Agricultural Statistics and Appraisal of Employment in Rural Areas —Some Issues[1]

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I feel highly honoured by the invitation of Indian Society of Agricultural Statistics to deliver the technical address at this annual conference. I have been associated with the Society and Agricultural Statistics research and development for more than forty years. During this period I have worked not only as agricultural statistician but also as a chief executive of Agricultural Development in one of the largest states of India as well as a planner for development of agriculture and I have studied the role of agricultural development in enriching the overall human development. It is in this background that I have chosen this topic for my address.

2. The title I have chosen today for the address would appear a little non-statistical in its narrow sense of term. What I have observed is that the statisticians are generally consulted in conducting sample surveys like NSS, crop estimation surveys etc., they are associated to build up various estimates of parameters of special interest and at best they are required to provide some estimates of the precision of these estimates and then they themselves forget or forgotten when time comes to use such set of information in formulating policies. I am attempting to cover one such area where statisticians have applied large-scale sample survey methodology for estimating cost of production of crops and livestock production. Inter-alia these surveys throw estimates of man-power requirement in the crop and livestock production. For cultivators and agricultural labourers, crop and livestock production are the two areas which are supposed to provide them enough employment in a year. In this address, an attempt has been made to match the total work force and employment opportunities in these two areas as well as other related areas of rural economy. An attempt has also been made to suggest some remedial measures to ensure adequate employment to rural workers in the rural areas itself through

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intensification and diversification of agricultural economy as also the entire economy of the state.

3. During 1998-90, agriculture, forestry and fisheries in India accounted for about 29 percent share in the total national income. However, the percentage of the cultivators and agricultural labourers in the total main workers according to the 1991 census was 59. The number of cultivators and agricultural labourers in the country was 1257 lakhs during 1971 which has increased to 1853 lakhs during 1991 and if this trend goes unabated, it is expected that this number would touch a mark of about 2400 lakhs during the year 2006. There would be no doubt a marginal shift from 59 percent during 1991 to 56 percent during the year 2006 (Table-1).

Table 1. Trends in population in India (in million)

S.No.	Category	Years				
		1971	1981	1991	2001(P)	2006(P)
1	2	3	4	5	6	7
1.	Total population	548.2	683.3	846.3	1012.4	1094.1
2.	Total workers	180.4	244.6	314.1	384.7	426.7
3.	Agricultural workers					
	(a) Total	125.7	148.0	185.3	220.7	238.5
	(b) As % of total population	22.9	21.7	21.9	21.8	21.8
	(c) Agricultural worker % of total workers	69.7	60.5	59.0	57.4	56.0

Source: Agricultural Statistics at a Glance, 2000
          P stands for estimated

4. It is at this point that a question regarding the capacity of agriculture and allied sectors for providing enough employment opportunity to each of these workers arises. The answer to this question has been attempted by analysing the present employment capacity of agriculture sector based on prevailing cropping pattern and man power required per unit of area under different crops, appraisal of likely changes in cropping pattern and structure of livestock, impact of labour saving devices in agriculture and changes in technology etc.

The Present Employment Capacity of Agriculture and Allied Sectors

5. Under the prevailing structure of rural economy, the main sources of employment in the rural areas are crop husbandry and animal husbandry. Some other minor activities like trade, cottage industry, services, public works like construction of roads, irrigation works, communication etc. also provide some employment. Recently employment generation programmes like Jawahar Rojgar

Yojna (JRY) and Employment Assurance Schemes (EAS) were executed to augment employment to landless agricultural labourers, marginal farmers and others needing such opportunities.

6. Of all these various components of employment activities, crop and animal husbandry continue to be the main source of employment. The various farm management studies being conducted by Govt. of India in different states on important crops do provide us the manpower absorption in different crops. As this information is available for only important crops for a state, the average manpower absorption has been used for other crops. These are shown in Annexure-2.

7. The employment capacity widely differs from crop to crop and from state to state implying in both the situations the nature of the crop and degree of agricultural development. Inspite of the fact that many of the agricultural operations are being executed by machines in Punjab, it still continues to generate sufficiently high degree of employment (Annexure-3) compared to Rajasthan, Madhya Pradesh, Gujarat, Karnataka. However, West Bengal and Kerala are the two states where the per-hectare man-power absorption in the crop husbandry operations is high mainly on account of crops requiring man-power per unit of area and low level of mechanization in these states.

Table 2. Cropping pattern in India: 1960-61 to 1999-2000(P)

(Area in lakh hects.)

