

A COMPARISON BETWEEN JHUM AND WET RICE CULTIVATION (WRC) IN MIZORAM

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ABSTRACT

This paper analyses the production and productivity of Paddy from WRC and Jhum cultivation for the state of Mizoram and also carried out the district wise comparison of their productivity. The study, surprisingly, revealed that the productivity of WRC was lower than that of Jhum cultivation within Kolasib district during the Mautam affected 3 years, within Lunglei district for 2 years, Mamit, Serchhip and Saiha district for 1 year each. The productivities of Jhum and WRC were same for 2013-14 for Mamit, Saiha and Serchhip districts. Area under Jhum cultivation is declining over the years.

Keywords: Paddy, Jhum, WRC, Production, productivity, Mautam.

1. INTRODUCTION

Agriculture plays a very important role in the economy of Mizoram and has remarkable contribution to the state Gross Domestic Products. More than 70% of the State population depends on land based activities for their livelihood. Agriculture is one among the sustainable land based activities/industries for development of the State economy due to its favourable agro-climatic condition, hilly terrain nature of the landscape and well distributed abundant rainfall during monsoon season.

The agriculture & allied activities contributed 18.75% (2015-16) to the GSDP. With more than half of the population deriving the greater part of their income from agriculture, faster growth in agriculture is necessary to provide boost to their income. Rising incomes in agriculture will also be an impetus to non-agricultural income in rural areas thus helping redress the rural-urban imbalance. Recently horticulture and floriculture has gained momentum and shown marked improvement in their production.

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The contribution of agriculture and allied sector to the economy in terms of Gross State Value added by economic activity at constant prices (2011-2012) was 20.12%, 18.43% 17.66%, 29.64%, 27.84% and 26.28% respectively in 2011-12, 2012-13, 2013-14, 2014-15, 2015-16(P) and 2016-17(Pr).

Table 1: Sectoral Share in percentage (Base year 2011-2012)

Year	Agriculture & Allied Sector		Industry Sector		Service Sector	
	Current Price	Constant (2011-12) Price	Current Price	Constant (2011-12) Price	Current Price	Constant (2011-12) Price
2011-2012	20.12	20.12	20.46	20.46	59.43	59.43
2012-2013	18.95	18.43	18.91	18.83	62.14	62.74
2013-2014	18.74	17.66	23.24	23.32	58.02	59.02
2014-2015	31.49	29.64	20.87	20.85	47.63	49.51
2015-2016 (P)	31.16	27.84	24.15	24.48	44.69	47.68
2016-2017 (Pr)	31.72	26.28	24.78	26.58	43.50	47.14

Source: Economic Survey Mizoram 2017-18

2. OBJECTIVES OF THE ANALYSIS

The objectives of this analysis are:

- 1) To compare the Production and productivity of Jhum and WRC
- 2) To carry out district wise comparison on the productivity of Jhum and WRC

3. METHODOLOGY AND TOOLS OF ANALYSIS

There are two analytics approaches. One is the ‘Predictive Analytics’, this is based on the study of current and past data to make a prediction model, this help decisions maker to see the possible outcomes of a decision even before it has been made. The other is ‘Descriptive Analytics’ which focuses on the reason behind the outcome. This work is the Predictive analytics in nature as the analysis is based on past record of the production. Simple Statistical tools percentage and weight measurements are employed for the analysis.

4. NATURE OF DATA

All data are collected from various departments like Economics & Statistics, Agriculture and other publications of state government. As the data are secondary in nature, the accuracy and reliability shall rest on the concerned departments.

5. DISTRICT-WISE AVAILABILITY OF WRC POTENTIAL

Under infrastructure development, expansion of Rice area was the priority sector during the 12th Plan period. The marginal increase in WRC Area has been recorded from 12,700 hectare at the beginning of 12th Plan to 17,302 hectares during 2016-17 which accounts for 36.24% increase. The productivity of Rice under WRC also increased significantly from 2.00 MT/Ha. at the beginning of 12th Five Year to 21.94 Quintal/Ha during 2016-17.

Table 2: District-wise availability of WRC Potential & Utilization Status 2016-17

(Area in Ha.)

