

मूल्यांकन अध्ययन सीरीज हरियाणा क्षेत्रीय कार्यालय सं: 1
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हरियाणा के भिवानी और हिसार जिले में दलहन पर अध्ययन
COMMODITY STUDY ON PULSES IN
BHIWANI AND HISAR DISTRICTS OF HARYANA



राष्ट्रीय कृषि और ग्रामीण विकास बैंक,
हरियाणा क्षेत्रीय कार्यालय, चण्डीगढ़
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CONTENTS

CHAPTERS	PAGE NO.
Foreword	iii
Acknowledgements	vii
Credit List	ix
Executive Summary	xii
Chapter-1: Introduction	1
Chapter-2: Objectives and Methodology	5
Chapter-3: Trends in Area, Production, and Productivity of Pulses	10
Chapter-4: Trends in Area, Production and Productivity of Chickpeas	15
Chapter-5: Chickpea Cultivation and its Economics	21
Chapter-6: Processing and Marketing of Chickpeas	34
Chapter-7: Summary, Conclusions and Action Points	47
List of Evaluation Studies conducted by NABARD	57

प्रस्तावना

भारत में दालें खाद्यान्न का महत्वपूर्ण घटक हैं. दालों में प्रोटीन की मात्रा अधिक होने के कारण इसे निर्धनों का मीट कहा जाता है (दालों में भार अनुसार 20 से 25 % प्रोटीन होता है, जोकि गेहूँ से दोगुना और चावलों से तिगुना हैं) यद्यपि भारत दालों का सबसे बड़ा उत्पादक (कुल उत्पादन 61.34 मिलियन टन का 25%) और सबसे बड़ा उपभोक्ता है (कुल का 30%) तथापि भारत में दालों की उपलब्धता निरन्तर कम हो रही है. भारत में वर्ष 1960-61 में दालों की प्रति व्यक्ति उपलब्धता 69 ग्राम थी जोकि वर्ष 2007-08 में घट कर 36 ग्राम रह गई है. जबकि विश्व स्वास्थ्य संगठन की अनुशंसा के अनुसार इसे प्रति व्यक्ति 80 ग्राम प्रतिदिन होना चाहिए.

वर्तमान अध्ययन के द्वारा हरियाणा में दालों के उत्पादन से जुड़े मुद्दों के गहन विश्लेषण का प्रयास किया गया है. इस अध्ययन में भिवानी और हिसार जिलों के अध्ययन क्षेत्र में प्रतिदर्श कृषकों, दाल मिलों और अन्य हितधारकों से एकत्रित प्राथमिक आंकड़ों के आधार पर विशेषतः उत्पादन, संसाधन और विपणन पहलुओं को शामिल किया गया है. हरियाणा में चने की कृषिगत जोत भूमि में 85.3% की अत्यधिक कमी दर्ज की गई है. यह एक निराशाजनक परिदृश्य है. वर्ष 1970-71 के दौरान दालों की 1.16 मिलियन हे० जोत भूमि की तुलना में वर्ष 2007-08 के दौरान केवल 0.17 मिलियन हे० जोत भूमि थी. इसीप्रकार 0.83 मिलियन टन उत्पादन (1970-71) वर्ष 2007-08 में 87.7% घट कर मात्र 0.10 मिलियन टन रह गया. राज्य में दालों के उत्पादन और इसके अर्न्तगत कृषि जोत भूमि में कमी दर्ज की गई है जबकि मुख्य फसलें जैसे चावल, गेहूँ, तिलहन और कपास के उत्पादन और कृषि जोत भूमि में वृद्धि दर्ज की गई है. यह मुख्यतः किसानों के दालों और विशेषतः चना दाल के स्थान पर आर्थिक रूप से लाभकारी फसलें जैसे गेहूँ, चावल, कपास और तिलहन के उत्पादन की ओर रुझान के कारण हुआ.

अध्ययन के दौरान यह पाया गया कि प्रतिदर्श किसानों द्वारा किये गये चने की खेती से प्रति एकड़ औसतन शुद्ध आय रु.5152/- होती है. लेकिन "लघु और सीमान्त किसानों" एवं "अन्य किसानों" की प्रति एकड़ निवल आय क्रमशः रु.5419/- और रु. 4619/- है. जिससे यह प्रतिलिखित होता है कि "लघु/सीमांत किसानों" की प्रति एकड़ आय "अन्य किसानों" से अधिक है. प्रतिदर्श दाल मिलर्ज के संदर्भ में सकल और निवल आय क्रमशः रु 23675/- और रु 1460/- प्रति मीट्रिक टन है. मांग और आपूर्ति के बहुत से कारकों के प्रतिकूल प्रभाव से अध्ययन क्षेत्र हिसार और भिवानी जिलों में दाल मिलों की इकाईयाँ रुग्ण होकर बंद हो रही हैं. ऐसे परिदृश्य के लिए कम उत्पादन और कृषिगत जोत भूमि में कमी, 4% का वैट और 1% की मंडी शुल्क, बाजार में बेहतर गुणवत्ता वाली दाल (एम पी वैराइटी) सस्ते दामों पर

उपलब्ध होना, श्रम और बिजली की निर्बाध आपूर्ति की कमी आदि मुख्य कारण हैं। 4% की वैट और 1% की मंडी शुल्क के कारण ये इकाईयाँ दिल्ली में उनके समकक्षों की तुलना में अप्रतिस्पर्धी हो गई हैं। दिल्ली में ये शुल्क/ कर लागू नहीं हैं। अतः हरियाणा राज्य में इन करों को युक्तिसंगत बनाने के लिए प्रावधान किए जाने की आवश्यकता है।

समय पर वर्षा न होना, रबी के मौसम में नमी की कमी, किसानों द्वारा कम बीज प्रतिस्थापन दर वाले स्वयं के बीजों का उपयोग, भूमिगत जल की उच्च लवणता, नहर के पानी की सीमित उपलब्धता और खेती के लिए सीमान्त भूमि का उपयोग आदि जैसे कारणों से इसकी खेती पर प्रतिकूल प्रभाव पड़ा है।

इसके अतिरिक्त विगत 20-25 वर्षों से ट्यूबवैल के माध्यम से भूमिगत जल सिंचाई की अधिक उपलब्धता के कारण किसान चना दाल के स्थान पर आर्थिक दृष्टि से रबी की लाभकारी फसलें जैसे गेहूं, तिलहन आदि की खेती करने लगे हैं। यह अध्ययन सिंचित खेतों में उगाए जाने वाले बीजों का विकास, किसानों को उचित दर पर बीज की सही गुणवत्ता और सही मात्रा उपलब्ध कराना, बीज प्रतिस्थापन दर में वृद्धि, कृषि विज्ञान केन्द्रों और कृषि विश्वविद्यालयों के वैज्ञानिकों की भागीदारी से विस्तार तन्त्र को सुदृढ़ करना और छंटाई, कीटनाशकों का उपयोग आदि जैसी कृषि प्रथाओं को अपनाने की सिफारिश करता है। मुझे विश्वास है कि यह रिपोर्ट दलहनों के विकास से जुड़े सभी व्यक्तियों और शिक्षाविदों, नीति-निर्माताओं, योजनाकारों, बैंकों, किसानों और चना दाल के व्यापारियों के लिए उपयोगी साबित होगी। आपके सुझाव, यदि कोई हों, उनका स्वागत है।

चण्डीगढ़
11 जून 2010

एच के तलरेजा
मुख्य महाप्रबंधक

FOREWORD

Pulses are important constituent of food grains in India. Because of its high protein content (i.e. 20-25 per cent by weight which is double the protein content of wheat and three times that of rice), it is sometimes called 'poor man's meat'. Though India is the world's largest producer of pulses (25 per cent of total production of 61.34 million tonnes) and the largest consumer (30 per cent of total), but its availability in India is declining. The per capita availability of pulses has declined from 69 grams per day in 1960-61 to 36 grams per day in 2007-08 against the World Health Organisation's recommendation of 80 grams per capita per day.

The present study has attempted to make an in-depth analysis of the pulses sector in Haryana with special reference to chickpea covering its production, processing and marketing aspects based on the primary data collected from sample farmers, dal millers and other stakeholders in the study area of Bhiwani and Hisar Districts. The dismal scenario of chickpea cultivation in Haryana got reflected in declining area under cultivation from 1.16 million hectares in 1970-71 to 0.17 million hectares in 2007-08 registering an alarming decrease of 85.3 per cent. Similarly, the production also decreased from 0.83 million tonnes (1970-71) to 0.10 million tonnes (2007-08) registering a decline of 87.7 per cent. The decline both in area and production of pulses in the state has coincided with increase in area and production of major crops like paddy, wheat, oilseed and cotton. This was a reflection of switching over from pulses in general and gram in particular to economically more remunerative crops like wheat, paddy, cotton and oilseed.

The average net income per acre from chickpea cultivation by the sample farms worked out to Rs. 5152. However, the net income per acre derived by 'small & marginal farmers' and 'other farmers' worked out to Rs. 5419 and Rs. 4619 respectively, indicating higher return per acre to small and marginal farmers than the other farmers. In case of the sample dal millers, the gross and net income per metric tonnes worked out to Rs. 23675 and Rs. 1460 respectively. A host of demand and supply side factors adversely affecting

the dal mills had resulted in sickness of such units leading to their closure in the study area of Hisar and Bhiwani districts. Some of the factors contributing for such a scenario included non availability of chickpea in adequate quantity (due to declining area and production) through out the year, applicability of Value Addition Tax of 4 per cent and mandi fee of 1 per cent, competition from better quality dal (M.P.variety) available at cheaper rates in the market, shortage of labour and uninterrupted supply of electricity, etc. Applicability of VAT of 4 per cent and mandi fee of 1 per cent makes these units uncompetitive in comparison to their counterparts in Delhi where such fees/taxes are not applicable. Therefore, there was a felt need for provision of a level playing field through rationalisation of these taxes in the state.

Lack of timely rainfall and moisture stress in rabi season, use of own seeds by farmers with low seed replacement rate, high salinity of ground water and limited availability of canal water, use of marginal land for cultivation were some of the constraints hampering the prospects of chickpea cultivation. Further, increased availability of ground water irrigation through tube wells over last 20–25 years has induced farmers to switch over to economically more remunerative rabi crops like wheat and oilseed in place of chickpea. The study has recommended for development of seed variety that could be grown in irrigated field conditions, supply of right quality and quantity of seeds at reasonable rates to the farmers, enhancement of seed replacement rate, strengthening of extension mechanism by involvement of scientists from Agricultural Universities and KVKs, adoption of recommended agronomic practices such as weeding, application of rhizobium culture, application of pesticides, etc.

I am sure the report will be found useful by all those involved in development of Pulses in general and academicians, policy makers, planners, bankers, farmers, processors and traders of chickpea, in particular. Suggestions, if any, will be most welcomed.

Chandigarh
11 June 2010

H.K.Talreja
Chief General Manager

आभार सूची

समग्र निदेश

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आभार

इस अध्ययन में सहयोग के लिए हम सरकारी अधिकारियों, बैंकरों और चौ. चरण सिंह हरियाणा कृषि विश्वविद्यालय, हिसार के शिक्षाविदों, कृषि विज्ञान केन्द्रों, कृषकों, दाल मिलों और अध्ययन क्षेत्र के कमीशन एजेंट का आभार व्यक्त करते हैं. श्री एन. के. वर्मा, जि. वि. प्र., नाबार्ड, भिवानी और श्री जुगल किशोर , जि.वि.प्र., नाबार्ड, हिसार द्वारा दिया गया समग्र सहयोग सराहनीय है. उनके सक्रिय सहयोग से ही यह अध्ययन सफल हुआ है. राजभाषा प्रभाग, हरियाणा क्षेत्रीय कार्यालय, नाबार्ड द्वारा दिए गए सहयोग के लिए भी हम आभार व्यक्त करते हैं.

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कार्यकारी संदेश

वर्तमान अध्ययन में हरियाणा राज्य में दलहन क्षेत्र के गहन विश्लेषण का प्रयास किया गया है. यह हरियाणा के भिवानी और हिसार जिले के अध्ययन क्षेत्र में कृषकों, झाल मिलरों और अन्य हितधारकों से एकत्रित प्राथमिक आंकड़ों पर आधारित है एवं इसमें विशेषतः दलहन के उत्पादन, प्रसंस्करण और विपणन से जुड़े पहलुओं को कवर किया गया है. रिपोर्ट में अध्ययन के निष्कर्षों पर आधारित नीतिगत सुधारात्मक उपायों को भी रेखांकित किया गया है. सैम्पल फ्रेम में भिवानी और हिसार जिले के अध्ययन क्षेत्र से 63 कृषकों (इसमें से 67% लघु और सीमान्त किसान और 33% अन्य किसान) 4 डीलर/ थोक विक्रेता, 8 दाल मिलर और 04 खुदरा विक्रेता को शामिल किया गया है.

अध्ययन के मुख्य/प्रमुख निष्कर्ष

(i) पिछले 50 वर्षों में (1958-59) देश में दालों के तहत लगभग 24 मिलियन हेक्टेयर कृषि क्षेत्र स्थिर रहा है जबकि इसके उत्पादन में 14.9% की वृद्धि हुई है. वर्ष 1958-59 में उत्पादन 13.15 मिलियन टन था जो कि वर्ष 2007-08 में यह बढ़कर 15.12 मिलियन टन हो गया है. (पैरा 3.3)

(ii) हरियाणा में दालों के तहत कृषि क्षेत्र 1.16 मिलियन हे० (1970-71) से कम होकर 0.16 मिलियन हे० (2006-07) हो गया है. यह पिछले 36 वर्षों में सबसे अधिक कमी है. इसी प्रकार इसका उत्पादन 0.8 मिलियन टन (1970-71) से कम हो कर 0.1 मिलियन टन (2007-08) हो गया है जो कि राज्य में दलहन कृषि के निराशाजनक परिदृश्य को दर्शाता है (पैरा 3.5)

(iii) हरियाणा में मुख्यतः चना, हराचना (मूंग), मसर और मोठ की दालें उगाई जाती हैं. सभी दालों की तुलना में चने की दाल सबसे अधिक क्षेत्र (63.6%) में उगाई जाती है एवं इसका उत्पादन भी सबसे अधिक (66.2) था. (पैरा 3.5)

(iv) अखिल भारतीय स्तर पर चने की कृषिगत भूमि क्षेत्र 7.57 मिलियन हे० (1950-51) से बढ़ कर 1959-60 में 10.33 मिलियन हे० हो गया जो उस अवधि के दौरान 36.5% की वृद्धि दर्शाता है. यद्यपि उसके बाद वर्ष 2007-08 तक इसकी कृषि के तहत क्षेत्र कम हो कर 7.58 मिलियन हे० हो गया . चने की दाल का उत्पादन 3.65 मिलियन टन (1950-51) से बढ़ कर 6.91 मिलियन टन (2007-08) हो गया है. इस अवधि के दौरान 89.3% की वृद्धि वर्ष की गई (पैरा 4.3)

(v) हरियाणा में चने की दाल के तहत कृषि क्षेत्र में कमी आई हैं. वर्ष 1970-71 में यह 1.06 मि. हे० से कम होकर वर्ष 2007-08 में 0.11 मि. हे० हो गया जो कि पिछले 36 वर्षों में सबसे अधिक कमी दर्शाता है. इसी प्रकार इस अवधि के दौरान इसका उत्पादन भी 0.5 मिलियन टन (1970-71) से कम होकर 0.05 मिलियन टन (2007-08) हो गया . इस प्रकार हरियाणा में चने की दाल की खेती में गिरावट की प्रवृत्ति को पूरी तरह परिलक्षित होती है. (पैरा 4.5).

