

STANDARDIZATION AND QUALITY CONTROL IN AGRICULTURAL SECTOR—AN INTEGRATED APPROACH*

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I wish to express my deep gratitude to the Indian Society of Agricultural Statistics for honouring me by electing as Sessional President for its 41st Conference at Rajahmundry. I feel the honour all the more as I have been associated with the Society for over two decades. I also consider it a great privilege and honour to address such a gathering of learned statisticians and scientists:

Last year, I had the privilege of delivering Dr. V. G. Panse Memorial Lecture on "Role of Standardization in the Agricultural Development of India" [1] at the 40th Conference of the Society at Varanasi. The present address extends and further highlights the potentiality, versatility and achievements of standardization, quality control and statistical methods in sound development of agricultural and allied fields. This address also stresses the need for an integrated approach to standardization and quality control in order to obtain really effective, satisfactory and economic results in the agricultural sector with particular reference to the contributions made and experience gained within the framework of Bureau of Indian Standards (BIS). The Bureau (BIS) has come into effect from 1 April 1987 in place of the former Indian Standards Institution (ISI) after the enactment of the Bureau of Indian Standards Act, 1986 by our Parliament in December 1986.

During the last 40 years since independence, there has been tremendous growth in the different sectors of industries in our country. However,

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the industrial economy as also the national economy continues to be heavily dependent on the agricultural sector. Hence the efforts to enhance and stabilize the agricultural production become very important for the economic development of our country. Besides, the agricultural economy should also be resilient enough to meet the abnormal situations like the present drought conditions which are of an unprecedented magnitude with more than two-thirds of areas suffering from severe lack of rains. This calls for the mobilization of the various available resources as also the optimum and timely measures to provide benefit to the people concerned, not only on long term basis but also in alleviating the present difficulties. Standardization and quality control would be found to be eminently suitable to meet these needs and would play a valuable role in marshalling the resources and efforts throughout the country in systematic, integrated and rational manner.

Water Management

One of the most prime requirements of human beings is water for both drinking and irrigation purposes. It has been estimated that two-thirds of the cultivable areas in the country are rainfed. This means that these areas are vulnerable to the vagaries of weather and consequently the agricultural production also fluctuates. Fortunately, in the previous years, there was an averaging effect in the sense that the drought conditions in some parts were compensated by good rainfall in some other parts of the country. In the absence of reliable irrigation system in such vast areas of land, it becomes essential to have good water management system for utilizing whatever source of water is available at present. It has been estimated that the country's ground water resources have an annual usable potential of nearly 42 million hectare metres out of which at present only 10 million hectare metres are being utilized. Further, [unlike large irrigation schemes] like multipurpose dams and reservoirs, ground water utilization requires comparatively much lesser expenditure on simple measures like excavating water storage tanks, building bandhs and terracing. Deep tube wells may also be installed according to the water table. The planning and location of such tube wells require the co-operation of geo-scientists, engineers and planners as also the use of standard equipments. In the drought situation, it is all the more necessary that standard equipment and also standard codes of installing such tube wells are available at the national level for expediting such works.

The Bureau of Indian Standards has published IS : 11312 (Part 1)-1985, Indian Standard Specification for External Upset Drill Pipe Assemblies for use in Water Drilling. This specification gives in detail the

dimensional and metallurgical aspects of the drill pipe assemblies and gives also test methods for checking the conformity to the specification.

Drinking Water Supply System

It has been generally believed that drinking water is a gift of nature and is freely available in abundant quantity. But this belief has been shaken recently due to unabated increase in population both in urban and rural areas and the consequent greater demand for drinking water. A decade ago, it was estimated that about 1230 million people, throughout the world, were without safe drinking water supply. United Nations took a decision to declare International Drinking Water Supply and Sanitation Decade starting from 1981. Further, the Sixth Five Year Plan of our country also took note of the disturbing developments and made a special provision for the availability of safe drinking water. Consequent to this drive and massive programme throughout the country during the Sixth Five Year Plan, about 2.4 lakh villages were provided with supply of drinking water. However, it was estimated that there were still 45% of the population in rural areas who were to be covered for supplying safe drinking water.