S.No.	Crops	Years					
		1960-61	1970-71	1980-81	1990-91	1995-96	1999-2000(P)
1	2	3	4	5	6	7	8
1.	Rice	341	376	402	427	435	446
2.	Jowar	184	174	158	148	130	110
3.	Bajra	115	129	117	105	94	90
4.	Maize	44	59	60	59	62	65
5.	Wheat	129	182	223	242	255	267
6.	Barley	32	25	18	10	5	5
7.	Other foodgrains	311	298	289	297	290	285
8.	Oilseeds	138	166	176	241	255	270 .
9.	Sugarcane	24	26	27	34	40	45
10.	Potato	4	5	7	9	11	12
11.	Other crops	206	218	276	295	300	303
12.	Total	1528	1658	1753	1867	1877	1898

Source: Agricultural Statistics at a Glance, various issues. Column 8 is estimated

8. At the All India level, crops were grown in about 188 million hectares in the year 1995-96. Thirty five years back, crops were grown only in 152.8 million hectares. The cropping pattern as it obtains today compared to 1960-61 and thereafter is shown in Table-2.

9. Animal husbandry is a very important sector of rural economy and is too closely related to agriculture to differentiate it as far as the question of employment and poverty is concerned. This sector has a definite advantage over crop husbandry in the sense that whereas the land base for crop husbandry is limited, its base in the form of the number as well as quality is immense and can be expanded significantly. Hence the animal husbandry has to be duly evaluated for its employment generation capabilities. In evaluating these capabilities, we do not have data base as strong and scientific as in the case of crops with the help of which we can work out present level of use of human labour. We have, however, the norms given by National Commission on Agriculture and by using these norms which are broadly based on the results of various studies conducted by IASRI and the data on the various categories of livestock as per latest Livestock Census.

10. Two national programmes of JRY and Employment Assurance Scheme (EAS) are in operation which provided work opportunities of about 1.3 and 1.6 million SPYs respectively during the year 1995-96.

11. As has been pointed out by the National Commission on Agriculture (NCA), the other important employment generation programmes are the government sponsored programmes like building of roads, bridges, irrigation works etc. The total employment potential through crop husbandry, animal husbandry, JRY and others works out to 109.6 million SPYs as detailed in Table-3.

Table 3. Employment opportunities in rural areas in different sectors

S.No.	Sector	Employment (million SPYs) 1995-96
1	2	3
1.	Crop husbandry	62.1
2.	Animal husbandry	34.6
3.	Employment generating programmes of rural development	
	(a) JRY	1.3
	(b) EAS	1.6
4.	Other programmes	10.0
	All	109.6

12. Although the cropping pattern of 1995-96 and the results of cost of cultivation studies for the year 1994-95 to 1996-97 and similar other information for the previous year have been used, the updating of this information would not materially affect these estimates. Hence it can be inferred that the total employment opportunities available in the rural areas during 1995-96 through crop husbandry, animal husbandry, employment generation programmes etc. are of the order of 109.6 million SPYs against a total of 210.5 million agricultural workers leaving a gap of about 101 million SPYs. Thus against 273 days work in a year, an agricultural worker in rural area gets, on an average, work opportunities for only 142 days and that in order to give these workers right to work, additional employment opportunities of the order of 101 million SPYs for the existing workers have to be created in addition to the new incumbents who are expected to be about 18 million during 2006.

Inter State Variation in Employment Opportunities in Rural Areas

13. The macro level analysis of the employment opportunities in the country shows big gap of about 101 million SPYs. An attempt had also been made to study the situation obtaining in different states of the country. The methodology followed is almost similar to that used for national level. The broad cropping pattern and the estimated human labour utilization in cultivation of various crops are the same. The SPYs generated through JRY and EAS are given in Annexure 8.

14. On the basis of information mentioned above, the estimates of employment opportunities in rural areas for different states have been worked out and presented in Table-4.

15. The estimate of employment opportunities in the different states present a very gloomy picture for several states. On the one hand, there are states like Haryana and Punjab where an average worker gets about 200 days work opportunities in a year, there are states like Bihar and Tamil Nadu where an average agricultural worker gets less than 100 days work opportunities in a year. If the effect of the mechanisation is also taken into account, the employment scenario will further deteriorate in a number of states. Punjab and Haryana are the two states where local agricultural labour is not in far excess of the demand inspite a very high degree of mechanisation (Annexure-9).

