

FACTS ABOUT THE WHEAT VARIETY SHARBATI SONORA -
A REPLY TO THE ARTICLE PUBLISHED IN THE STATESMAN
DATED 17TH MAY, 1977.

This has reference to the article on Dr. M.S. Swaminathan by your staff reporter in your paper (The Statesman) dated 17th May, 1977. The allegations made in that article were not in anyway different from those made by some interested persons five or six years back. These had already been thoroughly examined by the I.C.A.R. Enquiry Committee constituted by the Government of India in 1972 and a report was submitted. In the light of this, your staff reporter's article under reference is very unfortunate. It is nothing but an attempt at character assassination. You may remember that Dr. M.S. Swaminathan is an eminent scientist of international repute and scientists all over India are so proud of him and look to him for inspiration and strength. Considering the disastrous effects your staff reporter's article is likely to produce, I would like to bring the following facts to your readers' notice. Tests conducted with the wheat varieties Sharbati Sonora and Sonora 64 by me and my colleagues at the Cereal Quality Testing Laboratory of the Indian Agricultural Research Institute showed a protein content of 16.2 percent for Sharbati Sonora and 13 percent for Sonora 64. Our first analysis of Sharbati Sonora for lysine content using the lysine decarboxylation method showed a mean value of 4.61 percent from three successive runs of single hydrolysate. Although this was our maiden analysis using the automatic lysine decarboxylation method, we did not have any reason to doubt this result due to the facts that the Sharbati Sonora flour gave a higher value for dye binding capacity which is an indirect measure of the amount of basic amino acids in flour protein and that higher lysine values similar to these have been reported in wheat elsewhere also. For instance, values exceeding 4 percent were reported for

some wheat strains by Dr. V.A. Johnson's group in the United States. Dr. M.S. Swaminathan, the then Director of the Indian Agricultural Research Institute who used to take keen interest in the research activities of the scientists happened to mention the findings made at the Cereal Quality Testing Laboratory in a popular talk on "Protein malnutrition and intellectual dwarfism" at a vegetarian congress held in Delhi in 1967. Later this came to be published elsewhere.

Samples of Sharbati Sonora and other commercially grown varieties obtained from different locations were later tested. Although the results still showed the superiority of Sharbati Sonora over several varieties for both protein and lysine, the values for lysine in general were lower and showed considerable variation. In the light of these differences tests were repeated and the confirmed values were subsequently presented and discussed in the Annual Wheat Workshop 1968, in the symposium on the "Nutritive value of high yielding cereals" organized under the auspices of the Nutrition Society of India in 1968 and in the International Atomic Energy Agency (IAEA) symposium on "New approaches to Breeding for Improved Plant Protein" held at Rostanga in 1968 where Dr. Swaminathan himself presented the paper. The results were subsequently published in the Proceedings of the Nutrition Society of India in 1969 and in the proceedings of the IAEA Symposium on "New Approaches to Breeding for Improved Plant Protein in 1969". Efforts were also made to get the materials analyzed in different laboratories in U.S.A. Samples of Sonora 64 and Sharbati Sonora were supplied for analysis to Prof. Oliver Nelson of Purdue University when he visited the Indian Agricultural Research Institute in 1967. The samples were analysed under the supervision of Prof. E.T. Mertz at Purdue University on 20th Nov, 1967. Seeds of Sharbati Sonora were also sent to Nebraska

(U.S.A.) for testing. Necessary efforts had been thus taken as early as 1967 to check and get correct data. Animal feeding experiments were also conducted by Prof. Eggum in Denmark and the results were presented in International Atomic Energy Agency (IAEA) symposium on "Plant Protein Resources: Their improvement through the application of nuclear techniques" jointly organized by the IAEA and FAO and held in Vienna from 8th to 12th June 1970.

Now let us examine whether there is anything superior in the wheat variety Sharbati Sonora which will be beneficial to the millions of people particularly in India who depend on wheat primarily for protein. The data supplied by Professor Mertz showed a protein content of 16.19 percent for Sharbati Sonora and 12.25 percent for Sonora 64. Four values for lysine as percentage of protein (i.e. g. lysine per 100 g. protein) obtained in Sharbati Sonora by Prof. Mertz were 2.65, 2.74, 2.57 and 2.75 while in Sonora 64 the values were 2.21, 2.38, 2.66 and 2.83. According to these data 100 g. of Sharbati Sonora will provide 416 mg. to 445 mg. of lysine while an equal amount of Sonora 64 will contribute only 271 mg. to 347 mg. lysine. According to the data supplied by Dr. V.A. Johnson (USA) in June 1968 the seeds of Sharbati Sonora (From IARI) showed a protein content of 16.2 percent with a lysine value of 2.7 percent which again will provide about 437 mg. to 443 mg. lysine per 100 g. grain. In another sample of Sharbati Sonora received by him from elsewhere a protein content of 14.4 percent with 2.89 to 3.26 percent lysine was reported. In a paper co-authored by Dr. Y.P. Gupta, an IARI scientist, Sharbati Sonora was reported to have a protein content of 16.25 percent and a lysine value of 510 mg. per 100 g. sample which work out to 3.14 g. lysine per 100 g. protein. Tests conducted at the instance of ICAR Enquiry Com-