One important development at national level has been the publication of Indian Standard Specification for Drinking Water, IS : 10500-1983. This standard deals with various characteristics of drinking water and divides them into essential and desirable requirements. The standard also mentions the desirable limits and indicates their background for guiding the implementing authorities, keeping in view the health of the people, adequacy of water treatment, etc. The standard prescribes that all essential characteristics of drinking water should be examined on routine basis while the desirable characteristics should be examined whenever a doubt arises about water quality or the potability of water from a new source is to be established. The important characteristics for drinking water are colour, odour, taste, turbidity, dissolved solids, pH value, total hardness, iron content, chlorides and residual free chlorine. Apart from this, bacteriological examination is also to be done regularly to verify that water samples do not contain any coliform organism as prescribed in the standard. If any coliform organisms are found, the action required is immediate re-sampling. The repeated finding of 1 to 10 coliform organisms in 100 ml or the appearance of higher number of coliform in any individual sample of water suggests that undesirable material is gaining access to the water and measures should at once be taken to discover and remove the source of pollution.

In majority of the villages and especially during the time of drought, it is impracticable to supply water to consumers through a proper distri-

bution net work and the sources, such as wells, bore-holes and springs may not provide naturally pure water. Under such circumstances, disinfection, although desirable, is not practicable and considerable reliance has to be placed on sanitary inspection and not to wait for the results of bacteriological examination. Obvious sources of contamination should be removed from the immediate catchment area, and wells and storage tanks should be properly protected by lining and covering. Surface drainage should be diverted, erosion of tanks should be prevented and the access of men and animals should be restricted by fencing of the source. In all these matters, it is imperative to obtain the cooperation of the local community and impart education in simple sanitary hygiene.

Sometimes, it also becomes necessary to subject drinking water to virological examination if there is suspicion of the presence of virus activity. The biological examination of water is of considerable value in determining the cause of objectionable taste and odour in water and in controlling remedial treatments. The drinking water should be also free from microscopic organisms such as algae, parasites and toxin producing organisms.

The mere stipulation of limits for various characteristics in drinking water is not sufficient unless it is backed up by sound sampling and testing methods. The Bureau of Indian Standards has brought out IS : 3025 Methods of Sampling and Tests (Physical and Chemical) for Water and Waste Water in 21 parts so far, covering all the tests prescribed in IS : 10500-1985.

It is also important to prescribe suitable water treatment wherever the drinking water needs such treatment before distribution to the consumers. IS : 9222 Recommendations for Handling and Dosing Devices for Chemicals and Water Treatment have been published and Part one of the standard deals with coagulants, dosing and handling.

Deepwell Hand Pumps

In the case of drinking water which is of prime necessity for all, there is a chance of the source itself getting contaminated with the conventional use of lifting methods from water wells. Deepwell handpumps have come as a boon for providing clean, potable, drinking water specially in the rural areas. These pumps have the advantage that they do not require any diesel or electric power for operation but they can be operated manually. The coordinated efforts of UNICEF, Central Mechanical Engineering Research Institute and Bureau of Indian Standards have resulted in standardization of such a reliable and efficient deepwell handpump which can be easily maintained in different locations with the locally available skills. The Indian Standard IS : 9301-1984 on deepwell pumps defines

the quality requirements expected to be met by them. The handpump manufactured according to this standard has revolutionized the drinking water scheme and it is now popularly called as 'The Miracle Pump'. IS : 9301 prescribes dimensions and construction details of various components of the deepwell handpumps like head assembly, handle assembly, water tank assembly and cylinder assembly. Anti-corrosive treatments like galvanising, painting, etc required for various components have been prescribed. Type tests and routine tests to be performed on the pumps have been laid down. IS : 11004-1985 covers installation and maintenance of deepwell handpumps. There are at present 50 BIS Certification marking licences for deepwell handpumps. Even small scale manufacturers have been able to manufacture quality handpumps due to guidance provided by BIS Certification marking and are able to compete in global tenders for exporting the pumps to overseas countries. This shows that with the coordinated efforts in the proper direction we will be able to bring technological upgradation within the reach of millions of people, even in the remotest corners of the country.

