Agricultural Mechanization Statistical Database Development in Pakistan

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1. Country Profile

The Islamic Republic of Pakistan is an ancient civilization, although its political boundaries were drawn only sixty seven years ago, when it gained independence on 14 August 1947. Initially comprising East and West Pakistan, separated by 1770 kilometers of India, its present territory since December 1971 is confined to the former West Wing, which has a total area of 79.61 million hectares[1]. It mainly comprises of four provinces i.e. Balochistan, Khyber Pakhtunkhwa, Punjab and Sindh. Pakistan lies between the longitudes of $23^0 30'$ and $36^0 45'$ North and between the latitudes of 61^0 and $75^0 31'$ East. This territory is a region of diversified relief, with mountains to the north and west, and arid and semi-arid expanses to the south and east. Down in the centre is a flat fertile plain, fed by the Indus and its tributaries. Beneath the northern part of this plain, hydrologist found a huge fresh water lake, equal in volume to ten times the annual discharge of the rivers flowing above. The Indus plain has the largest canal irrigation system in the world, making cultivation possible despite scanty and erratic rainfall and ranges of extreme temperature[2].

Pakistan is bound by Himalaya, Karakoram and Hindu Kush mountain ranges in the north which host the world's largest ice reserves. These mountains are the water tanks over the roof, which provide water to the reservoirs. Climatically Pakistan, located in the north of the tropic of cancer, possesses a great range of diversity, from some of the hottest in the world in the Jaccobabad and Sibbi districts to the snowy cold of Laddakh and Balochistan. In the plains, minimum temperature in the month of January varies from 4^0C to 15^0C and June/July from 25^0C to 30^0C. The maximum temperature in January varies from 17^0C to 24^0C and in June/July from 32^0C to 45^0C. Jaccobabad has even recorded an absolute maximum of 53^0C. Pakistan suffers from a general deficiency

of rainfall. Under the influence of the troughs of westerly waves as well as frontal systems, the northern half of Pakistan receives substantial rainfall over low elevation plains and snowfall in mountainous regions during winter season. Summer adds monsoon to Pakistan which contributes about 60% of the annual total precipitation from July to September[3]. In the plains, rainfall varies from 127 mm in upper Sindh to 1250 mm in the Himalayan sub-mountain areas.

The population in Pakistan, since its inception in 1947 has multiplied more than five times to 188 million on 1st June 2013 whilst the production of wheat, a staple food crop has increased only three fold[4]. The gap between food supply and demand requires concerted efforts to increase agricultural production with a view to ensure self-sufficiency in food commodities besides contributing to food and nutritional security for all in the country.

Despite movements of people from farms to cities, the country remains predominantly rural. A little under two thirds of the country's population lives in rural areas. The literacy rate in Pakistan which was estimated at 60 percent (71 percent male and 48 percent female) during 2012-2013 is still behind other countries of the region[1].

Pakistan's economy is characterized by; a predominance of agriculture; a strong industrial base with a large domestic market and an ample supply of skilled human resource. In general, Pakistan has a well-developed physical infrastructure and good communication facilities.

2. Agriculture

Agriculture is the single largest sector and driving force of Pakistan economy. In 1947, agriculture was dominant sector of the country and contributed 53 percent to the gross domestic product (GDP). Its share in the GDP has fallen considerably since then, while

the share of manufacturing, construction and services has risen. Although agriculture's share in the GDP has declined considerably between 1949-50 and 2013-2014, from 53 percent to nearly 21 percent, it remains leading sector of the economy. Employment share of agriculture has declined by far less (from 66 percent to 44 percent) over the same period[1].

Agriculture and agro-based products also account for approaching two thirds of the total foreign exchange earnings from exports. They supply many of the major industries with raw materials and consume around one third of the industrial finished goods. In terms of contribution to national income, employment, markets for industry and supply of raw materials or products for export, agriculture remains the foundation of Pakistan's economy[1,4].

The total geographical area of Pakistan is 79.61 million hectares, out of which Balochistan, Khyber Pakhtunkhwa, Punjab and Sindh Provinces have 34.72, 10.17, 20.63 and 14.09 million hectares areas, respectively. **Table 1** gives the land utilization statistics of Pakistan. Pakistan's agriculture mainly depends on the canal irrigation system. Out of the total cultivated area of 22.05 million hectares, 18.92 million hectares (86 percent) are irrigated and the balance 3.13 million hectares (14 percent) are rainfed[4].

Table 1: Land Utilization Statistics of Pakistan, 2011-2012[4]

(Million Hectares)

Province	Geographical Area	Total Area (4+5+6+7)	Forest Area	Not Available for Cultivation	Culturable waste	Cultivated Area (8+9)	Current Fallow	Net Area Sown	Area Sown More Than once	Total Cropped Area (9+10)
1	2	3	4	5	6	7	8	9	10	11
Punjab	20.63	17.54	0.50	2.81	1.71	12.52	1.69	10.83	5.71	16.54
Sindh	14.09	14.09	1.03	6.56	1.47	5.03	2.86	2.17	0.85	3.02
Khyber Pakhtunkhwa	10.17	8.37	1.33	3.94	1.20	1.87	0.61	1.25	0.50	1.75
Balochistan	34.72	17.80	1.41	9.84	3.92	2.63	1.52	1.11	0.01	1.12
Pakistan	79.61	57.80	4.27	23.15	8.30	22.05	6.68	15.36	7.07	22.43

Agricultural production is dominated by crop production. Wheat, rice, cotton and sugarcane are the principal crops. Wheat crop is grown in Rabi (winter) along with

oilseeds, coarse grains and pulses. The most important Kharif (summer) crops are cotton and rice, depending upon the ecological zone. The busiest periods in farming occur between April and June, and October and November, when harvesting of the major crops overlaps with land preparation for the next crop. The power and labor constraints are felt most severely where water availability permits double cropping on the same land. The area, production and yield of the four major crops are given in **Table 2**. Over time, share of the cropped area accounted for various crops has changed (**Table 3**).

