

Presidential Address 1954

By Prof. DR. ING. J. N. BASU, M.I.E., M.A.E., V.D.I., M.L.A.

Brother—Colleagues and Friends,

At the very outset it is my foremost duty to appreciate your kind choice of my humble self for the highest honour of the President of the Association of Engineers for the second time in succession. Depending entirely on your co-operation and advice I dare to shoulder the responsibilities of the Chair and express my grateful thanks to you all.

Technical Education.

The position that here in India we have practically very poor facility for research work in engineering still persists and we all feel the sooner the situation changes, the better it will be for us, the engineers. In the Sibpur College, some sort of start is given in this direction on "Gas Turbine"; Jadavpur will soon launch on research work and Post Graduate Study. Indian Institute of Technology at Kharagpur made provision for Post Graduate Study in Internal Combustion Engineering and Production Technology. What I feel is that these measures are not at all sufficient to cope with the engineering problems that faces us to-day in our country. The Post Graduate Study and research working in engineering not only will make Indian engineers efficient and scientific-minded, but will also bring courage and strength to them to face difficult problems and to move through the unexplored paths to reach their goals and thereby the engineers can prove that the import of foreign technical experts, which is so frequent now-a-days, would be solely unnecessary.

The defects as I feel it, in our technical education at present is that it is a bit unbalanced with respect to different cadres of trainees in engineering. I found out about 2 years ago, that the total annual intake in degree courses in 41 engineering institutions all over India is 3700 and that in the diploma, certificate and vocational courses this amounts to 14842. So the ratio of trainees in other courses to those in the degree courses is 14842 by 3700 i.e. nearly 4.03, which should be between 16 & 20. Consequently the training of graduate engineers is disproportional to that of the other cadres of technical personnel, which creates the unbalance.

The indication of unhappy consequences of this sort of unbalance in the technical training is already apparant.

It is high time now that we should set right the unbalance without any further loss of time

Table 1 shows the technical institutions of different cadres as exist in West Bengal, offering facilities for technical training. Here in West Bengal, we have two colleges, namely, (1) College of Engineering & Technology at Jadavpur under National Council of Education and (2) Bengal Engineering College at Sibpur, for training graduate engineers; the 3rd one is established for the last three years for the same purpose by Government of India at Kharagpur. There are five institutions in this state with facilities for training in diploma courses (L.M.E., L.C.E., L.E.E. and Draughtsmanship). Besides these, there are seven Polytechnics. In addition to these, Railway Workshops, one at Kharagpur and the other at Kanchrapara, have the facilities of training technical apprentices, the Corporation of Calcutta has also made arrangements for training apprentices in its workshop. Different firms in Calcutta offers facilities for technical apprenticeship in their firms. All these trainees come for their theoretical training to the Calcutta Technical School which is managed by the Government of West Bengal with representatives of the firms. Only the apprentices of the Calcutta Corporation are having their theoretical training and laboratory work in the College of Engineering & Technology, at Jadavpur under the National Council of Education. Recently I came to learn that Port Commissioners created this facility for apprenticeship training for more than 60 years. The Port Commissioners' arrangement for apprenticeship training seems to be oldest in the line.

Indian Iron and Steel Company, both at Burnpur and Kulti, admits persons for training in different cadres of apprentices with initial qualifications varying from non-matric to B.Sc. Moreover, Government of India's Department of Labour are maintaining 6 training Centres in West Bengal which offer 22 trade courses to 3000 trainees who are given certificates after satisfactory completion of the course and on passing a trade test.

Five Year Plan.

The Five year plan of development is known to you. Three years have almost passed. Definite information as to the progress of all the development schemes under the plan is not yet available. But some of them as known to us indicates adequate progress, as for instance, the Damodar Valley and Mayurakshi project in West Bengal; the total money that was allotted to be spent for five year plan in West Bengal was 69.09 crores of which 37.5 crores were spent. In the fourth year of the plan i.e. in the next financial year the West Bengal Government proposes to spend 16.3 crores consequently in the first four years of the plan, 53.8 crores will be spent leaving a balance of 15.29 crores of rupees will be spent in the fifth year. So it can be reasonably expected that the West Bengal Government will spend the entire estimated sum of Rs. 69.09 crores for developments in five years: Besides this expenditure West Bengal share of

expenditure of Damodar Valley Corporation during the first four years amounts to 36 crores.