Agricultural Pumps

The Seventh Five Year Plan has envisaged an outlay of Rs. 2805 crores for minor irrigation in the public sector. In our country lift irrigation, which requires power driven pumps for the supply of water lift agricultural lands, plays an important role in the agricultural production. These pumps are driven by the use of diesel or electric power. The farmer being a layman is often unable to control the utilisation of diesel and electrical energy as he is handicapped by the lack of knowledge of the use of specific sizes of pumps driven by diesel or electricity. Indian standards on agricultural pumps have a vital role to play in this context. The Indian Standard on Horizontal Centrifugal Pumps for clean, cold, fresh water (IS : 1520-1980) prescribes technical requirements for such pumps for general purposes other than agricultural use. Horizontal Centrifugal Pumps specially in the lower sizes are immensely useful for agricultural purposes when a pump low in capital cost is required. To make available pumps at as low a cost as possible to agricultural users, it is necessary to make the testing as economical as possible in the case of these pumps. IS : 6595-1980 on Horizontal Centrifugal Pumps for clear, cold, fresh water for agricultural purposes has been issued with this end in view. However, in the case of pumps there is always the problem of alignment and matching them with the prime movers. In case of misalignment and mismatching, there is always considerable loss of efficiency and energy. To obviate these difficulties, monoset pumps have been developed which provide efficient alignment and matching

between the pump and the prime mover. IS : 9079-1979 prescribes requirements for the monoset pumps for clean, cold, fresh water for agricultural purposes. IS : 8034-1976 covers the requirements for submersible pump set commonly used in boreholes for handling clear, cold, fresh water. At present 66 BIS licences according to IS : 9079 and 30 licences according to IS : 8034 are in operation. In order to provide guidelines for the selection, installation, operation and maintenance of pumps, IS : 9694-1980 has been published in four parts. The recommended pumping system for agriculture purposes has been covered in IS : 10804-1986.

HDPE and PVC Pipes for Water Supply

High density polyethylene (HDPE) pipes as well as unplasticised polyvinyl chloride (PVC) pipes are being more and more used in water supply replacing cast iron pipes owing to their lighter weight, much less frictional losses and easy assembly. BIS has published two standards, namely, IS : 4984-1978 and IS : 4985-1981 on HDPE pipes and unplasticised PVC pipes, respectively. These standards prescribe physical, dimensional and performance requirements for different classes of pipes depending on working pressure. Sampling inspection procedures have been provided after carrying out extensive studies and investigations. There are at present 30 and 87 licences operating respectively for the above two standards, thereby ensuring uninterrupted availability of quality pipes for potable water supply. For different classes of pipes, different colours have been prescribed in order to guide the consumer.

As an adjunct to these standards on pipes, IS : 8360 and IS : 10124 have been published in different parts dealing with fabricated HDPE fittings and fabricated PVC fittings to be used for jointing to the respective pipes. Dimensional interchangeability is ensured by providing suitable tolerances and hydraulic tests have been provided to ensure field performance. BIS certification for these fittings is also becoming popular. BIS has also published standards on injection moulded HDPE fittings to be used with HDPE pipes.

Concrete Pipes for Irrigation Purposes

Concrete pipes have been found eminently suitable for irrigation purposes because of their strength and freedom from metallic corrosion. IS : 458-1971 on concrete pipes (with and without reinforcements) prescribes various quality requirements and there are at present 160 manufacturers operating BIS certification marks scheme. The total value of production is estimated to be 80 crores of rupees and tonnage to be 7 lakhs.

Irrigation Water Management

As in the case of drinking water, the conservation, proper distribution and optimum use of irrigation water assume great importance, particularly at the time of drought. Education of farmers in the optimum use of water and adoption of rational irrigation methods require constant coordination among agricultural scientists, engineers, extension workers and farmers. BIS is engaged in preparing Indian Standards on methods of evaluation of quality of water, efficiency of irrigation, water requirements of crops and guidelines for various practices associated with soil water management, as well as various irrigation equipments and systems. So far 10 Indian Standards have been prepared which include IS : 10317-1982 Guide for evaluation of soil properties relevant to irrigation, IS : 11624-1986 Guide for the quality of irrigation water, IS : 11711-1986 Criteria for adopting different methods of irrigation and IS : 10809-1984 Hydraulic rams. A hydraulic ram can pump water to a greater height without any external source of energy. This is important for the agricultural development in hilly areas of our country which are more problematic than other areas due to extremely uneven topography and difficulties encountered in using conventional methods of lifting water by diesel engine or electric motor-driven pump-sets. In order to avoid irrigation water losses due to non-controlled and excessive application systems prevalent in the country, a need was felt to develop a system which can ensure optimum application of water. Trickle irrigation system has been developed to meet this need. This system is specially suited to drought prone areas where water is scarce. An Indian Standard code for design and Installation of Trickle Irrigation System, IS : 10799 (Part I)—1984 has been recently prepared. This standard deals with requirements for pressure feed system of trickle irrigation. The second part of the standard is expected to cover the gravity feed system. This standard, apart from defining various terms used in trickle irrigation system also enumerates the components required. It deals with design, installation and performance requirements of this irrigation system. However, it is important that the safety aspects of the irrigation system are suitably ensured at the time of installation so as to prevent the leakage or spraying of water on electrical lines and power units.