Table 2: Area, Production and Yield of Major Crops, 2012-2013[1]

Crop	Area ('000 ha)	Production ('000 tonnes)	Yield (kg/ha)
Wheat	8660	24211	2796
Cotton	2879	13031*	769**
Rice	2309	5536	2398
Sugarcane	1129	63750	56466

*000 bales; ** Lint

Table 3: Distribution of Cropped Area[4]

(Percent of cropped area)

Crops	1959-60	1969-70	1979-80	1989-90	1999-2000	2009-2010	2011-2012
Food Grains	54.8	58.3	56.0	54	56	58	58
Cash Crops	12.1	14.5	14.9	16	18	18	18
Pulses	11.6	8.0	8.1	7	6	6	6
Oilseeds	4.1	3.2	2.8	2	3	3	3
Vegetables	0.7	0.7	0.8	1	1	2	1
Condiments	0.3	0.3	0.6	1	1	1	1
Fruits	0.6	1.2	1.5	2	3	4	4
Others	15.8	13.7	15.1	17	11	9	10

N.B. Vegetables include Potatoes

Food grains : Wheat, Rice, Jowar, Maize, Bajra and Barley.
Cash crops : Sugarcane, Cotton, Tobacco, Sugar beet, Jute & Guarseed.
Pulses : Gram, Mung, Mash, Masoor, Mattar, other Kharif and Rabi Pulses.
Oilseeds : Rapeseed & Mustard, Sesamum, Groundnut, Linseed, Castorseed and other oilseeds.
Condiments : Chillies, Onion, Garlic, Coriander, Turmeric and Ginger.

3. Agricultural Mechanization

Agricultural mechanization is an important input in modern agriculture. It improves productivity of land and labor besides increasing cropping intensity and helping in timely crop stand establishment, cultural practices, harvests and reduction in post-harvest losses. It also results in considerable savings of fodder and feed through a reduction in bullock population. Thus, a transition from subsistence to commercial farming can be achieved through diffusion of modern, efficient, cost-effective mechanization technologies to the farming systems. The efficient use of scarce agricultural resources coupled with an accelerated agricultural mechanization is therefore, of extreme importance[5].

Agricultural mechanization has been selective in Pakistan and only those operations are mechanized for which there is constraint of labor or power or a combination of both. The effects of mechanization are overall positive. It has not only increased on-farm income and labor productivity but also generated off-farm employment in manufacturing, supply/servicing of agricultural machinery, supply of other inputs and post-harvest handling of increased agricultural production[6].

The most popular forms of mechanization in Pakistan are; bulldozers, power rigs, tube wells and tractors with cultivators, wheat threshers, sprayers and trailers. Mould board plough and disc plough for deep tillage are gaining popularity. **Table 4** shows population of tractors and important tractor operated machinery available in the country according to census of 2004[7] compared with the censuses of 1975, 1984 and 1994. It reflects increasing trends of their use.

Table 4: Ownership of Selected Tractor Drawn Machinery in Pakistan[7]

(Numbers)

Census Year	Tractor	Machinery							
		Cultivator	Mold Board Plough	Bar / Disc Harrow	Disc Plough	Drill / Planter	Ridger	Trailer	Thresher
2004	401663	369866	40050	23764	29218	70810	71338	242655	137270
1994	252861	236272	28413	13233	20372	64126	10987	176412	112707
1984	157310	146863	7319	8140	6355	11251	4711	98787	78377
1975	35714	31619	2734	2373	2938	1174	1174	18074	5635

Bulldozers and power rigs are operated and maintained by the public sector on subsidized rates to the farmers whereas tractors and other machines are owned by large and medium sized farmers themselves. The medium sized farmers generally provide their tractors and other farm machines on rental basis to their neighboring small farmers in addition to their own use[8].

The organizations dealing with the issues related to agricultural mechanization in Pakistan include: Ministry of National Food Security & Research; Research and Development institutions, mainly Agricultural & Biological Engineering Institute (ABEI), NARC, Islamabad under Pakistan Agricultural Research Council (PARC) at Federal level, Agricultural Mechanization Research Institute (AMRI), Multan under Government of Punjab, Agricultural Mechanization Research Cell (AMRC), Tandojam under Government of Sindh, Centre for Agricultural Machinery Industries, Mian Channun under Government of Punjab and Agricultural Light Engineering Program (ALEP), Mardan under Government of Khyber Pakhtunkhwa; agricultural machinery manufacturers; financial institutions; federal and provincial autonomous bodies; provincial directorates of agricultural engineering; and, agro-services providers[9].

In private sector, tractor manufacturers have made significant efforts in indigenization of tractors by deleting substantial quantities of imported components. Local manufacturing of tractors has not only saved foreign exchange but also provided

employment opportunities by establishing assembly lines at tractor manufacturers' premises and through vending industries. There were five firms which were licensed in assembly/local manufacturing of tractors in collaboration with the foreign firms of different makes, namely; Massey Ferguson (MF-240 & MF-265/MF-375), Fiat (Fiat-480 & Fiat-640), Belarus (MTZ-50 & UMZ-6AKM), Ford (3600 & 4600) and IMT (540 & 560). There are however, two firms (M/s Millat Tractors and M/s Al-Ghazi Tractors) which are at present mainly engaged in tractor manufacturing and they have achieved around 85% deletion. The major issues of the tractor manufacturers include; allocation of insufficient resources for R&D of matching implements and limited effort for introduction of agricultural machinery other than tractors.

There were 15 farm machinery manufacturers in 1959. As a result of liberal government policies such as rebate in import duty for raw material, exemption of sales and income tax, their number increased to around 500. Local farm machinery industry is producing farm implements/machines for land development, seedbed preparation, crop stand establishment, inter-culture, harvesting and threshing, crop protection and farm produce haulage[10].

4. Agricultural Statistics

The availability of timely, accurate and reliable data is precondition for sound agricultural planning and development. The data from the Agricultural Census thus provide a concrete basis from which the agriculture sector can ultimately develop through evidence-based policy designing.

4.1 Establishments of Bureau of Statistics

After independence of Pakistan, Central Statistical Office (CSO) was setup by the Government of Pakistan in 1950 as an attached department of Economic Affairs Division[11]. Since then statistical system was reviewed from time to time by both local and foreign consultants. In 1972, on the recommendation of IBRD Mission, Central

Statistical Office (CSO) was upgraded to a full-fledged Statistics Division. The Division was re-organized in 1981 and its technical wing (the then CSO) was converted into Federal Bureau of Statistics (FBS) as one of its attached departments. As a step forward Government of Pakistan has established Pakistan Bureau of Statistics, by merging Federal Bureau of Statistics, the Population Census Organization, The Agriculture Census Organization and the Technical wing of Statistics Division. All are now placed at one place, called Statistical House in Capital Territory Islamabad.

4.2 Functions of PBS

- Collection, compilation and analysis of statistical data relating to various sectors of economy
- Publication of statistical data
- Supply of statistical information to Federal Ministries, Provincial Governments and other organizations
- Research with a view of improving statistics
- Exchange of statistical information with foreign countries
- Technical advice and statistical coordination with other departments
- Evaluation and introduction of standard concepts, definition and classifications pertaining to national statistical series
- Clearance of statistical projects undertaken by different organizations
- Evaluation of efficient computation methods for statistical estimation
- Implementation of policy laid down by the Statistics Division by suitably adopting the Statistical System of Pakistan to conform with the policy
- Undertaking the National censuses and surveys

4.3 Main Activities of PBS

Collection and compilation of statistical data relating to various socio-economic sectors is done through primary, secondary sources and administrative records of the government of Pakistan.