Irrigation and Power.

India has food deficit; India has shortage of cotton, jute, wood and other forest products. India has to face a shortage of variety of agricultural products, required for her industry and human consumption.

The classification of land is shown State-wise in Table II. Out of 58 millions, (column 7) acres current fallows and 98 million uncultivated land, (column 6), at least 50 million acres should be utilised for forest-cultivation, since forest area is far too small, as at present only 11.5% (column 4), which should be at least 25% if not more to enable the country to meet its demand on forest product, such as, wood for industrial and domestic use. Some more land should be left for pasture. A great portion will not be either available or suitable for cultivation. So it is not possible to add more than 60 million acres under plough and this also is to be effected with huge cost and with the help of machinery and scientific measures. The Central Tractor Organisation undertook to reclaim 2 million acres (originally 3 million acres, later reduced to 2 million acres) of kankar-infested waste land in 7 years, which means 3 lakhs acres per year. The cost is estimated to be 10½ crores of rupees. The area selected for this scheme is more favourable for reclamation purposes. It is likely that reclamation cost of other waste lands will be of higher magnitude and complicated scientific methods may be necessary to bring them under cultivation.

Last 30 years experienced no substantial increase in land under plough; In British India net area shown was 202.0 million acres in 1911 and in 1941 it remained at 214.0 million acres. On the other hand population of British India increased in the same period from 231.6 million to 295.8 millions. In consequence thereof the sown area per capita decreased from .88 acre to .72 acre. During the last ten years the population of the country increased much more rapidly i.e. at the rate of 4 to 4½ millions per year and thus created much more complicated problem with respect to the requirements of agricultural products in this country.

Irrigation, which means an artificial application of water to crops, is an art employed in India through ages prior to the commencement of the christian era. Even the canal irrigation is traced to date back to the second century.

Irrigation is necessitated due to the outstanding feature of rain-fall in India, as manifested by its unequal distribution during the year as well as from place to place and its variation from year to year in respect of quantity, incidence and duration. The average annual rain-fall varies from 5 inches in the desert in North-West India to 100 inches in Assam.

TABLE I.

Name & location of the institution.	Bodies operating in the scheme.	Duration of training in each course.	Capacity of Trg. in the inst.	Admission qualification.	Age limit.	Commencement of the session.	Scope of employment.	Exam. conducted by.	Nature of qualification issued.
1	2	3	4	5	6	7	8	9	10
A. Post graduate and degree course,									
1. B. E. College, Shippur	Govt.	4 years.	—	I.Sc. Admission Test.	Max. 21 yrs.	July	Executive post in Govt. Dept. & Industry.	C.U.	Degree Certificate.
2. College of Eng. & Technology,	Aided	Do.	200	Do.	Max. 22 yrs.	Do.	Do.	National Council of Education	Do.
3. Indian Inst. of Technology	Govt. of India	Do.	350	Do.	—	Do.	Do.	—	Do.
B. Diploma Course,									
1. K. G. Engineering Inst., Vishnupur Bankura	Aided	3 and 2 years.	220	Matric	18 yrs.	Do.	Overseer & Supervisor	State Council of Tech. Education	Dip.
2. M. B. C. Inst. of Eng. & Tech. Burdwan.	Do.	Do.	320	Do.	Do.	Do.	Do.	Do.	Do.
3. Jadavpur Technic	Do.	Do.	550	Do.	Do.	Do.	Do.	Do.	Do.