(vi) हरियाणा में चावल, गेहूं, तिलहन और कपास की खेती के तहत कृषि क्षेत्र वर्ष 1966-67 से बढ़ती हुई प्रवृत्ति दर्शाता है. वर्ष 1966-67 इन चार प्रमुख फसलों में चावल के तहत कृषि क्षेत्र में 4.59 गुणा, गेहूं में 2.31 गुणा तिलहन में 1.90 गुणा और कपास में 1.88 गुणा वृद्धि दर्ज की गई. जबकि वर्ष 2007-08 में दालों का कृषि क्षेत्र वर्ष 1966-67 के कृषि क्षेत्र का मात्र 14.6% था और वर्ष 2007-08 में चने की दाल का कृषि क्षेत्र वर्ष 1966-67 के कृषि क्षेत्र का मात्र 10% था.

(vii) किसान राज्य में आमतौर पर दालों और विशेषकर चने की स्थान पर गेहूं, तिलहन जैसी आर्थिक तौर पर लाभकारी फसलें उगाने लगे. (पैरा 4.7)

(viii) सैम्पल किसानों के अंतर्गत भिवानी जिले में "अन्य फार्म" श्रेणी के तहत 18.2% की तुलना में "लघु और सीमान्त फार्म" द्वारा 23.6% कृषि क्षेत्र पर चने की दाल की खेती की गई . जबकि हिसार जिले में "लघु और सीमान्त फार्म" के तहत 17.7% की तुलना में "अन्य फार्म" श्रेणी के तहत 18.3% कृषि क्षेत्र पर चने की दाल की खेती की गई. (पैरा 5.19)

(ix) चने की दाल की प्रति एकड़ A1 लागत अनुमानतः "लघु और सीमान्त फार्म" के लिए रु.3305/- "अन्य फार्म" के लिए रु.3419/- एवं और सभी सैम्पल किसानों की समग्रतः लागत रु.3343/- थी "अन्य फार्म" के तहत उच्च लागत का मुख्य कारण उर्वरक, कीट नाशक जैसे इनपुट का गहन उपयोग हो सकता है (पैरा 5.26)

(x) सैम्पल फार्म के लिए कृषि की लागत में मानव श्रम सबसे बड़ा कम्पोनेन्ट था. यह "लघु और सीमान्त फार्म", "अन्य फार्म" और सभी किसानों की श्रेणियों के लिए क्रमशः 25.7%, 17.8% और 23% थी. मानव श्रम लागत (23%) के बाद बीजों की लागत (21.8%) का कम्पोनेन्ट था (पैरा 5.27)

(xi) लागत की तुलना में औसत प्रतिफल "लघु और सीमान्त किसानों" के लिए रु.4619/- "अन्य किसानों" के लिए रु.5152/- और सभी सैम्पल किसानों का समग्रतः रु.5152/- था.

“लघु और सीमान्त किसानों” का प्रति एकड़ प्रतिफल “अन्य किसानों” की तुलना में अधिक था. यह प्रति यूनिट कृषि भूमि के गहन उपयोग के कारण हो सकता है. A2 लागत पर प्रतिफल “लघु और सीमान्त किसानों” का रु.3326/-, “अन्य किसानों” का रु.2536/- और सभी सैम्पल किसानों का समग्रतः रु.3069/- पाया गया. इसी प्रकार A2 प्लस परिवार श्रम पर प्रतिफल लघु और सीमान्त किसानों के लिए रु.1526/- “अन्य किसानों” के लिए रु.1496/- और सभी सैम्पल किसानों का समग्रतः रु.1282/- पाया गया (पैरा 5.29)

(xii) ट्रेडर और मिलर्स बहुत हतोत्साहित थे चूंकि उनका कारोबार इन वर्षों में बहुत कम हो गया था. इसका मुख्य कारण अध्ययन क्षेत्र में पिछले 20-25 वर्षों में चने के कृषि क्षेत्र में आई कमी है जोकि चना के स्थान पर गेहूँ, तिलहन जैसी लाभकारी फसलों के उगाने के कारण, सिंचाई की बेहतर सुविधाओं की उपलब्धता के कारण अन्य फसलों का आर्थिक तौर पर ज्यादा लाभकारी होना, चने की दाल की खेती के लिए ट्यूबवैल का पानी उपयुक्त होना और नहर का पानी उपलब्ध न होना (जो इसकी खेती के लिए उपयुक्त था) के कारण हुई है (पैरा 6.14)

(xiii) दाल मिलर्ज की मांग और पूर्ति को प्रभावित करने वाले बहुत से कारकों की वजह से प्रोसेसिंग इकाइयों की कीमतें दिल्ली (जो कि अध्ययन क्षेत्र के निकट है) की तुलना में अप्रतिस्पर्धी हो गई. फलस्वरूप हिसार और भिवानी जिले की ऐसी सभी मिलज धीरे-धीरे बंद होने लगी. अन्य कुछ कारण जिनसे प्रोसेसिंग इकाइयाँ प्रभावित हुई उनमें वर्ष भर पर्याप्त मात्रा में कच्चे माल की अनुपलब्धता, 4% वैट लागू होना, 1% की मण्डी फीस, दिल्ली में स्थित मिलों से कड़ी प्रतिस्पर्धा, बाज़ार में कम दर पर उपलब्ध बढ़िया क्वालिटी की दाल से प्रतिस्पर्धा, श्रम और अबाधित बिजली आपूर्ति की कमी आदि शामिल हैं. पैरा (6.15)

(xiv) चने की दाल की प्रोसेसिंग के उपरांत बिना छिलका साबुत दाल का अंतिम उत्पादन 82% एवं बिना छिलके की टूटी दाल, चूरा आदि का उत्पादन 18% था (पैरा 6.18)

(xv) चने की दाल की औसत परिचालन लागत अनुमानतः रु.2215/- प्रति मीट्रिक टन थी. इसके अलग-अलग विवरण के अनुसार कच्चे माल की लागत रु.20,500 (92.3%) सेल्स टैक्स रु.5820/- (37%), मण्डी टैक्स रु.205/- (0.9%), बिजली/ अन्य सुविधाओं की लागत 155 (0.77%) आदि है (पैरा 6.20)

(xvi) एक मी. टन चने की दाल से कुल बिक्री आय अनुमानतः रु.23675/- थी इसमें से बिना छिलके की चना दाल की बिक्री से रु.21320/- (90.1%) छिलके की बिक्री से रु.1375/- (5.8%) और टूटी दाल से रु.980/- (4.1%) है (पैरा 6.21)

(xvii) परिचालन लागत (रू.22215/-) को घटाने के बाद शुद्ध बिक्री आय अनुमानतः रू.1460/- प्रति मीट्रिक टन थी. एक मीट्रिक टन चना दाल की प्रोसेसिंग का मार्जिन अनुमानतः 6.57% था. पैरा (6.22)

(xviii) किसानों द्वारा अपने बिक्रेय अधिशेष (कुल का 70%) को उपभोक्ताओं तक पहुंचाने के लिए पंसदीदा चैनल उत्पादक - दालमिलर - रिटेलर - उपभोक्ता (चैनल नः 2) था. इसी चैनल को किसानों द्वारा तरजीह दी गई क्योंकि इससे किसान आपूर्ति श्रृंखला को कम करने और उपभोक्ता रूप में अपनी हिस्सेदारी बढ़ा सकते थे.

कार्रवाई बिंदु

- कृषि से संबंधित सामान्य तौर पर दाल की फसल में और विशेषतः चना दाल की सम्भावनाओं को सुधारने के लिए दालों के तहत कृषि क्षेत्र को बढ़ाने और दालों की फसल की उत्पादकता को बढ़ाने की आवश्यकता है. इसके लिए निम्नलिखित उपायों की आवश्यकता है:
- सिंचित कृषि क्षेत्रों में नई किस्मों के लिए कार्यक्रम आयोजित किए जा सकते हैं. सिंचाई वाले क्षेत्रों में उगाई जाने वाली दाल की किस्मों से दालों के तहत कृषि क्षेत्र को बढ़ाया जा सकता है.
- किसानों को उचित कीमत पर उत्तम क्वालिटी और सही मात्रा में बीज की आपूर्ति के लिए आवश्यक कदम उठाया जाना जरूरी हैं
- सरकारी एजेन्सियों द्वारा प्रमाणित बीजों की आपूर्ति से बीज प्रतिस्थापन दर को बढ़ाया जा सकता है.
- कृषि विश्वविद्यालयों के वैज्ञानिकों और कृषि विज्ञान केन्द्र की सहभागिता से विस्तार तंत्र को सुदृढ़ बनाए जाने की आवश्यकता है. विषय विशेषज्ञों के हेल्पलाइन फोन नः चर्चा के लिए किसानों को उपलब्ध कराए जाने चाहिए ताकि किफायती लागतों पर उनकी समस्याओं का निवारण किया जा सके.
- विश्वविद्यालयों कृषि विज्ञान केन्द्रों और अनुसंधान संस्थानों के सहयोग से प्रशिक्षण कार्यक्रमों की व्यवस्था की जानी चाहिए.
- नाबाई के ग्राम विकास कार्यक्रमों में किसानों को विशेषतः दाल की फसलों के संदर्भ में नवीनतम कृषि के तरीकों और किस्मों से संबंधित विकासात्मक कार्यक्रमों के बारे में जानकारी प्रदान की जानी चाहिए.
- प्रगतिशील किसानों के लिए नई तकनीक से की जा रही दालों की खेती वाले क्षेत्रों / राज्यों में एक्सपोजर विज़िट की व्यवस्था कर उनकी क्षमताएं बढ़ाने का प्रयास किया

जाना चाहिए. नाबार्ड के तकनीक के अंगीकरण के लिए क्षमता निर्माण संबंधी कार्यक्रम को भी इच्छुक किसानों के एक्सपोजर विज़िट के लिए उपयोग किया जा सकता है.

- बैंकों की ग्रामीण और अर्ध शहरी शाखाओं द्वारा शुरू किए गए किसान क्लब के माध्यम से भी किसानों को नवीनतम कृषि प्रथाओं, किस्मों संबंधी कार्यक्रम मूल्य से संबंधित जानकारी और बेहतर कीमत प्राप्त करने के लिए उत्पाद सहकारी विपणन संबंधी जानकारी दी जा सकती है.

प्रोसेसिंग / प्रसंस्करण

- वैट समान रूप से सभी राज्यों में लागू किया जा सकता है. दिल्ली में दाल मिलों पर वैट प्रभावित नहीं किया जाता है. यह सुविधा हरियाणा में सभी प्रसंस्करण इकाइयों को उपलब्ध कराई जानी चाहिए ताकि इस क्षेत्र के सभी प्रतिस्पर्धियों को समान स्तर पर लाया जा सके.
- किसी भी प्रसंस्करण इकाई को चलाने के लिए कच्चे माल की अबाधित आपूर्ति एक अनिवार्य शर्त है. अतः वर्ष भर कच्चे माल की आपूर्ति सुनिश्चित करने के लिए सभी पक्षों से प्रयास किए जाने चाहिए. इस अध्ययन क्षेत्र में चना दाल की खेती को प्रोत्साहित करने के लिए इस क्षेत्र की सभी बाधाओं को दूर करने की आवश्यकता है.
- दिल्ली की मण्डियों में 1% बाज़ार फीस प्रभारित नहीं की जाती है. अतः अध्ययन क्षेत्र के जिलों की स्थानीय मण्डियों में भी यह 1% बाज़ार फीस नहीं ली जानी चाहिए ताकि सभी प्रतिस्पर्धियों को समान स्तर पर लाया जा सके. अध्ययन क्षेत्र की प्रसंस्करण इकाइयों को दिल्ली से निकटता के कारण काफी प्रतिस्पर्धा का सामना करना पड़ता है और अपेक्षित परिणाम नहीं मिल पा रहे हैं.
- बैंकिंग क्षेत्र दाल मिलों की स्थापना, विस्तार और आधुनिकीकरण के लिए वित्तीय सहायता प्रदान कर सकते हैं. इस संदर्भ में बैंक अध्ययन क्षेत्र के दाल मिल मालिकों को प्रत्यक्ष तौर पर परामर्श देकर प्रोत्साहित कर सकते हैं.
- अबाधित विद्युत आपूर्ति, जल आपूर्ति, बेहतर सड़क सम्पर्क और दूर संचार जैसी बुनियादी सुविधाओं की उपलब्धता अध्ययन क्षेत्र की दाल मिलों को पुनर्जीवित करने में महत्वपूर्ण भूमिका निभा सकती है.

EXECUTIVE SUMMARY

The present study has attempted to make an in-depth analysis of the pulses sector in Haryana with special reference to chickpea covering its production, processing and marketing aspects based on the primary data collected from sample farmers, dal millers and other stakeholders in the study area of Bhiwani and Hisar Districts in Haryana. The policy intervention emanating from study findings have also been outlined in the report. The sample frame constituted 63 farmers [67 % Small and Marginal Farmers (SMF) and 33 % Other Farmers (OF)], 4 dealers/wholesalers, 8 Dal millers and 4 retailers from two study districts viz. Bhiwani and Hisar.