Employment Capacity in the Rural Areas during the Year 2005-2006

16. At present, the crop and animal husbandry have the capacity to provide 8 hour per day employment for 273 days in a year to only 96.7 million workers against the availability of about 221 million workers for the year 2001. Some

Table 4. Statewise estimates of employment in rural areas

S.No.	States	Employment (in million SPY)									
		Crop Hus-bandry	Animal Hus-bandry	JRY	EAS	Sub Total of Col. 3, 4, 5 & 6	Other Sector	Grand Total Col. 7 & 8	Total Ag. Workers (95-96)	Gap Col. (10-9)	Average number of days per worker (Col. 9/10 × 273)
1	2	3	4	5	6	7	8	9	10	11	12
1	Andhra Pradesh	5.4	2.9	0.1	0.2	8.6	0.9	9.5	22.0	12.5	118
2	Bihar	3.6	3.2	0.2	0.2	7.2	0.7	7.9	22.9	15.0	94
3	Gujarat	3.0	1.4	0.0	0.0	4.4	0.4	4.8	9.2	4.4	142
4	Haryana	1.3	0.7	0.0	0.0	2.0	0.2	2.2	3.1	0.9	194
5	Himachal Pradesh	0.2	0.4	0.0	0.0	0.6	0.1	0.7	1.4	0.7	137
6	Karnataka	4.5	2.2	0.1	0.1	6.9	0.7	7.6	12.7	5.1	163
7	Kerala	1.1	0.6	0.0	0.0	1.7	0.2	1.9	4.3	2.4	121
8	Madhya Pradesh	5.9	3.9	0.1	0.1	10.0	1.0	11.0	21.0	10.0	143
9	Maharashtra	7.0	2.9	0.2	0.1	10.2	1.0	11.2	20.9	9.7	146
10	Orissa	4.0	1.8	0.1	0.1	6.0	0.6	6.6	8.6	2.0	209
11	Punjab	1.8	1.1	0.0	0.0	2.9	0.3	3.2	3.8	0.6	230
12	Rajasthan	4.1	2.4	0.1	0.1	6.7	0.7	7.4	10.8	3.4	187
13	Tamil Nadu	2.6	1.6	0.1	0.2	4.5	0.5	5.0	15.4	10.4	89
14	Uttar Pradesh	8.2	4.8	0.2	0.2	13.4	1.3	14.7	33.2	18.5	121
15	West Bengal	4.5	2.5	0.1	0.1	7.2	0.7	7.9	12.6	4.7	171
16	Other States	4.9	2.2	0.0	0.2	7.3	0.7	8.0	8.6	0.6	254
	India	62.1	34.6	1.3	1.6	99.6	10.0	109.6	210.5	100.9	142

Note : 0.0 denote negligible SPYs.

of these 221 million workers might be employed on non-farm activities. Assuming that the present trend in the structure of our economy continues, the total number of agricultural workers (both cultivators and agricultural labourers) would touch 239 million mark during 2005-06. There will be some improvement in the cropping pattern which would absorb some of this additional workforce as a result of expansion of irrigation facilities, strengthening of extension programmes, enlargement of credit system and improvement in delivery system etc. The area under some of the high valued and crops requiring high degree of manual labour would increase as well and the gross cropped area would also record an increase of about 4.4 million hectares (Table-5).

Table 5. Projected cropping pattern in India
(Area in lakh hect.)

S.No.	Crops	Year 2005-2006
1	2	3
1	Rice	455
2	Jowar	95
3	Bajra	90
4	Maize	70
5	Wheat	280
6	Barley	5
7	Other foodgrains	280
8	Oilseeds	275
9	Sugarcane	46
10	Potato	15
11	Other crops	310
	Total	1921

17. Similarly the total livestock population would also record an increase of about 79 million during the year 1992-2006. The structure of livestock population is expected to undergo a change of far reaching consequences in the sense that the share of buffaloes in the bovine population and share of crossbred animals in the cattle would increase quite considerably and that would provide additional work opportunities.

18. Thus after taking into consideration the changes and improvement in the crop and livestock sectors as also some acceleration in programmes of employment generation in rural areas, it is expected that, given the present trend, the total employment potential of all the major programmes in rural areas would be of the order of 121 million SPYs against an expected number of

239 million workers who would be engaged as cultivators or agricultural labours. Another disturbing dimension of this unemployment/underemployment is that there is great variation among various states. Punjab, Haryana and Orissa are the three states where each of the agriculture workers has employment of about 194 to 230 days in a year but an average worker in Tamil Nadu and Bihar have less than 100 days employment in a year. In most of the other states, a worker, on an average, gets employment between 100 to 187 days. Thus these workers need additional employment of 125 days to 180 days in a year. All the efforts of providing employment opportunities to these rural workers pale into insignificance when contrasted against this gap because the total employment generated through JRY and EAS worked to less than 4 days per such workers during 1995-96.

