given to the adoption of appropriate types of container whereby the content may be protected in the climatic conditions peculiar to the country concerned. The economic factor should also be taken into account, since even a slight difference in price can be prohibitive to the average farmer. A further question that arises is whether the legislation should allow small quantities of fertilizer to be sold from open packages. This is a delicate point. One practical advantage of such sales is that they often make it possible for the poorer small farmers to get accustomed to the use of fertilizer and thus helps to educate them to this practice.

Conceivably education should be secured by other means, however, and from the standpoint of control and efficacy, such expedients should be avoided as it is difficult to ascertain the effective (i.e. plant nutrient) value of fertilizers sold in this way, and (this is even more important) whether the article offered is what it claims to be. Instead, a provision could be incorporated in the law to the effect that certain types of fertilizer may also be offered in small (say 25 kg) packages.

With regard to labelling, a special effort should be made to design a simple system of making by using self-explanatory symbols which will be understood by even an illiterate person. In any case, it would be essential to label in the language or languages of the country. These remarks do not, of course, apply to bulk fertilizers. Here, information and other data should be given in the accompanying transport documentation and, in the case of storage on the premises of the manufacturer or warehouse, etc., an easily legible notice board should be placed beside the fertilizers containing such information and data.

Statutory statements are an essential requirement in all legislation. When the fertilizers are sold in the original packages - and this should be the absolute rule - statutory statements, guaranteeing the content and the quality of the product, should first be prepared by the manufacturer himself and accompany the fertilizers during transportation and storage and then be reproduced by the retailer at the point of sale and handed over to the purchaser. Such statements must indicate, in addition to the name, trade name and address of the manufacturer, the name of the fertilizer, its essential elements, guaranteed contents in plant nutrients, process of production, date of production and any further particulars which are deemed to be necessary in the national context. On the other hand, the seller should also be required to indicate on the sales invoice, in addition to the data contained in the statutory statement, his own name, address, trade name, the weight of the article sold and the date of the sale.

With regard to fertilizer mixtures, the sales invoice should give as much information as possible along the lines indicated above. Imported fertilizers must also be accompanied by statutory statements issued either by the manufacturer or by the exporter as the case may be.

The question of fertilizer storage should be given particular attention. Regulations should require that storage shall preclude all possibility of deterioration (due to humidity, etc.) of the containers and therefore of the fertilizer itself, and the pollution of groundwater or surface water through leakage, particularly of liquid fertilizers. Storage rules regarding liquid fertilizers must apply not only to products stored in factories following manufacture or at the place of sale but also to fertilizers stored on the farm.

4. Enforcement measures

Fertilizer legislation is enforced by means of inspection, sampling and analysis.

Inspection should be permitted, as a rule, at any reasonable time of the day provided that the inviolability of the private residence is respected. Inspectors must have the right to enter any premises where fertilizers are manufactured, stored or on sale, and inspect the premises themselves and production and storage facilities, as well as all documents, books and records relating to the manufacture, import, storage or sale of fertilizers. They should further be authorized to make copies or extracts of this documentation and also request any further information they consider relevant to their work. Finally, they must be empowered to take samples of the fertilizers in accordance with the prescribed methods and have them analysed.

Samples must be as representative as possible of the average quality of the fertilizer. The procedure explained above ^{2/}(partial samples → bulk samples → average samples → test samples) seems to be efficient enough in this respect. The number of closed containers to be sampled, depending on the number of the containers in the lot, or the number of samples per ton of bulk fertilizers to be taken, should, however, be decided in the light of the experience gained in other countries. Legal texts must explicitly allow the taking of samples at any place where fertilizers are stored and from any vehicle or ship by which such substances are transported.

Samples must be analysed according to some scientifically sound method. Here, as well as for most of the issues discussed earlier, the closest co-operation between fertilizer experts, agronomists, chemists and lawyers is necessary if the legislation covering the various aspects of production, trade in, and use of, fertilizers is to have the desired effects. The method of analysis must be given in detail - usually in a schedule to the regulations.

Practical methods for a rapid control of fertilizers sold from open bags at the retailer level can also be envisaged: depending on the fertilizer type, small scraps of inexpensive plastic or paper marked with the brand, type or content would be mixed in a determinate quantity with the fertilizer in a way making their separation from the fertilizer difficult. Appropriate colouring of the various types of fertilizer can also be useful. Such procedures should not, however, result in an increase in the price of the fertilizer. Fertilizer inspectors should also be trained to identify fertilizers on the basis of given properties of the material, easily recognizable by simple chemical test reactions or with a magnifying glass. Only control by exact analysis in an authorized laboratory will be valid, however, to ascertain violations of the law.

The right of the purchaser to have a fertilizer sampled by an inspector and analysed must be provided for in the legislation. Such a right dissuades any manufacturer or seller who is tempted by the idea of fertilizer adulteration, knowing that the purchaser is protected by law. At the same time, the purchaser feels more protected and confident as to the usefulness of the product he buys.

^{2/} Supra, p.16.

The question may then be asked, with respect to sampling and analysis, as to who, if anyone, should pay for the fertilizer sample taken and the analyst's fees. It is suggested that the owner of the fertilizer should not receive compensation for the samples but will be charged the analyst's fees if the analysis establishes that the fertilizer does not comply with the requirements of the law. If, on the other hand, it is proved that the fertilizer does comply with the prescribed standards, the owner will be paid by the service for the samples at their market value, and the analysis fees will also be charged to the service, regardless of whether the sampling has been made by the authority, or at the request of the purchaser.

Inspectors and samplers are the officials responsible for law enforcement. The best fertilizer legislation will never accomplish its purpose if these control officers are incompetent, poorly qualified or, even worse, corrupt. The law must, therefore, require that these officers (who, incidently, should in all cases report direct to the central service responsible for fertilizer control) should not only have the required qualifications and professional expertise but should also be persons of high moral integrity. Severe penalties should be laid down for any control official whose acts do not conform to his duties or are in contravention of the law.

5. Penalties

Fertilizer legislation must provide for penalties to be imposed on persons found guilty of an offence. The determination of the body which will be responsible for imposing penalties, the possibilities of appeal against its decision, the kind of penalty to be inflicted, etc., will vary in accordance with the legal context.

Offences under the fertilizer laws are best dealt with by the judiciary as being the most appropriate arm for trying cases where the national economy and the interests of society at large are concerned. By implication, then, the courts should be vested with specific powers to examine the respective offences and to impose such penalties as they deem appropriate. At the same time, the administrative authorities should also be empowered to take measures, at their level, in the way of seizure and confiscation of fertilizers which do not conform to the prescribed standards, etc., and, in certain cases, to impose fines of statutory amounts for a well-defined range of offences.

Penalties should sanction two main kinds of contravention: contraventions against the legal provisions prescribing standards of composition, minimum or maximum contents, tolerance limits, etc., of fertilizers, and contraventions against the provisions relevant to the enforcement of the fertilizer legislation (inspection, sampling, rights of the purchaser, etc.). A common penalty for both these contraventions would be advantageous for practical reasons. However, several penalties for various offences against these provisions could be instituted as well, but such a method offers little real advantage and certainly does not make for clarity in the law.

The provisions relating to penalties should state that any person who contravenes any of the provisions of the law or the regulations made under the law is guilty of an offence, and should also specify offences. It should then be provided that the person guilty of such offences will be liable on summary conviction to a fine or imprisonment or both (the law should not rigidly fix the amount of the fine or the term of imprisonment, thus allowing for an adjustment of the penalty to the gravity of the offence) ^{3/}. More severe penalties

^{3/} In this context the following remarks are pertinent: "In practice, penalties for deficiencies will not keep a fertilizer producer from being dishonest. Very few, if any, control officials are in a position to inspect one ton for each 100 tons sold by a company. If one ton were inspected for each 100 tons and 50 percent of the suspected fertilizer were deficient, it would be presumed that 50 percent of all fertilizer sold would be deficient and, yet, only one percent of the deficiencies would be found. For the dishonest producer only paying a heavy fine on the deficient fertilizer inspected could enable a big profit to be made on the 99 percent of the deficiencies which are not found". (W.B. Andrews. Fertilizer Control Laws and Regulations, United Nations Industrial Development Organization ID/IG.99/53, 6 August 1971, p. 12).

should be envisaged for subsequent offences, and offences against special provisions of the legislation by the control and enforcement officers. The administrative measures to be taken in such cases should also be given in these provisions.

6. General remarks

As is generally true of all legislation, it is desirable that enactments governing fertilizers should be as precise, simple and brief as the subject-matter will allow. This is particularly true of the Basic Act, which will recite the principles governing the manufacture, import and marketing of fertilizers, while the Regulations themselves should make explicit reference to the corresponding clauses of the Act and consign to schedules and lists all those points which lead themselves to this form of presentation.

But the terminology, too, must be unambiguous. Thus, it is the traditional practice to express the phosphorus, potassium, calcium and magnesium contents of fertilizers in terms of their oxides (P_2O_5 , K_2O , CaO and MgO , respectively); or, alternatively, in their elemental forms - simply P and K, in addition, of course, to nitrogen, N, and any other plant nutrients present. In scientific publications it is now generally the practice to refer to fertilizer contents in terms of pure elements. But if confusion is to be avoided, the method used in legislative text must be clearly stated; and if the weight of the element is preferred, then a schedule to the Act or the Regulations should contain a conversion table from elemental to oxide weights and vice versa, along the lines suggested in the footnote here 4/.

In drafting national fertilizer legislation it must be borne in mind that it does not only concern a small percentage of the inhabitants (i.e. those dealing in fertilizers only) but the whole population of the country and its ecosystem besides. The use of fertilizers at the time of the enactment of the legislation might still be a limited one in the national context, but it has been shown that fertilizer use develops at an impressive rate. The national legislator should therefore both think of the future and learn from the position in other countries. To protect the fertilizer consumer also means to protect the consumer of agricultural products and the agricultural sector of the country as a whole.

CONCLUSIONS

The decision to enact fertilizer legislation, the points which such a legislation must cover, the issues needing to be emphasized and the specific way in which certain questions must be answered all these depend on a political choice that the national authorities have to make in the light of the realities prevailing in their country. A mainly exporting country will not regulate fertilizer control in exactly the same way as one that is mainly an importer. A country with a highly developed fertilizer industry will not adopt enforcement provisions identical to those found in another in which no fertilizers are produced and where the fertilizer trade is still in its infancy.

Furthermore, developments in chemistry and agronomy, as well as in extension techniques, are of paramount importance because these can influence not only the overall production of fertilizers but also the selection of fertilizer types and their appropriate use at the farm level.

<u>4/</u> Some examples:	$P = P_2O_5 \times 0.436$	$P_2O_5 = P \times 2.291$
	$K = K_2O \times 0.830$	$K_2O = K \times 1.205$
	$Ca = CaO \times 0.715$	$CaO = Ca \times 1.399$
	$Mg = MgO \times 0.603$	$MgO = Mg \times 1.658$

The legislator, therefore, is not called upon to forge an ideally perfect enactment for an ideal set of conditions but the best possible text for the actual conditions in which it is to be enforced. For this, he will do well to call in experts of other sectors at the drafting stage, and also to draw upon the experience gained by other countries in the matter. A thorough acquaintance - it goes without saying - with the legal framework and the economic, social and technological realities of the country where his law on fertilizers is expected to find its place, is of great importance. Beyond this, it is equally a truism to say that to enact the best possible fertilizer law will serve no purpose unless adequately enforced, by competent administrators and by officials with a sense of commitment: fertilizer legislation itself is no panacea for the contrary ills, which can only be cured, if at all, in quite another context, by each country for itself.

ANNEX I - EXAMPLE OF A BASIC FERTILIZER LAW

NORWAY (1970)

Act on trade in fertilizers and soil amendments and matters connected therewith.
4 December 1970. Norsk Lovtidend No. 35, 29 December 1970, p. 1530.

1. This Act applies to the manufacture, for the purpose of sale, and to the importation of, and trade in, fertilizers, soil amendments, cultivation media and compost preparations offered to the public for use for the purposes inherent in the description thereof. The Crown* may rule that other products used for similar purposes shall come within the scope of this Act.

This Act does not apply to the importation of products in transit or products which the importer intends to use for re-processing activities other than their packing and marking as contemplated under Section 2(a) below.

The Crown may waive all or some of the provisions of this Act in respect of certain types of products and in respect of batches and packages of less than a specified quantity.

The Ministry may exempt specified batches of products from all or some of the provisions of this Act.

2. In this Act there shall be understood by:
 - a) **Manufacture:** production, preparation, mixing, packing and marking;
 - b) **Importation:** the bringing or sending of goods from abroad;
 - c) **Marketing:** offering for sale, handling, storage, distribution or forwarding;
 - d) **Fertilizer:** any technically produced or technically treated product having beneficial effects on the growth of plants where such effects are entirely or chiefly caused by that product's content in plant nutrients. The Ministry may determine what shall be deemed to be plant nutrients;
 - e) **Soil amendments:** products which have beneficial effects only, or chiefly, on the chemical, physical or biological condition of the soil, and thereby indirectly on the growth of plants;
 - f) **Cultivation media:** basic substances which consist of natural or artificially produced materials which, alone or in combination, with or without added nutrient or other materials, are intended for use in the cultivation of plants;
 - g) **Compost preparations:** preparations which, when incorporated in compost materials and farmyard manure, are intended to accelerate the availability of organic matter and enhance the fertilizing effect thereof;
 - h) **Growth promoting substances;** substances used in order to stimulate the growth of a plant, or to produce a regulating effect on its development, without such stimulation or regulation being attributable to the plant nutrient content of the substance in question.

* (Editor's Note) : "The Crown" should be understood as meaning "the King and the Council of Ministers".

3. The manufacture, importation and marketing of products coming within the scope of this Act shall be subject to control, as prescribed by the Crown.

By way of enforcement of such control, the Crown may, inter alia:

- a) prohibit the manufacture, importation or marketing of products which may be deleterious or which fail to comply with the desired quality standards;
- b) prohibit the importation of mixtures which contain products coming within the scope of this Act; and prescribe that the manufacture and marketing of such mixtures may be carried on only by authorization of the Ministry and subject to such conditions as it may lay down;
- c) prohibit the importation of organic or inorganic fertilizers to which have been added certain special nutrients*, soil amendments, cultivation media and compost preparations, and prescribe that the manufacture or marketing of such products shall be carried on only by authorization of the Ministry and subject to such conditions as it may lay down;
- d) prohibit the admixture or addition of plant protection substances or growth promoting substances to fertilizers or soil amendments and the admixture of plant nutrient materials to lime, and prescribe that the manufacture and marketing of such products shall be carried on only by authorization of the Ministry and subject to such conditions as it may lay down;
- e) issue prescriptions concerning publicity for products coming with the scope of this Act.

In issuing authorizations and establishing conditions as contemplated in b) and c) above, account may be taken of the price of the product as determined in relation to the effect it produces.

4. The Crown may order that any person importing or manufacturing products coming within the scope of this Act shall:
- a) notify the Ministry, or whomsoever the Ministry may appoint, as to the name and package marking that it is intended to use in marketing such products;
 - b) supply such data and information as the Ministry requires concerning the products in question;
 - c) keep such books as the Ministry deems to be necessary with a view to effective control.
5. Any person who markets products coming within the scope of this Act shall by means of markings on the package, labels, invoices or the like supply the purchaser with information as to the content and nature of the product, inter alia, as to plant nutrients and other active ingredients; together with details on conditions of significance in assessing the efficacy of the product as a nutrient source for plants or its effects as a soil amendment.

* (Editor's Note) : In accordance with Recommendation O No. 2 (Ot. prp. No. 61) for 1969-1970 made to the Parliament by the Agriculture Committee in respect of this Act in 1970-1971, the expression "certain special plant nutrients" should be construed as meaning such substances as micro-nutrients, magnesium and sulphur.

The Crown may lay down regulations as to the nature and form of the required statements, the marking of the packaging, etc., for the respective products. Such regulations may prohibit statements to the effect that the product contains nutrient materials or other active ingredients when these are present in small amounts, in a form producing negligible effect, or where the amount is not stated. The said regulations may contain provisions to the effect that the product content in certain substances may not exceed certain maximum limits and that information as to the amount of the content shall be stated when this exceeds certain limits.

The Crown may lay down regulations as to the storage, marking, etc., of products that may cause harm or damage.

Quantities shall be given in terms of weight unless the Ministry requires their statement in terms of volume. The Ministry may lay down regulations as to the statement of quantities.

The information contemplated in the first paragraph shall be given in terms referable to specific analysis methods to be prescribed by the Ministry.

6. Where products coming within the scope of this Act are of foreign provenance, the customs service shall forthwith notify the responsible sampler or, if no sampler has been appointed, the appropriate control authority in order that samples may be taken from the consignment in conformity with such provisions as are laid down in their regard.

Products may not be withdrawn from the customs before such samples have been taken. Samples shall forthwith be sent to the appropriate control authority together with information as to the importer's name, the designation and mark of the product, the amount of the consignment and data as to the sample taking and the sampler's name.

The consignee may, as a rule, require a progressive delivery of the products as sampling is effected.

The Crown may prescribe that specified types of product may not be delivered or despatched from the importer's premises until the analyst's findings have been made known and that such findings state that the product conforms to conditions laid down pursuant to this Act. The control authorities may in special cases place an embargo as appropriate when there are particular grounds for believing that the consignment does not satisfy conditions laid down pursuant to this Act.

The appropriate Ministry shall decide in each case as to the disposal of imported products which are not in conformity with the conditions laid down in this Act.

The control service shall notify the importer the analyst's findings as soon as possible.

7. Such body or bodies or persons as are empowered by the Ministry in that behalf shall be responsible for securing compliance with the Act and with regulations issued pursuant thereto.

The control authorities and the Ministry otherwise empowered in that behalf shall have access to warehouses, storage premises, sales premises and vehicles used for products coming within the scope of the Act, and to places of manufacture of products which may not be offered for sale except by authorisation of the Ministry, and shall be empowered to take samples for the purpose of analysis.