4.	Jalpaiguri Polytechnic	Do.	Do.	200
5.	Hooghly Ins- titute of Technology	Do.	Do.	80

C. Post Matric
Course.

1.	Shibpur Poly technic, Shibpur.	Govt.	1 year intensive training	356
2.	Asansol Poly- technic (Dhadka) Asansol, Burdwan	Do.	Do.	364
3.	Jadavpur Poly- technic.	Aided	Do.	328
4.	Dum Dum Poly- technic.	Do.	Do.	216
5.	R. K. Mission Silpamandira, Belurmath, Howrah.	Do.	year	146
6.	Hooghly Insti- tute of Tech- nology, Hooghly.	Do.	Do.	56
7.	Jalpaiguri Poly- technic Insti- tute, Patkata.	Do.	Do.	216

Do.	Do.	Do.	Do.	Do.	Do.
Do.	Do.	Do.	Do.	Do.	Do.
Matric Standard	15 to 18	May & Nov.	Apprentice Semi-skilled & skilled Artisan.	Local Board of Examinees.	One year Trg. Certificated.
Do.	Do.	Jan. & July	Do.	Do.	Do.
Do.	Do.	July	Do.	Do.	Do.
Do.	Do.	Aug.	Do.	Do.	Do.
Do.	Do.	Do.	Do.	Do.	Do.
Do.	Do.	July	Do.	Do.	Do.
Do.	Do.	Aug.	Do.	Do.	Do.

TABLE II.

Classification of land in the Indian Union (By states) 1949-50
(Figures in 1000 acres).

Name of the State.	Gross Area.	Classified area (area according to village papers for which returns exist.)	Forest.	Not available for cultivation.	Other uncultivated land excluding current fallows.	Current Fallows.	Net Area sown.	Area sown more than once.	Gross area sown.	Cultivable area included in (6).	Net area irrigated.	Percentage sown Area of Total Area (8 ^{1/2}).	Percentage irrigated Area of net Area sown (12/8).
1	2	3	4	5	6	7	8	9	10	11	12	13	14
<i>Part 'A' States.</i>													
Assam	54,404	33,400	4002	4248	16946	1739	5570	823	6393	.....	1327	10.23	23.6
Bihar	45,011	44790	7884	3747	5574	4737	22848	6285	29133	N.A.	5595	50.76	25.3
Bombay	71,213	70212	9914	8473	2098	7042	41082	1281	42363	1058	1761	57.69	4.3
Madhya Pradesh	83,375	83104	23645	5817	20267	4919	28456	3738	32194	5764	1691	34.13	5.9
Madras	81,786	80757	13814	14647	11272	9716	31308	5937	36345	245	9850	38.28	31.5
Orissa	38,487	18264	2502	4735	3498	1169	6359	965	7324	.....	1672	16.52	26.3
Punjab (1)	23,922	23208	759	6034	2587	1830	11948	2183	14136	307	4790	49.95	40.2
Uttar Pradesh	72,597	72224	7819	11834	10240	2562	39769	9459	49228	.....	10878	54.78	27.3
West Bengal	19,696	19549	1713	3046	1919	1159	11720	1291	13011	N.A.	2329	59.50	19.8
Total ...	490,491	445,508	72052	62,582	74,401	34923	199060	31062	230127	7374	39893	40.58	20.0
<i>Part 'B' States.</i>													
Hyderabad	52,572	52927	6137	8572	985	13119	24064	135	24199	N.A.	1488	45.77	6.2
Jamu & Kashmir	59,379	5799*	1472*	1801*	554*	406*	1556*	103*	1664*	74*	701*	.....	45.0
Madhya Bharat	29785	27625	2880	6215	6669	1109	10752	688	11440	.....	462	36.70	4.3
Mysore	18873	17385	1957	5705	1460	1807	6456	140	6596	.....	1152	34.20	17.8
Pepsu	6431	6371	46	998	936	876	4115	675	4790	.....	1845	63.08	44.8
Rajasthan	83382	20669	655	4223	4544	2862	8385	1005	9450	10	1593	10.06	16.9