Sl. No	Name of District	WRC Potential Area (in Ha.)	Area under Cultivation	% utilization of WRC Potential	Area need to be developed
1	Aizawl	4,140	875	21.14	3,265
2	Lunglei	12,797	1,202	39.00	11,595
3	Saiha	4,284	504	76.00	3,780
4	Champhai	8,697	4,554	52.36	4,143
5	Kolasib	9,429	4,335	98.00	5,094
6	Serchhip	3,710	2,308	62.21	1,402
7	Lawngtlai	11,405	2,556	22.41	8,849
8	Mamit	20,182	968	4.80	19,214
Grand Total		74,644	17,302	23.18	57,342

Source: Economic Survey Mizoram 2017-18

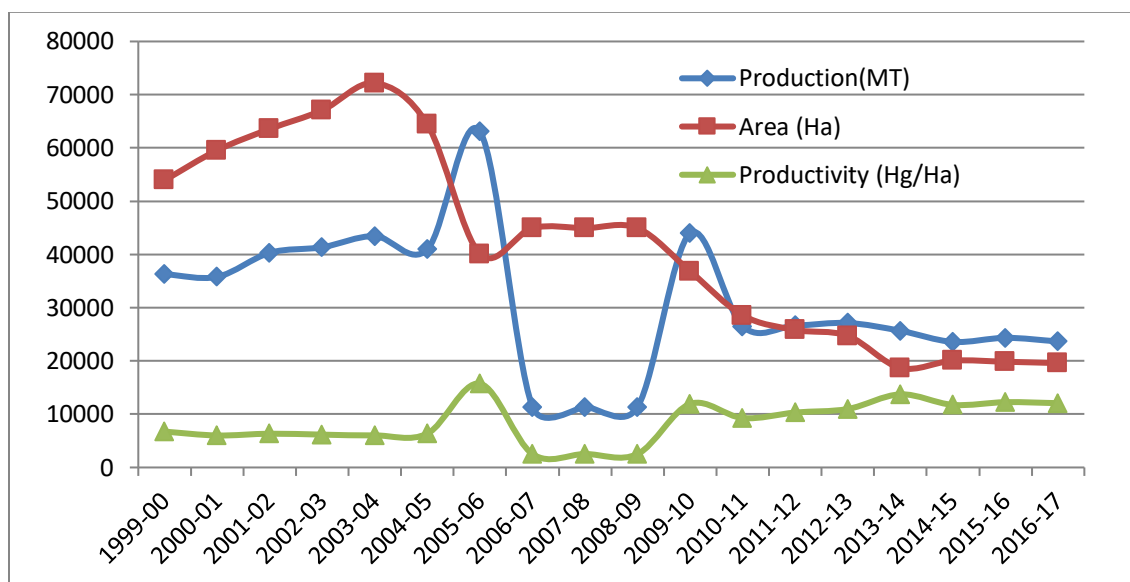
6. PRODUCTION OF PADDY FROM JHUM CULTIVATION

Paddy is the staple food of Mizoram people. The annual paddy production, area of cultivation and productivity of Jhum Cultivation from 1999-2000 to 2016-17 was presented in annexure I. The production recorded a sustain increase of 73.9% from 36,285MT in 1999-2000 to 63,100MT in 2005-06 and a sudden drop to 11,355MT in 2006-07, 2007-08 and 2008-09 due to the so called Mautam². Though the production pickup to 43,985MT in 2009-10, it declined again thereafter.

² Mautam is a bamboo (*Melocana baccifera*) flowering related starvation. Bamboo flowering had resulted a mass dying-out of the species which the Mizo called 'Mautam' (Bamboo mass dying-out). The flowering and fruiting of bamboo species are quite natural and plays a vital role in the rebuilding of new bamboo forest in the state. However,

The area of Jhum cultivation recorded an increase from 53,930Ha in 1999-2000 to 72,181Ha in 2003-04. However, the figure recorded a 74.10% dropped to a record low of 18,693Ha in 2013-14 and started a slow recovery to 19,602Ha in 2016-17. The diminishing trend in area of the destructive system of Jhum cultivation is a welcoming trend. The significant reduction in Jhum area is mainly due to the implementation of Oil Palm development programme, Sugarcane cultivation programme, RKVY, NLUP & RAD