The control authorities and the Ministry may demand all necessary information from persons engaged in the manufacture, import or marketing of products coming within the scope of this Act, for the purpose of control as to compliance with the provisions laid down in this Act or pursuant thereupon and may therefore require the production of the books referred to in Section 4 above.

Any person who in the exercise of his duties for the enforcement of this Act obtains cognizance of manufacturing or production secrets or other information that is not common knowledge shall, subject to the limits entailed by his activities under this Act, be bound not to divulge what has so come to his knowledge and may not make use of such information outside the requirements of the service. The Ministry may issue prescriptions as to the taking and analysis of samples of products referred to in this Act.

8. The Crown may require the importers, manufacturers and traders concerned to pay fees to cover expenses arising in connection with sample taking, analysis, control, supervision and otherwise securing compliance with this Act and with prescriptions made pursuant thereto. The said fees may be determined according to rates for the respective control operations and/or in relation to the weight, volume or value of the products imported, manufactured or marketed. The Crown may likewise issue prescriptions governing the exemption from such fees either generally or for the respective cases. The Ministry may issue the necessary prescriptions as to the method of computing, collection and payment of fees, as well as control over these matters and the obligation to pay interest on amounts of fees not paid by the appointed date. The Ministry may further issue instructions to the effect that the basis for the computation of fees shall be taken as estimated amounts when it is not possible, in the light of information or other evidence available, to determine the exact amount. Fees may be recovered by coercive means.
9. The Crown may issue detailed instructions for the enforcement of this Act.
10. Any person who knowingly or inadvertently contravenes the provisions of this Act or the prescriptions, prohibitions or injunctions issued pursuant thereto, shall be punished with a fine unless heavier penalties are otherwise provided for. Attempts so to contravene shall be punished in like measure.

Where importers or manufacturers fail to observe the provisions of Section 4 regarding notification and the keeping of books, the Ministry may prohibit import or manufacture of the products concerned by the person in question, for such short or long periods as it deems fit.

Products or the value of products that have been imported, manufactured or marketed, or where attempt has been made to manufacture, market or import them, in contravention of this Act or any provisions made thereunder may by order of the court be confiscated from the person guilty of that contravention or whoever has acted on that person's behalf or for his benefit. Confiscation may be ordered even where penal proceedings are not, or cannot be, instituted against any person. The Ministry shall decide as to the disposal of products confiscated under this Act.

11. 1. This Act shall enter into force on such date as the Crown may determine.
2. [Omitted: Contains amendments to the Act of 27 June 1924 (relating to trade in feed concentrates and artificial fertilizers) in respect of feed concentrates only. The title of that Act shall be: "Act on trade in feed concentrates".]
3. Ordinances and prescriptions relating to artificial fertilizers issued pursuant to the Act of 24 June 1924 relating to trade in feed concentrates and artificial fertilizers shall continue in force until repealed or rendered obsolete by prescriptions and decisions issued pursuant to this Act.

ANNEX II - EXAMPLES OF SPECIFICATIONS AS TO COMPOSITION OF FERTILIZERS

A. FEDERAL REPUBLIC OF GERMANY (1963-1972)

Schedule to the Order concerning the Admissibility of Fertilizer Types (Fertilizer Order). 21 November 1963 (as amended up to 28 February 1972) - Published in various issues of the "Bundesgesetzblatt" (see reference on page 40 of this study).

Extracts, containing selected examples*

* These extracts are reproduced, with acknowledgement, from the "Technical Bulletin No. 3, entitled German Fertilizer Legislation", of the Asia and South Pacific Council, Food and Fertilizer Technology Center.

EXAMPLES

No. (1)	Type of fertilizer (2)	Essential compo- nents (3)	Minimum content (4)	Main composition; essential properties for use (5)	Process of manufacture (6)	Special regulations (7)
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I. STRAIGHT MINERAL FERTILIZERS

Up to 4% Magnesium in the form of Total MgO or Total MgCO₃ may be added to the fertilizers without changing the type

A. NITROGENOUS FERTILIZERS

6	Ammonium sulphate	N	20% N	Ammonium sulphate; nitrogen expressed as NH ₄ nitrogen	(a) Neutralising ammonia with sulphuric acid (b) reaction of ammonium carbonate with calcium sulphate
7	Calcium ammonium nitrate	N	22% N	Ammonium nitrate and calcium carbonate or dolomite. 1/2 of the minimum content of nitrogen expressed as NH ₄ nitrogen, the other half as NO ₃ nitrogen (minor variations are permitted for technical reasons)	(a) From ammonia and nitric acid, adding ground limestone dolomite (b) From calcium nitrate by adding ammonia and carbon-dioxide
14	Urea	N	44% N	Urea nitrogen expressed as amide nitrogen	From ammonia and carbon dioxide under high pressure	The maximum biuret content is 1%

B. PHOSPHATIC FERTILIZERS

3	Superphosphate	P ₂ O ₅	16% P ₂ O ₅	Calcium hydrogen orthophosphate, calcium tetrahydrogen diortho-phosphate and calcium sulphate; phosphate expressed as P ₂ O ₅ , soluble in water and ammonium citrate, of which at least 90% water-soluble	Decomposition of ground phosphate rock with sulphuric acid
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C. POTASSIC FERTILIZERS

8	50's Potash	K ₂ O	47% K ₂ O	Potassium chloride and sodium chloride; Potash expressed as water-soluble K ₂ O	From crude potassium salts by dissolving and crystallising flotation and other methods of separation
9	Potassium sulphate	K ₂ O	47% K ₂ O	Potassium sulphate; Potassium expressed as water-soluble K ₂ O	From potash salts by double decomposition

No.	Type of fertilizer	Content of essential components	Main composition; essential properties for use	Process of manufacture	Special regulations
(1)	(2)	(3)	(4)	(5)	(6)

II. COMPOUND MINERAL FERTILIZERS

Up to 4% Magnesium, in the form of total MgO or total MgCO₃, may be added to the fertilizer without changing the type.

The contents in col. (3) may be exceeded; they may be less (but by not more than 0.5% N, 1% P₂O₅, and 1% K₂O)

A. NPK - FERTILIZERS

42	NPK-fertilizer	15% N 15% P ₂ O ₅ 15% K ₂ O	Ammonium salts, nitrates; Nitrogen expressed as NH ₃ - and NO ₃ -nitrogen. Calcium and ammonium phosphates; Phosphate expressed as P ₂ O ₅ soluble in water and ammonium citrate (of which at least 30% soluble in water). Potassium chloride; Potash expressed as water-soluble K ₂ O.	Decomposition of phosphate rock with nitric acid, sulphuric acid or phosphoric acid; ammoniation and addition of potassium chloride.
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III. ORGANIC FERTILIZERS

Up to 4% Magnesium in the form of total MgO or total MgCO₃ may be added to the fertilizers without changing the type. The contents shown in col. 3 may be exceeded; they must not be more than 1% N, 2% P₂O₅ and 1% K₂O lower. "Preparation" in the sense used in col. 5 means to make the fertilizer innocuous from the health point of view.

12	Organic NP-fertilizer (Mixed horn and bone meal fertilizer)	4% N 5% P ₂ O ₅	Nitrogenous organic materials; Nitrogen expressed as organically bound nitrogen. Calcium phosphates; Phosphate expressed as total P ₂ O ₅ .	Preparation of animal or vegetable materials (other than waste from the manufacture of pharmaceutical products), whether or not with diureidobut-2-ene added.	The fertilizer may be labelled "mixed horn and bone meal fertilizer" if prepared only of animal horn and bones, whether or not with blood added.
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IV. ORGANO - INORGANIC FERTILIZERS

Up to 4% Magnesium in the form of total MgO or total MgCO₃ may be added to the fertilizers without changing the type.

The contents shown in Col. 3 may be exceeded; they may be lower (with the exception of peat fertilizers and organo-inorganic mixed fertilizers) but not more than by 1% N, 2% P₂O₅ and 1% K₂O.

"Preparation" in the sense used in Col. 5 means to make the fertilizers innocuous from the health point of view.

14	Organo-inorganic NPK-fertilizer	4% N 4% P ₂ O ₅ 6% K ₂ O	Organic fertilizers and mineral fertilizers; Nitrogen expressed as total nitrogen, Phosphate expressed as total P ₂ O ₅ , Potash expressed as water-soluble K ₂ O	Preparation of animal or vegetable materials (other than waste from the manufacture of pharmaceutical products) whether or not with diureidobut - 2 - ene added; mixing with mineral fertilizers.
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No.	Type of fertilizer	Essential components	Minimum content	Main composition; essential properties for use	Process of manufacture	Special regulations
(1)	(2)	(3)	(4)	(5)	(6)	(7)

V. FERTILIZERS WITH TRACE ELEMENTS

Up to 4% Magnesium in the form of total MgO or total MgCO₃ may be added to the fertilizers without changing the type.

A. FERTILIZERS FALLING WITHIN "I" TO "IV" WITH TRACE ELEMENTS ADDED

1	Description of type as in "I" with addition of the words "WITH TRACE ELEMENTS", or of a description of the added trace elements.	In addition to N, P ₂ O ₅ or K ₂ O, the trace elements B, Cu or Mn.	0.2% B 0.4% Cu 1.0% Mn	For the main components as in "I"; the trace elements expressed as total content.	As in "I", with the trace elements added.	If the fertilizer contains boron, it must be put on the market in closed containers; attention must be drawn to the boron content by an indication printed on the outside or a label enclosed in the package.
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C. FERTILIZERS THE ESSENTIAL COMPONENTS OF WHICH CONSIST ONLY OF TRACE ELEMENTS

1	Boron fertilizer	B a)	11% B	di Sodium tetraborate (borax); Boron expressed as water-soluble B.	Solution and recrystallisation of sodium borate.	The fertilizer must be put on the market in closed containers; attention must be drawn by an indication printed on the outside or a label enclosed in the package, to the times of application (frequency, stage of growth) and to the quantity to be applied per unit of area. Every container must also be marked with the note: "VORSICHT, GEFAHR BEI ÜBERDOSIERUNG!" (Caution: Excessive dosage is dangerous!).
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B. BELGIUM (1970)

Schedule to the Crown Order Relative to Trade in Fertilizers and Soil Amendments, 12 September 1970 - Moniteur belge No. 11, 16 January 1971, p. 577.

[Extracts, containing selected examples]*

TABLE OF FERTILIZERS, LIMING MATERIALS, ORGANIC SOIL AMENDMENTS AND RELATED PRODUCTS

(a) Name	(b) Description	(c) Specifications	(d) Content in active principles to be guaranteed
<u>CHAPTER I - FERTILIZERS</u>			
<u>(a) Nitrogenous fertilizers</u>			
Ammonium nitrate. Ammonitrate. Ammonsalpeter. Calcareous ammonium nitrate.	Product obtained by chemical process and containing as essential ingredient, ammonium nitrate to which they have been added, as fillers: Calcium carbonate, magnesium and calcium carbonate, calcium sulphate (gypsum), magnesium carbonate, magnesium sulphate kieserite and/or coating materials such as kieselguhr. In the case of calcareous ammonium nitrate ("Kalkammonsalpeter") not less than 20% of the filler must be present in the form of calcium carbonate or magnesium carbonate and calcium.	Not less than 20% for the entire amount of ammonia and nitric nitrogen. The respective forms of nitrogen must represent not less than 45% of the nitrogen present.	Minimum: Ammonia-nitrogen; Nitric nitrogen.
Urea.	Product obtained by chemical process and containing urea as essential ingredient.	Not less than 44% total nitrogen, expressed as urea-nitrogen. Not more than 1.2% biuret.	Minimum: Total nitrogen expressed as urea-nitrogen.
<u>(b) Phosphatic fertilizers</u>			
Concentrated super-phosphate. Triple super-phosphate.	Product obtained by chemically reacting rock phosphate and sulphuric acid and containing monocalcium phosphate as essential ingredient.	Not less than 38% water-soluble phosphoric acid (anhydrous)	Minimum: water-soluble phosphoric acid.
Soft natural phosphate. Soft rock phosphate. (followed by the name of the region of origin).	Product obtained by grinding soft rock phosphates and containing tri-calcium phosphate and calcium carbonate as essential ingredients.	Not less than 25% phosphoric acid (anhydrous) soluble in mineral acid. Not less than 50% phosphoric acid (anhydrous) soluble in mineral acid, to be soluble in 2% formic acid. Fineness of grinding: not less than 90% to pass through 0.15 mm mesh sieve.	Minimum: phosphoric acid soluble in mineral acid.

* The number of items so selected from each section of each chapter of the table, is as follows: Chapter I: (a) two out of sixteen; (b) two out of eight; (c) two out of nine; (d) one out of five; (e) one (the entire section). Chapter II: one out of seven. Chapter III: one out of seven. Chapter IV: one out of three.

(c) Potassic fertilizers

Potassium chloride. The name may be followed by the number 40, 50 or 60, provided the fertilizer has a minimum content of respectively 40%, 50% or 60% potassium oxide. Potassium sulphate.

Product obtained from crude salts of potassium treated in such a way that the product contains potassium chloride as essential ingredient.

Not less than 37% potassium oxide, water-soluble.

Minimum water-soluble Potassium oxide.

Product obtained by chemical process and containing potassium sulphate as essential ingredient.

Not less than 48% potassium oxide, water-soluble. Not more than 3% chlorine.

Minimum: water-soluble potassium oxide.

(d) Fertilizers containing two, or three active principles (nitrogen and/or phosphoric acid and/or potassium oxide)

Diammonium phosphate.

Product obtained by chemical process and containing diammonium phosphate as essential ingredient.

Not less than: 17% ammonia-nitrogen; 48% water-soluble phosphoric acid.

Minimum: nitric nitrogen; water-soluble potassium oxide.

(e) Compound fertilizers

Compound fertilizer (the description "Chemical Compound Fertilizer" may be used even when the product contains only chemicals)

Product containing not less than two of the following active principles: nitrogen, phosphoric acid, potassium oxide and obtained:

1. by mixture of several of the fertilizers contemplated in Chap. I to which the products described in Chapters II and/or IV and/or dried manure have been added where appropriate;
2. by reacting several raw materials and/or fertilizers.

Not less than 12% for the entire amount of active principles; nitrogen, phosphoric acid, potassium oxide, of which not less than 2% for the nitrogen content, 3% for the contents in phosphoric acid and potassium oxide. For each of the forms in which nitrogen is present in the fertilizer the content to be guaranteed must be not less than 0.5%. For each of the soluble forms in which phosphoric acid is present in the compound fertilizer, the content to be guaranteed must be not less than 1%.

Not less than two of the following active principles; Minimum:

- nitrogen, indicating the content in the form(s) in question in which this active principle is present; ammonia-nitrogen and/or nitric and/or cyanamide-process nitrogen and/or urea-nitrogen and/or organic nitrogen;*
- phosphoric acid, indicating one of the following solvents: water, water and alkaline ammonium citrate; alkaline ammonium citrate; 2% citric acid; solubility in citric acid may not be indicated unless the phosphorus present is obtained exclusively from Thomas slag. Where the guaranteed water-soluble phosphoric acid and alkaline ammonium citrate is indicated, the overall guarantee may be followed by an indication of the water-soluble portion expressed exclusively in the form of a vulgar fraction - potassium oxide, water-soluble.

* For organic nitrogen, the origin must also be indicated.

CHAPTER II - LIMING MATERIALS

(calcium or calcium/magnesium soil amendments)

Calcium oxide, ground. Lime-stone, ground. Quicklime. ground.	Product obtained by grinding calcined limestone, rock, containing calcium oxide as essential ingredient.	Not less than 70% neutralization value. Fineness of grinding: not less than 90% to pass through 2 mm mesh sieve, and 99% through 4 mm mesh.	Minimum: neutralization value; fineness of grinding. Optional: minimum: magnesium soluble in mineral acid, calculated as magnesium oxide provided content in latter is not less than 3%.
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CHAPTER III - ORGANIC SOIL AMENDMENTS

Dried... manure (insert here the name of the ingesting animal species in question). The description "dried manure" may be used when the manure in question is obtained exclusively from animals of the bovine species. Where peat or sawdust is used as bedding, an indication of this fact must be included in the description.	Dried accessory product consisting of the solid and liquid excreta of animals and, where appropriate, containing bedding and small amounts of farmyard waste.	Not less than 50% organic matter.	Minimum: organic matter.
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CHAPTER IV - RELATED PRODUCTS

Kieserite	Product containing magnesium sulphate (crystallized with 1 molecule water)	Not less than 25% magnesium in the form of water-soluble sulphate, calculated as magnesium oxide. Fineness of grinding: not less than 90% to pass 2 mm mesh sieve and 99% through 4 mm mesh sieve.	Minimum: water-soluble magnesium, calculated as magnesium oxide.
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ANNEX III - EXAMPLE OF OFFICIAL METHODS OF ANALYSIS FOR FERTILIZERS

Extracts from the Official Methods of Analysis of the Association of Official Analytical Chemists. Eleventh Edition 1970. Published by the Association of Official Analytical Chemists, P.O. Box 540, Benjamin Franklin Station, Washington, D.C. 20044*.

* Reprinted with the kind permission of the Executive Secretary of the Association.

OFFICIAL
METHODS OF ANALYSIS
OF THE
**ASSOCIATION OF OFFICIAL
ANALYTICAL CHEMISTS**

WILLIAM HORWITZ, Editor

PETER CHICHILO and HELEN REYNOLDS, ASSOCIATE EDITORS

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2. Fertilizers*

Sampling—Official Final Action

2.001 Solid Fertilizers (1)

(a) *Bagged fertilizers.*—Use slotted single or double tube, or slotted tube and rod, with solid cone tip at one end. Take sample as follows: Lay bag horizontally and remove core diagonally from end to end. From lots of 10 bags or more, take core from each of 10 bags. When necessary to sample lots of <10 bags, take 10 cores but at least 1 core from each bag present. For small packages (≤ 10 lb) take 1 entire package as sample.

(b) *Bulk fertilizers, including railroad car-size lots.*—Use trier of design represented in Table 2:1.