Saurashtra	13655	1397	7	155	222	.....	1013	.....	1013	N.A.	54	7.42	5.3
Travancore- Cochin	5852	5350	1542	482	429	68	2829	217	3046	N.A.	940	48.34	33.2
Total ...	269879	137523	14746	27551	15809	20247	59170	3028	62198	84	8145	21.92	13.7
<i>Part ' C ' States.</i>													
Ajmer	1547	1561	47	595	303	247	369	37	406	N.A.	117	23.54	31.8
Bhopal	4402	4406	953	937	858	107	1551	57	1608	N.A.	17	36.14	1.1
Bilaspur	290	285	90	29	136	15	75	45	120	N.A.	5	25.98	6.6
Coorg	1015	1012	331	250	226	35	170	1	171	N.A.	7	16.76	4.1
Delhi	370	366	(a)	80	50	11	225	49	274	N.A.	68	60.81	30.2
Himachal Pradesh	6692	1956	342	365	27	60	562	349	911	.....	135	8.28	24.0
Cutch	10864	5003	127	1407	1200	1466	741	23	764	599	69	6.98	9.3
Manipur	5522	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tripura	2580	2634	1715	17	501	14	387	70	457	13	.....	15.00	.....
Vindhya Pradesh	15104	14356	2740	2211	4297	1046	4062	788	4850	3484	196	26.80	4.8
Total ...	48386	31579	6285	5891	8198	3001	8142	1419	9561	4096	616	16.81	7.5
<i>Part ' D ' Areas.</i>													
Andamans & Nicobar	2058	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Grand Total ...	810809	614610	93143	96024	98400	58171	266372	35514	301886	11554	48652	32.85	18.5

* Excluding enemy-held areas (a) less than 500 acres.

Almost the entire rain-fall in the country is received during four months of the year (June to September) and is due to South West Monsoons. The rain fall further shows considerable variations from year to year, in many places it is less than half the normal, even one-fourth of the normal in some other places.

It is estimated that the total annual flow of water in rivers under Indian Union is equivalent to 1356 million acre-feet of which only 76 million acre feet i.e. 5.6% are used for irrigation and the rest flow waste to the sea. It is considered to be possible to put to beneficial use about 450 millions acre-feet i.e. 33%.

The Storage project for irrigation is more costly due to construction of Dams, which may offset the high cost if combined with the uses of hydro-electric development and protection against flood damage.

Apart from rivers the underground waters constitute an essential source of water supply for domestic and agricultural purposes. Utilisation of sub-soil water is to be integrated with the exploitation of river waters. Substantial water supplies are available from the underground for irrigation, industrial and municipal uses. Water from wells is used for irrigation and domestic purposes from times immemorial. Ground water is generally available in all parts of the country and it was used for large scale irrigation in Uttar Pradesh, Bihar, Punjab, Pepsu, Rajasthan and Gujrat by means of power driven tube-wells.

It is stated before that 48.6 million acres are irrigated out of the net sown area of 266 million acres. The irrigated area is only 16% of the sown area. The provision of irrigation facilities greatly affect the yield per acre. The increase in yield in some acres comes up to 50% and in areas of low and uncertain rainfall, the increase may be 2 to 3 times the yield from unirrigated lands. With a limited scope to enhance the area to be sown, resource is to be taken to the extensive expansion of irrigation means in order to be able to cope with the problem of food shortage. During the last 45 years from 1901 to 1945, the irrigated area in British India increased from 30 million acres to 58 million acres i.e. 28 million acres in 45 years. The increase in agricultural products on account of the enhanced irrigation facilities was however more than counter-balanced by the increase in population. Moreover the partition of the country made the food position worse in the Indian Union. Nearly half of 4,00,000 acre of water carried by canals of undivided India and a little more than half of 24 million acres of land irrigated by State controlled canals, now in Pakistan. With 18% of the population of undivided India, Pakistan has 23% of the total area 32% of the rice, 35% of the wheat and 25% of all the food grains of undivided India.