Diagram I: Area, production and productivity of Jhum cultivation



The productivity is hovering around 6270 Hg/Ha during 1999 to 2005 and a suddenly rose to a record high of 15735.66 Hg /Ha was observed in 2005-06. Due to the Rodent population explosion as a result of Bamboo flowering, the productivity of Jhum witnessed a record low of 2526.31Hg/Ha for consecutive three years ie 2006-2007 to 2008-09 – the year and following

it always coincides with the rapid multiplication of rat population within a short span of time, which we call rodent outbreak. The Mizos believed that the rats consumed the nutritious bamboo fruits that results to increase in the litter size of different rat species, building their population during the non – crop season. It is said that the bamboo fruit increases their fertility to such an extent that the number of their litter jumps from the normal 6 –8 to 12-18 (Rokhuma, 1988) though there is no scientific explanation yet. Pal (1993) stated that the sudden availability of nutritious food is likely to increase the prodigality of the local rodent population and increase in population. The increase in rat population ultimately devastated the Jhum paddy at the harvesting time which ultimately leads to cruel and severe famines in Mizoram. This mass dying-out and its consequent famine have been observed in Mizoram since the Mizos occupied Mizoram. The last Mautam was happened in Mizoram during 2007- 2008.

year of Bamboo flowering. Thereafter, it recorded a random behaviour and a graphical representation was available in diagram I³.

Table 3: District wise area of Jhum cultivation (in %)

	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Aizawl	3.19	0.29	0.29	0.29	1.71	1.26	1.13	1.07	1.01	1.20	1.20
Champhai	2.82	1.27	1.27	1.27	2.25	1.39	1.26	2.22	2.02	1.51	1.54
Kolasib	3.12	1.28	1.28	1.28	2.71	1.70	1.86	1.68	1.58	1.36	1.39
Lawngtlai	3.78	1.04	1.04	1.04	1.27	0.87	1.18	1.69	1.79	1.60	1.54
Lunglei	2.80	0.04	0.04	0.04	2.12	1.11	1.13	0.78	0.86	0.80	0.77
Mamit	2.20	0.27	0.27	0.27	3.16	1.16	1.61	0.83	0.68	0.65	0.93
Saiha	3.99	0.31	0.31	0.31	0.77	0.60	0.75	0.77	0.43	0.40	0.47
Serchhip	2.67	0.27	0.27	0.27	2.43	2.53	1.37	1.72	1.63	1.65	1.63
Max	3.99	1.28	1.28	1.28	3.16	2.53	1.86	2.22	2.02	1.65	1.63
Min	2.20	0.04	0.04	0.04	0.77	0.60	0.75	0.77	0.43	0.40	0.47

Source: Derived from various issues of Agriculture Statistical Abstract

Champhai district devoted the highest percentage of its district area for two consecutive years - 2012-2013 and 2013-14, Kolasib for four years (2006-07, 2007-08, 2008-09 and 2011-12), Mamit for 2009-10, Saiha for 2005-06 and Serchhip for 2010-11, 2014-15 and 2016. Lunglei district dedicated the least percentage of its area for three consecutive years (2006-07, 2007-08 and 2008-09), Mamit for 2005-06 and Saiha district for five consecutive years from 2009-10 to 2015-16.

On average, Kolasib district utilized the highest percentage of its area for Jhum cultivation (1.75%), followed by Champhai with 1.71%, Lawngtlai (1.53%), Serchhip (1.49%), Aizawl (1.15%), Mamit (1.09%), Lunglei (0.95%) and the lowest is Saiha district with bare percentage of 0.83.