Indian Standards are also available for the conventional irrigation systems. For instance, IS : 5968 deals with the planning and layout of irrigation canal system. From the point of view of surface of irrigation water, it is equally necessary that water reservoirs should be operated and maintained at optimum level and there should be a code of practice for these activities. Further, it is a common knowledge that sizeable quantities of water are lost by evaporation from storage reservoirs.

Taking the above into consideration, IS : 7323-1974 Indian Standard guidelines for operation of Reservoirs has been prepared covering all aspects of reservoir operation. Both single purpose and multi-purpose reservoirs have been covered by these standards for dealing with various situations like flood control regulations and conservation regulations. In the operation of reservoirs, the collection and analysis of hydrological data assumes great importance. The establishment of rainfall and river gauging stations has to be done in a planned manner in order to obtain the relevant data for the purpose of flood control as well as timely distribution of water for irrigation purposes. These standards also give the extracts from the operation schedules of major reservoirs in India. For fighting the drought, the regular collection and analysis of these data is of primary consideration so that the impact of water scarcity can be estimated and timely action taken for tapping alternative sources of irrigation.

IS : 6939-1973 Methods for Determination of Evaporation from Reservoirs deals with various factors affecting the evaporation. The methods of determining evaporation from free water surfaces has been prescribed and the relative merits of these methods have been discussed so that proper method can be utilised depending on the regions in the country, such as, arid regions, humid temperature regions and cold regions. It is highly essential that modern scientific methods are applied to minimise the evaporation losses caused by such factors as vapour pressure difference, temperature, wind and radiation.

Availability of Irrigation Water through Water Treatment of Effluents

With rapid industrialization, industries are consuming a large amount of water and the waste water (effluents) is generally unfit for any purpose including irrigation. However, recently, statutory regulations have come into force in most of the States to arrange proper treatment of effluent water so that no harm is done when this water is drained ultimately. Recent experience has shown that the treated water can be successfully used for irrigation purpose also. This, of course, requires a close coordination between the factory personnel and the farmers who would be using treated water. Indian Standards are available not only for water required for various industrial uses, such as, high pressure boiler, ice manufacturer, industrial cooling system, etc. but also for the treatment of industrial effluents discharged by various industries, such as, distillery, electroplating, sugarcane, fertilizer, tanning, textiles, petroleum refinery, steel plant, etc. These standards provide valuable guidance for treatment of waste water of these industries and thus provide a large potential for additional water for irrigation if these are

properly implemented. It is equally important to have proper test methods for estimating the toxicity of these effluents. IS : 6582-1971 Bio-assay Methods for Evaluating Acute Toxicity of Industrial Effluents and Waste Waters; IS : 2490 Tolerance Limits for Industrial Effluents and IS : 2488 Methods of Sampling and Test for Industrial Effluents (in five parts) have provided valuable guidance to industries in this respect.

Soil Management

Soil Management is one of the vital factors affecting agricultural productivity. Our country is endowed with vast varieties and types of soil. Further, conventional farming practices also vary from region to region for the same type of soil. It is highly imperative that soil management practices and equipment are standardised in order to attain optimum results. BIS is engaged in preparing specifications for Soil Management, Microbial Inoculants and Soil Testing kits. Code and Guidelines for reclamation of acid and salt affected soils have also been prepared. Some of the important Standards are IS : 6046-1982 Gypsum for Agricultural Use, IS : 8268-1986 Rhizobium Inoculants and IS : 9138-1979 Azotobacter Chroococcum Inoculants. The standard on Azotobacter Chroococcum Inoculants is being implemented through BIS Certification Marks Scheme. At present, 9 BIS licences are in operation. The operation of BIS Certification Marks for IS : 8249—Zinc Sulphate for Agricultural purpose has vastly improved the availability of this important chemical to the farmers throughout the country. At present, there are 27 Licences operating this scheme. In the field of substitution of energy-intensive conventional materials pertaining to agriculture by alternative materials, standardization has played an important role. Bio-fertilisers can be used in lieu of traditional nitrogenous fertilizers like urea and ammonium nitrate. They fix atmospheric nitrogen and make it available to the plants. Since they do not contribute to any type of environmental pollution, they have a positive advantage over high energy consuming chemical fertilizers.