Some Measures to Solve the Problem of Underemployment/Unemployment

19. We have seen that during 1995-96, the total employment opportunities in the crop and animal husbandry sector, JRY and EAS, and other sectors related to overall development measures was of the order of 110 million SPYs against about 210 million agricultural workers. This left a gap of 100 millions SPYs to be generated to solve the problem of full employment to these workers in rural areas. By the year 2005-06, the number of agricultural workers would touch a mark of about 240 million against the total employment potential of about only 120 to 125 million SPYs. Thus this gap would further increase to a minimum of 115 million SPYs compared to 100 million SPYs during 1995-96 and in all likelihood would continue to increase every year if effective measures are not taken to combat it.

20. I would now suggest some broad measures to solve this problem of growing unemployment/underemployment in the rural areas of the country.

21. The first basic change has to be brought in our economy is the overall diversification of our economy. There are some significant signals to indicate that our economy is undergoing transformation from primary sector to secondary and tertiary sectors. During 1980-81, agriculture, forestry and fisheries had a share of 38 percent in the National Gross Domestic Product. It reduced to 29 percent during 1998-99. The percentage of total agricultural workers has declined from about 70 during 1971 to 59 during 1991; this reduction should have been more. In some of the states in India, the percentage of agricultural workers is as low as 21 (in Maharashtra); but on the other hand it is still as high as 75 in Bihar. The pressure on the land has to be reduced. But that would be long term strategy and it would require huge investment in

infrastructure, industries and other services. The land-based programmes which would generate sufficiently large employment opportunities are :

(i) *Diversification of crop-production programmes :* More and more areas should be devoted to such crops as are in short supply at present and are more labour intensive. Most of such crops belong to vegetable group. A vegetable crop generally require 250 man days compared to 50 to 60 man days for most of the food grain crops.

(ii) *Livestock production* : It is another area which is free from the constraint of limited land resource and which can help the marginal, small farmers and most of the agricultural labourers to improve their economic conditions. Almost all the marginal farmers and even small farmers in the dry areas do not get enough work from crop husbandry alone for keeping the working members fully employed throughout the year. Our annual milk production in the country is about 75 million tonnes which works out to about 230 gms per day per person compared to 600 gms in some developed countries. Even in some of our states like Punjab/Haryana, this average is 980 gms and 700 gms respectively. Cross breeding of cows supported by a programme of improved fodder, particularly green fodder and concentrates can lead to doubling of milk production. This would also add to job opportunities in rural areas.

(iii) *Poultry and fisheries* are other two areas with a very high potential of employment and with a very low ICOR. These two sectors can be developed manyfolds in a short span of time and both these products are in high demand. The total production of eggs in the country is about 30 per person in a year against a requirement of more than 200 eggs. Similarly production of fish, particularly inland, can be increased considerably. Each tonne of production of fish generates about 2 SPYs and consequently about 10 million SPYs can be generated if the production of fish is increased from the present level of 5 to 6 million tonnes to 10 to 12 million tonnes in next 5 years. These are the three sectors where very high growth rates can be achieved with not very huge investment.

(iv) *Water and soil management* : India is endowed with very rich resources of soil and water. The annual precipitation in the country is about 400 million hectometer. From meteorological considerations, India is divided into 35 zones. The normal rainfall during monsoon season in 14 zones exceeds 1000 mm, in 16 zones it lies between 500 to 1000 mm and in 5 zones it is below 500 mm. It is thus clear that except for 5 zones, the normal rainfall is quite satisfactory. What is needed is scientific harnessing of this water resource in all the areas through large scale moisture and soil conservation works. Land development and water management, drainage and social forestry are important component of this programme.

(a)   Land Development and Water Management : Of the total
        geographical area in the country, 141.25 million hectare
        (Annexure-11) is subject to water and wind erosion and another
        33.70 million hectares is degraded on account of water logging,
        alkalinity/salinity, ravines and gullies etc. Beside this 174.95
        million hectares, about 40 million hectares area is prone to floods.
        All these areas (215 million hectare) need special treatment. Land
        development work of these problem areas should be undertaken
        on a war footing so that, atleast 50 million hectares of such area is
        improved by 2005-06. It is not possible nor necessary to give
        details of each of these components here. At present about 4000
        crore rupees are earmarked under JRY/EAS. Hence given the
        political will and determination, resources are not constraints. And
        if this is done; another 10 years would see a sea change in the
        land-base of our economy which would boost the productivity to
        new heights. If the programme of development of degraded land
        is undertaken on such scale, it would create about 5 million SPYs
        and double the productivity of land in a period of 2 to 3 years. Fifty
        million families can be benefited in the next 5 to 6 years by this
        programme. While soil conservation and drainage works have to
        be executed and funded by Governments, the measures of social
        forestry can be undertaken through private investments.