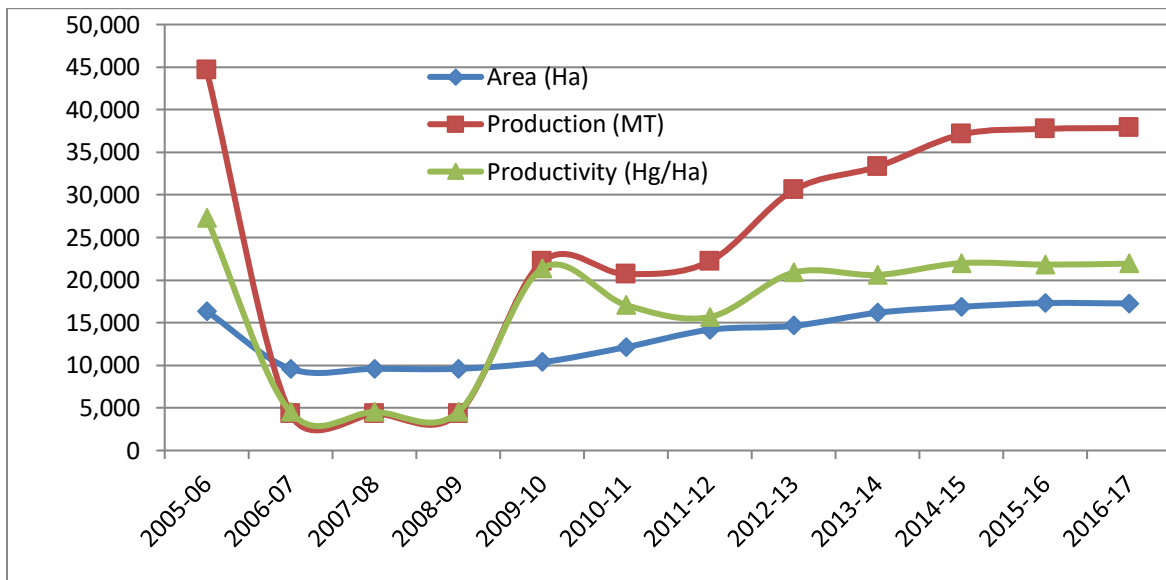
7. PRODUCTION OF PADDY FROM WET RICE CULTIVATION

Area under WRC cultivation was hovering around 15,500Ha during the first seven years, and experienced a sudden reduction from 16,360Ha in 2005-06 to 9594Ha for the next three consecutive years due to the Mautam phenomenon. The area was again expanded to 10,363Ha in 2009-10 and witnessed a sustained increase since then. The production pattern of Paddy under WRC also followed almost the same behaviour with the area under cultivation – an irregular

³ In the diagram Hectogram(Hg) is used so as to compatible the graph with other figures, 10,000Hg = 1MT

fluctuation before the Mautam, a sudden reduction during Mautam and a sustained improvement in Production. Both the area under cultivation and paddy production overtook the level of 1999-2000.

Diagram 2: Area, production and productivity of WRC cultivation



Productivity is a matter of prime concern for attaining food sufficiency in the state. The productivity was around 26.87 Quintals/Ha during the pre-Mautam period which was suddenly dropped to 4.52 Quintals/Ha for the 3 consecutive Mautam affected years. The yield was pick-up again in 2009-10 to 21.37 Quintals/Ha. However, the productivity cannot attain its pre-Mautam level even after the introduction of many schemes.

Table 4: Area, production and productivity of WRC

	Area(Ha)	Production (MT)	Productivity (Qntl/Ha)
1999 – 00	13,428	34,467	25.67
2000 - 01	16,041	44,113	27.50
2001- 02	15,575	42,147	27.06
2002 – 03	15,711	42,129	26.81
2003 – 04	15,749	42,449	26.95
2004 - 05	16,117	43,240	26.83
2005-06	16,360	44,640	27.29
2006-07	9,594	4,333	4.52

2007-08	9,594	4,333	4.52
2008-09	9,594	4,333	4.52
2009-10	10,363	22,146	21.37
2010-11	12,130	20,703	17.07
2011-12	14,175	22,212	15.67
2012-13	14,636	30,572	20.89
2013-14	16,170	33,323	20.61
2014-15	16,866	37,096	21.99
2015-16	17,302	37,746	21.82
2016-17	17,256	37851	21.94

Source: Derived from various issues of Agriculture Statistical Abstract

As depicted in annexure III, Champhai district had the highest contribution followed by Kolasib, Serchhip, Lawngtlai, Mamit, Lunglei district and Saiha district had the smallest contribution in overall state's Paddy production under WRC Cultivation during 2005-06 to 2015-16.

8. COMPARISION BETWEEN THE PRODUCTIVITY OF JHUM AND WRC

As seen in the table 4, during 2005-06 to 2015-16, the WRC productivity of Aizawl district was the highest for 6 years, Champhai and Mamit district for 2 years each and Saiha and Champhai district for 1 year each while Champhai district had the lowest productivity for 1 year, Kolasib and Lawngtlai district for 2 years each, Lunglei district 1 year, Saiha district for 4 years and Serchhip district for 1 year.