Major Findings

- (i) During last 50 years (since 1958-59), the area under pulses in the country has almost stagnated around 24 million hectares though the production has increased by 14.9 per cent from 13.15 million tonnes (1958-59) to 15.12 million tonnes (2007-08). (Para 3.3)
- (ii) In Haryana, the area under pulse cultivation had decreased from 1.16 million hectares (1970-71) to 0.16 million hectares (2006-07) witnessing an alarming decrease during last 36 years. Similarly, its production had decreased from 0.8 million tonnes (1970-71) to 0.1 million tonnes (2007-08) indicating a dismal scenario of pulse cultivation in the state. (Para 3.5)
- (iii) Important pulse crops grown in Haryana were chickpea or gram, green gram (moong), lentil (massar) and moth. Among various types of pulses, the share of Chickpea in terms of area (63.6 %) and production (66.2) was highest. (Para 3.5)
- (iv) At all India level, area under Chickpeas had increased from 7.57 million hectares in 1950-51 to 10.33 million hectares in 1959-60 showing an increase of 36.5 % during the period. However, since then, the area under its cultivation decreased to 7.58 million hectares by the year 2007-08. Chickpeas production had increased from 3.65 million tonnes (1950-51) to 6.91 million tonnes (2007-08) witnessing a growth of 89.3 per cent during the period. (Para 4.3)
- (v) In Haryana, however, the area under Chickpeas cultivation had decreased from 1.06 million hectares in 1970-71 to 0.11 million hectares in 2007-08 showing an

- alarming decrease during last 36 years. Similarly, the production also decreased from 0.5 million tonnes (1970-71) to 0.05 million tonnes (2007-08) during the period. Thus the declining trend of Chickpeas cultivation in Haryana was fully exemplified. (Para 4.5)
- (vi) The area under rice, wheat, oilseed and cotton in Haryana were increasing over the years since 1966-67. Among these four major crops, rice area had increased by 4.59 times, wheat by 2.31 times, oilseeds by 1.90 times and cotton by 1.88 times since 1966-67. As against this, the area under pulses in general (in 2007-08) was only 14.6 % of area cultivated in 1966-67 and the area under chickpea (in 2007-08) was only 10 % of area cultivated in 1966-67.
 - (vii) The farmers were switching over from pulses in general and gram in particular to economically more remunerative crops like wheat, paddy and oilseed in the state (Para 4.7)
 - (viii) Among the sample farmer categories, the proportion of area devoted for Chickpeas was observed to be more on ‘small and marginal farm’ (23.6 %) compared to ‘other farms’ (18.2%) in Bhiwani district whereas in Hisar district the proportion of area put under Chickpeas was observed to be more on ‘other farms’ (18.3%) compared to ‘small and marginal farm’ (17.7%). (Para 5.19)
 - (ix) The A1 cost (of chickpea cultivation) per acre was estimated to be Rs. 3305 for ‘small and marginal farm’, Rs. 3419 for ‘other farms’ and Rs. 3343 for all the sample farmers taken together. The higher cost observed for ‘other farms’ could be attributed to more intensive use of inputs like fertilizer and pesticides. (Para 5.26)
 - (x) Human labour constituted the largest component of the cost of cultivation for the sample farms. It was 25.7%, 17.8% and 23% for ‘small and marginal farm’, ‘other farms’ and all farmers categories respectively. Human labour cost (23%) was followed by the cost of seeds (21.8%). (Para 5.27)
 - (xi) The average return over cost A1 was worked out to Rs. 5419 for SMF, Rs. 4619 for OF and Rs. 5152 for all sample farmers taken together. This showed that the return per acre of farm was higher in ‘small and marginal farm’ than in ‘other farms’. It could be attributed to more intensive use of per unit land. The returns

- over A2 cost was worked out to Rs. 3326 for SMF, Rs. 2536 for OF and Rs. 3069 for all sample farmers. Similarly, the returns over A2 plus family labour were at found to be Rs. 1526 for SMF, Rs. 1496 for OF and Rs. 1282 for all sample farmers. (Para 5.29)
- (xii) The traders and millers were a demoralized lot as their business had slowed down over the years. The reasons highlighted were decline in area under cultivation of Chickpeas during last 20-25 years owing to switching over to other more remunerative crop like wheat and oil seed, improved availability of irrigation facility making other crops economically more profitable, unsuitability of tube well water for chickpea cultivation and non availability of canal water (which was suitable for its cultivation) in the study area. (Para 6.14)
- (xiii) A host of factors affecting the demand and supply side of Dal mills made the processing units' price uncompetitive in comparison to their competitors in Delhi which was also very close to the study area. As a result, slowly and slowly all such mills in Hisar and Bhiwani districts were getting closed. Some of the factors which adversely affected the processing units included non availability of raw material in adequate quantity throughout the year, applicability of VAT (4%), Mandi fee (1%), stiff competition from Dal millers situated in Delhi, competition from better quality of Dal (M.P.) variety available at cheaper rates in the market, shortage of labour and uninterrupted supply of electricity, etc. (Para 6.15)
- (xiv) The processing of chickpea resulted in production of final products (82 per cent) i.e. dehusked whole pulses and by products (18%) viz. dehusked and split pulses, fine dust powder, brokens, husk, unhusked pulses. (Para 6.18)
- (xv) The average cost of operation of gram dal was estimated at Rs. 22215 per MT. Its break up indicated that the raw material cost was Rs.20,500 (92.3 per cent), followed by the sales tax of Rs. 820 (3.7 per cent), mandi tax of Rs. 205 (0.9 per cent), cost of electricity/other utilities at Rs. 155 (0.7 per cent), etc. (Para 6.20)
- (xvi) The total sale proceeds from one MT of gram dal was estimated to be Rs. 23675 of which Rs. 21320 (90.1 per cent) was contribution from sale of dehusked gram dal, Rs. 1375 (5.8 per cent) from sale of husk and Rs. 980 (4.1 per cent) from sale of brokens, etc. (Para 6.21)

- (xvii) The net proceeds realized after deduction of the operational cost (Rs. 22215) was estimated at Rs. 1460 per MT. The margin for processing of one MT of gram dal was estimated at 6.57 per cent. (Para 6.22)
- (xviii) Producer → Dal Miller → Retailer → Consumer (Channel no. 2), was the most preferred channel by farmers for routing their marketable surplus (70 % of total share) to the consumers. This was the most preferred channel mainly because farmers were able to shorten the supply chain and increase their share in the consumer's rupee. (Para 6.25)

Action Points

Cultivation Aspects

Major thrust for improving the prospects of pulse crops in general and chickpea in particular must involve a strategy to increase the area under cultivation and also increase the productivity of the crop in the area. This requires following interventions:

- New varietal programme may be undertaken for irrigated area. Seed variety, which can be grown in irrigated field conditions, could help increase the area under pulse.
- Seed intervention need to be undertaken in a vigorous way so as to supply right quality and quantity of seeds at an affordable cost to the farmers.
- Enhancement of seed replacement rate could be major thrust through supply of certified seeds by Government agencies.
- The extension mechanism need to be strengthened by involvement of scientists from Agricultural Universities and KVKs. Helpline phone numbers with subject experts should be made available to the farmers for discussion and redressal of their problems at affordable cost.
- The training programmes may also be arranged in collaboration with agencies like Universities, KVKs and Research Institutes.
- The opportunity provided by the launching of Village Development Programmes of NABARD could be roped in to increase awareness of farmers about latest agronomic practices and varietal development programmes with specific reference to pulse crops.

- Arrangement could be made for capacity building of progressive farmer through their exposure visits to such areas/states where innovative technology have been adopted for cultivation of pulses. NABARD's programme of Capacity Building for Adoption of Technology (CAT) can also be utilized for exposure visits of interested farmers.
- The outreach of Farmers Club launched by Rural and Semi Urban branches of banks could be leveraged for propagation of latest agronomic practices, varietal programmes, market information relating to price and cooperative marketing of final produce to have better price discovery.

Processing

- VAT may be equitably implemented in all States. In Delhi, VAT is not charged to Dal Mills. The same facility may be made available to processing units in Haryana also so that level playing field is assured to all the players operating in this segment.
- The uninterrupted supply of raw material is a prerequisite for running any processing unit. Hence, efforts may be made from all sides for ensuring supply of raw material throughout the year. This calls for incentivising the cultivation of chickpea in the study area and removing the bottlenecks in this sector.
- Market fee of 1 per cent levied in the local mandis in the study districts also need to be removed for providing level playing field to them as the same is not charged in Delhi mandis. Nearness to Delhi is not helping the cause of processing units in the study area.
- Providing financial assistance for the establishment, expansion and modernization of Dal mills also involves opportunity for the banking sector. This could be encouraged by bankers through direct counseling of Dal Mill owners in the study area.
- Availability of infrastructure facilities like un-interrupted electricity and water supply, better road connectivity and telecommunication would go a long way in enhancing the viability of moribund Dal mills in the area.

CHAPTER 1

Introduction

From the nutritional point of view, 'Pulses' are a very important category of food grains in India. Pulses contain 20-25 per cent protein by weight, which is double the protein content of wheat and 3 times that of rice. For this reason, pulses are sometimes called "poor man's meat". While pulses are generally high in digestible protein, they often are relatively poor in the essential amino acid methionine. Grains are commonly consumed along with pulses to form a complete protein diet.

1.2 It is an annual leguminous crop yielding from one to twelve grains or seeds of variable size, shape, and color within a pod. Pulses are used for food and animal feed. The term "pulse", as used by the Food and Agricultural Organization (FAO), is reserved for crops harvested solely for the dry grain. This excludes green beans and green peas, which are considered vegetable crops. Also excluded are crops that are mainly grown for oil extraction (oilseeds like soybeans and peanuts), and crops which are used exclusively for sowing (clovers, alfalfa). Like many leguminous crops, pulses play a key role in crop rotation due to their ability to fix nitrogen. Cultivation of pulses improves soil fertility, requires less water than cereals and their rotation with cereals controls various kinds of plant diseases and pests. They are complementary in nature both for production and consumption purposes as it is produced as well as consumed in combination with other cereals.

1.3 Pulses have significant health advantages for consumers also. They are the most important dietary predictor of survival in older people of different ethnicities, and as per a study, legume consumption was highly correlated with a reduced mortality from coronary heart disease.

Pulse Production in India

1.4 India is the world's largest producer and the largest consumer of pulses. Canada, Myanmar, Australia and the United States are significant exporters, and are India's most

significant suppliers, in that order. The major pulse crops of the country are red gram or pigeon pea (tur, arhar), chickpea or gram, blackgram (urd bean), green gram (mungbean) and lentil (masur), Minor pulses include rajmah and other beans, cowpea, horsegram, mothbean, khesari-dal, guar etc.

1.5 Despite their importance, the per capita availability of pulses has declined from 69 grams per day in 1960-61 to 36 grams per day in 2006-07 against the World Health Organization's recommendation of 80 grams per capita per day in India. At all India level, in the year 2006-07, total food grain production was 216.1 million tonnes [advance estimate, Economic Survey, 2007-08, GOI, New Delhi], out of which pulses production was 14.2 million tonnes indicating its poor share (6.57 %) in total food grain production. The dismal scenario of pulse production in the country is attributed to the technological stagnation and supply side constraints.

1.6 In the country, three major pulse producing states are Madhya Pradesh (3.20 million tonnes), Maharashtra (2.30 million tonnes) and Uttar Pradesh (1.98 million tonnes), accounting for slightly more than 50% of total pulse production in the country. The final data available for the year 2006-07, indicated that the share of above three States in all India production was 22.5 per cent, 16.2 per cent, and 13.9 per cent respectively. Among the pulse producing states, Haryana is at the lowest level with a total production of 0.14 million tones contributing only 1 per cent of the all India production. Area wise major pulse producing states are Madhya Pradesh, Maharashtra, Uttar Pradesh and Rajasthan, each one accounting for more than 10 per cent share of total area under cultivation in the country. Haryana is having less than 1 per cent share in total area under cultivation. However, the per hectare productivity in the State at 824 kg / ha is the highest in the country.

Need For the Study in Haryana

1.7 The comparative area under cultivation and production of pulses in India and Haryana is presented in *Table 1.1*. During 1970-71 to 2006-07, the area under pulses increased by 2.21 per cent in India whereas the same declined by 85.4 per cent during this period in

Haryana. It indicated that area under pulse declined sharply in Haryana State as against marginal increase at all India level. As far as production of pulses was concerned, it increased by 20.5 per cent in India. However, in Haryana, the same declined by 83.6 per cent between 1970-71 and 2006-07. In this backdrop, it was decided to undertake a commodity study on pulses in Haryana with the objectives as outlined in Chapter 2.

**Table 1.1: Area and Production of Pulse in India and Haryana
(1970-71 to 2007-08)**

Year	Area (in 000 hectares)		Production (in 000 tonnes)	
	India	Haryana	India	Haryana
1970-71	22600	1159	11800	832
1980-81	22500	798	10600	502
1990-91	24700	742	14300	541
2000-01	20300	157	11000	100
2003-04	23500	198	14900	143
2004-05	22800	176	13100	135
2005-06	22400	195	13400	112
2006-07	23100	169	14200	136
2007-08	NA	168	NA	102

Source: Statistical Abstract of Haryana 2009 and Economic Survey, GoI, 2007-08

Outline of the Report

1.8 The study report has been organized into seven chapters. Chapter one is the introductory one outlining the need and scope of the present study, followed by the objectives and methodology in Chapter two. Chapters three and four deal with trends in area, production, and productivity of Pulses and Chickpeas, respectively. Chapter five dwells upon the aspects of pulses cultivation and economics relating to the same, whereas chapter six deals with processing and marketing aspects. Chapter seven summarizes the entire study indicating the action point for various stake holders in the supply chain of pulses.

Scope and Limitations of the Study

1.9 The findings of the study are based on a sample of pulse cultivating farmers, Dal millers, traders, etc. in two study districts viz. Bhiwani and Hisar. Besides, it is based on discussions with academicians from Agricultural University, Scientists from KVKs,

district level officials of Agriculture Department, Bankers and consumers of pulses in general and Chickpea in particular. The production, processing and marketing of pulses differ from region to region and from district to district within the regions. Therefore, the findings of the study may be interpreted suitably and should not be generalized over space and time.

CHAPTER 2

OBJECTIVES AND METHODOLOGY

Objectives

The commodity study on pulses in Haryana was undertaken with the following objectives:

- i. To analyse the time series data in area, production, yield of pulses, prices and relative income, etc. to identify the determinants of pulse supply.
- ii. To study the cultivation and post harvest management aspects including need for value addition through processing and bottlenecks faced.
- iii. To study the marketing channels their efficiency and price spread, etc.
- iv. To examine the issues related to availability of seeds, their supply and provision of incentives, if any.
- v. To suggest policies for development of this sector.