mitted at the Central Food Technological Research Institute, Mysore and the Indian Institute of Science, Bangalore showed values of 450 mg. and 478 mg. lysine respectively per 100 g. sample.

Protein values as high as those obtained in Sharbati Sonora (i.e. over 16 percent) were not reported in Sonora 64 either from CMMT or Nebraska. Also lysine values as high as 450 mg. to 510 mg. per 100 g. sample have not been reported in Sonora 64 from anywhere. Regarding the percentage of lysine (g. lysine per 100 g. protein) the values reported for Sonora 64 were 2.21 to 2.83 percent at 12.25 percent protein level (from Prof. Mertz' Lab.) and 2.83 percent at 14.59 percent protein level (from CMMT) whereas in Sharbati Sonora the values varied between 2.45 to 3.17 percent at over 15 percent protein level (i.e. 2.57 to 2.75 percent lysine at protein content of 16.19 percent from Prof. Mertz' Lab., 2.99 percent at 15.07 percent protein from CFTRI Mysore and 3.17 percent lysine at 15.07 percent protein from Indian Institute of Science, Bangalore. All these results clearly show that the values of 16.5 percent protein and 3 percent lysine mentioned in the Ramon Magsaysay Award citation to Dr. M.S. Swaminathan are correct.

Animal (rat) feeding experiments by Prof. Bjorn O. Eggum in Denmark in 1970 showed a higher biological value (BV) of 60.5 and net protein utilization of 53.9 in Sharbati Sonora while the respective values in Sonora 64 were only 52.0 and 48.4. The figures for BV and NPU in some other important wheat varieties tested by Prof. Eggum along with Sharbati Sonora were 52.0 and 49.1 in Super X (Mexican), 49.4 and 44.3 in **Inda** (Mexican), 49.4 and 45.8 in Jarral (Mexican), 55.0 and 50.3 in Colibri (German) and 59.0 and 52.9 in Average Danish Wheat. It may be noted that Sharbati Sonora came out superior to all the varieties

listed by him for biological and net protein utilization values.

The data for the quantity and quality of protein in Sharbati Sonora obtained by various workers in different countries show that this is a good source of protein and lysine to the diet of people consuming wheat as one of the major foods as in India. For instance, one who consumes just about 250 g. to 300 g. of this wheat will get on an average 40 g. to 48 g. protein and 1125 to 1350 mg. lysine which are more than the per day requirement of these for an adult. Also the proteins contain fairly good percentage of lysine (2.45 to 3.17%) and are of good quality as shown by the data of Prof. Eggum (1970). In this respect this variety is definitely superior to Sonora 64 or Kalyansona or most of the varieties commercially grown at present in India. This variety, in addition, has better consumer acceptability in view of its attractive amber grain colour and medium strong dough characteristics desirable from the point of making chapaties. It is also found to have good bread-making properties.

As one who has been engaged in cereal quality testing work at the Indian Agricultural Research Institute for the last 20 years, I can confidently say that I have not come across so far a released variety which is superior to Sharbati Sonora for protein potential (as high as even upto 20 percent), fairly high lysine content (up to 3.17 percent) and relatively high biological and net protein utilization values. In view of its high nutritional and technological properties I would suggest this as a standard variety for quality and any variety released for commercial cultivation should be atleast comparable to this variety for quality.

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SOUTHERN FOREST RANGERS COLLEGE, COIMBATORE

" Indian Forestry at the Crossroads "

CONVOCATION ADDRESS

BY

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I am glad to be here on an occasion when this College is providing to the country an additional number of trained Forest Rangers. Since its establishment in 1912 originally as the Madras Forest College and subsequently as a constituent unit of the Forest Research Institute and Colleges, Dehra Dun, this institution has earned for itself a good reputation both within the country and outside. This has been possible only because of the dedication of its staff and students. I would like to pay my tribute to the staff for the excellent training they have been giving to successive generations of students. I also offer to all of you who are passing out of the College my sincere congratulations and best wishes for success and happiness in your professional as well as personal life.