Table 2:1 Trier specifications

Trier	Length, in.	od in.	ld in.	Compartment- ments	
				No.	Size, in.
Missouri	59	1½	¾	8	3
552 Grain*	63	1½	1¼	11	3½
Missouri "D"†	52	1¼	1	1	45

Triers available from:

* Seedboro Equipment Co., 618 W. Jackson Blvd, Chicago, IL 60606.

† American Tool and Die, Inc., 1105 Maple St, West Des Moines, IA 50265.

Draw 10 vertical cores distributed in std concentric sampling pattern (Fig. 2:1) of such design that each core represents approx. equal fractions of lot.

Bulk shipments may be sampled at time of loading or unloading by passing National Plant Food Institute type sampling cup, Fig. 2:2 (mouth dimensions: width ¾", length 16", or as long as max. diam. of stream), thru entire stream of material as it drops from belt or chute. Make sampling such as to assure

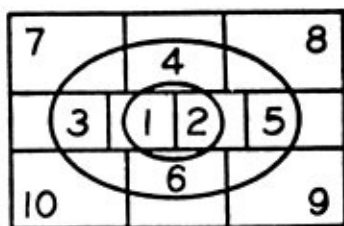


FIG. 2:1—Sampling pattern

* Methods so marked are surplus methods. See "Definitions of Terms and Explanatory Notes," item (29).

≥ 10 equal-timed-spaced passes thruout transfer operation. Stream samples are not applicable unless uniform continuous flow of fertilizer is maintained for >3 min while lot is being sampled.

(c) *Preparation of sample.*—Place composite sample in airtight container and deliver entire sample to laboratory. If composite sample is reduced in field, use riffle.



FIG. 2:2—Sampling cup

2.002 Liquid Fertilizers (2)

(In Absence of Free Ammonia)

(a) *Clear solns.*—(Mixed liqs and N solns.) Secure sample directly from mixing vat, storage tank, or delivery tank after thoro mixing. Take sample from surface or thru direct tap. Flush direct tap, or delivery line and faucet, and collect sample in glass or polyethylene container. Alternatively, lower sample container into well mixed material thru port in top of tank and let fill. Seal container tightly.

(b) *Fluid fertilizers with suspended material.*—(Salt suspensions and slurries.) Agitate material in storage until thoroly mixed (15 min usually adequate) before taking sample. Sample directly as in (a), or use 500 ml Missouri or Indiana sampling bottle, Fig. 2:3. Lower sampling bottle from top opening to bottom of tank and raise slowly while filling. Transfer to sample bottle and seal tightly.

Alternatively, secure sample from tap on recirculation line after agitating and recirculating simultaneously until thoroly mixed. Draw sample while recirculating. If recirculation line is attached to manifold delivery line, allowing cross-contamination, pump ca 1' or 500 gal. into temporary storage tank, then sample from recirculation line as above or delivery line. Transfer to sample bottle and seal tightly.

SAMPLING

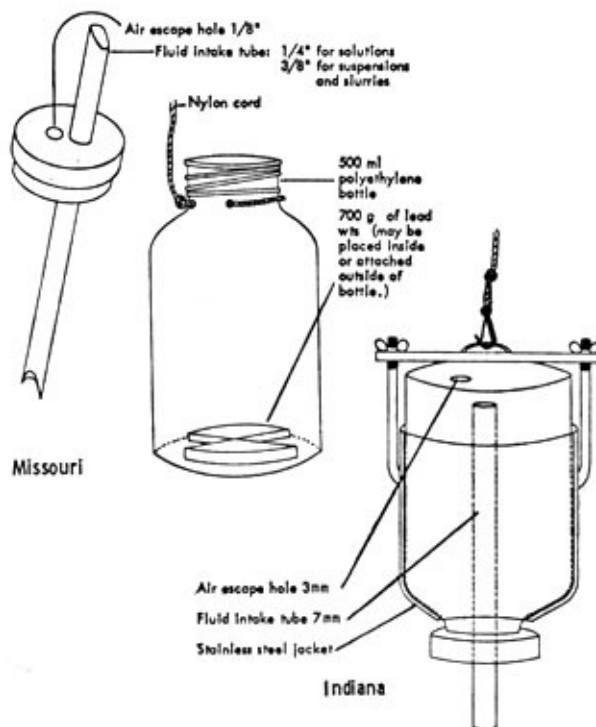


FIG. 2:3—Missouri and Indiana weighted restricted-fill fluid fertilizer sampling bottles designed to fill while being lowered (and raised) in storage tanks

Ammoniacal Solutions (3)

2.003

Apparatus

(a) Container.—Polyethylene reagent-form bottle with buttress-type cap, 1 qt capacity.

(b) Sample flow control apparatus.—Construct from following fittings: $1\frac{1}{2} \times \frac{1}{4}$ " reducing bushing; $\frac{1}{4}$ " tee; $\frac{1}{4}$ " nipple 12–18" long (length not critical); two $\frac{1}{4}$ " stainless steel, blunt-nose needle valves with hose connections (Hoke No. 328). All fittings except valves can be either Al or stainless steel. (See Fig. 2:4.)

Attach valves directly to tee which is then attached to reducing bushing thru nipple. To both valves attach $\frac{1}{4}$ " id Tygon tubing (Hoke No. 314A hose connection), 12" length to sample valve and sufficient length to vent valve to reach disposal area of container. To free end of sample tubing attach 3" length of $\frac{1}{4}$ " glass or stainless steel tubing inserted thru No. 4 rubber stopper. To exit end of metal tube attach addnl 6" length of Tygon tubing. Make certain all connections are tight. App. can be attached directly to tank cars, but requires addnl coupling, which varies with installation, to attach to storage tanks. $1\frac{1}{2}$ " "quick coupler" (Ever-Tite Coupling Co., 254 W. 54th St, New York, NY 10019) suffices in most cases.

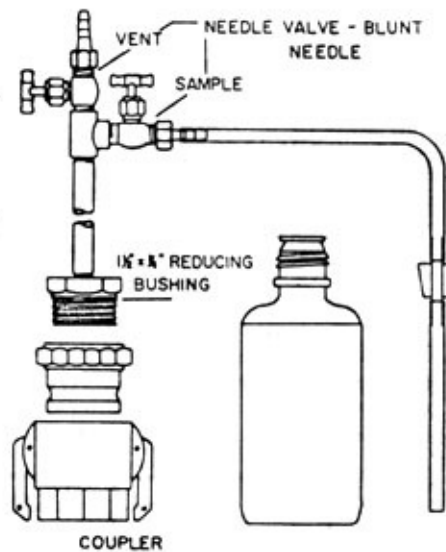


FIG. 2:4—Sampling apparatus for ammoniacal solutions, including "quick coupler" for attaching to storage tanks

2. FERTILIZERS

2.004

Sampling

Prep. sample bottle in laboratory by adding ca 500 ml H₂O, replacing cap, and weighing accurately (± 0.1 g). Attach sampling app. to car or tank and, with sample valve closed, flush line thru vent valve. Partially collapse sample bottle, insert sample tube with stopper, and seat tightly. With sample tube dipping below surface of H₂O in bottle, throttle vent valve to maintain small flow of soln and partially open sample valve, collecting ca 100 ml sample. (Bottle should not expand to full size during this time.) Close sample valve, remove sample tube, partially collapse bottle, and cap tightly. Reweigh (± 0.1 g) and calc. wt sample. Cool to 20°, transfer to 1 or 2 L vol. flask, dil. to vol. with H₂O, mix thoroly, and take aliquots for analysis.

Anhydrous Ammonia (3)

(Caution: Use extreme care in handling anhyd. NH₃. Suitable gas mask and rubber gloves are required. See 46.032.)

2.005

Sampling

Use sample tube of thermal shock-resistant glass calibrated to contain 100 ml and graduated in 0.05 ml subdivisions up to 0.5 ml. (DuPont special oil centr. tube or ASTM long-form oil tube is satisfactory.) Flush line and fill tube to 100 ml mark with sample in such manner that condensing moisture will not enter sample tube. (Skirt attached to end of sample line will drain moisture away.)

2.006

Water and Nitrogen

Immediately close sample tube with tight-fitting rubber stopper into which is inserted tight-fitting piece of 0.25" id glass tubing 2-3" long, bent at its exit from outer end of stopper to let gases escape but to exclude entrance of moisture or moisture-laden air. Place in H₂O bath at approx. air temp. and let NH₃ evap. When temp. of sample tube is ca that of bath, remove tube, wipe outer surface, and det. vol. of residue.

% H₂O in sample = ml residue \times C, where C = 0.74, 0.70, or 0.66 for pressures in original containers of 100, 150, or 200 psi, resp.

$$\% \text{N} = (100 - \% \text{H}_2\text{O}) \times 0.8224.$$

2.007 Preparation of Sample (4)—Official Final Action

Reduce gross sample to quantity sufficient for analysis or grind ≥ 0.5 lb of reduced sample without previous sieving. For fertilizer materials and moist fertilizer mixts, grind to pass sieve with 1 mm circular openings, or No. 20 sieve; for dry mixts that tend to segregate, grind to pass No. 40 sieve. Grind as rapidly as possible to avoid loss or gain of moisture during operation. Mix thoroly and store in tightly stoppered bottles.

2.008 ★ Mechanical Analysis of Bone, ★ Tankage, and Basic Slag (5)—Official Final Action

Transfer 100 g original bone or tankage or 10 g basic slag to sieve with circular openings 0.5 mm diam., and sift. Break lumps with soft rubber pestle if material tends to cake. Weigh coarse portion remaining on sieve. Det. fine portion by difference.

Mechanical Analysis of Phosphate Rock (6)—Official Final Action

2.009

Apparatus

(a) Water pressure control.—See Fig. 2:5. Connect valve, A, std pressure gage, B, and aerator, C, with $\frac{3}{8}$ " diam. pipe.

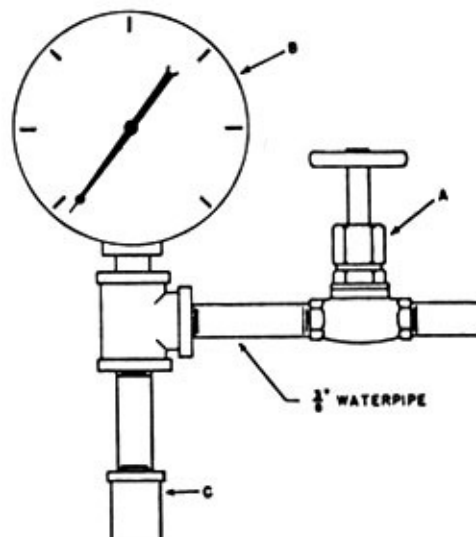


FIG. 2:5—Apparatus for control of water pressure

(b) Sieves.—Nos. 100 and 200, bronze or stainless steel cloth, checked against certified sieves. Sieves 8" diam. and 2" in depth to sieve cloth are recommended for both wet and dry sieving, but other sizes may be used if detd. to be suitable under conditions of method. (Other sieves in U.S. series may be used, with precaution to ensure complete sepn of sample into desired fractions.)

(c) Sieve shaker.—Ro-Tap, Syntron, or other suitable machine.

2.010

Reagent

Dispersing agent.—Dissolve 36 g Na hexameta-phosphate and 8 g Na₂CO₃ in H₂O and dil. to 1 L.

2.011

Determination

(a) Ground phosphate rock.—Place 100 g sample on No. 200 sieve and wash with moderate stream of tap H₂O at max. gage pressure of 4 lb until H₂O

PHOSPHORUS

passing sieve is clear, with care to avoid loss of sample by splashing. Dry material remaining on sieve at 105° and transfer to No. 100 sieve in series with No. 200 sieve of same diam. and depth. Shake 8 min in mech. shaker. Det. % sample passing No. 100 sieve by subtracting wt of material retained on that sieve from 100. Det. % sample passing No. 200 sieve by subtracting sum of wts of material retained on that sieve and on No. 100 sieve from 100.

(b) *Soft phosphate with colloidal clay.*—Add 100 g sample to rapidly stirred soln of 50 ml dispersing agent and 450 ml tap H₂O, with care to avoid contact of unwetted material with shaft of stirrer and side of beaker. Stir 5 min after addn of sample is completed. Transfer slurry to No. 200 sieve and proceed as in (a).

2.012 Total Water—Official Final Action

Not applicable to samples that yield volatile substances other than H₂O at drying temp.)

Heat 2 g sample, 2.007, 5 hr in oven at 99–101°. In case of NaNO₃, (NH₄)₂SO₄, and K salts, heat to constant wt at 129–131°. Report % loss in wt as H₂O at temp. used.

FREE WATER

Vacuum-Desiccation Methods (7)

2.013 Method I—Official Final Action

Place 2 g prepd sample, 2.007, in tared weighing dish. (Weigh extremely hygroscopic or damp materials by difference in covered dishes.) Dry sample at 25–30° (precise results depend on as constant a temp. as possible) in vac. desiccator over anhyd. Mg(ClO₄)₂, P₂O₅, or BaO, under ≥20 or ≤22" vac. (8–10" absolute pressure) 16–18 hr. Reweigh, and report % loss in wt as free H₂O.

2.014 Method II—Official First Action

Weigh 2 g prepd sample, 2.007, into tared glass weighing dish. Dry sample 2 hr ± 10 min at 50 ± 1.5° in oven under vac. of 19–21" (absolute pressure 9–11"). (Temp. control within specified limits thruout vac. chamber is essential.) Maintain vac. by passing desiccated air thru chamber. Cool dried sample in desiccator and reweigh. Report % loss in wt as free H₂O.

2.015 ★ Acid-Insoluble Ash (8)—★ Official Final Action

Transfer 2 g sample to 400 ml beaker. Add 100 ml HCl (1 + 4), cover with watch glass, and immerse 30 min in steam or hot H₂O bath (98–100°), keeping liq. level in beaker below that of H₂O in bath. Stir at 10 min intervals, and after 30 min remove from bath and filter thru 11 or 12.5 cm medium paper, transferring insol. residue to filter with stream of H₂O. Fold paper contg residue, place in porcelain crucible, and ignite in muffle furnace 1 hr at 800°. Cool, transfer contents of crucible to original beaker with 50 ml HCl (1 + 4), cover, and again immerse in steam or

hot H₂O bath 30 min, stirring occasionally. After 30 min, remove from bath and filter thru weighed gooch contg acid-washed asbestos mat on filter paper disk. Wash insol. residue several times with H₂O, dry crucible 1 hr at 125°, cool in desiccator, and weigh. Calc. net increase in wt crucible to % acid-insol. ash.

PHOSPHORUS

Total Phosphorus

2.016

Reagent

Magnesium nitrate soln.—Dissolve 950 g P-free Mg(NO₃)₂·6H₂O in H₂O and dil. to 1 L.

2.017

**Preparation of Solution—
Official Final Action**

(Caution: See 46.019, 46.026, 46.028, 46.030,
and 46.069.)

Treat 1 g sample by (a), (b), (c), (d), or (e), as indicated. Cool soln, transfer to 200 or 250 ml vol. flask, dil. to vol., mix, and filter thru dry filter.

(a) *Materials containing small quantities of organic matter.*—Dissolve in 30 ml HNO₃ and 3–5 ml HCl, and boil until org. matter is destroyed (30 min for liqs and suspensions).

★(b) *Fertilizers containing much Fe or Al phosphate, and basic slag.*★—Dissolve in 15–30 ml HCl and 3–10 ml HNO₃.

(c) *Organic material like cottonseed meal alone or in mixtures.*—Evap. with 5 ml of the Mg(NO₃)₂ soln, ignite, and dissolve in HCl.

★(d) *Materials or mixtures containing large quantities of organic matter.*★—(With cottonseed meal and similar materials it is best to add first ca 5 ml HNO₃ and then the H₂SO₄.) Add 20–30 ml H₂SO₄ to sample in 200 ml flask. Let mixt. digest, at gentle heat if necessary, until violence of reaction is over. Add 2–4 g NaNO₃ or KNO₃, boil, and add addnl small amt nitrate after soln is nearly colorless, or add nitrate in small portions from time to time. When soln is colorless, cool, add 150 ml H₂O, and boil few min.

(e) *All fertilizers.*—Boil gently 30–45 min with 20–30 ml HNO₃ in suitable flask (preferably Kjeldahl for samples contg large amts of org. matter) to oxidize all easily oxidizable matter. Cool and add 10–20 ml 70–72% HClO₄. Boil very gently until soln is colorless or nearly so and dense white fumes appear in flask. Do not boil to dryness at any time (Danger!). (With samples contg large amts of org. matter, temp. should be raised to fuming point, ca 170°, over period of at least 1 hr.) Cool slightly, add 50 ml H₂O, and boil few min.

Spectrophotometric Molybdovanadophosphate Method (9)—Official Final Action

(Not applicable to materials yielding colored solns or solns contg ions other than orthophosphate which form colored complexes with molybdovanadate. Not recommended for basic slag.)

2. FERTILIZERS

2.018

Apparatus

Photometer.—Beckman Instruments, Inc. Model DU spectrophtr with stray light filter and matched 1 cm absorption cells. With other photometers analyst must det. suitability for use and conditions for satisfactory performance. Means for dispelling heat from light source is desirable.

2.019

Reagents

(a) *Molybdovanadate reagent.*—Dissolve 40 g NH_4 molybdate. $4\text{H}_2\text{O}$ in 400 ml hot H_2O and cool. Dissolve 2 g NH_4 metavanadate in 250 ml hot H_2O , cool, and add 450 ml 70% HClO_4 . (Caution: See 46.028(a) and (d).) Gradually add molybdate soln to vanadate soln with stirring, and dil. to 2 L.

(b) *Phosphate std soln.*—Prep. solns of pure, dry (2 hr at 105°) KH_2PO_4 (52.15% P_2O_5) contg 0.4–1.0 mg P_2O_5 /ml in 0.1 mg increments. Prep. fresh solns contg 0.4 and 0.7 mg P_2O_5 /ml weekly.

2.020

Preparation of Standard Curve

Pipet 5 ml aliquots of 7 std phosphate solns (2–5 mg P_2O_5 /aliquot) into 100 ml vol. flasks and add 45 ml H_2O . Then, within 5 min for entire series, add 20 ml molybdovanadate reagent by buret or pipet, dil. to vol. and mix. Let stand 10 min.