Methodology

Selection of Districts

2.2 In Haryana, important pulse crops are chickpea or gram, greengram (mungbean) lentil (masur), and moth. District-wise Area & Production of Pulses in Haryana for 2005-06 and 2006-07 are given in table 2.1. The major pulse growing districts in terms of area in the State are Bhiwani, Hisar, Rohtak and Sirsa in that order. For last two years i.e. 2005-06 and 2006-07, for which data was available before the launch of the study, the highest production was also recorded in Bhiwani, Hisar, Rohtak and Sirsa in decreasing order (*Table 2.1*). Hence, two districts i.e Bhiwani and Hisar with the highest area (under cultivation) as well as production were selected for the present study. Notwithstanding the fact that, three major pulses viz., Gram, Moong and Masar were grown in the study area, chickpea or gram, was the most dominant type of pulse cultivated in the two identified districts i.e. Bhiwani and Hisar in Haryana. Area wise, the share of gram out of total pulses in Bhiwani and Hisar District was 91.6 % and 55.8 % respectively. Similarly, production wise, share of these two districts in state's total production was 91.6 % and 71 % respectively. Hence, chickpea or gram was selected for an in-depth field study.

Selection of Blocks

2.3 In each selected district, a list of developmental blocks as per yield level of pulses was prepared in consultation with Agriculture Department and subsequently two blocks, one with high yield (irrigated) and one with low yield (un-irrigated) was selected for in-depth study. In Bhiwani district, two blocks viz. Bhawanikheda (irrigated) and Siivani (un-irrigated) were selected. Similarly, in Hisar district, Adampur Block (irrigated) and Hisar II (unirrigated) were selected for the study.

**Table- 2.1: District-wise Area & Production of Pulses in Haryana
(2005-06 & 2006-07)**

S. No.	District	2005-06		2006-07		Important pulses grown
		Area (000 ha)	Production (000 tonnes)	Area (000 ha)	Production (000 tonnes)	
1	Ambala	2.3	1.1	2.2	1.1	Massar, Mash
2	Bhiwani	88.3	45.9	76.2	58.8	Gram, Moong
3	Faridabad	6.8	3.6	4.4	2.4	Moong
4	Fatehabad	1.9	1.6	2.2	1.7	Gram, Moong
5	Gurgaon	0.7	0.4	0.5	0.3	Moong
6	Hisar	31.9	16.6	26.7	16.9	Gram, Moong
7	Jhajjar	7.2	7.4	7.7	8	Gram
8	Jind	1.7	1.9	1.6	2	Gram, moong
9	Kaithal	0.9	0.2	0.5	0.3	Gram, Massar,
10	Karnal	1.1	0.7	1.5	1.1	Massar, Gram,
11	Kurukshetra	1.2	0.9	1.4	1	Massar, Mash
12	Mahendragarh	8.5	4.3	7.9	9.1	Gram, Moong
13	Mewat	5.7	2.5	1.8	2.5	Gram, Masar
14	Panchkula	1.9	1.7	1.3	0.4	Gram, Massar,
15	Panipat	0.4	0.4	0.7	0.6	Gram, other pulses
16	Rewari	0.4	0.2	0.3	0.2	Gram
17	Rohtak	12.5	6.6	11.8	12.9	Gram, Moong
18	Sirsa	12.4	6	12.5	9.2	Gram, Moong
19	Sonipat	7.7	8.5	5.5	6	Moong, Gram
20	Yamunanagar	2.2	1.3	2.6	1.5	Massar, Mash
	Haryana	195.3	111.8	169.3	136.0	Gram, Moong, Masar

Source: Statistical Abstract of Haryana 2009

Selection of Villages and Beneficiaries

2.4 From each selected block, depending upon level of irrigation, two villages were chosen. From each village, 15-16 farmers were drawn up giving due weightage to different categories of farmers based on land holding size and level of irrigation. Thus, samples of 63 farmers were studied in detail to collect information on cost of cultivation of pulses and other agronomic aspects. For the purpose of classification of farmers into ‘Small & Marginal Farmers’ (SMF) and ‘Other Farmers’ (OF), the details of acreage ceiling in different agro climatic regions across the country, as circulated vide NABARD Circular No. Ref.NB.EAPD.1950/SF-03-84/84/85 dated 03 July 1984, and as reiterated in Circular Ref. No. NB.DPD(FS)/112/LPS/2005-06 dated 21 September 2005 have been followed. As per the circulars under reference, a farmer would be considered ‘Small & Marginal Farmer’, if his operational holding is upto 15.0 acres of rainfed land in Hisar district or up to 17.5 acres of rainfed land in Bhiwani district. In case of irrigated land farmers with holding size of 8.5 acres are considered small farmers in the both the districts. The sampling design of the study is given in Table 2.2.

Table 2.2: Distribution of Sample Farmers

District	SMF	OF	Total Farmers
Bhiwani	20	10	30
Hisar	22	11	33
Total	42	21	63

Selection of Retailers/Wholesalers

2.5 Besides farmers, 4 dealers/wholesalers, 8 Dal millers and 4 retailers dealing in pulses were also interviewed in each district to assess the marketing channels, their efficiency, and price spread.

Discussions with Department of Agriculture

2.6 Discussion with officials of Department of Agriculture with respect to their role in supply of seeds, fertilizers and pesticides and technical advice for pulse production were held at the district level and plans/programmes/schemes of Haryana Government were also studied at length. Besides, discussions with Agricultural Universities/ Krishi Vigyan

Kendras were also held to ascertain status of varieties supplied and likely to be released in near future.

Data Collection

Primary Data

2.7 A structured survey schedule was used to collect detailed data on technical and economic parameters from the sample farmers. Specifically these, inter alia, included socio economic background details of the sample beneficiaries, item-wise cost of cultivation, procurements of inputs and marketing of output, labour employment, backward and forward linkages, availability of loans, scale of finance, repayment of bank loan, etc.

Secondary Data

2.8 Secondary time series data on area, production, yield, harvest prices, wholesale prices, relative prices, import, export of pulse and other reading/background material were collected from Statistical Abstract of the State and websites of CACP, RBI, Ministry of Food Processing Industries, APEDA, FAO, IMF, CMIE, Directorate of Foreign Trade etc.

Analysis of Data

2.9 Secondary and primary data was suitably analysed to identify the determinants of area under pulses, economics of pulse cultivation and processing, price spread at various levels in the supply chain. Tabular analysis was also carried out to supplement the findings of the study.

Reference Year

2.10 The inputs were valued at the market prices prevailing in the area and the output was valued on the basis of farm gate harvest prices. The reference year of the study was agricultural year 2007-08. The cost of cultivation and profitability of chickpea or gram cultivation was calculated on per acre basis.

Conclusions and Policy Recommendations

2.11 Based on inferences derived from the study, suitable policy recommendations have been prescribed for improving the dismal scenario of pulses production in India in general and Haryana in particular.

Study Team and Composition

2.12 The study team consisting of two Officers (one Agricultural Economist and another Officer with agronomy discipline) from NABARD conducted the study.

CHAPTER 3

TRENDS IN AREA, PRODUCTION AND PRODUCTIVITY OF PULSES

In this chapter, an attempt has been made to analyse the trends in area, production, yield of pulses in Haryana. The production scenario at all India level has also been highlighted.

Area, Production and Productivity of pulses in India

3.2 India is one of the largest producers of pulses in the world. The data relating to area, production and yield for the country as a whole is given in Table 3.1. The area under pulse cultivation has increased from 19.09 million hectares in 1950-51 to 23.86 million hectares in 2007-08 witnessing a growth of 25 per cent during last 57 years. Similarly, during this period, pulse production has increased from 8.41 million (1950-51) to 15.12 million tonnes in 2007-08 witnessing a growth of 79.7 per cent. As far as yield was concerned, it has increased from 441 kg per hectare in 1950-51 to 638 kg per hectare in 2007-08 registering a growth of 44.6 per cent.

3.3 However, during last 50 years (since 1958-59), the area under pulses in the country has almost stagnated around 24 million hectares though the production has increased by 14.9 per cent from 13.15 m tones (1958-59) to 15.12 million tonnes in 2007-08. (Table 3.1)

Table 3.1: Trends in Area, Production and Yield of Total Pulses: All India
(1950-51 to 2007-08)

Year	Area Million Hectares	Production Million Tonnes	Yield Kg./Hectare	% Coverage Under Irrigation
1950-51	19.09	8.41	441	9.4
1951-52	18.78	8.42	448	9.7
1952-53	19.84	9.19	463	9.8
1953-54	21.73	10.62	489	9.2
1954-55	21.91	10.95	500	8.8
1955-56	23.22	11.04	476	8.4
1956-57	23.32	11.55	495	7.3
1957-58	22.54	9.56	424	9.1
1958-59	24.31	13.15	541	8.4
1959-60	24.83	11.80	475	8.5
1960-61	23.56	12.70	539	8.0

1961-62	24.24	11.76	485	8.1
1962-63	24.27	11.53	475	8.9
1963-64	24.18	10.07	416	8.9
1964-65	23.88	12.42	520	9.2
1965-66	22.72	9.94	438	9.4
1966-67	22.12	8.35	377	10.9
1967-68	22.65	12.10	534	8.7
1968-69	21.26	10.42	490	9.8
1969-70	22.02	11.69	531	9.4
1970-71	22.54	11.82	524	8.8
1971-72	22.15	11.09	501	8.8
1972-73	20.92	9.91	474	8.1
1973-74	23.43	10.01	427	7.9
1974-75	22.03	10.02	455	8.1
1975-76	24.45	13.04	533	7.9
1976-77	22.98	11.36	494	7.5
1977-78	23.50	11.97	510	7.1
1978-79	23.66	12.18	515	7.9
1979-80	22.26	8.57	385	8.8
1980-81	22.46	10.63	473	9.0
1981-82	23.84	11.51	483	8.5
1982-83	22.83	11.86	519	8.2
1983-84	23.54	12.89	548	7.5
1984-85	22.74	11.96	526	7.9
1985-86	24.42	13.36	547	8.5
1986-87	23.16	11.71	506	9.6
1987-88	21.27	10.96	515	9.4
1988-89	23.15	13.85	598	9.3
1989-90	23.41	12.86	549	10.0
1990-91	24.66	14.26	578	10.5
1991-92	22.54	12.02	533	10.7
1992-93	22.36	12.82	573	10.4
1993-94	22.25	13.30	598	11.3
1994-95	23.03	14.04	610	12.7
1995-96	22.28	12.31	552	12.9
1996-97	22.45	14.24	635	12.7
1997-98	22.87	12.98	567	11.3
1998-99	23.50	14.91	634	12.1
1999-00	21.12	13.42	635	16.1
2000-01	20.35	11.08	544	12.5
2001-02	22.01	13.37	607	13.3
2002-03	20.50	11.13	543	14.4
2003-04	23.46	14.91	635	13.6
2004-05	22.76	13.13	577	13.9
2005-06	22.39	13.39	598	15.0
2006-07	23.19	14.20	612	NA
2007-08	23.86	15.12	638	NA

Source. Directorate of Economics and Statistics, Department of Agriculture & Cooperation, Ministry of Agriculture, GOI.

State-wise Scenario

3.4 The major pulse growing states are Madhya Pradesh, Maharashtra, Uttar Pradesh, Rajasthan and Andhra Pradesh. Area-wise, M.P occupies almost 18 per cent of total area under pulse cultivation, followed by Maharashtra (16.5%), Rajasthan (13.8%), Uttar Pradesh (11.7%) and A.P. (8.5%). The share of Haryana in terms of area and production is lowest in the country. However, the yield is higher than all other major pulse producing states (Table 3.2)

Table 3.2: Area, Production and Yield of Pulses in Major Pulse Growing States in 2006-07

State	Area		Production			Yield Kg./ Hectare
	Million Hectares	% to All - India	Million Tonnes	% to All - India	Cumulative %	
Madhya Pradesh	4.11	17.72	3.20	22.54	22.54	780
Maharashtra	3.83	16.52	2.30	16.20	38.73	602
Uttar Pradesh	2.72	11.73	1.98	13.94	52.68	725
Rajasthan	3.21	13.84	1.48	10.42	63.10	462
Andhra Pradesh	1.98	8.54	1.35	9.51	72.61	679
Karnataka	2.37	10.22	0.89	6.27	78.87	377
Gujarat	1.00	4.31	0.59	4.15	83.03	593
Chhattisgarh	0.91	3.92	0.49	3.45	86.48	543
Bihar	0.61	2.63	0.44	3.10	89.58	722
Orissa	0.79	3.41	0.35	2.46	92.04	445
Tamil Nadu	0.54	2.33	0.29	2.04	94.08	541
Jharkhand	0.38	1.64	0.26	1.83	95.92	686
West Bengal	0.22	0.95	0.15	1.06	96.97	703
Haryana	0.17	0.73	0.14	0.99	97.96	824
Others	0.35	1.51	0.29	2.04	100.00	-
All India	23.19	100.00	14.20	100.00	100.0	612

Source: Directorate of Economics and Statistics, Department of Agriculture & Cooperation, Ministry of Agriculture, GOI.

Pulse Production in Haryana

3.5 The trend of area and production of pulses in the State of Haryana from 1970-71 to 2007-08 is given in Table 3.3. The area (under pulse cultivation) has decreased from 1.1 million hectares in 1970-71 to 0.16 million hectares in 2006-07 witnessing an alarming decrease during last 36 years. Similarly, during this period, pulse production has decreased from 0.8 million tones (1970-71) to 0.1 million tonnes in 2007-08. This is

indicator of dismal scenario of pulse production in Haryana. Over the years, with the increase in irrigation facilities combined with advancement of technology and breakthrough research in other crops, farmers have switched over to other profitable crops like wheat, rice and oil seed as detailed in Chapter 4.

**Table 3.3: Area and Production of Pulse in Haryana
(1970-71 to 2007-08)**

Year	Area (in 000 hectares)	Production (in 000 tonnes)
1970-71	1159	832
1980-81	798	502
1990-91	742	541
2000-01	157	100
2003-04	198	143
2004-05	176	135
2005-06	195	112
2006-07	169	136
2007-08	168	102

Source: Statistical Abstract of Haryana 2009 and Economic Survey, GoI, 2007-08

Area and Production of various Types of Pulses in Haryana

3.6 In Haryana, important pulse crops were chickpea or gram, greengram (moong), lentil (massar or masur), and moth. The data relating to area, production and yield in respect of various types of pulses in Haryana state are given in Table 3.4. Among various types of pulses, the share of gram in terms of area (63.6 %) and production (66.2 %) was the highest.