Agricultural Equipment

Modernisation in agricultural operations has introduced a number of labour saving and time saving equipment. The phenomenon has affected the entire spectrum of agriculture. Considering the above developments BIS had started the work on standardisation of agricultural equipment in a big way covering different agricultural operations. BIS is engaged in preparing specifications on equipment operated by manual, animal and tractor power, used for tillage and inter-cultivation opera-

tions. It has so far prepared 44 Indian Standards including specifications and testing codes. The important Indian Standards prepared include IS : 4366 (Part-1)—1985 Agricultural Tillage Discs; Part 1 Concave type, IS : 4366 (Part-2)—1985 Agricultural Tillage discs (Part-2) Flat type, IS : 7640-1975 Test Code for Disc Harrows, IS : 7926-1975, Classification of Soil for Testing of Agricultural Machinery, IS : 7927-1975 Method of field testing for Manually operated Paddy Weeder & IS : 9217-1979 Test code for Agricultural Discs. The Indian Standard on concave type Agricultural Tillage Discs, IS : 4366 (Part-1)—1985 is being implemented through BIS Certification Marks Scheme and 4 licencees are in operation at present.

BIS is also engaged in the preparation of Indian Standards on equipment operated by manual, animal and tractor power used for sowing, planting, manure and fertilizer application. Two important specifications prepared are IS : 11271-1985 Groundnut Planters & IS : 11314-1986 Furrow Opener for single row Jute Seed Drill. The specifications prepared are being widely used.

Harvesting and Threshing Equipment

Furthermore, BIS is engaged in preparing Indian Standards on equipment for harvesting and threshing including combine harvesters. 25 Indian Standards on threshers, sickles, test codes for power threshers safety and technical requirements for power threshers and code of practice of installation, operation and preventive maintenance of power thresher have been issued. Standardisation of symbols is an important area. Since our country is a multi-lingual country with sizeable sections of the population in the rural areas being illiterate, there is a need for standardisation of symbols for facilitating the use of implements in the farms and cottage industries. Accordingly, a standard of this nature giving pictorial representation for cautionary notices for power threshers has been published. Proper implementation of this standard is very important for avoiding accidents which may be caused by the improper usage of threshers. The Indian Standard IS : 9020-1979 Safety requirements for Power Threshers is being widely implemented through BIS Certification Marks Scheme. At present, 119 BIS Licensees are in operation according to IS : 9020-1979.

Post-Harvest Operations

The post-harvest technology is a multi-disciplinary field which encompasses handling with minimum loss, processing and marketing not only for foodgrains but also for other crops. The operations such as proces-

sing, storage, packaging and transport are covered under post-harvest operations. BIS is engaged in preparing Indian standards on storage structures and storage management systems for all agricultural produce and products, primary produce and processed products such as oils and oil seeds, excluding fish and animal products. About 50 Indian Standards have been prepared on codes of practice for construction of different types of foodgrains, storage management code including general and specific care in handling and storage of agricultural produce and inputs. Standards on test methods for determination of storability (safe storage life) of foodgrains (IS : 11396-1985) and methods for assessment of post-harvest grain losses by rodents [IS : 11261 (Parts 1 and 2)-1985], have also been published. BIS is also engaged in preparing Indian Standards on equipment operated by animal, power tiller and tractor for farm transport purposes including animal-drawn vehicles. 8 Indian Standards including IS : 8213-1987 Agricultural Trailer (*Second revision*) have been prepared.

It is estimated that adoption of all the Indian Standards on storage of foodgrains will substantially reduce the storage losses. According to one estimate they may be brought down from 10 to 2 percent. Foodgrains saved are foodgrains produced. In the present situation of drought, this assumes increasingly high importance.