Select 2 absorption cells (std and sample cells) and fill both with 2 mg std. Set spectrophtr to 400 nm and adjust to zero *A* with std cell. Sample cell must check zero *A* within 0.001 unit; otherwise read *A* difference for sample cell and correct subsequent readings. (Choose cell showing pos. *A* against other as sample cell so that this pos. *A* is always subtracted.) Using sample cell, det. *A* of other stds with instrument adjusted to zero *A* for 2 mg std. After each detn empty and refill cell contg 2 mg std, to avoid error that might arise from temp. changes. Plot *A* against concn in mg P_2O_5 /ml std soln.

2.021

Preparation of Solution

Treat 1 g sample as in 2.017(a), (b), (c), (d), or (e), preferably (e) when these acids are suitable solv. (Soln should be free of N oxides and NOCl .)

(a) For P_2O_5 content up to 5%, dil. to 250 ml.

(b) For P_2O_5 content >5%, dil. to such vol. that 5 or 10 ml aliquot contains 2–5 mg P_2O_5 .

2.022

Determination

Pipet, into 100 ml vol. flasks, 5 ml aliquots of std phosphate solns contg 2 and 3.5 mg P_2O_5 /aliquot, resp., and develop color as in 2.020. Adjust instrument to zero *A* for 2 mg std, and det. *A* of 3.5 mg std. (It is essential that the *A* of latter std be practically identical with corresponding value on std curve.)

(a) *Samples containing up to 5% P_2O_5 .*—Pipet, into 100 ml vol. flask, 5 ml sample soln, 2.021(a), and 5 ml std phosphate soln contg 2 mg P_2O_5 . Develop color and det. *A* concurrently with and in same

manner as for std phosphate solns in preceding par., with instrument adjusted to zero *A* for 2 mg color std. Read P_2O_5 content of soln from std curve. With series of sample solns, empty and refill cell contg 2 mg std after each detn.

% P_2O_5 in sample = $100 \times [(\text{mg } \text{P}_2\text{O}_5 \text{ from std curve} - 2)/20]$.

(b) *Samples containing more than 5% P_2O_5 .*—Pipet 5 or 10 ml sample soln, 2.021(b), into 100 ml vol. flask. Without adding std phosphate soln, proceed as in (a).

% P_2O_5 in sample = $100 \times (\text{mg } \text{P}_2\text{O}_5 \text{ from std curve}/\text{mg sample in aliquot})$.

Gravimetric Quinolinium Molybdophosphate Method (10)—Official Final Action

2.023

Reagents

(Store solns in polyethylene bottles.)

(a) *Citric-molybdic acid reagent.*—Dissolve 54 g 100% molybdic anhydride (MoO_3) and 12 g NaOH with stirring in 400 ml hot H_2O , and cool. Dissolve 60 g citric acid in mixt. of 140 ml HCl and 200 ml H_2O , and cool. Gradually add molybdic soln to citric acid soln with stirring. Cool, filter, and dil. to 1 L. (Soln may be green or blue; color deepens on exposure to light.) If necessary, add 0.5% KBrO_3 soln dropwise until green color pales. Store in dark.

(b) *Quinoline soln.*—Dissolve 50 ml synthetic quinoline, with stirring, in mixt. of 60 ml HCl and 300 ml H_2O . Cool, dil. to 1 L, and filter.

(c) *Quimociac reagent.*—Dissolve 70 g Na molybdate. $2\text{H}_2\text{O}$ in 150 ml H_2O . Dissolve 60 g citric acid in mixt. of 85 ml HNO_3 and 150 ml H_2O , and cool. Gradually add molybdate soln to citric acid- HNO_3 mixt. with stirring. Dissolve 5 ml synthetic quinoline in mixt. of 35 ml HNO_3 and 100 ml H_2O . Gradually add this soln to molybdate-citric acid- HNO_3 soln, mix, and let stand 24 hr. Filter, add 280 ml acetone, dil. to 1 L with H_2O , and mix.

2.024

Preparation of Solution

Treat 1 g sample as in 2.017, dilg to 200 ml.

2.025

Determination

Pipet, into 500 ml erlenmeyer, aliquot contg ≤ 25 mg P_2O_5 and dil. to ca 100 ml with H_2O . Continue by one of the following methods:

(a) Add 30 ml citric-molybdic acid reagent and boil gently 3 min. (Soln must be ppt-free at this time.) Remove from heat and swirl carefully. Immediately add 10 ml quinoline soln from buret with continuous swirling. (Add first 3–4 ml dropwise and remainder in steady stream.) Or:

(b) Add 50 ml quimociac reagent, cover with watch glass, place on hot plate in well-ventilated hood, and boil 1 min.

After treatment by (a) or (b), cool to room temp., swirl carefully 3–4 times during cooling, filter into gooch with glass fiber filter paper previously dried at

250° and weighed, and wash with five 25 ml portions of H₂O. Dry crucible and contents 30 min at 250°, cool in desiccator to constant wt, and weigh as (C₉H₇N)₃H₃[PO₄.12MoO₃]. Subtract wt reagent blank. Multiply by 0.03207 to obtain wt P₂O₅ (or by 0.01400 for P). Report as % P₂O₅ (or % P).

Alkalimetric Quinolinium Molybdophosphate Method (11)—Official First Action

2.026 Reagents

- (a) *Quimociae reagent*.—See 2.023(c).
 (b) *Sodium hydroxide std soln*.—(1 ml = 1 mg P₂O₅.) Dil. 366.32 ml 1N NaOH, 45.033–45.037, to 1 L with H₂O.
 (c) *Nitric acid std soln*.—Prep. HNO₃ soln equiv. to concn of (b) and stdze by titrg against (b), using phthln. (For greater precision, use HNO₃ soln corresponding to 1/5 concn of (b).)
 (d) *Citric acid*.—10% (w/v).
 (e) *Indicators*.—(1) *Thymol blue soln*.—0.1%. Add 2.2 ml 0.1N NaOH to 0.1 g thymol blue and dil. to 100 ml with 50% alcohol. (2) *Phenolphthalein*.—0.1%. Dissolve 0.1 g phthln in 100 ml 50% alcohol. (3) *Mixed indicator*.—Mix 3 vols (1) and 2 vols (2).

2.027 Preparation of Sample Solution

Treat 1 g sample as in 2.017, first par. and (a) or (e).

2.028 Determination

- (a) *Precipitation*.—Transfer aliquot contg ≤30 mg P₂O₅ and ≤5 ml concd acid to 500 ml erlenmeyer, add 20 ml citric acid soln, and adjust to ca 100 ml. Add 60 ml quimociae reagent to prepd sample soln, immediately cover with watch glass, and place on medium temp. hot plate. After soln comes to boil, move to cooler portion of hot plate and boil gently 1 min. Let cool until flask can be handled comfortably with bare hand.
 (b) *Filtration and washing*.—Prep. pulped-paper pad ca 1/4" thick on perforated porcelain disk in funnel by adding 2 or more approx. equal increments of H₂O suspension of pulped paper and sucking dry with vac. between addns. Swirl flask, pour contents into filter, and wash flask with five ca 15 ml portions H₂O, adding washings to funnel. Immediately after funnel has emptied, wash down sides with ca 15 ml H₂O to remove residual acetone, which causes excessively fast drying and later lump formation if allowed to evap. Wash with 3 addnl 15 ml portions H₂O, letting funnel empty between addns. Keep drying of ppt to min. Using only jet of H₂O, transfer ppt and pad to pptn flask and break up pad with jet of H₂O. Do not smear ppt against funnel or flask.
 (c) *Titration*.—Titr. with std NaOH soln and add 1.5 ml excess. Add 1 ml mixed indicator and titr. with std HNO₃ soln to grey-blue end point. If over-titrated (greenish-yellow), add addnl excess std NaOH soln and titr. to grey-blue.

(d) *Blank*.—Det. blank on all reagents, adding known quantity (1–2 mg) of P₂O₅. Use 1 + 9 dilns of std NaOH and HNO₃ for titrn and subtract theoretical titer equiv. to P₂O₅ added from experimental titer. Calc. difference equiv. to 0.3663N NaOH and subtract this blank from all sample detns.

Calc. and report as % P₂O₅.

Alkalimetric Ammonium Molybdophosphate Method (12)—Official First Action

2.029 Reagents

- (a) *Molybdate soln*.—Dissolve 100 g MoO₃ in mixt. of 144 ml NH₄OH and 271 ml H₂O. Cool, and pour soln slowly, stirring constantly, into cool mixt. of 489 ml HNO₃ and 1148 ml H₂O. Keep final mixt. in warm place several days or until portion heated to 40° deposits no yellow ppt. Decant soln from any sediment and keep in g-s vessels.
 (b) *Acidified molybdate soln*.—To 100 ml molybdate soln, (a), add 5 ml HNO₃. Filter immediately before use.
 (c) *Sodium hydroxide std soln*.—Dil. 324.03 ml 1N alkali, carbonate-free, 45.033–45.037, to 1 L. (100 ml of this soln should neutze 32.40 ml 1N acid; 1 ml = 1 mg or 1% P₂O₅ on basis of 0.1 g sample.) For basic slag, stdze against std phosphate material of ca same composition as sample being examined. (Since burets in constant use may become so corroded as to increase their capacity, test them at least annually.)
 (d) *Std acid soln*.—Prep. soln of HCl or of HNO₃, corresponding to concn of (c) or to 1/2 this concn, and stdze by titrn against (c), using phthln.

2.030 Preparation of Solution

- (a) Treat 1 g sample as in 2.017(a), (b), (c), (d), or (e), preferably (a) when these acids are suitable solv.
 (b) Proceed as in 2.017(a), (b), (c), or (e), preferably (a) when these acids are suitable solv. Add 25 ml 10% BaCl₂ soln to hot digestate, boil ca 2 min, cool, dil. to 200 ml, mix, filter thru dry filter, and continue as in 2.031(b).

2.031 Determination

- (a) Prep. sample soln as in 2.030(a). Pipet, into beaker or flask, aliquot corresponding to 0.4 g sample for P₂O₅ content of sample <5%; 0.2 g for 5–20%; 0.1 g for >20%. Add 5–10 ml HNO₃, depending on method of soln (or equiv. in NH₄NO₃); then add NH₄OH until ppt that forms dissolves only slowly on vigorous stirring, dil. to 75–100 ml, and adjust to 25–30°. If sample does not give ppt with NH₄OH as test of neutzn, make soln slightly alk. to litmus paper with NH₄OH and then slightly acid with HNO₃ (1 + 3). Add 20–25 ml acidified molybdate soln for P₂O₅ content <5%; 30–35 ml for 5–20%; and enough acidified molybdate soln to insure complete pptn for >20%. Place soln in shaking or stirring app. and agitate 30 min at room temp.;

2. FERTILIZERS

decant *at once* thru filter and wash ppt twice by decanting with 25–30 ml portions H_2O , agitating thoroly and allowing to settle. Transfer ppt to filter and wash with cold H_2O until filtrate from 2 fillings of filter yields pink color on adding phthln and 1 drop of the std alkali. Transfer ppt and filter to beaker or pptg vessel, dissolve ppt in small excess of the std alkali, add few drops of phthln, and titr. with std acid. Report as % P_2O_5 .

(b) Prep. soln as in 2.030(b). Proceed as in 2.031(a) to diln to 75–100 ml. Heat in H_2O bath to 45–50°, add acidified molybdate soln at rate of 75 ml /100 mg P_2O_5 present, and let mixt. remain in bath 30 min, stirring occasionally. Decant *at once* thru filter, wash, and titr. as in 2.031(a).

(c) *Not applicable to superphosphates and other fertilizers containing sulfate or to solns prepd with aid of sulfuric acid.*—Prep. sample soln as in 2.030(a). Proceed as in 2.031(b).

Water-Soluble Phosphorus

2.032 Preparation of Solution— Official Final Action

Place 1 g sample on 9 cm filter and wash with small portions H_2O until filtrate measures ca 250 ml. Let each portion pass thru filter before adding more and use suction if washing would not otherwise be complete within 1 hr. If filtrate is turbid, add 1–2 ml HNO_3 , dil. to 250 ml, and mix.

2.033 Gravimetric Quinolinium Molybdophosphate Method— Official Final Action

Pipet aliquot contg ≤ 25 mg P_2O_5 into 500 ml erlenmeyer. Dil., if necessary, to 50 ml, add 10 ml HNO_3 (1 + 1), and boil gently 10 min. Cool, dil. to 100 ml, and proceed as in 2.025(b).

2.034 Alkalimetric Quinolinium Molybdophosphate Method— Official First Action

Pipet aliquot contg ≤ 30 mg P_2O_5 into 500 ml erlenmeyer. Dil., if necessary, to 50 ml, add 10 ml HNO_3 (1 + 1), boil gently 10 min, cool, and proceed as in 2.028, beginning "add 20 ml citric acid soln . . ."

2.035 Spectrophotometric Molybdovanadophosphate Method— Official First Action

Adjust concn according to 2.021(a) or (b) and proceed as in 2.022.

2.036 Alkalimetric Ammonium Molybdophosphate Method— Official First Action

Pipet, into beaker or flask, aliquots of soln corresponding to 0.4 g sample for P_2O_5 content of sample $< 5\%$, 0.2 g for 5–20%, or 0.1 g for $> 20\%$, and dil. to 50 ml, if necessary. Add 10 ml HNO_3 (1 + 1) and

boil gently 10 min. Cool, nearly neutze with NH_4OH , dil. to 60–75 ml, and proceed as in 2.031(a), beginning "Add 20–25 ml acidified . . ."

Citrate-Insoluble Phosphorus (13)— Official Final Action

2.037 Reagents

(a) *Ammonium citrate soln (12).*—Should have sp gr of 1.09 at 20° and pH of 7.0 as detd electro-metrically.

Dissolve 370 g cryst. citric acid in 1.5 L H_2O and nearly neutze by adding 345 ml NH_4OH (28–29% NH_3). If concn of NH_3 is $< 28\%$, add correspondingly larger vol. and dissolve citric acid in correspondingly smaller vol. H_2O . Cool, and check pH. Adjust with NH_4OH (1 + 7) or citric acid soln to pH 7. Dil. soln, if necessary, to sp gr of 1.09 at 20°. (Vol. will be ca 2 L.) Keep in tightly stoppered bottles and check pH from time to time. If pH has changed from 7.0, readjust.

(b) *Other reagents and solns.*—See 2.016, 2.019, 2.023, or 2.029.

2.038 Determination

(a) *Acidulated samples, mixed fertilizers, and materials containing water-soluble compounds.*—After removing H_2O -sol. P_2O_5 , 2.032, transfer filter and residue, within 1 hr, to 200 or 250 ml flask contg 100 ml NH_4 citrate soln previously heated to 65°. Close flask tightly with smooth rubber stopper, shake vigorously until paper is reduced to pulp, and relieve pressure by removing stopper momentarily. Continuously agitate stoppered flask in constant temp. app. at exactly 65°. (Action of app. should be such that dispersion of sample in citrate soln is continually maintained and entire inner surface of flask and stopper is continually bathed with soln.)

Exactly 1 hr after adding filter and residue, remove flask from app. and immediately filter by suction as rapidly as possible thru Whatman No. 5 paper or equiv., using buchner or ordinary funnel with Pt or other cone. Wash with H_2O at 65° until vol. filtrate is ca 350 ml, allowing time for thoro draining before adding more H_2O . If material is one that yields cloudy filtrate, wash with 5% NH_4NO_3 soln. Det. P_2O_5 in citrate-insol. residue by one of following methods:

(1) Dry paper and contents, transfer to crucible, ignite until all org. matter is destroyed, and digest with 10–15 ml HCl until all phosphate dissolves; or (2) treat wet filter and contents as in 2.017(a), (c), (d), or (e). Dil. soln to 250 ml, or other suitable vol. mix well, filter thru dry paper, and det. P_2O_5 as in 2.022, 2.025, or 2.031.

(b) *Nonacidulated samples.*—Place 1 g sample (ground to pass No. 40 sieve in case of Ca metaphosphate) on dry 9 cm paper. Without previous washing with H_2O , proceed as in (a). If sample contain much org. matter (bone, fish, etc.), dissolve residu insol. in NH_4 citrate as in 2.017(c), (d), or (e).

PHOSPHORUS

2.039 Alkalimetric Quinolinium Molybdophosphate Method (14)—Official First Action

Treat 1 g sample by 2.038(a) or (b). Transfer aliquot of citrate-insol. P_2O_5 contg ≤ 5 ml coned acid to 500 ml erlenmeyer. Add 20 ml 10% citric acid soln and dil. to 100 ml with H_2O . Continue as in 2.028(a), beginning "Add 60 ml quimociac reagent ..."

2.040 Citrate-Soluble Phosphorus—Official Final Action

Subtract sum of H_2O -sol. and citrate-insol. P_2O_5 from total P_2O_5 to obtain citrate-sol. P_2O_5 .

Available Phosphorus

2.041 Indirect Method—Official Final Action

Subtract citrate-insol. P_2O_5 from total P_2O_5 to obtain available P_2O_5 .

Direct Method—Official Final Action

2.042 Reagents
(Caution: See 46.026, 46.028, 46.030, and Acids, Chap. 46.)

(a) Nitric-perchloric acid mixture.—Add 300 ml 70% $HClO_4$ to 700 ml HNO_3 .

(b) Ternary acid mixture.—Add 20 ml H_2SO_4 to 100 ml HNO_3 , mix, and add 40 ml 70% $HClO_4$.

(c) Modified molybdovanadate reagent.—Prep. as in 2.019(a) except use 250 ml 70% $HClO_4$ instead of 450 ml.

2.043 Preparation of Solution

(a) Acidulated samples, mixed fertilizers, and materials containing water-soluble compounds.—(1) Without filtration of citrate digestate.—Place 1 g sample on 9 cm paper and wash by gravity with twelve 10 ml portions H_2O into 500 ml vol. flask. Let each portion pass thru filter before adding more. Let paper drain thoroly, remove, and rinse funnel with 10 ml H_2O . Treat H_2O -insol. residue with NH_4 citrate soln as in 2.038(a). Exactly 1 hr after adding filter and residue, remove flask from app. and transfer contents to flask contg H_2O -sol. fraction. Cool to room temp. immediately, dil. to vol., mix thoroly, and let stand at least 2 hr before removing aliquot.