**Table 3.4: Area, Production and Yield of Different Types of Pulses in Haryana in
2006-07**

Type of Pulses	Area		Production		Yield (Kg./ Hectare)
	(in 000 hectares)	% share to total	(in 000 tonnes)	% share to total	
Gram	107.7	63.6	90.0	66.2	843
Mash	3.2	1.9	1.3	1.0	383
Moong	21.4	12.6	9.3	6.8	435
Massar	4.5	2.7	3.5	2.6	788
Other pulses	32.5	19.2	31.9	23.5	NA
Total Pulses	169.3	100.0	136.0	100	NA

Area & Production of Pulses in Haryana: District-wise

3.7 Based on district wise data available, Bhiwani and Hisar District with highest area under cultivation and pulse production in the state of Haryana were selected as sample districts for an in-depth study.

Area & Production of Gram in Sample Districts

3.8 In the sample districts of Bhiwani and Hisar, there was a predominance of gram among all pulse crops. In Bhiwani district, the share of area and production of chickpea i.e. gram to total pulses was found to be 91.6 % and 95.2 % respectively. Similarly, in Hisar district, the share of area and production of chickpea i.e. gram to total pulses was found to be 55.8 % and 71.0 % respectively.

Table 3.5: Area, Production and Yield of Different Types of Pulses in sample districts in 2006-07

Type of Pulse	Bhiwani			Hisar		
	Area (in 000 hectares)	Production (in 000 tonnes)	Yield Kg./Ha	Area (in 000 hectares)	Production (in 000 tonnes)	Yield Kg./Ha
Gram	69.0	56.0	794	14.9	12.0	832
Mash	-	-	-	0.2	0.1	548
Moong	6.3	2.8	443	10.7	4.5	423
Massar	-	-	-			
Other pulses	0.9	-	-	0.9	0.3	-
Total Pulses	76.2	58.8	-	26.7	16.9	-

CHAPTER 4

TRENDS IN AREA, PRODUCTION AND PRODUCTIVITY OF CHICKPEAS

In this chapter, an attempt has been made to analyse the trends in area, production and yield of Chickpeas in Haryana. The production scenario at global and all India level has also been highlighted.

Global Scenario

4.2 India was the largest producer of Chickpeas in the world having a share of 64.1 per cent of global production as per the latest available data. Other major pulse producing countries of the world are Pakistan, Turkey, Australia, Iran, Myanmar etc. in decreasing order (Table 4.1.) The total world production during 2008 was estimated to be 9.3 million tonnes where India was at the top rank (5.9 m. tonnes), poorly followed by Pakistan, (0.8 m. tonnes), Turkey (0.5 m. tonnes), Australia (0.3 m. tonnes), Iran (0.3 m. tonnes), Myanmar and Canada (0.2 m. tonnes), etc. It could be seen that except India all other countries are having less than 10 per cent share of global production.

Table 4.1: Top Ten Chickpeas Producer countries of World (June 2008)

Sr. No.	Country	Production (tonnes)	Per cent share to World Production
1	India	5,970,000	64.1
2	Pakistan	842,000	9.0
3	Turkey	523,553	5.6
4	Australia	313,000	3.4
5	Iran	310,000	3.3
6	Myanmar	225,000	2.4
7	Canada	215,000	2.3
8	Ethiopia	190,000	2.0
9	Mexico	165,000	1.8
10	Iraq	85,000	0.9
11	World	9313043	100.0

Source: Food And Agricultural Organization of United Nations: Economic And Social Department: The Statistical Division

Area, Production and Productivity of Chickpeas in India

4.3 India is one of the largest producers of Chickpeas in the world. The data relating to area, production and yield for the country as a whole is given in Table 4.2. The area under Chickpeas had increased from 7.57 million hectares in 1950-51 to 10.33 million hectares in 1959-60 showing an increase of 36.5 % in a period of 9 years. However, since then, the area under its cultivation decreased to 7.58 million hectares by the year 2007-08 witnessing a poor growth of 1.3 per cent during last 57 years. During this period, Chickpeas production had increased from 3.65 million tonnes (1950-51) to 6.91 million tonnes (2007-08) witnessing a growth of 89.3 per cent. As far as yield was concerned, it had increased from 482 kg per hectare in 1950-51 to 780 kg per hectare in 2007-08 registering a growth of 61.8 per cent. Therefore, growth in production was solely due to increase in productivity and not because of any area expansion. This productivity gain could, inter alia, be attributed to increased area under irrigation from 12.5 % in 1950-51 to 31.1% in 2005-06.

Table 4.2: Trends in Area, Production and Yield of Chickpeas: All India (1950-51 to 2007-08)

Year	Area Million ha	Production Million tonne	Yield Kg/ha	% Coverage Under Irrigation
1950-51	7.57	3.65	482	12.5
1951-52	6.83	3.39	496	15.1
1952-53	7.26	4.21	580	14.6
1953-54	7.97	4.83	606	14.0
1954-55	9.25	5.62	608	12.8
1955-56	9.78	5.42	554	12.1
1956-57	9.67	6.23	644	10.8
1957-58	9.09	4.89	538	12.5
1958-59	10.08	7.02	697	12.0
1959-60	10.33	5.62	544	12.4
1960-61	9.28	6.25	674	11.9
1961-62	9.57	5.79	605	12.2
1962-63	9.19	5.36	583	13.7
1963-64	9.35	4.50	481	13.7
1964-65	8.87	5.78	651	15.8
1965-66	8.02	4.22	527	16.4
1966-67	8.00	3.62	453	18.8
1967-68	8.26	5.97	723	15.6
1968-69	7.11	4.31	607	18.8

Year	Area Million ha	Production Million tonne	Yield Kg/ha	% Coverage Under Irrigation
1969-70	7.75	5.55	715	17.3
1970-71	7.84	5.20	663	15.6
1971-72	7.91	5.08	642	15.0
1972-73	6.97	4.54	651	15.6
1973-74	7.76	4.10	528	15.8
1974-75	7.04	4.02	570	17.8
1975-76	8.32	5.88	707	16.5
1976-77	7.97	5.42	680	15.2
1977-78	7.97	5.41	678	14.7
1978-79	7.71	5.74	745	15.6
1979-80	6.99	3.36	481	18.6
1980-81	6.58	4.33	657	20.6
1981-82	7.87	4.64	590	17.9
1982-83	7.40	5.29	715	15.6
1983-84	7.16	4.75	663	14.5
1984-85	6.91	4.56	661	14.8
1985-86	7.80	5.79	742	15.6
1986-87	6.98	4.53	649	19.4
1987-88	5.77	3.63	629	19.2
1988-89	6.81	5.13	753	18.3
1989-90	6.47	4.22	652	21.0
1990-91	7.52	5.36	712	20.5
1991-92	5.58	4.12	739	24.2
1992-93	6.45	4.42	684	22.0
1993-94	6.36	4.98	783	24.0
1994-95	7.54	6.44	853	25.3
1995-96	7.12	4.98	700	26.0
1996-97	6.85	5.57	813	25.1
1997-98	7.56	6.13	811	21.8
1998-99	8.47	6.80	803	21.0
1999-00	6.15	5.12	833	29.1
2000-01	5.19	3.86	744	30.9
2001-02	6.42	5.47	853	30.4
2002-03	5.91	4.24	717	32.1
2003-04	7.05	5.72	811	31.0
2004-05	6.71	5.47	815	31.4
2005-06	6.93	5.60	808	31.1
2006-07	7.49	6.33	845	NA
2007-08	7.58	6.91	780	NA

Source: Directorate of Economics and Statistics, Department of Agriculture & Cooperation, Ministry of Agriculture, GOI.

State-wise Scenario

4.4 The major Chickpeas growing states were Madhya Pradesh, Maharashtra, Rajasthan, Uttar Pradesh, Andhra Pradesh and Karnataka. Area-wise, M.P occupied the highest area under chickpea (32.8 %), followed by Maharashtra (17.5%), Rajasthan (13.5%), Uttar Pradesh (9.0%) and A.P. (8.1%). The share of Haryana to all India in terms of area (1.47 %) and production (1.42) was very low and marginally higher than eastern states of Bihar, West Bengal and Orissa. However, the yield was almost at par with all other major Chickpeas producing States except Andhra Pradesh where it was highest at 1085 kg/ha (Table 4.3).

Table 4.3: Area, Production and Yield of Chickpeas: Major States: 2006-07

State	Area		Production		Yield
	Million Hectares	% to All - India	Million Tonnes	% to All - India	Kg./ Hectare
M.P.	2.46	32.84	2.41	22.54	980
Maharashtra	1.31	17.49	0.92	16.20	706
Rajasthan	1.01	13.48	0.87	13.94	863
U.P.	0.68	9.08	0.50	9.51	742
Karnataka	0.65	8.68	0.31	6.27	473
A.P.	0.60	8.01	0.65	10.42	1085
Haryana	0.11	1.47	0.09	1.42	843
All India	7.49	100.00	6.33	100.00	845

Area and Production of Chickpeas in Haryana

4.5 The trend of area and production of Chickpeas in the State of Haryana from 1970-71 to 2007-08 is given in Table 4.4. The area under Chickpeas cultivation had decreased from 1.06 million hectares in 1970-71 to 0.11 million hectares in 2007-08 witnessing an alarming decrease during last 36 years. Similarly, during this period, Chickpeas production had decreased from 0.5 million tonnes (1970-71) to 0.05 million tonnes in 2007-08. This was an indicator of dismal scenario of Chickpeas cultivation in Haryana. Over the years, with advancement of technology and breakthrough research in other crops, combined with enhanced irrigation facilities, farmers have switched over to other profitable crops like wheat, paddy and oil seed.

Table 4.4: Area and Production of Chickpeas in Haryana

Year	Area (in 000 hectares)	Production (in 000 tonnes)
1970-71	1063.2	531.0
1980-81	721.9	455.0
1990-91	760.9	625
1995-96	649.3	469.0
2000-01	124.5	80.0
2005-06	129.8	72.0
2006-07	107.7	90.0
2007-08	107.0	54.0

Source: Statistical Abstract of Haryana 2009 and Economic Survey, GoI, 2007-08

Trends in Area under Cultivation: Major Crops

4.6 The area cultivated under various crops is indicated in the Table 4.5. The area under rice, wheat, oilseed and cotton was increasing over the years since 1966-67. Among these four major crops, rice area had increased by 4.59 times, wheat by 2.31 times, oilseeds by 1.90 times and cotton by 1.88 times since 1966-67. As against this, the area under pulses in general (in 2007-08) was only 14.6 % of area cultivated in 1966-67 and the area under chickpea (in 2007-08) was only 10 % of area cultivated in 1966-67. Thus the declining trend of chickpea cultivation in the state was fully exemplified by above-mentioned scenario.

**Table 4.5: Trends in Area under Cultivation in Haryana : Major Crops
(1966-67 to 2007-08)**

(000 hectares)

Year	Rice	wheat	Bajra	Cotton	Chick peas	Total pulses	Total Foodgrain	Oilseeds
1	2	3	4	5	6	7	8	9
1966-67	192	743	893	183	1062	1150	3520	212
1970-71	269	1129	880	193	1063	1159	3867	143
1980-81	484	1479	870	316	722	798	3962	311
1990-91	661	1850	609	491	649	742	4079	488
2000-01	1054	2355	608	555	124	157	4343	414
2005-06	1047	2303	631	584	130	195	4311	736
2006-07	1042	2377	619	528	108	169	4347	616
2007-08	1075	2462	630	NA	107	168	4475	NA

Source: Statistical Abstract of Haryana 2009

Share of Various Crops in Total area under Foodgrains

4.7 The share of various crops in total area under foodgrains was derived from the absolute values given above (Table 4.5) and presented in Table 4.6. During the period from 1966-76 to 2007-08, the share had increased for major food viz. rice (from 5.5% to 24%), wheat (from 21.0 % to 55.0 %), and non food crops viz. oilseed (from 6.0 % to 14.6 %) and cotton (from 5.2% to 12.1 %). However, the share of area under total pulses in 2007-08 had decreased to 3.8 % from 32.7% in 1966-67 and the share of area under chickpeas (in 2007-08) had decreased to 2.4% from 30.2 % in 1966-67. Thus it was observed that farmers were switching over from pulses in general and gram in particular to more remunerative crops like wheat, paddy and oilseed in the state.

Table 4.6: Share of Area under major Crops vis-à-vis total foodgrains in Haryana (1966-67 to 2007-08)

(per cent share)

Year	Rice	wheat	Bajra	Cotton	Chickpeas	Total pulses	Oilseeds
1966-67	5.5	21.1	25.4	5.2	30.2	32.7	6.0
1970-71	7.0	29.2	22.8	5.0	27.5	30.0	3.7
1980-81	12.2	37.3	22.0	8.0	18.2	20.1	7.8
1990-91	16.2	45.4	14.9	12.0	15.9	18.2	12.0
2000-01	24.3	54.2	14.0	12.8	2.9	3.6	9.5
2005-06	24.3	53.4	14.6	13.5	3.0	4.5	17.1
2006-07	24.0	54.7	14.2	12.1	2.5	3.9	14.2
2007-08	24.0	55.0	14.1	NA	2.4	3.8	NA

Source: Calculated by authors based on data available from Statistical Abstract of Haryana 2009

CHAPTER 5

CHICKPEA CULTIVATION AND ITS ECONOMICS

In this chapter, an attempt has been made to examine the viability aspects relating to cultivation of Chickpeas. It also gives the details of the profile of sample districts as also sample farmers. The analysis was supported by data /information collected from 63 sample Chickpeas cultivators from the two study districts viz. Bhiwani and Hisar. The socio economic characteristics of sample farmers such as education level, land holding, cropping pattern and agronomic aspects have also been described. However, before that, the basic features of Chickpeas and its nutritional aspects have been discussed.

5.2 The Chickpea (*Cicer arietinum*) is an edible legume of the family Fabaceae, and subfamily Faboideae. Chickpeas are high in protein and one of the earliest cultivated vegetables. 7,500-year-old remains have been found in the Middle East. The name *chickpea* traces back through the French *chiche* to Latin *cicer* (from which the Roman cognomen Cicero was taken). The *Oxford English Dictionary* lists a 1548 citation that reads, "*Cicer* may be named in English Cich, or ciche pease, after the Frenche tonge." The dictionary cites "Chick-pea" in the mid-18th century, the original word in English was chich, found in print in English in 1388, and taken directly from French.

5.3 The plant grows to between 20 and 50 cm high and has small feathery leaves on either side of the stem. One seedpod contains two or three peas. It has white flowers with blue, violet or pink veins. Chickpeas need a subtropical or tropical climate with more than 400 millimetres of annual rain. They are grown in the Mediterranean, western Asia and the Indian subcontinent. They can be grown in a temperate climate but yields will be much lower.