(b)   Drainage : Floods and water logging cause considerable damages
        not only to the crops, but also to a number of other sectors of the
        economy like roads, houses, irrigation network, create health
        problem etc. As much as 40 million hectare of area is flood prone
        and annual average area affected by floods is of the order of 12
        million hectares (Annexure-11). Most of this area can be improved
        by providing adequate drainage facilities. As a matter of fact, all
        irrigation programmes must have a component of drainage. The
        case of vertical drainage should also be given due attention atleast
        in the areas which have become prone to waterlodgging due to the
        developmental works like roads, canals, houses etc. which have
        choked the natural drainage. The damage caused by floods per
        annum in the last 20 years is of the order of 8 to 10 thousand crores
        rupees. The drainage for one million hectares of area would require
        an investment of about 100 to 150 crore rupees and would generate
        about 5 lakh SPYs and increase the overall productivity of the land.

(c)   Afforestation : Much of the degraded land can be improved
        through afforestation which, on the one hand, is very labour
        intensive and, on the other hand, is extremely rewarding with one
        of the lowest ICOR. Each hectare of degraded land brought under

afforestation provide about 2 SPYs and costs about 20 thousand rupees only. The total area under forests in the country is only 22 percent of the total geographical area of about 328.73 million hectares against an accepted norm of 30 percent. Thus additional area of the order of 25 million hectares should be brought under forest cover. Far more area is available in the country. Hence this deserves the due attention of planners. The total investment required for bringing 25 million hectares under afforestation would be of the order of 40 to 50 thousand crore rupees. Obviously, this would be beyond the capacity of public funds, howsoever thinly they are spread over the next five or ten years. Hence, the private investment has to be attracted. The major portion of this area should be leased out to private individuals and institutions for a sufficiently long period say 20 to 25 years whereafter the land would revert back to the village community for social use.

Concluding Remarks

22. The Indian economy has registered remarkable growth (upto 5 percent per annum), but the problem of incidence of poverty has remained unsolved. Undoubtedly rapid growth of the economy is necessary but not sufficient for removing the twin problems of unemployment and poverty. The forgoing analysis of the incidence of underemployment (and of poverty) clearly indicated that it is the class of marginal farmers all over the country, the small farmers in the dry land areas who are grossly underemployed and poor. A marginal farmer with as average size of holding of 0.30 hectare can at best work for about 60 days even in area like Muzaffarnagar of Uttar Pradesh with 200 percent intensity of cultivator. Any effort to solve the problem of poverty without concentrating on this class would be as futile in future as has been in the past. Hence the need is to concentrate all efforts only on those programmes which benefit this and only this class of rural poor. There are other classes in rural areas like village artisans, agricultural labourers, small traders and unemployed educated youths in urban areas who need equal care. But once this vulnerable class of rural poor is taken care of, the other classes of poor people would be automatically covered as a result of the boom in rural economy and equitable distributive nature of these programmes.

ANNEXURE-1

(A) Gross domestic product by economic activity (At current prices)

(Rs. Crore)

S.No.	Sectors	1980-81	%	1990-91	%	1995-96	%	1998-99	%
1	2	3	4	5	6	7	8	9	10
1	Agriculture, forestry & fisheries	46649	38.1	148001	31.0	303122	28.4	469340	29.1
2	Mining & quarrying	1887	1.5	11785	2.5	25109	2.4	33249	2.1
3	Manufacturing	21644	17.7	89160	18.6	189788	17.8	250905	15.5
4	Elect. gas & water supply	2070	1.7	10464	2.2	27681	2.6	38066	2.4
5	Construction	6114	5.0	28616	6.0	55219	5.2	92239	5.7
6	Trade, hotel & resturant	14713	12.0	61883	13.0	144078	13.5	213422	13.2
7	Transport, storage & communication	5724	4.7	33913	7.1	70542	6.6	113042	7.0
8	Financing, insurance, real estate & business services	10791	8.8	38902	8.1	125352	11.7	181806	11.3
9	Community, social & personal services	12835	10.5	55090	11.5	126329	11.8	220314	13.7
10	Gross domestic product at factor cost (1 to 9)	122427	100.0	477814	100.0	1067220	100.0	1612383	100.0

Source: Agricultural Statistics at a Glance 2000

(B) Classification of workers : 1991

(Nos. in Million)

S.No.	Class	Nos.	Percentage to total
1	2	3	4
1	Cultivators	110.7	35.24
2	Agricultural labours	74.6	23.75
	Sub total	185.3	58.99
3	Other workers	128.8	41.01
	Total	314.1	100.00

Source : Agricultural Statistics at a Glance 2000

ANNEXURE-2

Statewise labour inputs (human labour) in various crops
(Average 1994-97)
(Labour input days/hectare)