(2) With filtration of citrate digestate.—If desired, wash by gravity into 500 ml Kohlrausch flask contg 5 ml HNO_3 (1 + 1), catching filtrate from insol. residue, 2.038(a), in the Kohlrausch flask contg H_2O -sol. fraction, and wash residue until vol. soln in flask is ca 500 ml. Cool, dil. to 500 ml, and mix.

(b) Nonacidulated samples.—Place 1 g sample ground to pass No. 40 sieve in case of Ca metaphosphate on dry 9 cm paper. Without previous washing with H_2O , proceed as in (a)(1) or (2). If (2) is used, wash residue until vol. soln is ca 350 ml. Cool, dil. to 500 ml, and mix.

2.044 Alkalimetric Quinolinium Molybdophosphate Method (14)—Official First Action

Treat 1 g sample by appropriate modification of 2.043. Transfer aliquot contg ≤ 30 mg P_2O_5 and ≤ 10 ml NH_4 citrate soln, 2.037(a), to 500 ml erlenmeyer. Dil., if necessary, to 50 ml, add 10 ml HNO_3 (1 + 1), and boil gently 10 min. Cool, dil. to 100 ml, and continue as in 2.028(a), beginning "Add 60 ml quimociac reagent ..."

2.045 Spectrophotometric Molybdovanadophosphate Method (15)—Official Final Action

(Not applicable to materials yielding colored solns or solns contg ions other than orthophosphate which form colored complexes with molybdovanadate. Not recommended for basic slag.)

Prep. std curve as in 2.020, using photometer, 2.018.

Pipet, into 100 ml vol. flasks, 5 ml aliquots std phosphate solns contg 2 and 3.5 mg P_2O_5 /aliquot, 2.019(b), resp., add 2 ml 70% $HClO_4$, and develop color as in 2.020. Adjust instrument to zero A for 2 mg std and det. A of 3.5 mg std. (A of latter must be practically identical with corresponding value on std curve.)

Prep. sample as in 2.043.

(a) Samples containing up to 5% P_2O_5 .—Pipet 10 ml sample soln into 125 ml erlenmeyer, and treat by one of following methods (Caution: See 46.019, 46.026, and 46.028):

(1) Add 5 ml 20% $NaClO_3$ soln and 10 ml HNO_3 - $HClO_4$ mixt., 2.042(a). Boil gently until greenish-yellow color disappears (ca 20 min), cool, and add 2 ml HCl . After vigorous reaction subsides, evap. to fumes of $HClO_4$, and fume 2 min.

(2) Add 5 ml ternary acid mixt., 2.042(b), swirl, boil gently 15 min, and digest at 150–200° until clear white salt or colorless soln remains. Evap. to white fumes and continue heating 5 min.

Cool, add 15 ml H_2O , and boil 5 min. Transfer to 100 ml vol. flask, dil. to 50 ml, swirl, and cool to room temp. Add 5 ml std phosphate soln contg 2 mg P_2O_5 and 20 ml modified molybdovanadate soln, 2.042(c). Dil. to 100 ml, and continue as in 2.022(a).

(b) Samples containing more than 5% P_2O_5 .—Dil. soln to such vol. that 5–10 ml aliquot contains 2–5 mg P_2O_5 . Digest as in (a)(1) or (2). Without adding std phosphate soln, continue as in (a).

2.046 Gravimetric Quinolinium Molybdophosphate Method (16)—Official Final Action

(a) Solns containing no organic phosphorus.—Prep. sample as in 2.043. Pipet, into 500 ml erlenmeyer, aliquot contg ≤ 25 mg P_2O_5 and ≤ 10 ml original NH_4 citrate. Dil., if necessary, to ca 50 ml, add 10 ml HNO_3 (1 + 1), and boil gently 10 min. Cool, dil. to 150 ml, and proceed as in 2.025(a) or (b).

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(b) *Solns containing organic phosphorus.*—(Caution: See 46.019, 46.026, and 46.028.) Select aliquot as in (a). Add 10 ml 20% NaClO₂ and 10 ml HNO₃-HClO₄ mixt., 2.042(a). Boil vigorously until greenish-yellow color disappears (usually ca 30 min), cool, and add 2 ml HCl. After vigorous reaction subsides, evap. to white fumes, and continue heating 5 min. Cool, and proceed as in 2.025(a) or (b).

2.047 Alkalimetric Ammonium Molybdophosphate Method (17)—Official First Action

(a) *Solns containing no organic phosphorus.*—Pipet, into suitable vessel, aliquot contg ≤ 25 mg P₂O₅ and ≤ 10 ml original NH₄ citrate. Add 10 ml HNO₃ (1 + 1) and boil gently 15 min. Cool, add 15 ml soln contg 10 g NH₄NO₃, add NH₄OH until ppt that forms dissolves only slowly on vigorous stirring, and dil. to 75–100 ml. Slowly add 45 ml acidified molybdate soln, 2.029(b), place in 50° bath, and agitate continuously 45 min. Continue as in 2.031(a), beginning, "decant at once..."

(b) *Solns containing organic phosphorus.*—Proceed as in 2.046(b) thru fuming 5 min. Cool, add 15 ml soln contg 10 g NH₄NO₃, and continue as in 2.031(a), beginning, "then add NH₄OH until ppt that forms..."

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2.048 ★ Detection of Nitrates—★ Official Final Action

Mix 5 g sample with 25 ml hot H₂O, and filter. To 1 vol. of this soln add 2 vols H₂SO₄, free from HNO₃ and oxides of N, and let cool. Add few drops concd FeSO₄ soln in such manner that fluids do not mix. If nitrates are present, junction at first shows purple, afterwards brown, or if only minute quantity is present, reddish color. To another portion of soln add 1 ml 1% NaNO₃ soln and test as before to det. whether enough H₂SO₄ was added in first test.

Total Nitrogen

(Provide adequate ventilation in laboratory and do not permit accumulation of exposed Hg.)

2.049 Reagents—Official Final Action

- (a) *Sulfuric acid.*—93–98% H₂SO₄, N-free.
(b) *Mercuric oxide or metallic mercury.*—HgO or Hg, reagent grade, N-free.
(c) *Potassium sulfate (or anhydrous sodium sulfate).*—Reagent grade, N-free.
(d) *Salicylic acid.*—Reagent grade, N-free.
(e) *Sulfide or thiosulfate soln.*—Dissolve 40 g com. K₂S in 1 L H₂O. (Soln of 40 g Na₂S or 80 g Na₂S₂O₃·5H₂O in 1 L may be used.)
(f) *Sodium hydroxide.*—Pellets or soln, nitrate-free. For soln, dissolve ca 450 g solid NaOH in H₂O, cool, and dil. to 1 L. (Sp gr of soln should be 1.36 or higher.)

(g) *Zinc granules.*—Reagent grade.

(h) *Zinc dust.*—Impalpable powder.

(i) *Methyl red indicator.*—Dissolve 1 g Me red in 200 ml alcohol.

(j) *Hydrochloric or sulfuric acid std soln.*—0.5N, or 0.1N when amt of N is small. Prep. as in 45.012 or 45.040.

(k) *Sodium hydroxide std soln.*—0.1N (or other specified concn). Prep. as in 45.033–45.035.

Stdze each std soln with primary std, Chap. 45, and check one against the other. Test reagents before use by blank detn with 2 g sugar, which insures partial reduction of any nitrates present.

Caution: Use freshly opened H₂SO₄ or add dry P₂O₅ to avoid hydrolysis of nitriles and cyanates. Ratio of salt to acid (wt:vol.) should be ca 1:1 at end of digestion for proper temp. control. Digestion may be incomplete at lower ratio; N may be lost at higher ratio. Each g fat consumes 10 ml, and each g carbohydrate 4 ml, H₂SO₄ during digestion.

2.050 Apparatus—Official Final Action

(a) *For digestion.*—Use Kjeldahl flasks of hard, moderately thick, well-annealed glass with total capacity ca 500–800 ml. Conduct digestion over heating device adjusted to bring 250 ml H₂O at 25° to rolling boil in ca 5 min or other time as specified in method. To test heaters, preheat 10 min if gas or 30 min if elec. Add 3–4 boiling chips to prevent superheating.

(b) *For distillation.*—Use 500–800 Kjeldahl or other suitable flask, fitted with rubber stopper thru which passes lower end of efficient scrubber bulb or trap to prevent mech. carryover of NaOH during distn. Connect upper end of bulb tube to condenser tube by rubber tubing. Trap outlet of condenser in such way as to ensure complete absorption of NH₃ distd over into acid in receiver.

2.051 Improved Kjeldahl Method for Nitrate-Free Samples (18)—Official Final Action

(Caution: See 46.030 and 46.065.)

Place weighed sample (0.7–2.2 g) in digestion flask. Add 0.7 g HgO or 0.65 g metallic Hg, 15 g powd K₂SO₄ or anhyd. Na₂SO₄, and 25 ml H₂SO₄. If sample >2.2 g is used, increase H₂SO₄ by 10 ml for each g sample. Place flask in inclined position and heat gently until frothing ceases (if necessary, add small amt of paraffin to reduce frothing); boil briskly until soln clears and then ≥ 30 min longer (2 hr for samples contg org. material).

Cool, add ca 200 ml H₂O, cool below 25°, add 25 ml of the sulfide or thiosulfate soln, and mix to ppt Hg. Add few Zn granules to prevent bumping, tilt flask, and add layer of NaOH (usually 25 g solid reagent or enough soln to make contents strongly alk.) without agitation. (Thiosulfate or sulfide soln may be mixed with the NaOH soln before addn to flask.) Immediately connect flask to distg bulb on condenser, and, with tip of condenser immersed in std

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acid and 5-7 drops indicator in receiver, rotate flask to mix contents thoroly; then heat until all NH_3 has distd (at least 150 ml distillate). Remove receiver, wash tip of condenser, and titr. excess std acid in distillate with std NaOH soln. Correct for blank detn on reagents.

2.052 Improved Kjeldahl Method for Nitrate-Containing Samples— Official Final Action

(Not applicable to liqs or to materials with high $\text{Cl}:\text{NO}_3$ ratio; *Caution: See 46.030 and 46.065.*)

Place weighed sample (0.7-2.2 g) in digestion flask. Add 40 ml H_2SO_4 contg 2 g salicylic acid. Shake until thoroly mixed and let stand, with occasional shaking, 30 min or more; then add (1) 5 g $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$ or (2) 2 g Zn dust (as impalpable powder, not granulated Zn or filings). Shake and let stand 5 min; then heat over low flame until frothing ceases. Turn off heat, add 0.7 g HgO (or 0.65 g metallic Hg) and 15 g powd K_2SO_4 (or anhyd. Na_2SO_4), and boil briskly until soln clears, then ≥ 30 min longer (2 hr for samples contg org. material).

Proceed as in second par. of 2.051.

Comprehensive Nitrogen Method (19)— Official First Action

(Applicable to all fertilizer samples;
Caution: See 46.030 and 46.079.)

2.053 Reagents

(a) *Chromium metal*.—100 mesh, low N (Fisher Scientific Co. No. C-318 or Sargent-Welch Scientific Co. No. SC11432 are satisfactory).

(b) *Alundum*.—Norton 14X (Arthur H. Thomas Co.).

(c) *Dilute sulfuric acid*.—Slowly add 625 ml H_2SO_4 to 300 ml H_2O . Dil. to ca 1 L and mix. After cooling, dil. to 1 L with H_2O and mix. Avoid absorption of NH_3 from air during prepn, particularly if stream of air is used for mixing.

(d) *Sodium thiosulfate or potassium sulfide soln.*—160 g $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}/\text{L}$ or 80 g $\text{K}_2\text{S}/\text{L}$.

For other reagents, see 2.049.

2.054 Determination

Place 0.2-2.0 g sample contg ≤ 60 mg nitrate N in 500-800 ml Kjeldahl flask and add 1.2 g Cr powder. Add 35 ml H_2O or, with liqs, lesser amt to make total vol. of liq. 35 ml. Let stand 10 min with occasional gentle swirling to dissolve all nitrate salts. Add 7 ml HCl and let stand ≥ 30 sec but ≤ 10 min.

Place flask on preheated burner with heat input set at 7.0-7.5 min boil test, 2.050(a). After heating 3.5 min, remove from heat and let cool.

Add 22 g K_2SO_4 , 1.0 g HgO , and few granules Alundum. Add 40 ml dil. H_2SO_4 , (c). (If adequate ventilation is available, 25 ml H_2SO_4 may be added instead of dil. H_2SO_4 . If org. matter which consumes large amt of acid exceeds 1.0 g, add addnl 1.0 ml H_2SO_4 for each 0.1 g org. matter in excess of 1.0 g.)

Place flask on burners set at 5 min boil test. (Preheated burners reduce foaming with most samples. Cut back heat input if foam fills $\geq \frac{2}{3}$ of bulb of flask. Use variable heat input until this phase is past.) Heat at 5 min boil test until dense white fumes of H_2SO_4 clear bulb of flask. Digestion is now complete for samples contg ammoniacal, nitrate, and urea N. For other samples, swirl flask gently and continue digestion 60 min more.

Proceed as in 2.051, second par., substituting 2.053(d) for 2.049(e).

Raney Powder Method (19)— Official First Action

(Applicable to all fertilizer samples;
Caution: See 46.030 and 46.079.)

2.055 Reagents

(a) *Raney catalyst powder No. 2813*.—50% Ni, 50% Al (W. R. Grace and Co., Raney Catalyst Division, 819 Hamilton National Bank Building, Chattanooga, TN 37402). *Caution: Raney catalyst powders react slowly in water or moist air to form alumina; avoid prolonged contact with air or moisture during storage or use.*

(b) *Sulfuric acid-potassium sulfate soln*.—Slowly add 200 ml H_2SO_4 to 625 ml of H_2O and mix. Without cooling, add 106.7 g K_2SO_4 and continue stirring until all salt dissolves. Dil. to ca 1 L and mix. Cool, dil. to 1 L with H_2O , and mix. Avoid absorption of NH_3 from air during prepn particularly if stream of air is used for mixing.

For other reagents, see 2.049.

2.056 Determination

Place 0.2-2.0 g sample contg ≤ 42 mg nitrate N in 500-800 ml Kjeldahl flask (800 ml flask is preferred with samples which foam considerably, especially orgs). Add 1.7 g Raney catalyst powder, 3 drops *tributyl citrate*, and 150 ml $\text{H}_2\text{SO}_4\text{-K}_2\text{SO}_4$ soln. If org. matter exceeds 0.6 g, add addnl 2.5 ml of this soln for each 0.1 g of org. matter in excess of 0.6 g.

Swirl to mix sample with acid and place flask on cold burner. If burner has been in use, turn off completely at least 10 min before placing flask on burner. After flask is on burner, set heat input to 5 min boil test. When sample starts boiling, reduce heat to pass 10 min boil test. After 10 min, raise flask to vertical position and add 0.7 g HgO and 15 g K_2SO_4 . (Contents of Kel-Pak No. 5 (Matheson Scientific, 1850 Greenleaf Ave, Elk Grove Village, IL 60007) without plastic container may be used.) Replace flask in inclined position and increase heat to 4-5 min boil test. (Cut back heat input if foam fills $\geq \frac{2}{3}$ of bulb of flask. Use variable heat input until this phase is past.) Heat at 4-5 min boil test until dense white fumes of H_2SO_4 clear bulb of flask. Digestion is now complete for samples contg only ammoniacal, nitrate, and urea N. For other samples, swirl flask gently and continue digestion another 30 min.

2. FERTILIZERS

Proceed as in 2.051, second par. If 800 ml Kjeldahl flasks have been used, add 300 instead of 200 ml H₂O.

Ammoniacal Nitrogen

2.057 *Magnesium Oxide Method—Official Final Action*

(Not applicable in presence of urea)

Place 0.7–3.5 g, according to NH₃ content of sample, in distn flask with ca 200 ml H₂O and 2 g or more carbonate-free MgO. Connect flask to condenser by Kjeldahl connecting bulb, distill 100 ml liq. into measured quantity of std acid, 2.049(j), and titr. with std NaOH soln, 2.049(k), using Me red, 2.049(i).

2.058 ★ *Formaldehyde Titration ★ Method—Official Final Action*

(Applicable to NH₄NO₃ and (NH₄)₂SO₄)

Weigh 7.003 or 14.007 g sample and dil. to 250 or 500 ml. Pipet 25 or 50 ml into 300–500 ml erlenmeyer (ca 1.5 g may be rapidly weighed and washed directly into flask). Add ca 1 ml 37% HCHO soln for each 0.1 g sample in aliquot. Dil. to 150–200 ml and let stand 5 min. Titr. with 0.25–0.50N NaOH, 2.049(k), using 5 drops phthln, until there is no perceptible color change at point of contact, or until proper shade of pink persists. (If electrometric titrn is preferred, titr. to ca pH 8.6.) Det. blank on HCHO soln.

% ammoniacal N = net ml NaOH × normality × 1.4007/wt sample.

Nitrate and Ammoniacal Nitrogen

2.059 ★ *Ferrous Sulfate-Zinc-Soda ★ Method—Official Final Action*

(Not applicable in presence of org. matter, Ca cyanamide, and urea)

Place 0.35, 0.5, or 0.7 g sample in 600–700 ml flask and add 200 ml H₂O, 5 g powd. Zn, 1–2 g FeSO₄·7H₂O, and 50 ml NaOH soln (sp gr 1.33). Connect flask with distg app., distill, collect distillate in usual way in std acid, 2.049(j), and titr. with std NaOH soln, 2.049(k), using Me red, 2.049(i). In analysis of nitrate salts dissolve 3.5 or 5.0 g in H₂O, dil. to 250 ml, and use 25 ml aliquot.