I. Ecological Security

I need hardly stress the importance of the work in which you are engaged. In fact, an enduring national food security system can be erected only on the foundation of ecological security. Ecological security implies the conservation and scientific utilisation of basic natural assets such as soil and water, flora and fauna. A well managed forest eco-system in which plants, animals and man co-exist in a mutually symbiotic manner, is an essential component of ecological security. The importance of protecting our forests and thereby the environment and wild life which forest canopies help to generate, was recognised in the Forest Policy Resolution of the Government of India adopted in 1952.

The 1952 National Forest Policy Resolution aimed at increasing the forest areas in the country to 33 per cent of the total land

area. Unfortunately, however, the position has steadily deteriorated since 1952. Far from expanding the area under forest, we are in fact fast losing ground. The adverse consequences of indiscriminate deforestation and shifting cultivation are now manifesting themselves in numerous ways like flash floods, land slides, soil erosion, silting of canals and reservoirs, and albedo effects. The damage to the Himalayan eco-system through extensive deforestation and erosion and land slides promoted by the methods adopted for the construction of roads, mining, etc., has become a matter of deep concern. If we do not arrest and reverse this process before the end of this century, the entire future of Indo-Gangetic agriculture may be in danger. Since the Indo-Gangetic belt has the maximum untapped agricultural production reservoir in the country, our ability to feed 1000 million people in another 25 years is inextricably intertwined with the restoration of the Himalayan eco-system. The mountain eco-systems of peninsular India also need rapid restoration.

Instead of repeatedly restating that serious damage is being done to our forests, we should ask ourselves why this is happening. Why has the 1952 National Forest Policy statement become a document of unfulfilled sentiments? The answer will be obvious if we examine the data compiled by the National Commission on Agriculture on the demand for forest products as well as some of the major purposes for which good forest area has been cleared.

II. Forests : a vanishing resource

The total forest area as per Indian Forest Statistics is about 75 million ha. of which States own 95 per cent. The total forest area as per Indian Agricultural Statistics is, however, about 66 million ha. I would request Foresters to identify the reasons for this discrepancy.

Of the total forest area as per forest statistics, reserved forests constitute 51 per cent. About 32 per cent is protected

forests linked with rights and privileges. About 17 per cent is still un-classified, which is hardly demarcated and as such very vulnerable to encroachments and deforestation. Some foresters are of the view that not more than about 40 million ha. may have any forests at all and even part of it may include areas above the tree line in the Himalayas. During 1951-52 to 1975-76, the total forest area deforested for different purposes had been of the following order:

a) River Valley Projects	..	0.48 million ha.
b) Agricultural Use	..	2.51 million ha.
c) Road Construction	..	0.06 million ha.
d) Establishment of Industries.	..	0.13 million ha.
e) Miscellaneous purposes	..	0.96 million ha.

Total	..	4.14 million ha.
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The above relate only to the notified areas which have been transferred officially. There may be still lakhs of hectares of forest lands encroached upon and not yet regularised. Also, the methods adopted now for the construction of hill roads become the starting point of extensive damage to soil fertility and thereby prevent forest regeneration.

The demand for forest products is increasing as rapidly as forests are vanishing. NCA's projection for aggregate industrial wood requirement even under assumption of low income growth is -

1980	25 million m ³
1985	30 million m ³
2000	47 million m ³

The production figures in 1974-75 was 9.7 million m³ and in 1975-76, 9.9 million m³. In 1976-77, it may have gone up to 11 million m³. Thus there is a total mismatch between demand and production. However, since a large part of the demand is being

fulfilled, the wood must be coming from illicit fellings both from forests and from other areas like farm lands, roads, etc.

Fuel wood requirement and supply is another key factor in the felling of trees. According to NCA's projection the requirement of fuel wood is as follows:

	<u>Million m³</u>
1970	150
1975	165
1980	184
1985	202
2000	225

The recorded fuel wood production from forests is of the order of 17 million cu.m. in 1975. Since people need fuel wood, we can immediately recognise the causes for the indiscriminate felling of trees.

The foregoing analysis would show that the pathway adopted by us so far for meeting our requirements of fuel and timber is leading us to a blind alley. If we continue on this path, the remaining forests will tend to disappear by the end of this century and a renewable resource of inestimable value may become non-renewable as a result of desertification. Therefore, our forest policy needs careful review. To me it is clear that unless we now take to a path where forestry becomes a People's movement, rather than remain as the responsibility of only Forest Departments, we cannot provide the ecological security we need. Nor can we meet the timber needs of industry, shipping, railways and domestic use. In my view, three different packages will have to be blended to construct the new pathway. I would like to deal with them briefly.