4.4 Statistical Acts

To provide legal protection and support to the statistical activities in the country following acts were passed;

- The Industrial Statistics Act, 1942
- The Agricultural Census Act, 1958
- The Census Ordinance, 1959 - Ordinance No. X of 1959
- The General Statistics, Act 1975
- The General Statistics (Reorganization) Act, 2011

4.5 Agricultural Census Wing

Agricultural Census Organization (ACO) was established in 1958 as an attached department of the then Ministry of Agriculture[12] under the legal cover of Agricultural Census Act 1958. Immediately after its inception, ACO conducted Agricultural Census of 1960 to fulfill national and international requirements of data on agriculture. Later on, this Organization conducted a survey-cum-census under the recommendation of the Farm Mechanization Committee, Government of Pakistan, in 1968 and an Agricultural Census in 1972 which was actually due in 1970. Two years delay in the conduct of Agricultural Census was on account of disturbed political environment in the country and war with India. Subsequently, ACO conducted Livestock Census in 1976 to provide data on livestock and related parameters as the last assignment carried out under Ministry of Agriculture.

Statistics Division was created with the objective of bringing all the data generating system at federal level under one umbrella. This Organization was resultantly transferred to newly established Statistics Division in 1978 as an attached entity. Since then, ACO had conducted four Agricultural Censuses each in the years of 1980, 1990, 2000, 2010 and three Livestock Censuses each in the years of 1986, 1996, 2006 and four Agricultural Machinery Censuses each in the years of 1974, 1984, 1994 and 2004 till to-

date. In addition, eight Mouza (Village) Censuses each in the years of 1970, 1979, 1983, 1988, 1993, 1998, 2003 and 2008 had been conducted by ACO in the overall statistical frame work under Statistics Division. This Organization has been merged with the newly established Pakistan Bureau of Statistics (PBS) since 23rd December, 2011 as its Agricultural Census Wing (ACW).

4.6 Functions of Agricultural Census Wing

Agricultural Census Wing (ACW) is responsible for planning, execution and publication of data on the censuses / surveys relating to agriculture on decennial basis, namely:

- Decennial Agricultural Censuses conducted in years ending with digit 'zero'
- Decennial Agricultural Machinery Censuses in years ending with digit 'four'
- Decennial Livestock Censuses conducted in the years ending with digit 'six'
- Quinquennial Mouza/Village Censuses, once before Agricultural Census in the digit 'eight' and once in the digit 'three' before every livestock census, to update sampling frame of Mouzas/villages
- Any other census/survey when directed by the Federal Government

The data collected through the above mentioned censuses are presented in country and provincial reports. The country reports present data on country and provincial levels while the provincial reports present data for the province concerned and for it's all the districts.

4.7 Methodology to Conduct Agricultural Census

All the censuses of Agricultural Census Wing (ACW) cover four provinces, capital territory, Gilgit Baltistan and Azad State of Jammu and Kashmir. Direct interview method is adopted for the respondents scattered throughout the area covered under the censuses and the responses are recorded on the carefully prepared questionnaires

and then computerized / tabulated as per tabulation plan prepared with consent of data users. Salient futures about each of the census conducted by ACW are as under:

Agricultural Census: It is conducted on sample basis. The sample design and sample size varies for different parts of the country. Provincial Revenue Departments act as the enumeration agency. Household is the source for provision of data.

Agricultural Machinery Census: This census is carried out on hundred per cent count basis for the agricultural machinery i.e. tractors, combine harvesters, bulldozers, important tractor drawn implements, tube wells, lift pumps, wells with pump, submersible pumps and modern irrigation systems (i.e. sprinkler and trickle / drip). However, the data on related parameters of farm mechanization are collected from the selected tractor, tube well, lift pump, well with pump and submersible pump owners on sample basis. Agricultural Extension Departments of the provinces act as the data collection agency.

Livestock Census: Livestock Census is also conducted on sample basis with different sampling plans for different areas of the country. Provincial Livestock and Dairy Development Departments perform the functions of data collection. Data is collected from the households.

Mouza (Village) Census: Mouza Census is carried out on hundred per cent count basis with the assistance of Provincial Revenue Departments. It was initially designed to update lists of mouzas / villages as per latest administrative order to be subsequently used as sampling frame. However, its scope improved overtime to cater for the community level data encompassing the environment within which the rural communities operate and perform various agriculture related functions.

The planners and researchers subsequently study various types of relationships and the changes occurring therein for planning and research endeavours in the country. The data of ACW are provided to the data users as per data dissemination policy of the PBS.

4.8 Agricultural Machinery Census

Since its inception, Pakistan is experiencing rapid growth in human population despite tremendous efforts to check population explosion. Over the years the population density had been increasing, land to man ratio deteriorating, and the food and cloth requirements intensifying.

On the contrary, the scope for increase in cultivated area over the years has always been marginal. Therefore, the expectations of a wide gap between future food requirements and supplies are high which may possibly be reduced by improving average yields by intensive use of agricultural machinery. It is obvious that use of agricultural machinery not only speeds up cultivation process but also accelerates harvesting and threshing operations. It is also instrumental to maximization of agricultural production by increasing land use and cropping intensities. Therefore, planning for judicious use of Agricultural Machinery is of utmost importance which, inter alia, depends upon availability of reliable and timely statistics.

The use of Agricultural Machinery is increasing day by day in Pakistan like other agricultural countries of the world which has necessitated periodic stocktaking of Agricultural Machinery as a regular activity. Realizing this fact in Pakistan, the first Agricultural Machinery Census was conducted in 1968, second in 1975, third in 1984, fourth in 1994 and fifth in 2004.

The Agricultural Machinery Census 2004 has an edge over the previous censuses on account of the fact that it has also attempted to cover bulldozers, combine harvesters, wells with pump, submersible pumps, modern irrigation systems (MISs) and a large

number of farm implements for the first time. Salient objectives of this census are as under:

i. To generate estimates of number of tractors, bulldozers, combine harvesters, tractor drawn and other farm implements.
ii. To develop statistics on tractors by make, model, power and working condition.
iii. To provide the number of tube wells/wells with pump/lift pumps/submersible pumps by type of motive power
iv. To ascertain information on the privately owned tube wells/wells with pump/lift pumps/ submersible pumps by type of ownership, year of installation, their suction and delivery capacity.
v. To reckon the households owning tractors and tube wells by type and source of finance.
vi. To provide data about the extent and type of use of agricultural machines on own farms and the practice of renting out tractor time and tube well water.
vii. To gauge the number of privately owned modern irrigation systems (MISs) i.e. sprinkler and trickle/drip irrigation systems.