S.No.	Crop	A.P.	Bihar	Gujarat	Haryana	H.P.	Karnataka	Kerala	M.P.	Maharashtra	Orissa	Punjab	Rajasthan	T.N.	U.P.	W.Bengal
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Paddy	143	94	94	86	94	194	94	85	94	133	63	94	94	102	143
2	Jowar	55	58	58	58	58	56	58	52	64	58	58	58	60	58	58
3	Bajra	54	58	65	41	54	54	54	54	57	54	54	32	65	56	54
4	Maize	95	116	81	81	70	81	81	56	81	81	81	86	81	88	81
5	Arhar (Tur)	60	60	70	60	60	60	60	60	60	62	60	60	60	63	60
6	Moong	44	44	44	44	44	44	44	44	44	41	44	44	44	44	44
7	Urd	33	54	54	54	54	43	43	43	52	51	54	54	46	54	54
8	Groundnut	79	60	60	60	133	133	133	133	111	133	133	133	113	60	60
9	Soyabean	47	47	47	47	47	47	47	50	47	47	47	44	47	47	47
10	Cotton	117	67	99	87	67	110	67	94	110	94	95	67	207	67	67
11	Wheat	70	70	74	44	38	70	70	48	70	70	43	73	70	65	89
12	Barley	65	65	65	65	65	65	65	65	65	65	65	73	65	58	65

ANNEXURE-2 (Contd.)

S.No.	Crop	A.P.	Bihar	Gujarat	Haryana	H.P.	Karnataka	Kerala	M.P.	Maharashtra	Orissa	Punjab	Rajasthan	T.N.	U.P.	W.Bengal
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
13	Gram	37	37	37	29	37	37	37	36	37	37	37	28	37	54	37
14	R. Mustard	43	43	65	30	43	43	43	33	43	43	34	44	43	49	43
15	Jute	192	192	192	192	192	192	192	192	192	197	192	192	192	192	187
16	Sugarcane	297	229	229	138	229	197	229	229	249	229	229	229	333	162	229
17	Nigerseed	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
18	Sunflower	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54
19	Safflower	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
20	Potato	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231
21	Onion	184	184	184	184	184	184	184	184	184	184	184	184	184	184	184
22	Tobacco	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227
23	Sesamum	50	50	50	50	50	50	50	50	50	50	50	37	59	54	50
24	Other crops	98	92	94	84	92	98	93	91	96	96	92	92	104	89	93

Source : Cost of Cultivation of Principal Crops in India February 2000.

ANNEXURE-3

Intensity of labour absorption

S.No.	States	Net area sown* (1995-96) (lakh hect.)	Total SPY from crop husbandry (lakh SPYs)	Average SPY/hect. of Net area sown (4)/(3)
1	2	3	4	5
1	Andhra Pradesh	106.37	56.00	0.53
2	Bihar	73.21	29.12	0.40
3	Gujarat	96.09	28.27	0.29
4	Haryana	35.86	21.37	0.60
5	Himachal Pradesh	5.68	1.87	0.33
6	Karnataka	104.20	22.21	0.21
7	Kerala	22.65	17.00	0.75
8	Madhya Pradesh	197.52	59.85	0.30
9	Maharashtra	179.11	58.57	0.33
10	Orissa	62.10	32.09	0.52
11	Punjab	41.39	19.12	0.46
12	Rajasthan	165.75	33.83	0.20
13	Tamil Nadu	53.42	29.12	0.55
14	Uttar Pradesh	173.99	89.94	0.52
15	West Bengal	54.62	51.44	0.94
	India	1422.15	583.48	0.41

* Fertilizers Statistics, 1998-99.

ANNEXURE-4

Norms of employment in animal husbandry

S.No.	Category of livestock	Total Nos. (lakh)	No. of mandays* per livestock in a year	Total no. of mandays
1	2	3	4	5
1	Cattle			
	Adults	1332	36.50	48618
	Young	627	9.13	5725
2	Buffaloes			
	Adults	491	36.50	17921
	Young	308	9.13	2812
3	Goats	1094	4.87	5328
4	Sheep	489	7.30	3570
5	Equines and camels	7	36.50	256
6	Poultry birds	2827	3.65	10319

* Based on the norms fixed in the report of National Commission on agriculture.