2.060 *Devarda Method (20)—Official Final Action*

(Not applicable in presence of org. matter, Ca cyanamide, and urea)

Place 0.35 or 0.5 g sample in 600–700 ml flask and add 300 ml H₂O, 3 g *Devarda alloy* (Cu 50, Al 45, Zn 5), and 5 ml NaOH soln (42% by wt), pouring latter down side of flask so that it does not mix at once with contents. By means of Davison (J. Ind. Eng. Chem. 11, 465(1919)) or other suitable scrubbing bulb that will prevent passing over of any spray, connect with condenser, tip of which always extends beneath surface of std acid in receiving flask. Mix contents of

distg flask by rotating. Heat slowly at first and then at rate to yield 250 ml distillate in 1 hr. Collect distillate in measured quantity of std acid, 2.049(j), and titr. with std NaOH soln, 2.049(k), using Me red, 2.049(i).

Nitrate Nitrogen

2.061 *Robertson Method (21)—Official Final Action*

(Applicable in presence of Ca cyanamide and urea; *Caution: See 46.030 and 46.065.*)

(a) Det. total N as in 2.052.

(b) Det. H₂O-insol. N as in 2.064, but use 2.5 g sample. Dil. filtrate to 250 ml.

(c) Det. ammoniacal N in 50 ml filtrate as in 2.057.

(d) Place another 50 ml portion filtrate in 500 ml Kjeldahl flask and add 2 g FeSO₄·7H₂O and 20 ml H₂SO₄. (If total N is >5%, use 5 g FeSO₄·7H₂O.) Digest over hot flame until all H₂O is evapd and white fumes appear, and continue digestion at least 10 min to drive off nitrate N. If severe bumping occurs, add 10–15 glass beads. Add 0.65 g Hg, or 0.7 g HgO, and digest until all org. matter is oxidized. Cool, dil., add the K₂S soln, and complete detn as in 2.051. Before distn add pinch of mixt. of Zn dust and granular "20-mesh" Zn to each flask to prevent bumping.

Total N (a) – H₂O-insol. N (b) = H₂O-sol. N.

H₂O-sol. N – N obtained in (d) = nitrate N.

2.062 *Jones Modification of Robertson Method (21)—Official Final Action*

(Applicable when H₂O-sol. N need not be detd; *Caution: See 46.030 and 46.065.*)

Weigh 0.5 g sample into Kjeldahl flask, add 50 ml H₂O, and rotate gently. Add 2 g FeSO₄·7H₂O and rotate. Add 20 ml H₂SO₄. Digest over hot flame. When H₂O evaps and white fumes appear, add 0.65 g Hg and proceed as in 2.051. Cool, dil., and distill as usual. Total N – N thus found = nitrate N.

2.063 ★ *Water-Insoluble Nitrogen in ★ Cyanamide (22)—Official Final Action*

Weigh 2 g finely ground sample and place in mortar. Gradually add ca 70 ml H₂O while stirring with pestle, and grind thoroly. Transfer mixt. to beaker, washing out mortar with H₂O. Filter on 11 cm paper. When all cyanamide has been transferred to paper, wash with addnl 250 ml H₂O, draining each portion before adding more H₂O. Transfer paper and residue to digestion flask. Det. N in residue as in 2.051.

2.064 *Water-Insoluble Nitrogen—Official Final Action*

(See 2.069(a) and (b) for urea-formaldehyde or mixts contg such compds.)

Place 1 or 1.4 g sample in 50 ml beaker, wet with alcohol, add 20 ml H₂O, and let stand 15 min, stirring occasionally. Transfer supernatant to 11 cm Whatman No. 2 paper in 60° long-stem funnel 2.5" diam., and wash residue 4 or 5 times by decanting with H₂O at room temp. (20–25°). Finally transfer all residue to filter and complete washing until filtrate measures 250 ml. Det. N in residue as in 2.051.

★ Nitrogen Activity ★

2.065 Removal of Water-Soluble Nitrogen— Official Final Action

- (a) *Mixed fertilizers.*—See 2.058, 10th ed.
(b) *Raw materials.*—See 2.058, 10th ed.

2.066 Water-Insoluble Organic Nitrogen Soluble in Neutral Permanganate— Official Final Action

See 2.059, 10th ed.

2.067 Water-Insoluble Organic Nitrogen Distilled from Alkaline Permanganate (23)—Official Final Action

See 2.060–2.061, 10th ed.

Nitrogen Activity Index (AI) of Urea- Formaldehyde Compounds (24)— Official Final Action

(Applicable to urea-formaldehyde compds
and mixts contg such compds)

2.068 *Reagent*

Phosphate buffer soln.—Dissolve 14.3 g KH₂PO₄ and 91.0 g K₂HPO₄ in H₂O and dil. to 1 L. Dil. 100 ml of this soln to 1 L (pH 7.5).

2.069 *Determination*

(a) Crush sample (do not grind) to pass No. 20 sieve.

(b) Det. cold H₂O-insol. N (*WIN*) as in 2.064, keeping temp. at 25±2°. Stir at 5 min intervals during 15 min standing.

(c) Det. hot H₂O-insol. N (*HWIN*) in phosphate buffer soln as follows: Place accurately weighed sample contg 0.1200 g *WIN* in 200 ml tall form beaker. Add ca 0.5 g CaCO₃ to mixed fertilizers contg urea-C₁₂H₂O compds. From supply of boiling buffer soln, add 100 ml from graduate to sample, stir, cover, and immerse promptly in boiling H₂O bath so that liq. in beaker is below H₂O level in bath. Maintain bath at 95–100°, checked with thermometer, and stir at 10 min intervals. After exactly 30 min, remove beaker from bath and filter promptly thru 15 cm Whatman No. 12 fluted paper. If filtration takes >4 min, discard detn. Repeat detn, adding, with stirring, 1 g Celite filter-aid just before removing beaker from bath, and filter.

Wash insol. residue completely onto paper with boiling H₂O and continue washing until total vol. used is 100 ml. Complete washing before filtrate becomes cloudy or its temp. drops to <60°. Det. total N (*HWIN*) in wet paper and residue as in 2.051, using 35 ml H₂SO₄ when CaCO₃ has been added.

$$\text{Activity index (AI)} = \frac{(\%WIN - \%HWIN)}{\%WIN} \times 100$$

Urea (25)—Official Final Action

2.070 *Reagent*

Neutral urease soln.—Use fresh com. 1% urease soln, or dissolve 1 g urease powder in 100 ml H₂O, or shake 1 g jack bean meal with 100 ml H₂O 5 min. Transfer 10 ml soln to 250 ml erlenmeyer, dil. with 50 ml H₂O, and add 4 drops Me purple (available from Fisher Scientific Co.). Titr. with 0.1N HCl to reddish-purple; then back-titr. to green with 0.1N NaOH. From difference in ml, calc. amt 0.1N HCl required to neutze remainder of soln (usually ca 2.5 ml/100 ml), add this amount of acid, and shake well.

Verify enzyme activity of urease source periodically. Discard any source which does not produce soln capable of hydrolyzing 0.1 g urea/20 ml soln.

2.071 *Determination*

Weigh 10±0.01 g sample and transfer to 15 cm Whatman No. 12 fluted filter paper. Leach with ca 300 ml H₂O into 500 ml vol. flask. Add 75–100 ml satd Ba(OH)₂ soln to ppt phosphates. Let settle and test for complete pptn with few drops satd Ba(OH)₂ soln. Add 20 ml 10% Na₂CO₃ soln to ppt excess Ba and any sol. Ca salts. Let settle and test for complete pptn. Dil. to vol., mix, and filter thru 15 cm Whatman No. 12 fluted paper. Transfer 50 ml aliquot (equiv. to 1 g sample) to 200 or 250 ml erlenmeyer and add 1–2 drops of Me purple. Acidify soln with 2N HCl and add 2–3 drops excess. Neutze soln with 0.1N NaOH to first change in color of indicator. Add 20 ml neutral urease soln, close flask with rubber stopper, and let stand 1 hr at 20–25°. Cool flask in ice-H₂O slurry and titr. at once with 0.1N HCl to full purple; then add ca 5 ml excess. Record total vol. added. Back-titr. excess HCl with 0.1N NaOH to neut. end point.

$$\% \text{ Urea} = (\text{ml } 0.1N \text{ HCl} - \text{ml } 0.1N \text{ NaOH}) \times 0.3003/\text{wt sample.}$$

2.072 Slow-Release Nitrogen (26)— Official Final Action

Weigh 20 g unground sample into 600 ml Berzelius tall-form, lipless beaker. Add 150 ml H₂O at boiling temp., after bubbling ceases. Without further heating, place on magnetic stirrer with 3/8 × 1 1/2" Teflon-covered stirring bar, cover, and stir exactly 30 min at speed to produce good agitation without bouncing of bar. Immediately decant supernatant thru Whatman No. 4 paper into 200 ml vol. flask. (For fertilizers

difficult to filter, transfer contents of beaker to 150 ml centr. tubes immediately after 30 min stirring, centr., and decant supernatant into 200 ml vol. flask.) Rinse beaker and residue with H₂O, swirl, and decant supernatant thru paper into vol. flask. Cool to room temp. and dil. to vol. with H₂O.

Det. N in 10 ml aliquot by 2.051 for nitrate-free and 2.052 for org. and nitrate-contg fertilizers, and calc. % N in filtrate. Det. total % N in sep. portion ground sample by 2.051 or 2.052, resp.

% Slow-release N = % total N - % N in filtrate.

Biuret (27)—Official First Action

2.073

Reagents

(a) *Alkaline tartrate soln.*—Dissolve 40 g NaOH in 500 ml H₂O, cool, add 50 g NaKC₄H₄O₆·4H₂O, and dil. to 1 L. Let stand 1 day before use.

(b) *Copper sulfate soln.*—Dissolve 15 g CuSO₄·5H₂O in CO₂-free H₂O and dil. to 1 L.

(c) *Biuret std soln.*—1 mg/ml. Dissolve 100 mg reagent grade biuret in CO₂-free H₂O and dil. to 100 ml.

(d) *Ion exchange resin.*—Fill 50 ml buret with 30 cm column of Amberlite IR120(H) resin on glass wool plug. Regenerate column after each use by passing 100 ml H₂SO₄ (1 + 9) or HCl (1 + 4) thru column at ca 5 ml/min and then washing with H₂O until pH of effluent is >6.

2.074

Preparation of Standard Curve

Transfer series of aliquots, 2–50 ml, of std biuret soln to 100 ml vol. flasks. Adjust vol. to ca 50 ml with CO₂-free H₂O, add 1 drop Me red, and neutze with 0.1N H₂SO₄ to pink color. Add with swirling 20 ml alk. tartrate soln and then 20 ml CuSO₄ soln. Dil. to vol., shake 10 sec, and place in H₂O bath 15 min at 30±5°. Also prep. reagent blank. Set A of each soln against blank at 555 nm (instrument with 500–570 nm filter is also satisfactory) with 2–4 cm cell. Plot std curve.

2.075

Determination

(a) *In urea.*—Continuously stir 2–5 g sample in 100 ml ca 50° H₂O 30 min. Filter and wash into 250 ml vol. flask, and dil. to vol. Transfer 25 ml aliquot to 100 ml vol. flask and proceed as in 2.074.

(b) *In mixed fertilizers.*—Continuously stir 10–20 g sample in 150 ml ca 50° H₂O 30 min. Filter and wash into 250 ml vol. flask, and dil. to vol. Transfer 25 ml aliquot to column, (d), and adjust flow to 4–5 ml/min. Receive eluate in 100 ml beaker. When liq. level falls to top of resin bed, wash with two 25 ml portions H₂O. To eluate and washings add 2 drops Me red and then 1N NaOH to yellow color. Add 0.1N H₂SO₄ until soln just turns pink, transfer to 100 ml vol. flask, and dil. to vol. with CO₂-free H₂O. Transfer 50 ml aliquot to 100 ml vol. flask and proceed as in 2.074.

POTASSIUM

★ *Lindo-Gladding Method (28)*—★ Official Final Action

2.076

Reagents

(a) *Ammonium chloride soln.*—Dissolve 100 g NH₄Cl in 500 ml H₂O, add 5–10 g pulverized K₂PtCl₆, and shake at intervals 6–8 hr. Let mixt. settle overnight and filter. (Residue may be used to prep. fresh supply.)

(b) *Platinum soln.*—Use Pt soln contg equiv. of 0.05 g Pt (0.105 g H₂PtCl₆)/ml. 1 ml = 0.024 g K₂O.

(c) *Diglycol stearate soln.*—Dissolve 20 g diglycol stearate, tech., in 1 L benzene-alcohol (1 + 1).

(d) *Acid-alcohol.*—Mix 200 ml alcohol with 20 ml HCl and cool to room temp.

2.077

Preparation of Solution

(a) *Mixed fertilizers.*—Place 2.5 g sample, or factor wt 2.430 g, in 250 ml vol. flask, and add 125 ml H₂O and 50 ml satd (NH₄)₂C₂O₄ soln; add 1 ml diglycol stearate soln if needed to prevent foaming. Boil 30 min, add slight excess of NH₄OH, and after cooling, dil. to 250 ml. Mix, and pass thru dry filter.

(b) *Potassium salts (potassium chloride and sulfate, potassium-magnesium sulfate, and kainit).*—Dissolve 2.5 g, or factor wt 2.430 g, and dil. to 250 ml without adding NH₄OH and (NH₄)₂C₂O₄. When interfering substances such as NH₃, Ca, Al, etc., are present, proceed as in (a).

(c) *Organic materials (cottonseed meal, tobacco stems, etc.).*—For total K, sat. 10 g sample with H₂SO₄ and ignite in muffle at low red heat (625–650°) to destroy org. matter. Add little HCl, warm slightly to loosen mass from dish, transfer to 500 ml vol. flask, add NH₄OH and satd (NH₄)₂C₂O₄ soln, cool, dil. to 500 ml, mix, pass thru dry filter, and proceed as in 2.078(a).

(d) *Ashes from wood, cotton hulls, etc.*—Boil 10 g sample with 300 ml H₂O 30 min, and while hot add slight excess of NH₄OH and then enough satd (NH₄)₂C₂O₄ soln to ppt all Ca present. Cool, dil. to 500 ml, mix, pass thru dry filter, and proceed as in 2.078(a).

(e) *Potassium nitrate or potassium and sodium nitrate.*—If impure, proceed as in (a); if pure enough, proceed as for K salts, (b), except evap. aliquot to dryness in porcelain dish with 2 ml HCl (if Pt dish is used, add H₂SO₄ instead) and take up with H₂O and few drops HCl, before adding Pt soln.

2.078

Determination

(a) *Mixed fertilizers.*—In ca 100 ml quartz, SiO₂, or Pt dish, evap. nearly to dryness 25 or 50 ml aliquot of soln, 2.077(a), (c), or (d), to which is added enough K-free 1N NaOH (1–2 ml) to prevent formation of free H₃PO₄ during ignition; add 1 ml H₂SO₄ (1 + 1) and 6–8 granules of granulated sugar, evap. to dryness, and ignite to white ash at low temp. (The

POTASSIUM

H₂SO₄ may be added after evapn to dryness and before ignition.) Maintain dull red heat (600–650°) until residue is perfectly white. Dissolve residue in hot H₂O, using at least 20 ml/100 mg K₂O present, and add few drops HCl and then excess Pt soln. Evap. on H₂O bath to thick paste, avoiding exposure to NH₃. Treat residue with ca 6 ml acid-alcohol soln. (Temp. of wash solns should be <30°.) After 15 min filter on gooch or on medium fritted crucible (Pyrex M porosity), and wash ppt thoroly with alcohol, both by decanting and on filter, continuing washing after filtrate is colorless (75 ml is usually enough). Wash 5 or 6 times with 10 ml portions NH₄Cl soln to remove impurities from ppt. Wash again thoroly with alcohol and dry ppt 30 min at 100°. Cool and weigh. Wash K₂PtCl₆ thru crucible with hot H₂O; then wash all H₂O from crucible with alcohol, and dry crucible and residue 30 min at 100°. Cool, reweigh, and calc. wt difference to K₂O. If factor wt and 50 ml aliquot (contg 0.486 g sample) are used, multiply wt by 40 to obtain % K₂O.

(b) *Potassium chloride*.—Acidify 50 ml soln prepd as in 2.077(b) with few drops HCl, add excess Pt soln, and evap. to thick paste. Treat residue as in (a). If NH₄OH and (NH₄)₂C₂O₄ are used in prep soln, ignite and complete detn as in (a).

(c) *Potassium sulfate, potassium-magnesium sulfate, and kainit*.—Acidify 50 ml soln prepd as in 2.077(b) with few drops HCl and add excess Pt soln. Evap. mixt. and proceed as in (a), but use 25 ml portions NH₄Cl soln. If NH₄OH and (NH₄)₂C₂O₄ are used in prep soln, ignite and complete detn as in (a), but use 25 ml portions NH₄Cl soln.

To convert K₂PtCl₆ to KCl use factor 0.3068; to K₂SO₄, 0.3586; to K₂O, 0.1938.

★ *Wet-Digestion Method (29)*—★ *Official Final Action*

2.079 *Preparation of Solution*

Proceed as in 2.077(a).

2.080 *Determination*

Place 50 ml aliquot soln (or 25 ml aliquot and 25 ml H₂O, if sample contains >20% K₂O) in 500 ml Kjeldahl flask. Add 10 ml HNO₃ and *silica granule* (ca 1 cm long, previously weighed along with prepd gooch or medium porosity fritted Pyrex crucible). Boil 2 min and add 10 ml HCl. Boil down to ca 25 ml, and add 5 ml HCl and excess Pt soln. Boil down to 10–15 ml, rotating flask occasionally, and then add 5 ml HCl. Reduce heat and boil down to 3–5 ml (depending on amt of ppt), rotating flask frequently near end of evapn. Remove flask from heat and swirl to dissolve any sol. residue on walls. Cool, and immediately add 25 ml alcohol to wash down neck of flask. Chill under tap, swirl, and let stand at least 5 min. Decant into weighed crucible and transfer ppt and granule with aid of stream of alcohol. Wash 5–6 times with 10 ml portions NH₄Cl soln, 2.076(a), to

remove Mg and Na salts from ppt. Wash again thoroly with alcohol and dry ppt 30 min at 100°. Weigh and subtract wt crucible plus silica granule. $K_2PtCl_6 \times 0.1938 = K_2O$.