The scope of census is primarily confined to:

i. All public and private tractors / bulldozers / combine harvesters used wholly or partly for agricultural purposes. Tractors / bulldozers maintained and used entirely for non-agricultural purposes were not covered in the census.
ii. The farm implements normally pulled by or motivated with tractor and in possession of tractor owners.
iii. All public and private tube wells / wells with pump / lift pumps / submercible pumps used for irrigation purposes. These machines sunk for drinking water fell outside the scope of this census.
iv. Ascertaining the extent and pattern of use of the privately owned farm machinery mentioned above.
v. All private modern irrigation systems (MISs) installed for agricultural purposes.

4.9 Highlights of AMC 2004

Table 5, 6 and 7 indicates the state of agricultural machinery in the country till 2004.

Table 5: Population of Tractors in the Country

Administrative Unit	Number of Tractors			Percentage Increase	
	1984	1994	2004	1984 to 1994	1994 to 2004
Pakistan	157,310	252,861	401,663	61	59
NWFP/KPK	10,105	14,571	24,269	44	67
Punjab	127,589	210,628	331,905	65	58
Sindh	16,542	23,182	36,245	40	56
Balochistan	3,074	4,480	9,244	46	106

Table 6: Tractor Drawn Implements and Equipments

Administrative Unit	Census Year	Implement						Equipment	
		Culti-vator	Mould Board Plough	Bar / Disk Harrow	Disk Plough	Seed Drill / Planter	Ridger	Trolly	Thresher
Pakistan	2004	369,866	40,050	23,764	29,218	70,810	71,338	242,655	137,270
	1994	236,272	28,413	13,233	20,372	64,126	10,984	176,412	112,707
	1984	146,863	7,319	8,140	6,355	11,251	4,711	98,787	78,377
NWFP/KPK	2004	21,440	3,004	540	1,371	1,644	658	18,709	9,761
	1994	12,722	1,993	438	879	1,226	46	11,283	5,997
	1984	9,702	377	357	392	299	54	6,808	2,945
Punjab	2004	317,506	27,093	16,032	16,471	66,700	66,806	195,332	112,655
	1994	203,444	17,980	8,302	10,485	60,835	10,872	145,557	96,655
	1984	123,755	2,780	2,734	1,134	10,669	4,030	81,668	71,195
Sindh	2004	26,998	6,357	6,786	9,602	2,147	3,471	21,881	11,626
	1994	17,993	5,908	4,341	8,121	1,237	55	15,681	9,018
	1984	11,244	2,917	4,839	4,644	218	574	8,018	4,166
Balochistan	2004	3,922	3,596	406	1,774	319	403	6,733	3,228
	1994	2,113	2,532	152	887	828	11	3,891	1,037
	1984	2,162	1,245	210	185	65	53	2,293	71

Table 7: Tractor Drawn Implements and Equipments

Administrative Unit	Number of Tubewells / Lift Pumps Vide Censuses of			Per cent Increase	
	1984	1994	2004	1984 to 1994	1994 to 2004
Pakistan	237,990	454,257	931,048	91	105
NWFP / KPK	9,217	14,365	21,524	56	50
Punjab	214,106	414,188	837,904	93	102
Sindh	9,481	16,236	50,683	71	212
Balochistan	5,186	9,468	20,937	83	121

Extensive and detailed data is collected while compiling the final figures for agricultural machinery. Following table specifies different data types which are collected during AMC. Sample farms are annexed (Annexure-I) to illustrate that a copious information are gathered during census.

Table 8: Description of Data Collected in Census

Machines	**Data Description**
Tractors	▪ Tractor population by ownership type (public/private) ▪ Private tractor owners by land tenure status (owner, tenant/share crop) ▪ Tractor population by make and horsepower ▪ Tractor population by year of purchase ▪ Private tractors purchased as new or used & their present condition ▪ Renting out private tractor time ▪ Average tractor hiring charges for different operations by horse power ▪ Area added to farming after purchasing tractor, employment (family, casual & permanent hired labor) ▪ Tractor remained out of order in past 12 months ▪ Miscellaneous --- Availability of tractor workshops by distance, private tractors repaired, performance of tractor workshops, availability of spare parts, service interval of private tractor by makes

Bulldozers, combine Harvesters	▪ Bulldozers by ownership type ▪ Combine harvesters by ownership types
Tractor Operated Equipments	▪ Levelling and cultivating equipment owned by tractor owners ▪ Sowing, fertilizing and spraying equipment owned by tractor owners ▪ Harvesting, haulage and processing equipment (owned, rented, purch) ▪ Miscellaneous equipment ▪ Purchased equipment and source of finance
Tubewells	▪ Tubewells and lift pumps by type of power (electric, diesel) ▪ Private tubewells and lift pumps by type of ownership & tenure ▪ Private centrifugal and turbine tubewells by types of ownerships ▪ Private wells with pump and sub-mercible pumps by type of ownership ▪ Private tubewells and lift pumps by year of installation ▪ Private tubewells by horse power of installed diesel/electric motors ▪ Private tubewells by depth of water table now and at installation time ▪ Private tubewells - water table difference now & at installation time ▪ Private tubewells by boring, installation agency and fitness of water ▪ Re-boring periodicity of private tubewells ▪ Area irrigated by tubewell & lift pump in rabi and kharif seasons ▪ Area added to farming after installation of tubewells & lift pumps ▪ Effect of tubewells and lift pump irrigation on land productivity ▪ Using and renting out time of private tubewells and lift pumps ▪ Use and renting out time of private tubewells and lift pumps (hrs/year) ▪ Private tubewells and lift pumps by purpose of installation ▪ Tubewell operators by status and by type of household

5. Data Dissemination

The data collected through various census and surveys is disseminated through;

- Printing of reports at Federal and Provincial levels
- Data are disseminated through websites developed by Federal Bureau of Statistics , M/O Finance and State Bank of Pakistan
- Socio-economic data alongwith details of tables and methodologies are easily downloadable from government of Pakistan official website http://www.pbs.gov.pk/
- Pakistan is one of the participating countries in the GDDS- General Data Dissemination System and provides all requested data
- GDDS Site of IMF provides data/information on data produced and disseminated by member countries that participate in the GDDS

Other than the ACO, selected data is also managed by following national organizations

- 'Zarai Taraqiati' Bank (former Agricultural Development Bank of Pakistan)
- Other Selected Commercial Banks involved in facilitation and disbursement of Agricultural Loans
- Selected Agricultural Research and Development Institutes, e.g. ABEI and AMRI (Specific surveys e.g. Farm Accidents)
- Federal Board of Revenue (FBR) (for the purpose of collecting Sales Tax, import/export Taxes etc.)
- Agricultural Machinery Manufacturers Associations

5.1 Agricultural Statistics and Sources of Data Publication

Table below indicates the sources of agricultural data published in the country.