Processing of Agricultural Product

BIS has also prepared Indian standards on equipment for primary processing operations like cleaning, grading, drying of grains and miscellaneous equipment like sugarcane crushing, chaff cutting, maize shelling, tuber crop processing, etc. So far 17 Indian standards on equipment and test codes for grain dryers have been prepared. IS : 11032-1984 Rotary Screen-type pre-cleaner, IS : 11459-1985 power-operated chaff cutter have also been published.

BIS is engaged in preparation of Indian Standards on equipment and system for milling of foodgrains (cereals and pulses), oil seeds, feed as well as solvent extraction plant. So far 8 Indian Standards on Rice milling machinery have been prepared. Out of these 8 standards, 4 are already being implemented through BIS Certification marks scheme and 6 BIS Licences are in operation at present.

Crop Protection

Food and disease control are two of the basic needs of the mankind, While efforts have been made to increase our food production through the use of high yielding varieties as also the extensive changes in the

various agricultural operations and practices, the control of diseases and the damages done by the pests and insects still pose formidable problems. In fact, the struggle between the man and insects began long before the dawn of civilization, has continued without cessation to the present time, and will continue, no doubt, as long as the human race endures.

Pesticides and insecticides have been playing vital role in fighting the plant diseases pertaining to various crops. Quality of pesticidal formulations which are put to ultimate use by the farmers is a very important factor in case of pesticides. Unlike fertilizers which may result in drop of production alone if not used in correct dosages, improper use of pesticides is hazardous. Higher dosages would result in residual toxicity in the plant products while smaller dosages not only can not stop the impending damage to plant from pests and diseases but would also result in development of resistant varieties of pests. BIS is actively engaged in the standardization and quality control for pesticides industry. So far, BIS has prepared about 200 Indian Standards on technical grade pesticides, pesticidal formulations and requirements for safe handling and packaging of pesticides. These Indian Standards include IS : 560-1980 BHC, technical and refind, IS : 564-1984 DDT dusting powders, IS : 562-1978 BHC water dispersible powder concentrates, IS : 1307-1982 Aldrin emulsifiable concentrates, IS : 4015 (Part 1 and 2)-1967 Guide for handling cases of pesticides poisoning. The pesticide industry has wholeheartedly responded by adopting the voluntary BIS Certification marks scheme. BIS has so far granted about 1100 licences covering about 350 units for different types of pesticides. The use of statistical methods have considerably helped in ensuring the manufacture of pesticides of satisfactory and uniform quality.

Currently, BIS is making efforts to develop an Indian Standard on synthetic pyrethroids which are recognized as a fourth generation pesticide. Adequate and functional packing of pesticides technicals and their formulations becomes as important as technical specifications on quality requirements. An Indian Standard (IS : 8190) for laying down uniform packaging system has been published in 4 parts—Part I covering solid pesticides, Part 2 liquid pesticides, Part 3 household pesticides and Part 4 fumigants. This has resulted in making available the pesticides of desired quality to the poor farmers in a standardized and safe pack.

Furthermore, BIS is preparing Indian standards on crop protection equipment. So far about 26 standards covering hand-operated compression knapsack sprayer, rocker sprayer, code of practice for operation and preventive maintenance of crop protection equipment and methods of test for hand operated cut-off device for pest control equipment have been published. Out of these 26 standards, 7 are already being implemented through BIS Certification marks scheme. At present, 14 licences of hand-operated

compression knapsack sprayer 1 Part 2 Non-pressure retaining type according to IS : 1970 (Part 1)-1982, 6 licences of hand-operated stirrup-type sprayer according to IS : 1971-1982, 10 licences of rocker sprayer according to IS : 3062-1982, 16 licences of foot sprayer according to IS : 3652-1982, 14 licences of piston type hand-operated knapsack sprayer according to I : 3906 (Part 1)-1982, 2 licences of belly mounted type hand rotary duster according to IS : 5135 (Part 1)-1974 and 4 licences of shoulder mounted type hand rotary duster according to IS : 5135 (Part 2)-1977 are in operation. This very clearly brings out the successful operation of the integrated approach of standardization and quality control in the field of crop protection equipment.