ANNEXURE-5

State-wise livestock and poultry

(in lakh)

S.No.			A.P.	Bihar	Gujarat	Haryana	H.P.	Karnataka	Kerala	M.P.	Maharashtra	Orissa	Punjab	Rajasthan	T.N.	U.P.	W.Bengal	India
1	Cattle	(i) Adult	82	140	48	12	16	89	18	187	124	89	18	74	55	173	106	1332
		(ii) Young	26	72	17	8	6	37	15	90	45	43	9	39	25	76	63	627
2	Buffaloes	(i) Adult	53	34	30	24	5	25	2	47	32	10	36	40	15	116	8	491
		(ii) Young	35	18	20	18	2	15	0.9	29	18	4	21	34	8	76	1	308
3	Goats		42	166	39	8	11	60	17	79	94	48	5	143	56	125	138	1094
4	Sheep		77	17	19	10	11	53	0.3	8	30	18	5	119	53	24	15	489
5	Horses & Ponies		0.07	1	0.11	0.46	0.13	0.09		0.61	0.34		0.37	0.22	0.05	2	0.12	7
6	Poultry & other birds		471	160	52	83	7	148	203	111	286	125	178	27	205	98	356	2827

Source: Livestock Census, 1992, Govt. of India, Ministry of Industry.

ANNEXURE-6

State-wise employment through animal husbandry

(in lakh)

S.No.		A.P.	BIHAR	GUJARAT	HARYANA	H.P.	KARNATAKA	KERALA	M.P.	MAHARASH-TRA	ORISSA	PUNJAB	RAJASTHAN	T.N.	U.P.	WEST BENGAL	INDIA
1	Cattle																
	(i) Adult	2993	5110	1752	438	584	3249	657	6826	4526	3249	657	2701	2008	6315	3869	48618
	(ii) Young	237	657	155	73	55	338	137	822	411	393	82	356	228	694	575	5725
2	Buffaloes																
	(i) Adult	1935	1241	1095	876	183	913	73	1716	1168	365	1314	1460	548	4234	292	17921
	(ii) Young	320	164	183	164	18	137	8	265	164	37	192	310	73	694	9	2812
3	Goats	205	808	190	39	54	292	83	385	458	234	24	696	273	609	672	5328
4	Sheep	562	124	139	73	80	387	2	58	219	131	37	869	387	175	110	3570
5	Horses & Ponies	3	37	4	17	5	3	2	22	12		14	8	2	73	4	256
6	Poultry & other birds	1719	584	190	303	26	540	741	405	1044	456	650	99	748	358	1299	10319

ANNEXURE-7

Area under major crops 1998-99 (area in million hectares)

S.No.	Crop	A.P.	Bihar	Gujarat	Haryana	H.P.	Karnataka	Kerala	M.P.	Maharashtra	Orissa	Punjab	Rajasthan	T.N.	U.P.	W. Bengal	Others	India
1	Rice	4.11	5.10	0.62	1.08	Neg.	1.43	0.35	5.31	1.48	4.45	2.52	Neg.	2.39	5.93	5.90	3.93	44.60
2	Jowar	0.79	Neg.	0.24	Neg.	Neg.	1.85	Neg.	0.81	4.78	Neg.	Neg.	0.54	0.50	0.33	Neg.	0.14	9.98
3	Bajra	0.12	Neg.	1.04	0.61	Neg.	0.42	Neg.	0.14	1.76	Neg.	Neg.	4.17	0.20	0.80	Neg.	0.02	9.28
4	Maize	0.41	0.69	0.41	Neg.	0.31	0.50	Neg.	0.85	0.28	0.05	0.15	0.95	Neg.	0.90	0.04	0.54	6.08
5	Wheat	Neg.	Neg.	0.70	2.19	0.38	Neg.	Neg.	4.65	Neg.	Neg.	3.34	2.77	Neg.	9.23	0.37	3.77	27.40
6	Gram	Neg.	Neg.	Neg.	0.36	Neg.	Neg.	Neg.	2.67	Neg.	Neg.	Neg.	2.82	Neg.	0.82	Neg.	1.74	8.41
7	Arhar	0.39	0.07	0.36	0.04	Neg.	0.47	Neg.	0.40	1.01	0.14	Neg.	Neg.	0.11	0.42	Neg.	0.06	3.47
8	Groundnut	1.94	Neg.	1.94	Neg.	Neg.	Neg.	Neg.	Neg.	0.52	0.08	Neg.	Neg.	1.09	Neg.	Neg.	2.00	7.57
9	R.Mustard	Neg.	Neg.	0.33	0.49	Neg.	Neg.	Neg.	0.69	Neg.	Neg.	0.07	3.00	Neg.	1.11	Neg.	0.91	6.60
10	Soyabean	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	4.42	3.20	Neg.	Neg.	0.68	Neg.	Neg.	Neg.	1.21	6.31
11	Cotton	1.28	Neg.	1.61	0.58	Neg.	Neg.	Neg.	0.50	3.20	Neg.	0.56	0.64	0.24	Neg.	Neg.	0.68	9.29
12	Sugarcane	0.21	Neg.	Neg.	0.13	Neg.	0.31	Neg.	Neg.	0.53	Neg.	Neg.	Neg.	0.35	1.97	Neg.	0.58	4.08
13	Jute & Mesta	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	0.03	Neg.	Neg.	Neg.	Neg.	0.62	0.36	1.01
14	Tobacco	0.19	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	0.27	0.46
15	Potato	Neg.	0.19	0.03	0.01	0.01	0.03	Neg.	0.06	Neg.	0.01	0.05	Neg.	Neg.	0.42	0.32	0.15	1.28
16	Other crops	3.60	3.97	2.80	0.48	0.27	6.95	2.72	4.54	7.77	4.91	1.06	4.10	1.39	3.86	1.72	Neg.	50.14
17	Gross cropped area*	13.04	10.02	10.08	5.97	0.97	11.96	3.07	25.04	21.33	9.67	7.75	19.67	6.27	25.79	8.97	16.36	195.96