Types

5.4 There are two main kinds of chickpea:

(i) Desi, which has small, darker seeds and a rough coat, cultivated mostly in the Indian subcontinent, Ethiopia, Mexico and Iran. The Desi (meaning *country* or *local* in Hindi) is also known as Bengal gram or kala chana. Desi chickpeas have a markedly higher fiber

content than Kabulis and hence a very low glycemic index which may make them suitable for people with blood sugar problems. The desi type is used to make Chana Dal, which is a split chickpea with the skin removed. On the Indian subcontinent, chickpeas are called *kadale kaalu* in Kannada, *shanaga* in Telugu, *chana* in Hindi and other Indian languages, *Chhola* in Bengali and *konda kadalai* in Tamil, *Harbara* in Marathi, where they are a major source of protein in a mostly vegetarian culture.

(ii) Kabuli (meaning *from Kabul* in Hindi, since they were thought to have come from Afghanistan when first seen in India) is the second kind widely grown throughout the Mediterranean. Desi is likely the earliest form since it closely resembles seeds found both on archaeological sites and the wild plant ancestor of domesticated chickpeas (*cicer reticulatum*) which only grows in southeast Turkey, where it is believed to have originated. Kabuli, which has light colour, large seeds and a smoother coat, are mainly grown in Southern Europe, Northern Africa, Afghanistan and Chile, also introduced during the 18th century to the Indian subcontinent.

Cultivation and use

5.5 Mature chickpeas can be cooked and eaten cold in salads, cooked in stews, ground into a flour called gram flour (also known as *besan* and used primarily in Indian cuisine) and several other preparations. Chick peas are used to make curries and are one of the most popular vegetarian foods in India, Pakistan, Bangladesh and the UK.

Nutritional Value

5.6 Chickpeas are helpful source of zinc, folate and protein. They are also very high in dietary fiber and hence a healthy source of carbohydrates for persons with insulin sensitivity or diabetes. Chickpeas are low in fat and most of this is polyunsaturated. One hundred grams of mature boiled chickpeas contains 164 calories, 2.6 grams of fat (of which only 0.27 grams is saturated), 7.6 grams of dietary fiber and 8.9 grams of protein. Chickpeas also provide dietary calcium (49–53 mg/100 g), with some sources citing the

garbanzo's calcium content as about the same as yogurt and close to milk. According to the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) chickpea seeds contain on average:

- 23% protein
- 64% total carbohydrates (47% starch, 6% soluble sugar)
- 5% fat
- 6% crude fiber
- 3% ash

There is also report of high mineral content:

- phosphorus (340 mg/100 g)
- calcium (190 mg/100 g)
- magnesium (140 mg/100g)
- iron (7 mg/100 g)
- zinc (3 mg/100 g)

Importance

5.7 Recent studies by Government agencies have also shown that they can assist in lowering of Cholesterol in the bloodstream. Chickpeas are the principal source of dietary proteins in a vegetarian country like India. Increasing their production and keeping their prices within the reach of the poor, therefore, assume paramount importance.

Profile of Study Area

5.8 Out of 21 districts of the Haryana state, two districts with highest area under cultivation and highest production were selected for an in-depth study of pulse production. A farm profile of the two districts is presented in the Table 5.1.

Hisar District

5.9 The Hisar district, established in 1354 by Firozeshah Tughlak of Tughlak dynasty, is situated in south-western region of Haryana between the North latitude $28^{\circ} 59'$ and $27^{\circ} 46'$ and East longitude $75^{\circ} 11'$ and $78^{\circ} 18'$ of equator. The district is surrounded by Fatehabad in North-West, Jind and Rohtak in the East, Bhiwani and Rajasthan in the South. The geographical area of the district (3983 Sq. kms.) forms 11% of the total geographical area of the Haryana state. The district has sandy, loamy sand and clay loam

soils. Except Hisar and Hansi blocks the entire area falls under Indo-gangetic region. There is no river having a perennial flow of water.

Table 5.1: Farm Business Profile of Sample Districts

No.	Particulars	Hisar	Bhiwani
1	Agro-climatic sub-zone	Western Zone water logged area	Western Arid and Alluvial Plain Zone
2	Soil Type	Sandy, loamy sand and clay loam soils	Light textured soils ranging from sandy to loam
3	Major agriculture crops	Wheat, Paddy, Bajra, Gram Cotton and Mustard	Wheat, Bajra, Cotton, Oilseed and Gram
4	Major horticulture crops	Kinnow, Malta, Ber, Guava and Aonla Floriculture - Rose and Marigold.	Carrot, Tomato, Cauliflower, Onion and other vegetables
5	Normal Rainfall (mm)	415.4	427.5
6.a	Geographical Area ('000 ha.)	405	466
b.	NSA ('000.ha.)	330	418
7	Net Irrig. Area('000 ha.)	280	282
8	Net Irrig. Area to NSA (%)	84.8	67.4
9	Cropping Intensity (%)	168	207
10	Horticulture Area ('000 ha.)		6.02
11	Irrigation (canal) ('000 ha.)	249	159
12	Irrigation (Tubewell) ('000 ha.)	9	124
13	Irrigation by other sources ('000 ha.)	21.7	NIL
14	Land holdings (No.)		
A	Less than 1 ha	68891 (45%)	50046 (35%)
B	Between 1 ha & 2 ha	27526 (18%)	38398 (27%)
C	Above 2 ha	57078 (37%)	55389 (38%)
D	Total no. of land holdings	153495(100%)	143833 (100%)

(Source : Potential Linked Credit Plan, 2009-2010 of the respective districts, NABARD)

Canals

5.10 There are two main canals - one Bhakra canal and other is Western Yamuna canal, which are the main sources of irrigation in the district. The multi-purpose channel is being constructed to carry the excess water from waterlogged areas to water scarce areas of the district which will terminate into Sirsa district via Fatehabad. This region is covered under Sub-Zone "C" which is characterised by high soil salinity problems.

5.11 The temperature of the district varies from 48° in summer to 2° in winter. The average rainfall in the district is 415 mm. The district has two subdivisions- Hisar and Hansi, four tehsils - Hisar, Hansi, Adampur and Narnaund, three sub-tehsils - Uklana, Barwala and Bass and nine blocks - Hansi, Bass, Narnaund, Hisar-I, Hisar-II, Barwal, Agroha, Adampur and Uklana. There are 271 villages in the district, all villages are connected with road and electricity. The Hisar district has been characterised by frequent deficient rain fall and resultant drought conditions. The rain fall during last three years has been much below the average rainfall. The major part of Hisar is dependent on rain fed agriculture despite a network of canals and minors due to non availability of timely water from the system. Hansi and Narnaund blocks are having a problem of water logging during the rainy season. Approximately, 35 % of the district is affected with salinity with high contents of salt in underground water. Another problem faced by the farmers is shifting sand dunes in major part of Hisar district.

Bhiwani District

5.12 Bhiwani District is situated in the south of Haryana, in its East lies Rohtak district, Hisar on North, Rewari on south and Churu District of Rajasthan falls in the West. Bhiwani District came into existence on 22 December 1972. Its climate is dry and area is desert like due to the fact that it falls on the border of Rajasthan. There are six tehsils namely Bhiwani, Dadri, Loharu, Siwani, Bawani Khera and Tosham. The total number of development block contains all the six tehsils and other blocks like Bond Kalan (Dadri II), Kairu, Badhra and Behel.

5.13 Major crops of the district are cotton, mustard, bajra and wheat. In some of the blocks like Siwani, Loharu and Badhra, gram and guar crops are also grown. Some

progressive farmers have started floriculture, medicinal and Jatropha plantation. The district has been selected under the Horticulture Mission Programme of Govt. of India w.e.f. July 2006. Among the allied activities, dairy development is the prime activity undertaken by the farmers. In some of the blocks, poultry farming, Sheep, Goat & Piggery activities have also been taken up.

Micro Nutrient Deficit Area in Sample Districts

5.14 The status of district wise micro nutrient deficit area is indicated in table 5.2 . The zinc deficient area is very high (145000 ha) in Hisar district whereas iron deficient area is 54000 ha. In Bhiwani district, iron deficient area is more (60000 ha) whereas zinc and manganese deficient area is 60000 ha. and 65000 ha. respectively. Among the major nutrients, phosphorus is critical for cultivation of pulses. In Hisar district, availability of phosphorus in soil is low whereas in Bhiwani district it is available in more quantity. Hence, Bhiwani is more suitable for pulses cultivation.

Table 5.2 : District wise Micro nutrient deficit area (000 Hactare)

District	Net Sown Area	Deficit Area		
		Zinc	Iron	Manganese
Hisar	315	145	54	25
Bhiwani	395	60	83	65

Source: Department of Agriculture, Govt. of Haryana

Profile of Sample Farmers

Literacy Status

5.15 An analysis of the educational status of the sample farmers indicated that 79 % of the farmers covered under the programme were literate. A large proportion of the farmers i.e. 44 % had studied up to secondary / higher secondary / inter level, followed by those who had completed primary education (30 %), and graduates (5%). The level of illiteracy among the sample borrowers was at 21 per cent (Table 5.3)

Table 5.3: Level of Education of Sample Farmers

Educational Status	Sample size (No.)	Per cent to total
Illiterate	13	21
Primary	28	30

Secondary / Higher secondary / Intermediate	19	44
Graduates	3	5
Total	63	100

Coverage of Small/Marginal Farmers

5.16 The sample had 67 per cent farmers belonging to the category of ‘small and marginal farmers’ (SMF) and remaining 33 per cent farmers were ‘other farmers’ (OF).

Size of the Operational Holdings

5.17 Distribution of operational land holding of the sample farmers is presented in Table 5.4. It can be observed from the table that the practice of leasing-in of land was prevalent in both the districts on all farm categories but was more pronounced in ‘other farmers’ category. However, surprisingly, for Hisar district, leasing in of land was more pronounced in case of small and marginal farmers. Whereas in case of small and marginal farmers, this was done to make the farm size viable, in case of other farmers, leasing-in was resorted to, to make optimum use of farm resources.

Table 5.4: Average Operational Land Holding of Sample Farmers

(acres)

District	Land Category	SMF	OF
Bhiwani	Owned Land	8.6	29.1
	Leased-in	1.2	2.3
	Leased-out	0	0
	Total Operational Holding	9.8	31.4
Hisar	Owned Land	10.3	29.2
	Leased-in	1.6	1.1
	Leased-out	0	0
	Total Operational Holding	11.9	30.3
All	Owned Land	9.5	29.1
	Leased-in	1.4	1.7
	Leased-out	0	0
	Total Operational Holding	10.9	30.8

Cropping Pattern

5.18 The cropping pattern on sample farms in Bhiwani and Hisar districts is given in Table 5.5A and Table 5.5B. The tables show that Bajra, Cotton and Guar are major kharif crops and Chickpeas, Wheat and Oilseed were the main rabi crops in the districts together occupying more than 55 per cent of the gross cropped area (GCA). Chickpea, an important pulse crop occupied 18 to 23 per cent of GCA in Bhiwani district and 17 to 18 per cent of GCA in Hisar district. Across the farm categories, the proportion of area devoted for Chickpeas was observed to be more for 'small and marginal farm' (23.6 %) compared to 'other farms' (18.2%) in Bhiwani district whereas in Hisar district the proportion of area devoted for Chickpeas was observed to be more for 'other farms' (18.3 %) compared to 'small and marginal farms' (17.7%). So no clear cut pattern as regards proportion of area under Chickpeas cultivation was emerging as far as farm size category was concerned. Also, no significant difference in the proportion of area devoted to this crop across farm categories was observed. In contrast to the widely believed notion, the cropping intensity, in both the districts, was found to be higher on 'other farms' in comparison to 'small and marginal farm' indicating more efficient use of area by the former category.

Table 5.5 A: Cropping Pattern on Sample Farms in Bhiwani District
(Acres per Farm)

Crop	Small/Marginal Farms	Other Farms
Bajra	3.1 (18.1)	11.6 (23.1)
Cotton	3.2 (18.6)	6.6 (11.2)
Guar	1.5 (8.7)	6.8 (13.5)
Wheat	2.5 (14.4)	3.1 (6.2)
Oilseed	2.7 (15.9)	5.1 (10.2)
Gram	4.0 (23.6)	10.1 (18.2)
Others	0.1 (0.7)	8.9 (17.6)
Gross Cropped Area	340.5	555.5
Net Cropped Area	197.9	313.8
Cropping Intensity (%)	172	177

Figures in parentheses indicate per cent to Gross Cropped Area (GCA)

Table 5.5 B. Cropping Pattern on Sample Farms in Hisar District

(Acres per Farm)

Crop	Small/Marginal Farms	Other Farms
Bajra	1.6 (8.3)	1.5 (3.6)
Cotton	2.0 (10.6)	6.9 (13.8)
Guar	4.5 (23.6)	12.6 (25.4)
Wheat	3.4 (17.7)	9.1 (18.3)
Oilseed	2.3 (11.8)	6.8 (13.6)
Gram	3.2 (16.5)	8.0 (16.5)
Others	2.2 (11.4)	4.0 (8.0)
Gross Cropped Area	420.0	547.0
Net Cropped Area	260.8	333.5
Cropping Intensity (%)	161	164

Figures in parentheses indicate per cent to Gross Cropped Area (GCA)

Optimum time of sowing of Chickpeas

5.19 The most opportune time to sow Chickpeas is mid October to 30 October. However, in irrigated land, Chana no. 1 variety could be grown in 2nd or 3rd week of November. It could be sown upto mid of December provided the land is having assured irrigation.

Weed Control

5.20 Like other crops, Chickpeas crop is also susceptible to attack of weeds. Weeds remove available nutrients from the soil and compete with the plant for moisture and light.

Plant Protection Measures

5.21 Chickpea is liable to be attacked by a number of insect-pests and diseases. The diseases affect the crop from the germination of seeds to maturation of crops. Some of the diseases are wide spread whereas others are of local occurrences. The farmers in Haryana have been bearing the brunt of the diseases for a long time.

5.22 One of the common complaints made by the farmers is regarding the reducing effectiveness of the pesticides and other chemicals. This may be due to the increasing resistance of pests as a result of continuous application of pesticides. This calls for Integrated Pest Management (IPM). The Integrated Pest Management involves an integrated approach based on cultural, mechanical, chemical and biological measures. The IPM helps in reducing the pest population and promotes bio-control agents in the crop eco - system. Surveillance, monitoring and crop protection tactics with altered agronomic practices go a long way in keeping the pests at a manageable level. The implementation of pest management programme depends a lot on the capabilities of extension workers and the farmers to recognise the different life stages of pests and natural calamities.