Oil Seeds

The technology mission on oil seed production set up under the direction of the Prime Minister to achieve increased production of oil seeds has selected 180 districts spread over 17 states for special thrust on oilseeds production so as to increase the availability of the oils, which at the moment is under the import list. The technology mission has fixed a target of 18 million tonnes of oils seeds production by 1989-90 and envisaged a production of 25 million tonnes of oil seeds by the year 2000. A significant achievement of BIS has been the acceptance by Government of India of solvent extracted oils for edible purposes after proper processing. Till 1967, the oil obtained by solvent extraction was not permitted for edible purposes even after processing. Realizing the vast potential of such oils and their acceptance in many overseas countries, BIS took the lead and formulated specifications for solvent extracted oils thus helping in obtaining due recognition to such oils and enabling the industry to a large extent to grow to its present size.

Vanaspati

BI certification marking had been made mandatory for vanaspati with effect from 1 October 1985 with a view to providing wholesome vanaspati to the people. The specification for vanaspati, IS : 10633-1984 was formulated after extensive investigations on the melting point of vanaspati and the limit for unsaponifiable matter. This Indian Standard was revised in 1986 to accommodate the problem faced by the industry and other concerned as a result of compulsory certification of vanaspati under the BIS Certification marking scheme. In order not to unduly burden the testing laboratories, non-edible oils, the tests for which should be carried out on routine basis, have been enumerated. At present, 86 BIS licences are in operation for vanaspati according to IS : 10633-

1986. In a monetary term, the value of vanaspati under BIS certification comes out to be about Rs 2250 crores.

Non-Conventional Edible Oils

In some cases, the formulation of specifications has enhanced the acceptability of oils for edible purposes like those for maize oil, rice bran oil, soyabean oil and watermelon seed oil. With an increase in the production of soyabean in the country, need was felt for finding alternative uses for indigenous soyabean oil as refined as refined one for direct consumption purposes. A separate standard IS :11069-1984 Specification for refined, bleached, hydrogenated, winterized and deodorized (RBHWD) Soyabean oil has been formulated for this purpose which would take care of all the problems in making available refined soyabean oils for direct consumption purposes.

With the increase in production and demand of oilseeds, there is also an important need for ensuring proper handling and storage of oilseeds in such a way as to protect them from insect infestation and deterioration of quality. Guidelines and instructions for proper handling and storage of oilseeds are laid down in IS : 5686-1970 Code of Practice for handling and storage of oilseeds. By following various practices recommended in this standard, the losses in deterioration in quality of oilseeds may be minimized to a great extent, thereby improving the quality and quantity of oilseeds for oil milling.

Economic Savings

As a result of standardization, quality control and certification, a large amount of economic savings have been obtained. For example, in the case of diesel engines, the specific fuel consumption values had been brought down by 15 to 22 percent. When I had estimated the economic savings in fuel consumption accruing from the lower specific fuel consumption values of the diesel engines, the savings came out to be Rs 990 million a year (2).

In the case of reinforced cement concrete (RCC) pipes, BIS certification and quality control had brought about considerable improvements in the quality of the pipes. The percentage of rejection had come down from about 25 percent to 3 percent. I estimated the resulting economic savings to be about Rs 18 crores per year.

Conclusion

The public sector outlay for agriculture and irrigation in seventh five year plan is Rs 27,552 crores which constitutes 15.30 percent of the total

outlay. In fact, in all the Five year plans, this sector has been occupying a prominent place and hence more and more efforts have been made to further develop this sector which occupies a key position in our economy. In all the areas including land preparation, sowing, crop protection, soil and water management, irrigation, inter-cultivation, harvesting, transport, storage, processing, and milling, BIS through its standardization, quality control and certification effort has successfully demonstrated the validity and increasing need to follow the integrated approach. This approach has also proved to be an effective and fruitful medium for propagating the modern agricultural practices and has also brought the advantages of advancements in science and technology to the rural masses even in the remotest corners of the country. A more bold and vigorous implementation of this approach would not only ensure faster agricultural and economic development of our country but would also considerably improve the quality of life of the people.

REFERENCES

- [1] SINGH, B. N. (1986): "Role of Standardization in the agricultural development of India", Dr V. G. Panse Memorial Lecture, Journal of Indian Society of Agricultural Statistics, Vol XXXVIII, No. 3, P. 269-280.
- [2](1983): "Standardization and Certification in diesel engine industry", ISI Bulletin, Vol 35, No. 3, 82-85.