Table 9: Agricultural Commodities and sources of Publication

Agricultural Commodities	**Source of Publication**
Agricultural growth	Pakistan Bureau of Statistics
Production of Important Crops	Pakistan Bureau of Statistics
Area & Production of Major Oilseed Crops	Pakistan Oilseed Development Board
Fertilizer Situation	National Fertilizer Development Center
Seed Availability	Federal Seed Certification & Registration Deptt
Prices of Locally Manufactured Tractors	Tractor Manufacturers Association
Agricultural Mechanization	Agricultural Mechanization Organization
Rainfall	Pakistan Meteorological Department
Actual Surface Water Availability	Indus River System Authority
Canal Head Withdrawals	Indus River System Authority
Major Water Sector Projects	Planning Commission of Pakistan
Supply of Agricultural Credit by Institutions	State Bank of Pakistan
Livestock Population	Ministry of National Food Security & Research
Milk and Meat Production	Ministry of National Food Security & Research
Domestic/Rural & Commercial Poultry	Ministry of National Food Security & Research

6. Issue Concerning AMC

- Resources - Data collection, compilation and its processing involve sizeable cost that private sector is un-willing to share
- Credibility - Durability and sustainability of data as the quantities reported are sometimes challengeable

- Trust deficit while seeking data from:
  - Industry
  - Credit facilitators/ Financial Institutions
  - Contractor or service providers
  - Large farmers
- Coordination - Lack of networking while collecting data from various public and private sectors organizations
- Expertise - Co-relations between various segments of data while analyzing e.g. land development machines such as scrapers not considered farm equipment, but as road construction equipment

7. Recommendations

7.1 National Level:

- Enhancing frequency of AMC from decade to five years
- Enhance interaction of ACO with provincial, national, regional and international agricultural mechanization entities - DDO
- Increasing financial resources of the census organization to conduct census and data handling
- Capacity building of the census organization – HR & Equipment
- Exploring expansion in the scope of AMC by encompassing mechanization technologies used in emerging areas such as livestock, poultry and agro-processing
- Accountability of data collection agencies in terms of delivering agricultural statistics of appropriate scope, quality, quantity and timeliness

7.2 Regional Level:

- Formulation of a census framework for CSAM MCs
- Establishment and periodic updation of agricultural mechanization statistical

database

- Capacity building – HR and Institutional through International Development Partners and financial institutions
- Facilitation in study visits of census staff amongst member countries
- Development of internet linkages for sharing data through respective websites

8. Conclusion

Agriculture sector is reckoned as one of the main drivers of economic growth in Pakistan. It not only provides food (both fresh and processed) but also inputs for industries such as textiles (e.g. cotton and wool). The national economic growth demands that agriculture sector grows at a healthy rate and that it has to be highly efficient and competitive besides ensuring food and nutritional security in the country and surplus for exports. Costs of production of various crops are however, not competitive due to low productivity levels, mainly owing to inefficient farming practices. Challenges of the free market and globalization have further necessitated modernization of agriculture by especially intensifying the use of sustainable agricultural mechanization technologies in the country.

Therefore, planning for introduction and efficient utilization of agricultural mechanization technologies has become of extreme importance. This, inter alia, depends upon availability of reliable and timely statistics concerning such technologies through periodic stock-takings. Some notable progress has been registered in this context over the years in Pakistan. However, concerted efforts of both public and private sector organizations are needed for development of robust agricultural mechanization statistical database on sustainable basis in the country.

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13. Meeting and Telephonic discussion with Mr. Muhammad Akram Khan, Agricultural Census Commissioner, Agricultural Census Organization, Statistics Division, Government of Pakistan, Lahore.

ANNEX-I

CONFIDENTIAL

GOVERNMENT OF PAKISTAN
AGRICULTURAL CENSUS ORGANIZATION

AGRICULTURAL MACHINERY CENSUS 2004

FORM - 1
LIST OF PRIVATE TRACTORS / BULLDOZERS
COMBINE HARVESTERS
(To be filled in separately for each Union Council / Town Committee / Municipality)

1- DISTRICT:	2- SUB-DIVISION:	3- TEHSIL:
4- NAME OF UNION COUNCIL / TOWN COMMITTEE / MUNICIPALITY:		
5- NAME OF FIELD ASSISTANT	6- STARTING DATE:	7- COMPLETION DATE:

NAME OF MOUZA/DEH KILLI/BASTI	SL. NO.	NAME FATHER'S NAME & ADDRESS OF OWNER	TYPE OF OWNERSHIP	NAME OF TRACTOR / BULLDOZER/ COMBINE HARVESTER		MODEL	HORSE POWER	YEAR OF MANU-FACTURE	YEAR OF PURCHASE	GENERAL USE	OWNERSHIP OF TRACTOR DRAWN IMPLEMENTS: NAME	NOS.	NAME	NOS.	SL.NO.OF SELECTED TRACTOR
01	02	03	04	05		06	07	08	09	10	11	12	13	14	15
											CULTIVATOR 01		THRESHER 09		
			INDIV 01	MASSEY 01	UNIVERSAL 17						M.B.PLOUGH 02		TROLLEY 10		
										AGRI CULTURAL 01	DISK PLOUGH 03		CHISEL PLOUGH 11		
			JOINT 02	FIAT 02	OTHERS NAME.......... ☐						BLADE 04		ROTAVATOR 12		
			NUMBER	FORD 03							DRILL 05		RIDGER 21		
			---------------	IMT 04	BULLDOZER 21					NON-AGRI CULTURAL 02	DISK HARROW 06		OTHERS NAME.......... ☐		
			CO-OP 03	BELARUS 05	COMBINE HARVESTER 22						SPRAYER 07		OTHERS NAME.......... ☐		
											REAPER 08		OTHERS NAME.......... ☐		
											CULTIVATOR 01		THRESHER 09		
			INDIV 01	MASSEY 01	UNIVERSAL 17						M.B.PLOUGH 02		TROLLEY 10		
										AGRI CULTURAL 01	DISK PLOUGH 03		CHISEL PLOUGH 11		
			JOINT 02	FIAT 02	OTHERS NAME.......... ☐						BLADE 04		ROTAVATOR 12		
			NUMBER	FORD 03							DRILL 05		RIDGER 21		
			---------------	IMT 04	BULLDOZER 21					NON-AGRI CULTURAL 02	DISK HARROW 06		OTHERS NAME.......... ☐		
			CO-OP 03	BELARUS 05	COMBINE HARVESTER 22						SPRAYER 07		OTHERS NAME.......... ☐		
											REAPER 08		OTHERS NAME.......... ☐		
											CULTIVATOR 01		THRESHER 09		
			INDIV 01	MASSEY 01	UNIVERSAL 17						M.B.PLOUGH 02		TROLLEY 10		
										AGRI CULTURAL 01	DISK PLOUGH 03		CHISEL PLOUGH 11		
			JOINT 02	FIAT 02	OTHERS NAME.......... ☐						BLADE 04		ROTAVATOR 12		
			NUMBER	FORD 03							DRILL 05		RIDGER 21		
			---------------	IMT 04	BULLDOZER 21					NON-AGRI CULTURAL 02	DISK HARROW 06		OTHERS NAME.......... ☐		
			CO-OP 03	BELARUS 05	COMBINE HARVESTER 22						SPRAYER 07		OTHERS NAME.......... ☐		
											REAPER 08		OTHERS NAME.......... ☐		