For Jhum cultivation, during the same period, Aizawl and Champhai district had the highest productivity for 2 years each, Kolasib for 3 years, Lawngtlai district for 1 year, Lunglei and Serchhip district for 2 and 1 year respectively. On the other hand, Champhai and Kolasib district had the lowest productivity for 1 year each, Lawngtlai district for 2 years, Lunglei district for 3 years, Mamit and Saiha district for 2 years each.

Table 4: Comparison between the productivity of Jhum and WRC

District	Type	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Aizawl	Jhum	1.31	0.13	0.13	0.13	1.22	0.94	1.06	1.12	1.2	1.39	1.4
	WRC	2.82	0.87	0.87	0.87	2.26	1.44	2.06	2.83	2.25	2.41	2.4
Champhai	Jhum	1.6	0.36	0.36	0.36	1.55	1.02	1.07	1.2	1.15	1.12	1.15
	WRC	2.22	0.56	0.56	0.56	3.01	2.17	2.02	2.04	2.13	1.99	2.2
Kolasib	Jhum	1.14	0.5	0.5	0.5	1.3	0.87	1.06	1.15	1.19	1.22	1.33
	WRC	2.92	0.3	0.3	0.3	2.2	1.63	1.88	1.83	1.88	2.07	2.09
Lawngtlai	Jhum	2.08	0.42	0.42	0.42	0.8	0.56	0.77	1.08	1.16	1.2	1.21
	WRC	2.17	0.5	0.5	0.5	1.47	1.02	1.8	1.89	1.93	2.51	2.24
Lunglei	Jhum	1.7	0.05	0.05	0.05	1.27	1.08	1.17	1.11	2.37	1.2	1.18
	WRC	3.59	0.6	0.6	0.6	1.6	1.13	1	2.4	2.08	2.36	2.01
Mamit	Jhum	1.76	0.22	0.22	0.22	1.41	0.81	1.02	0.85	2.27	0.9	1.2
	WRC	3.1	0.84	0.84	0.84	2.72	1.54	0.51	2.17	2.27	2.51	2.12
Saiha	Jhum	1.45	0.08	0.08	0.08	0.7	0.79	1.1	1.19	2.12	0.96	1.1
	WRC	4.07	0.11	0.11	0.11	1.5	1.28	0.31	2.58	2.12	2.14	2.17
Serchhip	Jhum	1.69	0.18	0.18	0.18	0.79	1.34	1.08	1.06	2.25	1.2	1.22
	WRC	2.66	0.48	0.48	0.48	0.74	1.75	1.77	2.38	2.25	2.24	2.28

Source: Derived from various issues of Agriculture Statistical Abstract

Surprisingly, the productivity of WRC was lower than that of Jhum cultivation within Kolasib district during the Mautam affected 3 years, within Lunglei district for 2011-12 and 2013-14, Mamit district for 2011-12, Saiha district for 2011-12 and within Serchhip district during 2009-10. Apart from these, both the productivities are the same during 2013-14 for Mamit, Saiha and Serchhip districts

8. CONCLUSIONS

- 1) The productivity of Jhum had fallen during Bamboo affected three years. The productivity of Jhum was sharply increased within Lunglei, Mamit, Saiha and Serchhip districts for 2013-14 and simultaneously decreased in the next year.
- 2) Productivity of Jhum was the highest within Lunglei district (10.21Qntls/Ha) followed by Serchhip district (10.15Qntls/Ha), Champhai district (9.95Qntls/Ha), Mamit (9.89Qntls/Ha), Kolasib district (9.78Qntls/Ha), Lawngtlai district (9.20 Qntls/Ha), Aizawl district (9.12Qntls/Ha) and Serchhip district (8.77Qntls/Ha) during 2005-06 to 2015-16