Economics of Chickpea Cultivation

5.23 The most important characteristic of farming business is the continuous changes in the economic environment that influence the production decisions. Changes occur in many areas such as production methods, govt. policy, prices of farm products as well as farm input prices. With introduction of new varieties of crops, the use of inputs such as fertilisers, pesticides and irrigation, the cost of production changes. The following sections analyse the cost of cultivation vis-a-vis profitability of Chickpeas cultivation of sample farmers.

Cost of cultivation of Chickpea

5.24 The calculation of cost of cultivation is based on the cost concepts adopted by the Comprehensive scheme for estimating Cost of Cultivation by Commission for Agricultural Costs and Prices, Govt. of India, New Delhi. Items of cost include the out of pocket expenses and the imputed cost of owned labour. The paid out cost is denoted as A and has two components i.e. A_1 and A_2 . The A_1 component included the following

- Hired labour both human and machine
- Maintenance of machinery
- Material inputs like seeds, fertilisers and manures, pesticides and irrigation
- Depreciation on implements and farm building
- Interest on borrowed capital / working capital

5.25 Cost A₂ includes cost A₁ and rent paid for leased in land. For calculation of interest cost on borrowed capital, rate of interest @ 7 % p.a. for six months have been included as cost whereas for calculation of A₂ cost, the rental value of land has been taken @ Rs. 5000 p.a. for 5 months. The third component of cost was calculated by adding the imputed value of family labour to the A₂.

5.26 The cost of cultivation is presented in Table 5.6. The A₁ cost (of cultivation) per acre was estimated to be Rs. 3305 for SMF, Rs. 3419 for OF and Rs. 3343 for all the sample farmers taken together. The higher cost observed for OF could be attributed to more intensive use of inputs like fertilizer and pesticides. During the field visit it was confirmed that ‘OF’ category was using phosphate and potash also in addition to nitrogenous fertilizers whereas SMF category was either using nitrogenous fertilizers i.e. urea or in many cases they reported no usage of fertilizers. The A₂ variant of cost was also found to be higher for OF (Rs. 5388) than SMF category (Rs. 5502).

Table 5.6: Cost of Cultivation of Chickpea

(Rs. per acre)

Sr. No	Particulars	Marginal/ Small Farmers	Other Farmers	All Farmers
1	Seeds	710 (21.5)	771 (22.6)	730 (21.8)
2	Fertilisers & Manure	385 (11.7)	435 (12.7)	402 (12.0)
3	Insecticides/Pesticides	45 (1.4)	60 (1.8)	50 (1.5)
4	Irrigation	490 (14.8)	580 (17.0)	520 (15.6)
5	Human Labour	850 (25.7)	608 (17.8)	769 (23.0)
6	Machine Labour	615 (18.6)	760 (22.2)	663 (19.8)
7	Interest on borrowing / working capital	116 (3.5)	120 (3.5)	117 (3.5)
8	Miscellaneous expenses	94 (2.8)	85 (2.5)	91 (2.7)
I	Cost A₁ (1 - 8)	3305 (100.0)	3419 (100.0)	3343 (100.0)
9	Rent on leased-in land	2083	2083	2083
II	Cost A₂ (A₁ + 9)	5388	5502	5426
10	Imputed value of FL	1810	1040	1787
III	Cost A₂ + FL	7198	6542	7213

Figures in parentheses indicate percent to total cost of cultivation (A₁)

5.27 The human labour constitutes the largest component of the cost of cultivation for the sample farms. It is 25.7 %, 17.8 % and 23 % for SMF, OF and all farmers category respectively. However, it is lower in case of ‘other farms’ than in case of SMF. Human labour cost is followed by the cost of seeds. The other major components of cost of cultivation include fertilisers/manures, irrigation, machine labour, etc. The small and marginal farmers had to shell out more for hiring labour during peak periods compared to other farmers.

Profitability of Chickpea Cultivation

5.28 The profitability of Chickpea cultivation was calculated by following method. The average yield of pulses and its selling price was calculated for the both categories of sample farmers viz. SMF and OF. Thereafter, the Gross Value of Output was calculated by multiplying the average yield per acre with the average selling price per quintal of chickpeas. Subsequently, the profitability of the crop was calculated by deducting the different costs from the Gross Value of Output. The results are given in tables 5.7.

5.29 The return over cost A₁ was found to be Rs. 5419 for SMF, Rs. 4619 for OF and Rs. 5152 for all sample farmers taken together. This showed that the return to SMF per acre of farm was higher than the OF. This could be attributed to more intensive use of per unit land. The return over A₂ cost was found to be Rs. 3326 for SMF, Rs. 2536 for OF and

Table 5.7: Profitability of Chickpeas

(Rs per acre)				
Sr. No	Particulars	Marginal/ Small Farmers	Other Farmers	All Farmers
1	Average yield per acre (qtl)	4.11	3.79	4.00
2	Average selling price per qtl (Rs)	2144	2152	2147
3	Gross Value of Output (Rs)	8827	8132	8595
4	Gross value of output at farm gate price (3 - Marketing cost)	8724	8038	8495
5	Returns Over Cost A ₁ (Rs)	5419	4619	5152
6	Returns Over Cost A ₂ (Rs)	3336	2536	3069
7	Returns Over Cost A ₂ + FL	1526	1496	1282

Rs. 3069 for all sample farmers. Similarly, the return over A2 plus family labour (FL) was found to be Rs. 1526 for SMF, Rs. 1496 for OF and Rs. 1282 for all sample farmers. It is discernible that the return goes on decreasing as we include the imputed value of family labour in the cost component (Table 5.7).

Price Policies and Support Prices

5.30 Based on the recommendations of the Commission for Agricultural Costs and Prices (CACP), the Central Government announces, at the beginning of each season, the Statutory Minimum Price (SMP) that farmers are expected to get from government Agencies on procurement. The trend of SMP over last five years is given in Table 5.8. It has increased from Rs. 1400 (2003-04) to Rs. 1600 (2007-08) during last five years. During 2007-08, there has been a substantial increase of Rs. 155 per quintal (10.7 per cent) over the previous year price.

Table 5.8: Trend in Statutory Minimum Support Prices for Chickpea

Sr. No.	Year	SMP (Rs./qtl.)	Absolute change (Rs./qtl)	Per cent change (Rs./qtl)
1	2003-04	1400	-	
2	2004-05	1425	25	1.8
3	2005-06	1435	10	0.7
4	2006-07	1445	10	0.7
5	2007-08	1600	155	10.7

Source: Department of Agriculture and Co-Operation, Ministry of Agriculture, Government of India, New Delhi

CHAPTER 6

PROCESSING AND MARKETING OF CHICKPEAS

The present chapter attempts to address issues relating to processing and marketing of Chickpeas in the study area.

Processing

6.2 Processing is concerned with the addition of value to the product by changing its form. Value addition is the process of changing or transforming a product from its original state to a more valuable state. Processing adds the value to its products from Chickpeas into Dal and Besan. Out of total production of 7.1 million tones (2008-09), more than 75 per cent of the Chickpeas are consumed as Dal and Beshan. Milling of the Chickpeas means removal of the outer husk and splitting of the grain into two equal halves.

Status of Dal Milling in India

6.3 Dal milling industry is one of the major agro processing industries in India. Out of total production of 14.7 million tonnes (2008-09) of pulses in the country, 75% was being processed by these dal mills. There were about 2000 dal mills in the country in 1972. The numbers grew steadily to 6000 units in 1982, 12000 units in 1995 and 14000 units during the year 1999-2000. Most of the dal mills in the country are concentrated in selected pockets of the country i.e. pulses producing areas such as Indore (MP), Jalgaon, Akola and Nagpur (Maharashtra) and in or near major consumption centres such as Kolkata, Mumbai, Chennai, Hyderabad, Delhi, Kanpur etc. Milling procedures vary widely from place to place. The recovery of dal varies from 60 to 82 per cent depending upon the type of pulses and techniques adopted by the millers.

The Gram Dal Milling Process

6.4 In India most of the pulses are consumed in dehusked and split form. Thus processing of pulses assumes a lot of importance. Pulses processing industry helps in processing the

raw grain legumes/ pulses into edible form. Processing activity is undertaken at 3 different levels. They are:

- i. Primary processing: Primary processing activities consist of production of cleaned, graded, packaged pulses.
- ii. Secondary processing: Under secondary processing activities such as dehusking, splitting, polishing, turmeric/ spices/ salt coating and powdered besan and packaged dal are done.
- iii. Tertiary processing: These activities mostly consist of preparation of roasted, fried dal and other associated dal products.

6.5 Basic processes in dal milling are cleaning, grading, conditioning, dehusking, splitting, separation, polishing and bagging. Major variation is involved with dehusking process only. Dals like Arhar, Urad, Moong and Lentil are difficult to dehusk as a result repeated operations by dehusking rollers are required. Repeated soaking, drying, tempering is done to loosen portions of husk sticking after rolling operations. Sometimes linseed oil is also used during dry milling operation to impart shine or better appeal to the milled dal.

6.6 The removal of the outer layer of husk and splitting the grain into two equal halves is known as milling of pulses. To facilitate dehusking and splitting of pulses alternate wetting and drying method is used. In India traditional milling methods produce dehusked split pulses. Loosening of husk by conditioning is insufficient in traditional methods. To obtain complete dehusking of the grains a large number of abrasive force is applied resulting in high losses in the form of brokens and powder. Yield of split and dehusked pulses in traditional mills are only 65 to 80% due to the above losses compared to 88 to 89% potential yield.

Operation of Gram Dal Milling Units

6.7 The important steps involved in Pulse (Dal) making are

- | | |
|-----------------|---|
| Cleaning | : Removing impurities (dust, dirt, grits, chaff) from Chickpeas. |
| Dampening | : Soaking grains in water or for the desired period of time. |
| Preconditioning | : Keeping the soaked grams after removal from water for drying in |

the sun (by traditional method)/dryer (by machine)

Dehusking and splitting : Removing the husk from the grains and splitting the grain to make Dal

Polishing : This is performed to impart shine and luster to dal. During this process a pre desired quantity of edible oil and / or water is mixed with dal by passing it through a screw conveyor. The presence of oil and water imparts desirable colour and shine to milled pulses.

6.8 Both Dehusking and splitting are obtained in a single operation. The process loss is 4-5%. The Dal may further be processed by grinding it into flour (Beshan). Traditional technologies for making Dal are laborious, time-consuming, and completely dependent on climate and low yielding. In modern technology, machineries are introduced for better and quick recovery to reduce the cost of processing and making the process independent on climatic conditions.

6.9 In the direction of modernisation of Dal-mill industry, the Central Food technological Research Institute (CFTRI), Mysore has employed the ‘conditioning technique’ to loosen the husk without resorting to sun drying and oil and water application. This step has been mechanised with the introduction of conditioning units where the grains are incipiently roasted by counter current through flow technique and tempered in specially designed tempering bins where moisture is reduced to the desired levels. The husk, thus loosened and then removed in an abrasion type dehusking machine wherein almost complete removal of the husk is achieved in a single operation. The scouring and breakage losses are minimised and Dal obtained in 5 to 10 per cent more than by using traditional method. The resultant product is also better in cooking quality. In India, pulse processing units are still running on old traditional system, while our major competitors viz. Canada Australia, Germany, Spain are using modern sophisticated high-tech technology for processing or pulses.

Sample Processing Units: Basic Data

6.10 The sample units covered during the study were mainly situated in Tosham and Bhiwani blocks of Bhiwani district. The units were very old with average age of 26 years. Some of the were established as early as 1977. The wear and tear and obsolescence of machinery was getting reflected in low operational efficiency of the units. The average capacity utilisation of the units ranged from 25% to 50%. This may be attributed to the fact that pulse processing is a seasonal activity mainly confined to period between March-April to June-July. The requisite infrastructure viz. pucca roads, space for storage, facility for weighing and grading etc. were available in the sample units. However, availability of quality power supply, shortage of labour and uninterrupted supply of raw material were major constraints facing the sample units. Due to non availability of power supply, processing units had to depend on diesel generator sets leading to increase in operational cost thereby resulting in erosion of net margin.

6.11 The majority of units were small with average processing capacity of 286 quintal per day. However, the average capacity utilization was 40 per cent. The sample units operated to higher capacity utilisation during April to June quarter. During the lean period, the units were mostly not operating. Owing to non-availability of raw material and fluctuating production, capacity utilisation of the processing units was very low.

The sample processing units were operating only for 4 to 5 months from March-April to June-July in the study area. During March-April, the chickpea was being harvested and availability of raw material was assured during these months. However, its availability goes on decreasing as the months progress. The overall working period was thus estimated to be 125 days. These units were procuring their raw material locally and it was not economical for them to procure raw material from Delhi or Madhya Pradesh because of high transportation cost. At times, for local millers the supply of raw material was getting hampered because local farmers were not selling their produce to local millers instead they were sending the same to Delhi as it was fetching more remunerative price even after paying for the transportation cost involved.

Types of machine used

6.12 The sample units had Precleaner, Roller Machine (dehusker), Grader, Bucket Elevator, Aspirators & Blowers, Control Panels etc.

Raw and Packing Materials

6.13 The sample units were procuring the raw material from villages within the study district either directly from the farmers or through brokers/commission agents. The quality of raw material was not considered very good by the sample units. Quality procurement was crucial as ultimately it decided the yield of dehusked and split pulses. The units were paying brokerage of 2.5 per cent of the total value when procuring through agents. The processed pulses were being packed in 50 kg and 100 kg jute bags which were locally available. The raw materials and processed goods were stored in godowns/covered sheds. Mode of transportation of both raw material and processed goods was by truck (tarpaulin closed). The processed pulses were sold to main stockists/wholesalers directly which was in turn sold to retailers in the local market for selling to the direct consumers.

6.14 Because of scarcity of raw materials, Dal mills were unable to run for the entire year. Most of the mills were running for three to four months in a year from March to June. Further, a value added tax of 4 per cent was being charged to Dal Millers in Haryana while VAT was not being charged to Dal Millers in Delhi. This rendered the Dal Millers of the study area uncompetitive in comparison to their counterparts in Delhi as far as price was concerned. This not only made them uncompetitive in the market but also enabled the Delhi millers to give better prices to farmers which was not far off from Delhi. Therefore, instead of selling their produce in the local market, many farmers used to go to Delhi to sell their produce even at the cost of incurring additional transportation expense of Rs. 20 per quintal. They preferred selling their produce in Delhi than in local market as it fetched them better price. Further, market fee of 1 per cent of total sale was also levied in Haryana Mandis adding further to the costs. This market fee was not charged in Delhi market. Thus, owing to VAT, market fee and high overhead cost on account of diseconomies of scale, the cost of producing Dal was Rs. 100 to 125 more per

quintal in these two districts than in Delhi. This was the supply side constraint of Dal mills in the study area.