★ *Recovery of Platinum (30)—Procedure* ★ 2.081 *Recovery from Alcohol Washings*

(a) Let NH₄Cl washings run into flask contg alcohol washings. Let (NH₄)₂PtCl₆ settle, decant supernatant, and save residue. Reduce as in 2.082(a) or (b).

(b) Evap. alcohol waste in porcelain dish on steam bath or elec. hot plate. (Piece of filter paper in dish prevents most of Pt from sticking to dish.) Filter on buchner and wash reduced Pt. Transfer to porcelain dish and ignite at ca 700° in muffle ca 20 min. Digest reduced Pt in porcelain dish on steam bath with several portions HCl (1 + 3). Repeat until soln is colorless. Wash well with H₂O until test with AgNO₃ shows no Cl. Digest with few portions HNO₃ (1 + 4), wash, dry, and weigh.

(c) Acidify alcohol waste with HCl. Add either "20-mesh" Zn, or Al in stick or sheet form (for 75–150 ml acid use 10–20 g metal), and let stand until all Pt is reduced. Filter, ignite at 700°, and proceed as in (b).

2.082 *Recovery from K₂PtCl₆ Salt*

(a) Dissolve K₂PtCl₆ in 20 parts or more hot H₂O, acidify with HCl, and reduce with either "20-mesh" Zn or Al in sheet or stick form. Filter and ignite as in 2.081(b).

(b) Dissolve K₂PtCl₆ in H₂O and ppt as (NH₄)₂PtCl₆ with NH₄Cl. Let stand several hr, filter on buchner with suction, and wash with alcohol. Transfer to porcelain dish and ignite in muffle, first ca 20 min at ca 200° and finally 30 min at ca 700°.

(c) Dissolve K₂PtCl₆ in 20 parts or more boiling H₂O. Add *Na formate* slowly (pinch at time), stirring well at each addn. (Use great care to control excessive foaming with resultant loss of Pt.) Reduction is complete when soln becomes colorless. If supernatant does not become colorless, test for complete reduction as follows:

Pipet 25 ml into 250 ml beaker, and add few drops HCl and small amt KI soln. Red color indicates presence of unreduced Pt (or other oxidant such as HNO₃).

Filter reduced Pt and ignite as in 2.081(b).

2.083 *Preparation of Platinum Solution*

Dissolve Pt from 2.081 or 2.082 in porcelain dish on steam bath with 3 parts HCl and 1 part HNO₃. Evap. with addns of HCl 3 times to remove excess HNO₃, and then with H₂O 3 times to remove excess HCl, but do not evap. below $\frac{1}{4}$ original vol. Filter, and dil. to calcd vol. Evap. and test 10 ml portion, or portion equiv. to 1 g Pt, for material insol. in 80%

2. FERTILIZERS

alcohol. If impurities are evident, reduce soln again, purify Pt, and redissolve. To det. concn of soln, evap. 2 ml in porcelain dish with ca 0.5 g excess of K_2SO_4 . Add alcohol and wash K_2PtCl_6 as in 2.078. (Soln may be prepd so that 1 ml = 1% K_2O in 1 g sample.)

Flame Photometric Method (31)—

Official Final Action

(Caution: See 46.007.)

2.084 Reagents and Apparatus

(a) *Ammonium oxalate soln.*—Dissolve 40 g $(NH_4)_2C_2O_4$ in 1 L H_2O .

(b) *Methyl red indicator.*—Dissolve 0.2 g Me red in 100 ml alcohol.

(c) *Dilute nitric acid.*—Reagent grade (1 + 10).

(d) *Anion exchange resin.*—Amberlite IR-4B (Fisher Scientific Co.); Duolite A-7 or Duolite A-41 (Diamond Shamrock Chemical Co., PO Box 829, Redwood City, CA 94064); Permutit-S (Permutit Co., E49 Midland Ave, Paramus, NJ 07652); or equiv.

(e) *Potassium nitrate or potassium chloride.*—Recrystallize reagent grade salt twice from H_2O and dry 5 hr at 105°.

(f) *Ion exchange column.*—Made from 12" length of std wall glass tubing, 2.5 cm od; one end closed by 1-hole No. 4 rubber stopper thru which is inserted 2-way stopcock or glass tubing connected to rubber tubing and compressor clamp. Do not let stopcock tubing protrude above stopper. Choose stopper large enough so that there is no space between stopper vertex and column wall. Alternatively use glass chromatc tube 12" × 19 mm id with stopcock or valve at bottom to control flow rate (such as Scientific Glass Apparatus Co. No. C-4225).

Place glass wool plug in bottom of column, close valve, and add H_2O to ht of 4". Transfer portion of resin to 200 ml beaker and suspend in H_2O . Transfer slurry to column and adjust ht of packed resin to 8", draining excess H_2O until 1" head remains. Regenerate resin after 10 successive aliquots have passed thru, except Amberlite IR-4B which can be used for 20 aliquots. For Na, regenerate after 5 aliquots have passed thru.

2.085 Preparation of Resin

Place ca 450 g resin in 4 L beaker and add 2 L 5% NaOH. Stir 30 min with elec. stirrer. Let resin settle, and decant NaOH soln. Repeat treatment with 5% NaOH twice, decanting NaOH soln after final treatment. Add 2 L H_2O to resin, stir few min, let resin settle, and decant wash H_2O . Repeat 3-4 times. Resin is now in free base form. Regenerate to NO_3 form by treating 3 times with 5% HNO_3 , in same manner as with NaOH soln. Wash resin with H_2O until washings reach pH 2 or above by backwashing in column or by stirring and decanting in large beaker. Store resin under H_2O in stoppered bottle.

2.086 Preparation of Solution

(a) *Mixed fertilizers and potassium-magnesium sulfate.*—Weigh 1.5058 g sample into 250 ml vol. flask (500 ml flask if sample contains >30% K_2O), add 125 ml H_2O and 50 ml $(NH_4)_2C_2O_4$ soln, and boil 30 min. Cool, dil. to vol., mix, and pass thru dry filter.

(b) *Potassium chloride and sulfate.*—Dissolve 1.5058 g in H_2O and dil. to 500 ml.

2.087 Preparation of Standard Curve

Dissolve 1.2931 g KNO_3 (or 0.9535 g KCl) in H_2O and dil. to 500 ml (1000 ppm K). Prep. std solns by diln covering range 0-80 ppm K at intervals not >10 ppm, adding appropriate amt $LiNO_3$ if internal std instrument is to be used. Prep. std curve of emission against concn, adjusting instrument so that 50 ppm K gives reading near mid-scale. Atomize portions of std solns until readings for series are reproducible.

2.088 Determination

(a) *Mixed fertilizers, potassium sulfate, and potassium-magnesium sulfate.*—Transfer 10 ml aliquot of sample soln to 250 ml beaker. Add 1 drop Me red and neutze with HNO_3 (1 + 10). Adjust H_2O level in column to top of resin and quant. transfer aliquot to column. Open stopcock to give flow rate of 2 drops/sec, collecting effluent in 250 ml vol. flask. Wash aliquot into resin with 2-3 small portions H_2O . Collect 50-75 ml effluent; then open stopcock and collect addnl 100 ml by pouring H_2O into column, making certain that H_2O level does not fall below top of resin bed. Dil. to vol. and mix (if internal std instrument is used, add required amt $LiNO_3$ before dilg to vol.). Atomize portions of sample several times to obtain reliable av. reading for each soln. Det. ppm K from std curve. (Temp. of std and sample solns must not differ by >2°.) Calc. % K_2O as follows:

$$\begin{aligned} 0-30\%: & \text{ ppm K}/2 = \% K_2O \\ >30\%: & \text{ ppm K}/1 = \% K_2O \end{aligned}$$

(b) *Potassium chloride.*—Proceed as in (a) but omit neutzn and resin treatment.

2.089 Instrument and Procedure Performance Test

Weigh 1.5058 g K acid phthalate (primary std) and transfer to 250 ml vol. flask. Add ca 0.5 g $(NH_4)_2HPO_4$ and proceed as in 2.086(a), beginning "add 125 ml H_2O ..." Calcd % K_2O = 23.0.

ANNEX IV - UNIFORM STATE FERTILIZER BILL OF THE USA

UNITED STATES OF AMERICA

Association of American Plant Food Control Officials: Uniform State Fertilizer
Bill (as revised August 8, 1972). Reprinted from Official Publication No. 26.

UNIFORM STATE FERTILIZER BILL

NOTE—Although this Bill and Regulations have not been passed into law in all states, the subject matter covered herein does represent the official policy of this Association.

AN ACT to regulate the sale and distribution of commercial fertilizers in the State of
BY the Legislature of the State of

BE IT ENACTED

Section 1. Title.

This Act shall be known as the " _____ of the State of _____", hereinafter referred to as the " _____" of the State of _____.

Section 2. Enforcing Official.

This Act shall be administered by the _____ of the State of _____, hereinafter referred to as the " _____" of the State of _____.

Section 3. Definitions of Words and Terms.

When used in this Act:

(a) The term "commercial fertilizer" means any substance containing one or more recognized plant nutrient(s) which is used for its plant nutrient content and which is designed for use or claimed to have value in promoting plant growth, except unmanipulated animal and vegetable manures, marl, lime, limestone, wood ashes and gypsum, and other products exempted by regulation of the _____.

(1) A "fertilizer material" is a commercial fertilizer which either:

A. Contains important quantities of no more than one of the primary plant nutrients (nitrogen, phosphoric acid and potash), or

B. Has approximately 85% of its plant nutrient content present in the form of a single chemical compound, or

C. Is derived from a plant or animal residue or by-product or a natural material deposit which has been processed in such a way that its content of primary plant nutrients has not been materially changed except by purification and concentration.

(2) A "mixed fertilizer" is a commercial fertilizer containing any combination of mixture of fertilizer materials.

(3) A "specialty fertilizer" is a commercial fertilizer distributed primarily for nonfarm use, such as home gardens, lawns, shrubbery, flowers, golf courses, municipal parks, cemeteries, greenhouses and nurseries.

(4) A "bulk fertilizer" is a commercial fertilizer distributed in a non-packaged form.

(b) The term "brand" means a term, design, or trade mark used in connection with one or several grades of commercial fertilizer.

(c) Guaranteed Analysis:

(1) Until the _____ prescribes the alternative form of "guaranteed analysis" in accordance with the provisions of subparagraph (2) hereof, the term "guaranteed analysis" shall mean the minimum percentage of plant nutrients claimed in the following order and form:

A. Total Nitrogen (N) _____ per cent
Available Phosphoric Acid (P_2O_5) _____ per cent
Soluble Potash (K_2O) _____ per cent

B. For unacidulated mineral phosphatic materials and basic slag, bone, tankage and other organic phosphate materials, the total phosphoric acid and/or degree of fineness may also be guaranteed.

C. Guarantees for plant nutrients other than nitrogen, phosphorus and potassium may be permitted or required by regulation of the _____.

The guarantees for such other nutrients shall be expressed in the form of the element. The sources of such other nutrients (oxides, salt, chelates, etc.) may be required to be stated on the application for registration and may be included as a parenthetical statement on the label. Other beneficial substances or compounds, determinable by laboratory methods, also may be guaranteed by permission of the _____ and with the advice of the Director of the Agricultural Experiment Station. When any plant nutrients or other substances or compounds are guaranteed, they shall be subject to inspection and analysis in accord with the methods and regulations prescribed by _____.

D. Potential basicity or acidity expressed in terms of calcium carbonate equivalent in multiples of one hundred pounds per ton, when required by regulation.

(2) When the _____ finds, after public hearing following due notice, that the requirement for expressing the guaranteed analysis of phosphorus and potassium in elemental form would not impose an economic hardship on distributors and users of fertilizer by reason of conflicting labeling requirements among the states, he may require by regulation thereafter that the "guaranteed analysis" shall be in the following form:

Total Nitrogen (N) _____ per cent
Available Phosphorus (P) _____ per cent
Soluble Potassium (K) _____ per cent

Provided, however, that the effective date of said regulation shall be not less than six months following the issuance thereof, and provided, further, that for a period two years following the effective date of said regulation the equivalent of phosphorus and potassium may also be shown in the form of phosphoric acid and potash; provided, however, that after the effective date of a regula-

tion issued under the provisions of this section, requiring that phosphorus and potassium be shown in the elemental form, the guaranteed analysis for nitrogen, phosphorus, and potassium shall constitute the grade.

(d) The term "grade" means the percentage of total nitrogen, available phosphorus or phosphoric acid, and soluble potassium or soluble potash stated in whole numbers in the same terms, order and percentages as in the guaranteed analysis. Provided however that fertilizer materials, bone meal, manures, and similar raw materials may be guaranteed in fractional units.

(e) The term "official sample" means any sample of commercial fertilizer taken by the or his agent and designated as "official" by the

(f) The term "ton" means a net weight of two thousand pounds avoirdupois.

(g) The term "per cent" or "percentage" means the percentage by weight.

(h) The term "person" includes individual, partnership, association, firm, and corporation.

(i) The term "distributor" means any person who imports, consigns, manufactures, produces, compounds, mixes, or blends commercial fertilizer, or who offers for sale, sells, barters or otherwise supplies commercial fertilizer in this state.

(j) The term "registrant" means the person who registers commercial fertilizer under the provisions of this Act.

(k) The term "label" means the display of all written, printed or graphic matter upon the immediate container or statement accompanying a commercial fertilizer.

(l) The term "labeling" means all written, printed or graphic matter, upon or accompanying any commercial fertilizer, or advertisements, brochures, posters, television and radio announcements used in promoting the sale of such commercial fertilizers.

(m) The term "investigational allowance" means an allowance for variations inherent in the taking, preparation and analysis of an official sample of commercial fertilizer.

Section 4. Registration (Option A)

(a) Each brand and grade of commercial fertilizer shall be registered before being distributed in this State. The application for registration shall be submitted to the..... on a form furnished by the, and shall be accompanied by a fee of \$.....per brand and grade except that those fertilizers sold in packages of 10 pounds or less shall be registered at a fee of twenty-five dollars each. Upon approval by the..... a copy of the registration shall be furnished to the applicant. All registrations expire on

.....of the following year.

The application shall include the following information:

- (1) The net weight
- (2) The brand and grade

(3) The guaranteed analysis

(1) The name and address of the registrant

(b) A distributor shall not be required to register any commercial fertilizer which is already registered under this Act by another person, providing the label does not differ in any respect.

(c) A distributor shall not be required to register each grade of commercial fertilizer formulated according to specifications which are furnished by a consumer prior to mixing, but shall be required to register his firm in a manner and at a fee as prescribed in the regulations by the , and to label such fertilizer as provided in Section 5 (b).

Licensing (Option B)

(a) No person shall manufacture or distribute in this state any type of fertilizer, except specialty fertilizers, until a license to distribute has been obtained by the person whose labeling is applied to such fertilizer from theupon payment of a \$.....fee. All licenses expire on the thirtieth day of June of each year.

(b) An application for license shall include:

- (1) The name and address of licensee;
- (2) The name and address of each bulk distribution point in the state, not licensed for fertilizer manufacture and distribution.

The name and address shown on the license shall be shown on all labels, pertinent invoices, and bulk storage for fertilizers distributed by the licensee in this state.

(c) The licensee shall inform the.....in writing of additional distribution points established during the period of the license.

(d) No person shall distribute in this state a specialty fertilizer until it is registered by the manufacturer or distributor with the An application in duplicate, for each brand and product name of each grade of specialty fertilizer shall be made on a form furnished by theand shall be accompanied with a fee of \$.....for each brand and product name of each grade. Labels for each brand and product name of each grade shall accompany the application. Upon the approval of an application by the....., a copy of the registration shall be furnished the applicant. All registrations expire on the thirtieth day of June of each year.

- (e) An application for registration shall include the following:
- (1) Name and address of the manufacturer or distributor;
 - (2) The brand and product name;
 - (3) The grade;
 - (4) The guaranteed analysis;
 - (5) The package sizes for persons that package fertilizers only in containers of ten pounds or less.

Section 5. Labels

- (a) Any commercial fertilizer distributed in this State in containers shall have placed on or affixed to the container a label setting forth in clearly legible and conspicuous form the information required by Section 4 (a) (1), (2), (3) and (4) of this Act. In case of bulk shipments, this information in written or printed form shall accompany delivery and be supplied to the purchaser at time of delivery.
- (b) A commercial fertilizer formulated according to specifications which are furnished by a consumer prior to mixing shall be labeled to show the net weight, guaranteed analysis, and the name and address of the distributor.

Section 6. Inspection Fees.

- (a) There shall be paid to the _____ for all commercial fertilizers distributed in this State an inspection fee at the rate of _____ cents per ton: Provided, that sales to manufacturers or exchanges between them are hereby exempted. Fees so collected shall be used for the payment of the costs of inspection, sampling, and analysis, and other expenses necessary for the administration of this Act. On individual packages of commercial fertilizer containing 10 pounds or less, there shall be paid in lieu of the annual registration fee of _____ per brand and grade and the _____ cents per ton inspection fee, an annual registration fee and inspection fee of twenty-five dollars for each brand and grade sold or distributed. Where a person sells commercial fertilizer in packages of 10 pounds or less and in packages over 10 pounds, this annual registration and inspection fee of twenty-five dollars shall apply only to that portion sold in packages of 10 pounds or less, and that portion sold in packages over 10 pounds shall be subject to the same inspection fee of _____ cents per ton as provided in this Act.

- (b) Every person who distributes a commercial fertilizer in this State shall:
 - File with the _____ on forms furnished by _____ a quarterly statement for the periods ending September 30, December 31, March 31 and June 30, setting forth the number of net tons of each commercial fertilizer distributed in this state during such quarter. The report shall be due on or before the thirtieth day of the month following the close of each quarter and upon such statement shall pay the inspec-

tion fee at the rate stated in paragraph (a) of this section. If the tonnage report is not filed and the payment of inspection fee is not made within 30 days after the end of the quarter, a collection fee amounting to 10 percent (minimum \$10.00) of the amount shall be assessed against the registrant, and the amount of fees due shall constitute a debt and become the basis of a judgment against the registrant.