- 3) On average, Kolasib district utilized the highest percentage of its area for Jhum cultivation (1.75%), followed by Champhai with 1.71%, Lawngtlai (1.53%), Serchhip (1.49%), Aizawl (1.15%), Mamit (1.09%), Lunglei (0.95%) and the lowest is Saiha district with bare percentage of 0.83.
- 4) The area under of Jhum cultivation is decreasing.
- 5) The productivity of WRC was stationed around 26.87 Quintals/Ha during the pre-Mautam period which was suddenly dropped to 4.52 Quintals/Ha for the 3 consecutive Mautam affected years. The yield was pick-up again in 2009-10 to 21.37 Quintals/Ha.
- 6) The productivity of WRC cannot attain its pre-Mautam level even after the introduction of many schemes.
- 7) Champhai district had the highest contribution in WRC followed by Kolasib, Serchhip, Lawngtlai, Mamit, Lunglei district and Saiha district had the smallest contribution in overall state's Paddy production under WRC Cultivation during 2005-06 to 2015-16.
- 8) Productivity of WRC was higher than that of Jhum

Jhum cultivation is culturally and traditionally attached to the habits and in the blood of Mizos and as such, there is no immediate means to stop the practice of Jhum cultivation. Therefore, it is the responsibility of the State authorities to think as to how to sustain the Jhum cultivation in terms of increasing Jhum productivity on one hand and reduce the area under cultivation on the other.

Well and advance preparation is required in future to face the predictable Mautam on the part of the concerned authorities to avoid the huge loss of Agricultural produces.

As the state's WRC productivity was much lower than the national average Productivity issue is a matter of prime concern for attaining food sufficiency in the state. The concerned department should carry out a systematic study to find out the reason behind this.

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Annexure I: Area, production and productivity of Jhum

Year	Area (Ha)	Production (MT)	Productivity (Qntls/Ha)
1999-00	53930	36285	6.73
2000-01	59560	35798	6.01
2001-02	63568	40306	6.34
2002-03	67076	41356	6.17
2003-04	72181	43447	6.02
2004-05	64420	40969	6.36
2005-06	40100	63100	15.74
2006-07	44947	11355	2.53
2007-08	44947	11355	2.53
2008-09	44947	11355	2.53
2009-10	36841	43985	11.94
2010-11	28562	26499	9.28
2011-12	25826	26644	10.32
2012-13	24706	27128	10.98
2013-14	18693	25671	13.73
2014-15	20064	23583	11.75
2015-16	19851	24343	12.26
2016-17	19,602	23,665	12.07

Source: Derived from various issues of Agriculture Statistical Abstract

Annexure II: District and year wise area of Jhum cultivation (Ha)

Year	Aizawl	Champhai	Kolasib	Lawngtlai	Lunglei	Mamit	Saiha	Serchhip
2005-06	11421	8975	4311	9664	12688	6663	5583	3795
2006-07	1020	4051	1770	2667	204	828	432	383
2007-08	1020	4051	1770	2667	204	828	432	383
2008-09	1020	4051	1770	2667	204	828	432	383
2009-10	6128	7155	3742	3245	9615	9565	1082	3453
2010-11	4518	4431	2346	2212	5029	3523	843	3597
2011-12	4038	4004	2566	3030	5148	4860	1053	1945
2012-13	3823	7060	2327	4322	3562	2510	1073	2451
2013-14	3605	6442	2177	4585	3900	2046	606	2310

2014-15	4300	4822	1878	4091	3628	1971	553	2340
2015-16	4296	4892	1916	3937	3513	2808	660	2321

Source: Derived from various issues of Agriculture Statistical Abstract

Annexure III: District and year wise Area under WRC cultivation

Year	Aizawl	Champhai	Kolasib	Lawngtlai	Lunglei	Mamit	Saiha	Serchhip
2005-06	4002	10685	13757	2157	3177	4753	2259	3850
2006-07	384	1319	1042	356	391	146	43	652
2007-08	384	1319	1042	356	391	146	43	652
2008-09	384	1319	1042	356	391	146	43	652
2009-10	695	10070	5488	1764	813	1603	577	1136
2010-11	573	8148	5850	1282	533	980	544	2793
2011-12	1281	7639	6877	2957	607	755	461	1635
2012-13	1855	8135	7596	3388	2372	1731	1311	4184
2013-14	1665	9338	7983	4351	2256	2013	1097	4620
2014-15	2010	8915	8987	6216	2719	2426	1043	4780
2015-16	2100	10018	9050	5735	2422	2052	1096	5273

Source: Derived from various issues of Agriculture Statistical Abstract