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GOVERNMENT OF PAKISTAN
AGRICULTURAL CENSUS ORGANIZATION

AGRICULTURAL
MACHINERY CENSUS 2004

FORM - 2
QUESTIONNAIRE FOR TRACTOR OWNER AND TRACTOR

1- DISTRICT:	2- SUB-DIVISION:	3- TEHSIL:			
4- NAME OF UNION COUNCIL / TOWN COMMITTEE / MUNICIPALITY:					
5- NAME OF MOUZA / DEH / KILLI / BASTI:	6- SL.NO.OF SELECTED TRACTOR (FORM-1,COL.15): →				
7- NAME OF TRACTOR OWNER:	8- NUMBER OF TRACTORS OWNED:		003		002
9- IF MORE THAN ONE TRACTOR ARE OWNED, WRITE THE LOCATION OF OTHER TRACTOR(S):					

PART - 1: FOR TRACTOR OWNER

DETAIL OF AREA OPERATED	AREA (IN ACRES)	Code
10- TOTAL AREA OWNED (LOCATED ANY WHERE IN THE COUNTRY)		004
11- AREA GIVEN TO OTHERS ON SHARE CROPPING, LEASE OR ON ANY OTHER TERMS		005
12- BALANCE OF AREA OWNED (10 MINUS 11)		006
13- AREA TAKEN FROM OTHERS FOR CULTIVATION ON SHARE CROPPING, LEASE OR ON ANY OTHER TERMS		007
14- TOTAL AREA OPERATED (12 PLUS 13)		008
15- OUT OF TOTAL AREA OPERATED HOW MUCH IS CULTIVATED		009
16- OUT OF TOTAL AREA OPERATED HOW MUCH IS UNCULTIVATED		010
17- AREA ADDED TO FARMING AFTER PURCHASE OF TRACTOR		011
18- IF AREA IS REPORTED IN Q NO.17, GIVE DETAILS OF AREA ADDED:		
a - BY MAKING OWNED UNCULTIVATED AREA CULTIVABLE		012
b - BY PURCHASE OF ADDITIONAL LAND		013
c - BY TAKING LAND FROM OTHERS ON SHARE CROPPING, LEASE OR ON ANY OTHER TERMS		014
d - BY EVICTION OF TENANTS		015

CHANGE IN LABOUR AND DRAUGHT ANIMALS AFTER PURCHASE OF TRACTOR	LABOUR AND DRAUGHT POWER			
	AT PRESENT	CODE	BEFORE PURCHASE OF TRACTOR	CODE
	1	2	3	4
19- NUMBER OF FAMILY MEMBERS ENGAGED WHOLE TIME ON THEIR OWN FARM		017		016
20- NUMBER OF PERMANENT HIRED AGRICULTURAL WORKERS		019		018
21- NUMBER OF WORK ANIMALS		021		020
22- NEED OF TEMPORARY LABOUR FOR AGRICULTURAL PURPOSE AFTER PURCHASE OF TRACTOR: INCREASED [1] DECREASED [2] NO CHANGE [3]				022

PART - II FOR TRACTOR

23- NAME OF THE SELECTED TRACTOR (AS PER FORM - 1, COL 5) : CODE ( )	023
24- WHETHER PURCHASED NEW OR OLD: NEW [1] OLD [2]	024
25- PRESENT CONDITION: IN SERVICE [1] NEED REPAIRS [2] UNSERVICEABLE [3]	025
26- TRACTOR DRIVER: FAMILY MEMBER [1] PAID DRIVER [2]	026
27- IN WHICH INSTITUTION THE DRIVER HAS GOT TRAINING: TRACTOR COMPANY'S INSTITUTION [1] GOVT. INSTITUTION [2] OTHERS [3] NONE [4]	027
28- SOURCES OF FINANCE FOR PURCHASE OF TRACTOR AND TRACTOR DRAWN IMPLEMENTS: OWN [1]	028
LOAN [2]	029

29- NUMBER OF OWNED TRACTOR DRAWN IMPLEMENTS EXCEPT THOSE INDICATED IN FORM-1 AND SELF PROPELLED IMPLEMENTS:

NAME OF IMPLEMENT	NUMBER	CODE	NAME OF IMPLEMENT	NUMBER	CODE
a - SUB-SOILER		095	h- FODDER CHOPPER		102
b - LASER LEVELLER		096	i- MAIZE SHELLER		103
c - POTATO PLANTER		097	j- SEED DELINTER		104
d - POTATO DIGGER		098	k- SEED TREATER		105
e - SUGARCANE PLANTER		099	l- SEED GRADER / SEED CLEANER		106
f - SUGARCANE CRUSHER		100	m - OTHERS (NAME).....		
g - FERTILIZER BROADCASTER		101	n - OTHERS (NAME)		

30-WHICH IMPLEMENTS WERE RENTED IN FOR USE DURING LAST TWELVE MONTHS: ..... [034] ..... [033] ..... [032] ..... [031]	030
31-WHICH IMPLEMENTS ARE INTENDED TO BE PURCHASED IN FUTURE: ..... [039] ..... [038] ..... [037] ..... [036]	035

38- USUAL SOURCES OF TRACTOR REPAIR AND THEIR USE:

SOURCE OF REPAIR	DISTENCE (IN KMS)	CODE	WORKSHOP FROM WHERE TRACTOR GOT REPAIRED DURING LAST 12 MONTHS	CODE
1	2	3	4	5
a) DEALER'S WORKSHOP		078	1	077
b) PRIVATE WORKSHOP		080	2	079
c) GOVERNMENT WORKSHOP		082	3	081

39- ARE YOU SATISFIED WITH THE AVAILABLE FACILITIES IN THE WORKSHOP? — CODE 083

YES [1] NO [2] — CODE 084

IF "NO" MARK THE RELEVANT CAUSE:

a- EXPENSIVE [1] — CODE 085

b- SUB STANDARD [2] — CODE 086

c- OTHERS (SPECIFY) [3]

40- AVAILABILITY OF SPARE PARTS FOR REPAIR OF TRACTOR: — CODE 087

a- FROM LOCAL AREA [1] — CODE 088

b- FROM NEARBY CITY / TOWN [2] — CODE 089

c- FROM DISTANT CITY [3]

41- HOW LONG THE TRACTOR REMAINED OUT OF ORDER DURING THE LAST 12 MONTHS: (IN DAYS ----------) — CODE 090

42- AFTER HOW LONG USUALLY, YOU GET YOUR TRACTOR SERVICED: (AFTER.....HOURS) — CODE 091

43- IF PURCHASE PERIOD OF TRACTOR IS LESS THAN A YEAR, GIVE THE PERIOD IN MONTHS : .....MONTHS — CODE 092

NAME & DESIGNATION OF THE ENUMERATOR.....