- (c) When more than one person is involved in the distribution of a commercial fertilizer, the last person who has the fertilizer registered and who distributes to a nonregistrant (dealer or consumer) is responsible for reporting the tonnage and paying the inspection fee, unless the report and payment is made by a prior distributor of a fertilizer.

Section 7. Tonnage Reports.

- (a) The person transacting, distributing or selling commercial fertilizer to a nonregistrant shall mail the _____ a report showing the county of the consignee, the amounts (tons) of each grade of commercial fertilizer, and the form in which the fertilizer was distributed (bags, bulk, liquid, etc.). This information shall be reported by one of the following methods: (1) submitting a summary report approved by the _____ on or before the _____ day of each month covering shipments made during the preceding month; or (2) submitting a copy of the invoice within _____ business days after shipment. No information furnished the _____ under this section shall be disclosed in such a way as to divulge the operation of any person.

Section 8. Inspection, Sampling, Analysis.

- (a) It shall be the duty of the _____, who may act through his authorized agent, to sample, inspect, make analyses of, and test commercial fertilizers distributed within this State at any time and place and to such an extent he may deem necessary to determine whether such commercial fertilizers are in compliance with the provisions of this Act. The _____, individually or through his agent, is authorized to enter upon any public or private premises or carriers during regular business hours in order to have access to commercial fertilizers subject to the provisions of this Act and the rules and regulations pertaining thereto, and to the records relating to their distribution.
 - (b) The methods of analysis and sampling shall be those adopted by the _____ from sources such as the A.O.A.C. Journal.
 - (c) The _____, in determining for administrative purposes whether any commercial fertilizer is deficient in plant food, shall be guided solely by the official sample as defined in paragraph (c) of Section 3, and obtained and analyzed as provided for in paragraph (b) of this section.
 - (d) The results of official analysis of commercial fertilizers and

portions of official samples shall be distributed by the as provided in the regulations.

Section 9. Plant Food Deficiency.

(a) Penalty for Nitrogen, Available Phosphoric Acid or Phosphorus and Potash or Potassium.—If the analysis shall show that a commercial fertilizer is deficient (1) in one or more of its guaranteed primary plant foods (NPK) beyond the "investigational allowances" as established by regulation, or (2) if the overall index value of the fertilizer is below the level established by regulations, a penalty of times the commercial value of such deficiency or deficiencies shall be assessed. When a commercial fertilizer is subject to a penalty under both (1) and (2) the larger penalty shall apply.

(b) Penalty for Other Deficiencies.—Deficiencies beyond the investigational allowances as established by regulation in any other constituent(s) covered under Section 3 paragraph (c) B, C, and D of this Act, which the registrant is required to or may guarantee, shall be evaluated and penalties prescribed therefore by the.....

(c) Nothing contained in this section shall prevent any person from appealing to a court of competent jurisdiction praying for judgment as to the justification of such penalties.

(d) All penalties assessed under this section shall be paid to the consumer of the lot of commercial fertilizer represented by the sample analyzed within three months after the date of notice from the to the registrant, receipts taken therefor and promptly forwarded to the If said consumers cannot be found, the amount of the penalty shall be paid to the who shall deposit the same (or shall pay said penalty to some local charitable or educational institution.)

Section 10. Commercial Value.

For the purpose of determining the commercial value to be applied under the provisions of Section 9 the shall determine and publish annually the values per unit of nitrogen, available phosphoric acid, and soluble potash in commercial fertilizers in this state. If guaranties are as provided in Section 3 (c) (2) the value shall be per unit of nitrogen, phosphorus, and potassium. The values so determined and published shall be used in determining and assessing penalties.

Section 11. Misbranding.

No person shall distribute misbranded fertilizer. A commercial fertilizer shall be deemed to be misbranded:

- (a) If its labeling is false or misleading in any particular.
- (b) If it is distributed under the name of another fertilizer product.
- (c) If it is not labeled as required in Section 5 of this act and in accordance with regulations prescribed under this act.

(d) If it purports to be or is represented as a commercial fertilizer, or is represented as containing a plant nutrient or commercial fertilizer unless such plant nutrient or commercial fertilizer conforms to the definition of identity, if any, prescribed by regulation of the; in the adopting of such regulations the shall give due regard to commonly accepted definitions and official fertilizer terms such as those issued by the Association of American Plant Food Control Officials.

Section 12. Adulteration.

No person shall distribute an adulterated fertilizer product. A commercial fertilizer shall be deemed to be adulterated:

- (a) If it contains any deleterious or harmful ingredient in sufficient amount to render it injurious to beneficial plant life when applied in accordance with directions or directions on the label, or if adequate warning statements or directions for use, which may be necessary to protect plant life are not shown upon the label.
- (b) If its composition falls below or differs from that which it is purported to possess by its labeling.
- (c) If it contains unwanted crop seed or weed seed.

Section 13. Publications.

The shall publish at least annually and in such forms as he may deem proper: (a) Information concerning the distribution of commercial fertilizers, (b) Results of analyses based on official samples of commercial fertilizers distributed within the state as compared with the analyses guaranteed under Section 4 and Section 5.

Section 14. Rules and Regulations.

The is authorized to prescribe and, after a public hearing following due public notice, to enforce such rules and regulations relating to investigational allowances, definitions, records, and the distribution of commercial fertilizers as may be necessary to carry into effect the full intent and meaning of this Act.

Section 15. Short Weight.

If any commercial fertilizer in the possession of the consumer is found by the to be short in weight, the registrant of said commercial fertilizer shall within thirty days after official notice from the pay to the consumer a penalty equal to four times the value of the actual shortage.

Section 16. Cancellation of Registrations.

The is authorized and empowered to cancel the registration of any brand of commercial fertilizer or to refuse to register any brand of commercial fertilizer as herein provided, upon satisfactory evidence that the registrant has used fraudulent or deceptive practices in the evasions or attempted

evasions of the provisions of this Act or any rules and regulations promulgated thereunder: Provided, that no registration shall be revoked or refused until the registrant shall have been given the opportunity to appear for a hearing by the

Section 17. "Stop Sale" Orders.

The _____ may issue and enforce a written or printed "stop sale, use, or removal" order to the owner or custodian of any lot of commercial fertilizer and to hold at a designated place when the _____ finds said commercial fertilizer is being offered or exposed for sale in violation of any of the provisions of this Act until the law has been complied with and said commercial fertilizer is released in writing by the _____, or said violation has been otherwise legally disposed of by written authority. The _____ shall release the commercial fertilizer so withdrawn when the requirements of the provisions of this Act have been complied with and all costs and expenses incurred in connection with the withdrawal have been paid.

Section 18. Seizure, Condemnation, and Sale.

Any lot of commercial fertilizer not in compliance with the provisions of this Act shall be subject to seizure on complaint of the _____ to a court of competent jurisdiction in the area in which said commercial fertilizer is located. In the event the court finds the said commercial fertilizer to be in violation of this Act and orders the condemnation of said commercial fertilizer it shall be disposed of in any manner consistent with the quality of the commercial fertilizer and the laws of the State: Provided, that in no instance shall the disposition of said commercial fertilizer be ordered by the court without first giving the claimant an opportunity to apply to the court for release of said commercial fertilizer or for permission to process or relabel said commercial fertilizer to bring it into compliance with this Act.

Section 19. Violations.

(a) If it shall appear from the examination of any commercial fertilizer that any of the provisions of this Act or the rules and regulations issued thereunder have been violated, the _____ shall cause notice of the violations to be given to the registrant, distributor, or possessor from whom said sample was taken; any person so notified shall be given opportunity to be heard under such rules and regulations as may be prescribed by the _____. If it appears after such hearing, either in the presence or absence of the person so notified, that any of the provisions of this Act or rules and regulations issued thereunder have been violated, the _____ may certify the facts to the proper prosecuting attorney.

(b) Any person convicted of violating any provision of this Act or the rules and regulations issued thereunder shall be punished in the discretion of the court.

(c) Nothing in this Act shall be construed as requiring the _____ or his representative to report for prosecution or for the institution of seizure proceedings as a result of minor violations of the Act when he believes that the public interests will be best served by a suitable notice of warning in writing.

(d) It shall be the duty of each _____ attorney to whom any violation is reported to cause appropriate proceedings to be instituted and prosecuted in a court of competent jurisdiction without delay.

(e) The _____ is hereby authorized to apply for and the court to grant a temporary or permanent injunction restraining any person from violating or continuing to violate any of the provisions of this Act or any rule or regulation promulgated under the Act notwithstanding the existence of other remedies at law. Said injunction to be issued without bond.

Section 20. Exchanges between Manufacturers.

Nothing in this Act shall be construed to restrict or avoid sales or exchanges of commercial fertilizers to each other by importers, manufacturers, or manipulators who mix fertilizer materials for sale or as preventing the free and unrestricted shipments of commercial fertilizer to manufacturers or manipulators who have registered their brands as required by the provisions of this Act.

Section 21. Constitutionality.

If any clause, sentence, paragraph, or part of this Act shall for any reason be judged invalid by any court of competent jurisdiction, such judgment shall not affect, impair, or invalidate the remainder thereof but shall be confined in its operation to the clause, sentence, paragraph, or part thereof directly involved in the controversy in which such judgment shall have been rendered.

Section 22. Repeal.

All laws and parts of laws in conflict with or inconsistent with the provisions of this Act are hereby repealed.

Section 23. Effective Date.

This Act shall take effect and be in force from and after the first day of _____

RULES AND REGULATIONS

Under the Uniform State Fertilizer Bill by the _____ of the State of _____

Pursuant to due publication and notice of opportunity for a public hearing, the _____ has adopted the following regulations.

1. Plant Nutrients in addition to Nitrogen, Phosphorus and Potassium

Other Plant Nutrients, when mentioned in any form or manner shall be registered and shall be guaranteed. Guarantees shall be made on the elemental basis. Sources of the elements guaranteed and proof of availability shall be provided the upon request. The minimum percentages which will be accepted for registration are as follows:

Element	%
Calcium (Ca)	1.00
Magnesium (Mg)	0.50
Sulfur (S)	1.00
Boron (B)	0.02
Chlorine (Cl)	0.10
Cobalt (Co)	0.0005
Copper (Cu)	0.05
Iron (Fe)	0.10
Manganese (Mn)	0.05
Molybdenum (Mo)	0.0005
Sodium (Na)	0.10
Zinc (Zn)	0.05

Guarantees or claims for the above listed plant nutrients are the only ones which will be accepted. Proposed labels and directions for use of the fertilizer shall be furnished with the application for registration upon request. Any of the above listed elements which are guaranteed shall appear in the order listed immediately following guarantees for the primary nutrients of nitrogen, phosphorus and potassium.

A warning or caution statement is required on the label for any product which contains 0.03% or more of boron in a water soluble form. This statement shall carry the word "WARNING" or "CAUTION" conspicuously displayed, shall state the crop(s) for which the fertilizer is to be used, and state that the use of the fertilizer on any other than those recommended may result in serious injury to the crop(s).

Products containing 0.001% or more of molybdenum also require a warning statement on the label. This shall include the word "WARNING" or "CAUTION" and the statement that the application of fertilizers containing molybdenum may result in forage crops containing levels of molybdenum which are toxic to ruminant animals.

EXAMPLES OF WARNING OR CAUTION STATEMENTS:

Boron:

- Directions: Apply this fertilizer at a maximum rate of 350 pounds per acre for Alfalfa or Red Clover seed production. CAUTION: Do not use on other crops. The boron may cause injury to them.
- CAUTION: Apply this fertilizer at a maximum rate of

700 pounds per acre for Alfalfa or Red Clover seed production. Do not use on other crops; the boron may cause serious injury to them.

- WARNING: This fertilizer carries added Borax and is intended for use only on alfalfa. Its use on any other crops or under conditions other than those recommended may result in serious injury to the crops.

Molybdenum:

- CAUTION: This fertilizer is to be used only on soil which responds to molybdenum. Crops high in molybdenum are toxic to grazing animals (ruminants).

2. Specialty Fertilizer Labels

The following information, if not appearing on the face or display side in a readable and conspicuous form, shall occupy at least the upper third of a side of the container and shall be considered the label:

- Net Weight
 - Brand and Grade
 - Guaranteed Analysis:

Total Nitrogen (N)	%	Ammoniacal Nitrogen**	%
		Nitrate Nitrogen**	%
		Water Insoluble Nitrogen*	%
Available Phosphoric Acid (P ₂ O ₅)	%		
Soluble Potash (K ₂ O)	%		
- Additional Plant Nutrients as prescribed by regulation.
 **Potential Acidity or Basicity _____% or _____lbs.
 Calcium Carbonate Equivalent per ton.
- Name and address of registrant

Notes:

- *If claimed or the statement "organic" or "slow acting nitrogen" is used on the label
- **If claimed or required

3. Slowly Available Plant Nutrients

- No fertilizer label shall bear a statement that connotes or infers the presence of a slowly available plant nutrient, unless the nutrient or nutrients are identified.
- When a fertilizer label infers or connotes that the nitrogen is slowly available through use of organic, organic nitrogen, ureaform, long lasting or similar terms, the guaranteed analysis must indicate the percentage of water insoluble nitrogen in the material.

(c) To supplement (b), it should be established that if a label states the amount of organic nitrogen present in a phrase, such as "25% of the nitrogen from ureaformaldehyde (ureaform)", then the water insoluble nitrogen guarantee must be not less than 60% of the nitrogen so designated.

Example: 10-6-4 Rose Food

25% of Nitrogen is Organic

$10(\text{Total N Guaranteed}) \times .25(\% \text{ N Claimed as}$

$(\text{Organic}) \times .60 = 1.5\% \text{ WIN}$

(d) When the water insoluble nitrogen is less than 15% of the total nitrogen, the label shall bear no references to any designations, such as stated in (b).

(e) The term "Coated-Slow Release Fertilizer," or "Coated-Slow Release" may be accepted as descriptive of products.

(f) Further, the above phrases (e) be allowed for any products that can show a testing program substantiating the claim. (Testing under guidance of Experiment Station personnel, or a recognized reputable researcher, etc.) Water insoluble nitrogen must be guaranteed at the 15% of total nitrogen level as in organic materials.

(g) That AOAC method 2.072 be used initially to substantiate the fact that "Coated-Slow Release" materials are present. The determination need only be modified by elimination of sample grind-
ing during preparation. When the AOAC Committee, working on this problem, comes up with a more specific method it will, of course, be substituted.

4. Definitions

Except as the designates otherwise in specific cases, the names and definitions for commercial fertilizers shall be those adopted by the Association of American Plant Food Control Officials.

5. Percentages

The term of "percentage," by symbol or word, when used on a fertilizer label shall represent only the amount of individual plant nutrients or other factors in relation to the total product by weight.

6. Investigational Allowances

(a) A commercial fertilizer shall be deemed deficient if the analysis of any nutrient is below the guarantee by an amount exceeding the values in the following schedule, or if the overall index value of the fertilizer is below 98%.*

Guarantee percent	Nitrogen percent	Available Phosphoric acid percent	Potash percent
4 or less	0.49	0.67	0.41
5	0.51	0.67	0.43
6	0.52	0.67	0.47
7	0.54	0.68	0.53
8	0.55	0.68	0.60
9	0.57	0.68	0.65
10	0.58	0.69	0.70
12	0.61	0.69	0.79
14	0.63	0.70	0.87
16	0.67	0.70	0.94
18	0.70	0.71	1.01
20	0.73	0.72	1.08
22	0.75	0.72	1.15
24	0.78	0.73	1.21
26	0.81	0.73	1.27
28	0.83	0.74	1.33
30	0.86	0.75	1.39
32 or more	0.88	0.76	1.44

For guarantees not listed, calculate the appropriate value by interpolation.

*For these investigational allowances to be applicable, the recommended AOAC procedures for obtaining samples, sample preparation and analysis must be used. These are described in Official Methods of Analysis of the Association of Official Analytical Chemists, 11th edition, 1970, and in succeeding issues of the Journal of the Association of Official Analytical Chemists. In evaluating replicate data, table 19, page 935, Journal of the Association of Official Analytical Chemists, volume 49, No. 5, October, 1966 should be followed.

Averaging at least two values must be adhered to. If more than two values are obtained, all significant values must be averaged. Values carried to two decimals are needed in applying averages to this table. Values may be "rounded" to one place where preferred in reporting. The overall index value is calculated by comparing the commercial value guaranteed with the commercial value found. Unit values of the nutrients used shall be those referred to in Section 10.

Overall index value—example of calculation for a 10-10-10 grade found to contain 10.1% Total Nitrogen (N), 10.2% Available Phosphoric Acid (P_2O_5), and 10.1% Soluble Potash (K_2O). Nutrient unit values are assumed to be \$3 per unit N, \$2 per unit P_2O_5 , and \$1 per unit K_2O .

10.0 units N	x 3 =	30.0
10.0 units P ₂ O ₅	x 2 =	20.0
10.0 units K ₂ O	x 1 =	10.0

Commercial Value Guarantee = 60.0

10.1 units N	x 3 =	30.3
10.2 units P ₂ O ₅	x 2 =	20.4
10.1 units K ₂ O	x 1 =	10.1

Commercial Value Found = 60.8

Overall index value = $\frac{60.8}{60.0} \times 100 = 101.3\%$

- (b) Secondary and minor elements shall be deemed deficient if any element is below the guarantee by an amount exceeding the values in the following schedule:

Element	Allowable Deficiency
Calcium) 0.2 unit + 5% of guarantee
Magnesium	
Sulfur	
Boron) 0.003 unit + 15% of guarantee
Cobalt) 0.0001 unit + 30% of guarantee
Molybdenum	
Chlorine) 0.005 unit + 10% of guarantee
Copper	
Iron	
Manganese	
Sodium	
Zinc	

The maximum allowance when calculated in accordance to the above shall be 1 unit (1%).

7. Sampling

Sampling equipment and procedures shall be those adopted by The Association of Official Analytical Chemists wherever applicable.