Source: Agricultural Statistics at a glance 2000

* Figures relate to year 1995-96

Statewise JRY & EAS achievement: 1997-98

S.No.	States	Employment (lakh mandays)		
		JRY	EAS	TOTAL
1	2	3	4	5
1	Andhra Pradesh	219.31	505.06	724.37
2	Bihar	533.04	420.45	953.49
3	Gujarat	82.81	92.71	175.52
4	Haryana	11.12	18.45	29.57
5	Himachal Pradesh	9.13	35.65	44.78
6	Karnataka	265.91	349.41	615.32
7	Kerala	41.82	47.26	89.08
8	Madhya Pradesh	281.69	328.71	610.40
9	Maharashtra	527.74	363.24	890.98
10	Orissa	201.82	382.14	583.96
11	Punjab	12.83	4.55	17.38
12	Rajasthan	196.14	250.06	446.20
13	Tamil Nadu	388.81	558.28	947.09
14	Uttar Pradesh	599.49	522.76	1122.25
15	West Bengal	154.62	138.60	293.22
16	Other States	122.02	437.43	559.45
	India	3648.30	4454.76	8103.06

Source: Annual Report 1997-98, Govt. of India, Ministry of Rural Areas and Employment

ANNEXURE-9

Extent of mechanisation in agriculture
(expressed as expense Rs./hect. on machine labour)

S.No.	States	Paddy		Wheat	
		1990-91	1996-97	1990-91	1996-97
1	2	3	4	5	6
1	Andhra Pradesh	580	1065	N.A.	N.A.
2	Assam	27*	66	N.A.	N.A.
3	Bihar	104	N.A.	N.A.	N.A.
4	Haryana	582	1427	1027	1682
5	Karnataka	222*	N.A.	N.A.	N.A.
6	Madhya Pradesh	64	223	331	947
7	Orissa	23	62	N.A.	N.A.
8	Punjab	991	1789	974	1586
9	Rajasthan	N.A.	N.A.	684**	1470
10	Tamil Nadu	N.A.	N.A.	N.A.	N.A.
11	Uttar Pradesh	343	507	713	1390
12	West Bengal	131*	259	N.A.	N.A.

* 1991-92   ** 1992-93
Source : Cost of cultivation, Government of India, 2000

ANNEXURE-10

No. of livestock and poultry

(in lakh)

Year	Cattle	Buf-faloes	Sheep	Goat	Horses & Ponies	Other Live-stock	Total	Poultry
1	2	3	4	5	6	7	8	9
1961	1756	512	402	609	13	72	3364	1143
1966	1762	530	420	646	11	72	3441	1154
1972	1784	574	400	675	9	91	3533	1385
1977	1801	620	409	756	9	99	3694	1609
1982	1925	698	488	952	9	124	4196	2077
1987	1997	760	457	1102	8	129	4453	2753
1992	2046	842	508	1153	8	152	4709	3071
2000(P)	2100	920	550	1200	8	170	5000	3400
2005(P)	2150	1000	600	1250	8	200	5500	3800

P stands for projected
Statistical : Agricultural Statistics at a Glance 2000

ANNEXURE-11

Problems of soil erosion and land degradation

S.No.	Items	Area (Million hectares (1984-85)	% to total geographical area
1	2	3	4
1	Total geographical area	328.73	—
2	Area subject to water and wind erosion	141.25	42.97
3	Water logged area	8.51	2.59
4	Alkali soils	3.58	1.09
5	Others (including ravines, and gullies)	21.61	6.57
6	Total problem areas	174.95	53.22
	Total flood prone area	40.00	12.17
7	(i) Annual average area affected by floods	8.00	2.43
	(ii) Annual average cropped area affected by floods	3.70	1.13
8	Total drought prone area	260.00	79.09

Source: Indian Agriculture in Brief, Directorate of Economics and Statistics, New Delhi, 25th Edition, 1994.