DATE OF COMPLETION.....

NAME & DESIGNATION OF VERIFIER .....

DATE OF VERIFICATION .....

NAME OF THE RESPONDENT .....

RELATION WITH THE OWNER OF TRACTOR .....

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GOVERNMENT OF PAKISTAN
AGRICULTURAL CENSUS ORGANIZATION

AGRICULTURAL
MACHINERY CENSUS 2004

FORM - 3-A
LIST OF MODERN IRRIGATION SYSTEMS
(To be filled in separately for each Union Council)

1- DISTRICT:	2- SUB-DIVISION:	3- TEHSIL:	
4- NAME OF UNION COUNCIL / TOWN COMMITTEE / MUNICIPALITY:			
5- NAME OF FIELD ASSISTANT:	6- STARTING DATE:	7- COMPLETION DATE :	

8- LIST OF MODERN IRRIGATION SYSTEMS IN UNION COUNCIL:
(NOTE: IN CASE OF MORE THAN ONE SYSTEM(S) MENTION PLACE OF INSTALLATION IN COL. NO.2.)

V

NAME OF MOUZA / DEH KILLI /BASTI	NAME, FATHER'S NAME AND ADDRESS OF OWNER OF MODERN IRRIGATION SYSTEM	SL.NO.	TYPE OF MODERN IRRIGATION SYSTEM	YEAR OF INSTALLATION	TOTAL OPERATED AREA (IN ACRES)	AREA IRRIGATED BY IRRIGATION SYSTEM GIVEN IN COLUMN - 4 (IN ACRES)
1	2	3	4	5	6	7
			SPRINKLER SYSTEM 01 TRICKLE/ DRIP SYSTEM 02			
			SPRINKLER SYSTEM 01 TRICKLE/ DRIP SYSTEM 02			
			SPRINKLER SYSTEM 01 TRICKLE/ DRIP SYSTEM 02			
			SPRINKLER SYSTEM 01 TRICKLE/ DRIP SYSTEM 02			
			SPRINKLER SYSTEM 01 TRICKLE/ DRIP SYSTEM 02			

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AGRICULTURAL CENSUS ORGANIZATION

AGRICULTURAL MACHINERY CENSUS 2004

FORM - 3

LIST OF TUBEWELLS / LIFT PUMPS / WELL WITH PUMPS / SUBMERCIBLE PUMPS

(To be filled in separately for each Union Council / Town Committee / Municipality)

1- DISTRICT:	2- SUB-DIVISION:	3- TEHSIL:
4- NAME OF UNION COUNCIL / TOWN COMMITTEE / MUNICIPALITY:		
5- NAME OF FIELD ASSISTANT:	6- STARTING DATE:	7- COMPLETION DATE :

8- NUMBER OF TUBEWELLS AND LIFT PUMPS MEANT FOR IRRIGATION IN THE UNION COUNCIL / TOWN COMMITTEE / MUNICIPALITY: **III**

NOTE: ANSWER THIS QUESTION AFTER TAKING INFORMATION IN QUESTION NO.9.

	NUMBER OF TUBEWELLS											
	ELECTRIC				DIESEL			TOTAL				
	CENTRI-FUGAL	TUR-BINE	WELL WITH PUMPS	SUBMER-CIBLE PUMPS	CENTRI-FUGAL	TUR-BINE	WELL WITH PUMPS	CENTRI-FUGAL	TUR-BINE	WELL WITH PUMPS	SUBMER-CIBLE PUMPS	IN WORKING ORDER
1	2	3	4	5	6	7	8	9	10	11	12	13
a) PRIVATE	01	02	03	04	05	06	07	08	09	10	11	12
b) GOVERNMENT	13	14	15	16	17	18	19	20	21	22	23	24
c) TOTAL	25	26	27	28	29	30	31	32	33	34	35	36

	NUMBER OF LIFT PUMPS			
	ELECTRIC	DIESEL	TOTAL	IN WORKING ORDER
1	2	3	4	5
a) PRIVATE	37	38	39	40
b) GOVERNMENT	41	42	43	44
c) TOTAL	45	46	47	48

9- LIST OF PRIVATE TUBEWLLS AND LIFT PUMPS MEANT FOR IRRIGATION"
IN CASE OF OWNERSHIP OF MORE THAN ONE TUBEWELL / LIFT PUMP / WELL WITH PUMP / SUBMERCIBLE PUMP, GIVE PLACE OF INSTALLATION IN COL. 2 →

NAME OF MOUZA/ DEH/ KILLI/ BASTI	TUBEWELL / LIFT PUMP / WELL WITH PUMP/ SUBMERCIBLE PUMP OWNER'S NAME, FATHER'S NAME AND ADDRESS	PARTICULAR OF TUBEWELLS AND LIFT PUMPS **IV**							
		SL. NO.	TUBEWELL/ LIFT PUMP/ WELL WITH PUMP/ SUBMERCIBLE PUMP	TYPE OF OWNERSHIP (FOR JOINT WRITE NO. OF OWNERS)	YEAR OF INSTAL-LATION	CAPACITY OF SUCTION /DELIVERY	MOTIVE POWER	WHETHER IN WORKING ORDER	S.NO. OF SELECTED TUBEWELL/LIFT PUMP/ WELL WITH PUMP/ SUBMERCIBLE PUMP
1	2	3	4	5	6	7	8	9	10
			CENTRIFUGAL T.W. 01 TURBINE T.WELL 02 LIFT PUMP 03 WELL WITH PUMP 04 SUBMERCIBLE PUMP 05	INDIV 01 JOINT 02 NO......... CO-OP 03			ELECTRIC 01 DIESEL 02 HORSE POWER	YES 01 NO 02	
			CENTRIFUGAL T.W. 01 TURBINE T.WELL 02 LIFT PUMP 03 WELL WITH PUMP 04 SUBMERCIBLE PUMP 05	INDIV 01 JOINT 02 NO......... CO-OP 03			ELECTRIC 01 DIESEL 02 HORSE POWER	YES 01 NO 02	
			CENTRIFUGAL T.W. 01 TURBINE T.WELL 02 LIFT PUMP 03 WELL WITH PUMP 04 SUBMERCIBLE PUMP 05	INDIV 01 JOINT 02 NO......... CO-OP 03			ELECTRIC 01 DIESEL 02 HORSE POWER	YES 01 NO 02	