So to meet with this piquant situation specially with respect to food, the planning commission recommended to double the area under Irrigation, namely to provide irrigation facilities to 40 to 45 millions acres, in 15 to 20 years. The irrigation schemes at present under construction, under 5 year plan, will provide irrigation over 8.5 million acres by 1955-56 and 16.94 million acres on their completion. So in the next fifteen years, irrigation facilities are to be tribled in order to achieve the goal.

The total estimated cost of all irrigation and power projects in the first part of the Five year plan as conceived by the Planning Commission is Rs. 734 crores. On these expenditure of 144 crores has been incurred upto the end of March, 1951. During the five year period covered by the plan i.e. April 1951 to March, 1956 proposed to spend Rs. 450 crores on these schemes, leaving Rs. 140 crores to be spent after the period. The projects are calculated to irrigate an additional area of 8.8 million acres and to generate 1.1 million K.W. of additional power in the last year of the plan. After the completion and full development of these projects only, the total addition to the irrigated area will be 16.5 million acres and to power 1.93 million killowatts. The annual expenditure on and likely benefits from the projects year by year, would be as follows:—

Year.	Expenditure (Rs. crores)	Additional irrigation (acres)	Additional Power (KW).
1951-52	99	1,559,000	144,000
1952-53	112	2,710,000	373,000
1953-54	100	4,525,000	889,000
1954-55	77	6,725,000	1,000,000
1955-56	53	8,832,000	1,124,000
Ultimate		16,501,000	1,935,000

The estimated cost on power development is shown separately for power under different states and amounts to Rs. 196.16 crores. In several multipurpose schemes under the Central Government, the cost on power and irrigation are shown collectively. Hence the proposed investment on power in the Five year plan is Rs. 196.16 crores plus the portion of the expenditure of Rs. 287.10 crores on several multi-purpose schemes, assuming this portion to be Rs. 104 crores, the total estimated expenditure on power would be nearly Rs. 300 crores in the last column the additional generating capacity would be total 1.935 million K.W. So the cost per K.W. will be 3,000: 1.926 Rs. 1,600/- approximately.

The maximum expenditure on power in any state would be Rs. 77.73 crores and that is in Madras; next in order comes Uttar Pradesh Rs. 27.28

crores, Mysore Rs. 19.24 crores, Travancore-Cochin Rs. 17.20 crores, Bombay Rs. 14.12 crores, Madhya Pradesh Rs. 13.69 crores; West Bengal has a very poor investment namely Rs. 1.36 crores in power and Rs. 19.21 crores in irrigation of which nearly Rs. 16 crores will be spent on Mayurakshi project alone. In West Bengal the consumption of electric units per capita is comparatively fair, due to heavy power use in the industrial area of Calcutta. Leaving greater Calcutta out of purview, the electricity use per capita over the rest of West Bengal would be very small. There is no irrigation by electric drive; no cottage and not many small industries have the benefit of electric power. Rural electrification is a vital need here in West Bengal without that no lasting solution can be found for the present day critical problems, such as unemployment, want of food and other vital necessities of life. It can make rural life much more attractive and thus help in arresting the influx of rural population into city. Nothing mentionable was done before independence to extend electric power to rural areas in West Bengal. The North Calcutta Electrification Scheme is practically the first attempt in West Bengal to supply power over a vast rural area. In this scheme, power will be taken from Mulajore Power Station of Calcutta Electric Supply Corporation and will be distributed over an area along the Hooghly up to Jiagunj in the Murshidabad district and in certain places on both sides of the river. The installation of a huge dewatering station at Sonarpur-Arapanch will furnish another rural area in the south of Calcutta with electricity. There is also a project to create an eastern belt of electric grid to the east of Calcutta. Much more attention of the West Bengal Government will be paid toward the important matter of bringing the benefit of Electric Power to the villages in the State.

In conclusion I wish to refer to the talk that is made most informally this year for the unification of activities of the Association of Engineers with other organisation of similar objectives in India. No progress is made as yet. The members will be informed of any substantive progress if made in this connection.

I thank you once again and wish you all happiness and prosperity.

Jai Hind.