III. Components of a Peoples' Forestry Movement

1. Public Policy Package:

Appropriate public policies represent the starting point for

stimulating development along the desired lines. For example, the most urgent need in the country side is wood for fuel and construction of homes. On the industrial side, we need wood material for making pulp for the paper industry, sleepers for railways and a host of other requirements. The Public Policy Package should include the provision of fuel and fodder in the Minimum Needs Programme and entrust the responsibility for the supply to the Gram Panchayats or any other appropriate agency in each block. Similarly, steps will have to be taken to arrest the diversion of good forest land for other purposes, unless an inescapable need like the defence of the country is involved.

2. Technological Package:

We need an appropriate technological package which can help school children as well as adults to raise trees in homes, schools, common land, road side, railway line, etc. So far, forest research has largely confined its attention to the management of reserve forests through scientific working schedules. We do not yet have location specific technologies for social forestry and agro-forestry programmes. Agro-forestry programmes could involve a wide range of land management systems leading to a combination of silviculture and horticulture, or silviculture and animal husbandry, or silviculture and aquaculture. In identifying suitable trees for each agro-ecological condition, preference should be given to trees of economic utility. For example, trees which can provide fuel, fodder, feed and fertilizer, should be accorded priority in the plantations being taken up in community lands. Similarly, fruit trees and oil-yielding trees should find a place depending upon the nutritional deficiencies occurring in each area.

In order to strengthen our on-going research programmes, the following projects will soon be initiated: (a) establishment of a National Forest Survey Organisation; (b) a National Bureau of Forest Genetic Resources; (c) a co-ordinated programme for the

improvement of bamboo and other under-utilised trees and (d) a co-ordinated programme for Agro-forestry research and development (jointly with ICAR).

We are endowed with the largest number of bamboo species in the world. Out of about 550 known species, more than a hundred have been described from India. About 40 species have also been introduced from outside. More than 50 per cent of the bamboo genetic wealth occurs in Eastern India, namely, Assam, Arunachal Pradesh, Mizoram, Sikkim and West Bengal. Other areas which are rich in bamboo, are Western Ghats and Andamans. We, therefore, propose to establish three major centres of research and development of bamboo. The Station in the North will take care of Dendrocalamus strictus and Bambusa arundinacea, the Station in the East will take care of Melocana balcooa, and the Station in South will take care of Bambusa arundinacea, Dendrocalamus strictus and Ochlandera species. Imaginative research involving distant crosses like the bamboo-sugarcane cross attempted by the late Dr. T.S. Venkataraman here at Coimbatore needs to be initiated for breeding quick growing bamboo varieties. Bamboo farming can then be taken up on a large scale for meeting the needs of our paper industry. We also need a considerable intensification of research on leguminous trees and shrubs as well as in wood technology. Forestry for packaging material, especially in areas characterised by horticultural advance is another area which deserves greater attention.

3. Package of Services:

Even when appropriate public policy decisions have been taken and a technological package has been developed, there will be need for providing a wide range of services for enabling forestry to become a People's movement. Besides arrangements for nurseries of appropriate planting material, there is need for a dynamic extension service. The whole area of extension and manpower development in

the forestry sector through appropriate training requires urgent strengthening. It is proposed to initiate the following steps for this purpose:

- a) A Directorate of Extension and Social Sciences will be set up at the Forest Research Institute and Colleges, Dehra Dun;
- b) Additional State Forest Service Officers' Colleges will be opened. At present there is one College at Burnihat and the establishment of another State Forest Service Officers College here at Coimbatore at a cost of over Rs. 80 lakhs has just been approved. We also propose to establish similar Colleges in the Central part of India and in Western India after a careful assessment of needs;
- c) State Governments will be assisted with appropriate technical advice in establishing Colleges for training Forest Rangers; and
- d) It is proposed to establish a chain of Van Vigyan Kendras (Forest Science Centres), which will impart training to those in charge of social, community and school forestry programmes. Van Vigyan Kendras like Krishti Vigyan Kendras of the ICAR, will impart relevant skills on the principle of "learning by doing". Priority will be given in these institutions to the training of rural women, since women are mostly in charge of energy management and budgeting in villages.

If we take to the pathway of promoting a People's Forestry Movement through an effective blend of public policies and technological and service packages, we may be able to introduce a new dimension of forest farming in our integrated Rural Development programmes. Since Block-level planning is the accepted procedure

in our approach to rural development, it is essential that we set up for each Block, or at least to start with, for each district, a Social Forestry Planning and Implementation Consortium. This Consortium should consist of appropriate representatives of the State Forest and Revenue Departments, Professors and Lecturers of Botany in the local Schools and Colleges, and representatives of Panchayats and voluntary organisations.

The future of our forestry movement depends upon people like you, who have chosen 'forestry' as a career. You are, therefore, going to serve as pillars of the new Forestry Movement of our country. I wish you much success in this mission.