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GOVERNMENT OF PAKISTAN
AGRICULTURAL CENSUS ORGANIZATION

AGRICULTURAL MACHINERY CENSUS 2004

FORM-4

QUESTIONNAIRE FOR TUBEWELL / LIFT PUMP / WELL WITH PUMP / SUBMERCIBLE PUMP

1- DISTRICT:	2- SUB-DIVISION:	3- TEHSIL:		
4- NAME OF UNION COUNCIL / TOWN COMMITTEE / MUNICIPALITY:				
5- NAME OF MOUZA/DEH/KILLI/BASTI:	6- SL.NO.OF SELECTED TUBEWELL/ LIFT PUMP/ WELL WITH PUMP / SUBMERCIBLE PUMP (FORM-3, QUESTION-9, COL.10): ⟶			
7- NAME OF OWNER:	COPY THE CODE FROM FORM-3, QUESTION-9, COLUMN-4:		VI	002

DETAIL OF AREA OPERATED	AREA (IN ACRES)	CODE
8- TOTAL AREA OWNED (LOCATED ANYWHERE IN THE COUNTRY)		003
9- AREA OWNED BUT GIVEN TO OTHERS ON SHARE CROPPING, LEASE OR ON ANY OTHER TERMS		004
10- BALANCE OF AREA OWNED (8 MINUS 9)		005
11- AREA TAKEN FROM OTHERS ON SHARE GROPPING, LEASE OR ON ANY OTHER TERMS		006
12- TOTAL AREA OPERATED (10 PLUS 11)		007
13- CULTIVATED AREA OUT OF TOTAL OPERATED AREA		008
14- UNCULTIVATED AREA OUT OF TOTAL OPERATED AREA		009
15- AREA ADDED TO FARMING AFTER INSTALLATION OF TUBEWELL / LIFT PUMP / WELL WITH PUMP / SUBMERCIBLE PUMP		010
16- YEAR OF INSTALLATION / PURCHASE OF TUBEWELL / LIFT PUMP / WELL WITH PUMP / SUBMERCIBLE PUMP		011
17- TYPE OF MOTIVE POWER: ELECTRIC [1] DIESEL [2] OTHERS [3]		012
IF DIESEL THEN TYPE OF DIESEL: SLOW SPEED [1] HIGH SPEED [2]		013
18- TUBEWELL / LIFT PUMP / WELL WITH PUMP / SUBMERCIBLE PUMP OPERATOR: FAMILY MEMBER [1] PAID OPERATOR [2]		014
19- SIZE OF PIPE: FOR DELIVERY .....INCH		015
FOR SUCTION .....INCH		016
20- TYPE OF FILTER: COPPER [1] COCONUT [2] PLASTIC [3] CEMENT [4] OTHERS [5]		017
21- LENGTH OF FILTER: ..... FEET		018
22- HORSE POWER OF ELECTRIC MOTOR / DIESEL ENGINE:		019
23- DEPTH OF WATER TABLE: a) AT THE TIME OF INSTALLATION ..... FEET		020
b) PRESENT ..... FEET		021
24- WAS WATER GOT TESTED BEFORE INSTALLATION ? YES [1] NO [2]		022
IF "YES" THEN FITNESS OF WATER ACCORDING TO TEST REPORT: FIT [1] UNFIT [2] PARTIALLY FIT [3]		023
25- FITNESS OF WATER FOR IRRIGATION AT PRESENT: FIT [1] UNFIT [2] PARTIALLY FIT [3]		024
26- WHICH AGENCY BORED TUBEWELL: GOVERNMENT [1] PRIVATE [2]		025
27- WHICH AGENCY INSTALLED TUBEWELL: GOVERNMENT [1] PRIVATE [2]		026

28- AFTER HOW MUCH TIME REBORING WAS PERFORMED: ..... YEARS		027
29- OBJECTIVES OF INSTALLATION:	a) TO MEET OUTSHORTAGE OF CANAL WATER [1]	028
	b) FOR IRRIGATION OF BARANI / SAILABA AREA [2]	029
	C) AS SUBSTITUTE OF WELL / KAREZ [3]	030
30- EFFECTS OF IRRIGATION ON PRODUCTIVITY OF LAND ? PRODUCTIVITY: INCREASED [1] DECREASED [2] NO CHANGE [3]		031

31-AREA IRRIGATED DURING LAST TWELVE MONTHS BY TUBEWELL/ LIFT PUMP/ WELL WITH PUMP / SUBMERCIBLE PUMP	IRRIGATED AREA (IN ACRES)			
	PRESENT RABI (2003-04)	CODE	LAST KHARIF (2003)	CODE
1	2	3	4	5
a) OWNER OPERATED IRRIGATED AREA		033		032
b) OTHER FARMER'S AREA		035		034

32- USE OF TUBEWELL / LIFT PUMP/ WELL WITH PUMP / SUBMERCIBLE PUMP DURING THE LAST TWELVE MONTHS:	
a- NUMBER OF DAYS TUBEWELL/ LIFT PUMP/ WELL WITH PUMP / SUBMERCIBLE PUMP WORKED ..... DAYS	036
b- AVERAGE HOURS PER DAY TUBEWELL/ LIFT PUMP/ WELL WITH PUMP / SUBMERCIBLE PUMP WORKED ..... HOURS	037
c- TOTAL HOURS WORKED (a x b) ..... HOURS	038
d- NUMBER OF HOURS WATER SOLD TO OTHERS ..... HOURS	039
33- IF WATER SOLD THE RATE PER HOUR: ..... RUPEES	040
34- SOURCE OF FINANCE FOR PURCHASE, BORING AND INSTALLATION OF TUBEWELL/ LIFT PUMP / WELL WITH PUMP / SUBMERCIBLE PUMP — OWN [1]	041
LOAN [2]	042
35- IF INSTALLATION PERIOD OF TUBEWELL / LIFT PUMP / WELL WITH PUMP / SUBMERCIBLE PUMP IS LESS THAN A YEAR, GIVE THE PERIOD IN MONTHS ..... MONTHS	043

NAME & DESIGNATION OF THE ENUMERATOR: _____

COMPLETION DATE: _____

NAME & DESIGNATION OF THE VERIFIER: _____

DATE OF VERIFICATION: _____

NAME OF THE RESPONDENT: _____

RELATION WITH THE OWNER OF TUBEWELL/ LIFT PUMP/ WELL WITH PUMP / SUBMERCIBLE PUMP:

_____