6.15 Looking at the scenario from the demand side, consumers were getting cheaper Chana Dal (M.P. variety) coming from Madhya Pradesh (via Delhi) at a cheaper rate than the local variety. These Millers in Delhi were procuring raw material from M.P. which was available at a lower rate and processing the same in Delhi where VAT and Market fees are not charged. As a result they are able to produce at lower cost and are more price competitive in the market. Hence consumers in the local market prefer buying M.P. variety to their local variety. About 20 to 25 years ago, local Dal mills of the study area used to get supply orders from neighbouring states like Punjab, Himachal Pradesh and J.K in addition to Haryana but nowadays they have lost these customers because of price competitiveness from Dal mills situated in Delhi. So, the forces of demand and supply combined together make Dal mills of the study area price uncompetitive. As a result, slowly and slowly all such mills in Hisar and Bhiwani districts are getting closed.

Credit Offtake

6.16 The sample units did not avail any institutional credit for term loan towards purchase of machinery, etc. as the units were very old. However, one of them had availed Cash Credit limit of Rs 10 lakh.

Product and By-Products of Processing

6.17 The processing of chickpea resulted in production of final products i.e. dehusked whole pulses and by products viz. dehusked and split pulses, fine dust powder, broken, husk, unhusked pulses. The percent share of each item is indicated in Table 6.1.

Table 6.1 Main and By-product of Sample processing Units

Sr. No.	Main and By-product	Share (Per cent)
1.	Dehusked Pulse	82
2.	Husk	11
3.	Broken, Whole Dehusked Pulses	6.5
4.	Fine Dust Powder	0.5
5.	Total	100.0

6.18 The main product i.e. split pulses constituted 82 per cent of total raw material. The by-products comprising of Broken, Whole Dehusked Pulses, Husk, Fine Dust Powder, etc. constitute the balance 18 per cent of total. The units were selling the main product i.e. pulses to wholesalers and dealers and the by-products were purchased by dairy units, individual milch animal owners, labourers. These items are considered to be very healthy and useful feed for such animals.

Cost of Operations

6.19 Based on data collected from the sample units, the cost of operation of gram dal was estimated per MT and the same is presented in Table 6.2.

6.20 The average raw material cost was estimated at Rs.20,500 (92.3 per cent), followed by the sales tax of Rs. 820 (3.7 per cent), mandi tax of Rs. 205 (0.9 per cent), cost of electricity/other utilities at Rs. 155 (0.7 per cent), etc. The average cost of operation of gram dal was estimated at Rs. 22215 per MT. The prices of raw material differed from time to time depending upon the supply side factors. The price during harvesting season was obviously lower than that prevailing during non-harvesting months.

Table 6.2: Cost of Operations of Sample Dal Processing Unit

(Rs. /MT)			
S. No	Particulars	(Rs)	Percent to total cost
1	Cost of Raw Material	20500	92.3
2	Cost of Jute Bags and Handling charges	135	0.6
3	Electricity, Diesel, Water & other utilities	155	0.7
4	Wages and salaries	105	0.5
5	Mandi tax/Brokerage	205	0.9
6	Repairs & maintenance	85	0.4
7	Transport and	110	0.5
8	Sales Tax i.e. VAT	820	3.7
9	Administrative and Other expenses	100	0.5
10	Total operational cost	22215	100.0

Gross Sales Proceeds

6.21 The dal processing units were generating revenue through sale of main product i.e. dehusked dal and by products viz. husk, brokens, etc. as indicated in Table 6.3. The total

sale proceeds from one MT of gram dal was worked out to Rs. 23675 of which Rs. 21320 (90.1 per cent) was contribution of dehusked gram dal, Rs. 1375 (5.8 per cent) from sale of husk and Rs. 980 (4.1 per cent) from sale of brokens, etc.

Table 6.3 : Sale Proceeds of Sample Processing Units

(Rs./MT)					
	Particulars	Output	Rate per M T	Value	Percent to total cost
1	Dehusked Pulse	82	26000	21320	90.1
2	Husk	11	12500	1375	5.8
3	Brokens, etc.	7	14000	980	4.1
4	Total	100		23675	100.0

Net Returns

6.22 The net returns per MT of sample dal processing units are presented in Table 6.4. The gross proceeds realized from sale of final product and by products for one MT of raw material used was estimated at Rs. 23675. The net returns realized after deduction of the cost of operation (Rs. 22215) was estimated at Rs. 1460 per MT. The margin for processing of one MT of gram dal was estimated at 6.57 per cent. With an average margin of 6.57 per cent, the sample units were operating at a margin which was not viable in the long run hampering the suitability of such units. As a result, the milling units in the study area of Hisar and Bhiwani were getting closed slowly and slowly

Table 6.4 Net Returns of Sample Dal Processing Units

Sr. No.	Particulars	Value (per MT)
1	Cost of operations	22215
2	Gross Sale proceeds	23675
3	Net Proceeds	1460
4	Margin (Per cent)	6.57

Uses of Chickpeas.

6.23 The main uses of Chickpeas are as follows

Chickpeas : is commonly used as Dal consumed with Chappatis and rice.

Snack foods : prepared by heating or toasting.

Sattu : Parched gram is grounded into flour called Sattu, which is very

popular in the states of Bihar and U.P.

Salad and sprouts : It is widely appreciated as a health food, used in salad and as sprouts

Chana saag : The leaves are consumed as a nutritious green known as Chana saag.

Medicinal : The leaf extract, rich in malic acid is sometimes used for medicinal purposes

Animal feed :The plants are also used for animal feed, where grazing vegetation is scarce. It is an important source of horse feed ingredient.

Marketing Channels for Chickpea

6.24 Availability of accurate and timely information, use of latest technology, marketing linkages for better price realisation are the hallmarks of a healthy marketing system. The marketing efficiency of a particular commodity is judged by evaluating the share of producer in the consumers's rupee. Based on the discussion with various stakeholders in supply chain management of Chickpeas, it was observed that following channels are instrumental in supplying it from producers to the ultimate consumers. The marketable surplus of the sample farmers was being reached to the consumers through following possible Channel. The share of each Channel in marketing of Chickpeas is also indicated below (Table 6.5.)

Table 6.5 Share of each Marketing Channels in Marketing of Chickpeas

S. No.	<i>Marketing Channels</i>	Share (%)
1	Producer → Village Trader → Dal Miller → Wholesaler → Retailer → Consumer	10
2	Producer → Dal Miller → Retailer → Consumer	70
3	Producer → Arhatiyas/Commission Agent → Dal Miller → Wholesaler → Consumer	15
4	Producer → Wholesaler → Dal Miller → Retailer → Consumer	5
	Total	100

6.25 The choice of marketing channel was guided by individual preference and convenience of the farmers and there was no specific sanctity attached to any particular channel. However, most preferred channel was Producer → Dal Miller → Retailer → Consumer (Channel no. 2), having a share of 70 % of total marketable surplus, mainly because farmers were able to shorten the supply chain and increase their share in the consumer's rupee. However, the traders and millers in the study area were a demoralized lot as their business had slowed down over last twenty to twenty-five years. The reasons highlighted by the people concerned were decline in area under cultivation of pulse in last 20-25 years due to switch over to other more remunerative crops like wheat and oil seed, enhanced availability of irrigation facility making other crops (in comparison to pulses) more profitable, unsuitability of tube well water for pulse cultivation, non availability of canal water which is more suitable for pulse cultivation in the study area and inadequate support price. Susceptibility of pulse crop in general and chickpea in particular to the pests and insects in the study area is another reason for declining area and production of Chickpea. Because of the above-indicated reasons, there is a scarcity of Chickpea as raw material for Dal mills in the study area.

6.26 Issues/Constraints Relating to Chickpea Processing

- Low availability of marketable surplus was the main reasons for the closure of the major processing units in the districts. The reasons highlighted were decline in area under pulses cultivation in last 20-25 years mainly due to switch over to other more remunerative crops like wheat and oil seed, enhanced availability of irrigation facility making other crops more profitable, unsuitability of tube well water for pulse cultivation and non availability of canal water which is more suited for pulse cultivation in the study area.
- As more and more irrigation facilities were available over a period of time, farmers were shifting to wheat and oilseed that fetched better returns in irrigated conditions.
- Shortage of labour was another problem for Mill owner, as local labourers preferred moving to more remunerative places like Delhi, Chandigarh, Faridabad, Karnal and other neighboring industrial centres.

- Lack of demand for Dal from neighbouring states like Punjab, Himachal Pradesh and J.K had also adversely impacted the processing units in the district. They face uneven competition from their Delhi counterparts.
- A value added tax (VAT) of 4 per cent was being levied to Dal Millers in Haryana while VAT was not being charged to Dal Millers in Delhi. This rendered the Dal Millers of the study area uncompetitive in comparison to their counterparts in Delhi as far as price is concerned.
- Market fee of 1 per cent of total sale was also levied in Haryana Mandis adding further to the costs for the processing units. This market fee was not being charged in Delhi markets.
- The mills were operating for limited period of three to four months (March to June/July) in a year. They were also operating at low level of their capacity owing to lack of demand for their finished products. So they are not able to reap the benefit of economies of scale leading to non viability over a period of time. The lack of infrastructure like uninterrupted supply of electricity and water were another constraint faced by the processing units.
- Historically, processing activities were strong in both the districts, but slowly these units are becoming unviable and getting closed. The prospects for future growth was also bleak for a host of reasons discussed earlier.
- The facilities for Quality Testing Laboratories in the sample dal mills were virtually non-existent.
- There was no existing practice of contract farming with the chickpea growers for procuring raw material.
- The backward and forward linkages were not very strong so as to give fillip to this industry.
- The sample mills were not undertaking extension works in terms of promotion of good seed varieties and sprinkler irrigation, etc.

- The major problems of present day mills are low recovery, separation of whole pulse from dehusked whole pulse, high cost of milling, especially due to oil treatment, frequent breakdowns and high cost of maintenance.
- The sample units were using sun drying which reduces the capacity utilisation of the units during rainy season. The modernization of Dal mills by installation of elevators, polishers, etc. may provide opportunity and scope for bank finance.

6.27 Suggestions

- ❖ The yield of dehusked and split pulses in sample mills was about 82 % in comparison to 88-89% maximum potential recovery of splits. Thus, there was loss of pulse cotyledons and embryos in the form of brokens and powdered grains (8-10%). Pulse processing mills in the country need to be modernized. Government organisations like Agro-Industries Corporations should take lead in this task.
- ❖ There was an urgent need for rationalization of tax structure like VAT, Mandi tax, etc. for providing a level playing field to local dal millers in Haryana
- ❖ There was a need to standardize the pretreatment/conditioning process and equipment of legumes milling to improve recovery of pulses.
- ❖ A need was felt for an improved institutional marketing arrangement through which the processors/millers could get cleaned and graded raw materials.
- ❖ The improved dal mills have dehusking efficiency of about 95% and the yield of split pulses is about 80-85% depending on the variety of pulse and conditioning of the pulse grain. Concerted efforts towards popularisation of mini-dal mills would result in reduction of milling losses.
- ❖ The mini-dal mills can be a good source of income to rural entrepreneurs, unemployed youths and farmers. Government organisations like Agro-industries corporations in different states may initiate actions to commercially manufacture this improved pulse milling machinery.

Marketing Strategy

6.28 Ideally, a small manufacturer should concentrate on such bulk consumers by undertaking direct supplies as the selling expenses are minimal and this benefit can be passed on to the buyer by way of discount. Bulk packing also results in saving of packing costs and assured orders bring down the per unit fixed costs over a period of time. Urban markets are saturated by some established manufacturers and thus for retailing, the concentration has to be on rural and semi-urban areas.

CHAPTER 7

SUMMARY, CONCLUSIONS AND ACTION POINTS

The commodity study on pulses in Bhiwani and Hisar Districts of Haryana was undertaken with the following objectives:

- (i) To analyse the time series data in area, production, yield of pulses, prices and relative income, etc. to identify the determinants of pulse supply.
- (ii) To study the cultivation and post harvest management aspects including need for value addition through processing and bottlenecks faced.
- (iii) To study the marketing channels their efficiency and price spread, etc.
- (iv) To examine the issues related to availability of seeds, their supply and provision of incentives, if any.
- (v) To suggest policies for development of this sector.

The sample frame constituted 63 farmers [67 % Small and Marginal Farmers (SMF) and 33 % Other Farmers (OF)], 4 dealers/wholesalers, 8 Dal millers and 4 retailers from two study districts of Bhiwani and Hisar of Haryana. Discussion with officials of Department of Agriculture, scientists/ academicians from Agricultural Universities/ Krishi Vigyan Kendras on relevant aspects were also held during the study.

Major Findings

- (xix) The area under pulse cultivation in India has increased from 19.09 million hectares in 1950-51 to 23.86 million hectares (2007-08) witnessing a growth of 25 per cent during last 57 years. During this period, its production has increased from 8.41 million (1950-51) to 15.12 million hectares in 2007-08 witnessing a growth of 79.7 per cent. As far as yield was concerned, it had increased from 441 kg per hectare in 1950-51 to 638 kg per hectare in 2007-08 registering a growth of 44.6 per cent. (Para 3.2)
- (xx) However, during last 50 years (since 1958-59), the area under pulses in the country has almost stagnated around 24 million hectares though the production

- has increased by 14.9 per cent from 13.15 million tonnes (1958-59) to 15.12 million tonnes (2007-08). (Para 3.3)
- (xxi) The major pulse growing states were Madhya Pradesh, Maharashtra, Uttar Pradesh, Rajasthan, and Andhra Pradesh, accounting for more than 72 per cent of total production. Area-wise, M.P occupied almost 18 per cent of total area, followed by Maharashtra (16.5%), Rajasthan (13.8%), Uttar Pradesh (11.7%) and A.P. (8.5%). The share of Haryana in terms of area and production was lowest (less than 1 %) in the country. (Para 3.4)
- (xxii) In Haryana, the area under pulse cultivation had decreased from 1.16 million hectares (1970-71) to 0.16 million hectares (2006-07) witnessing an alarming decrease during last 36 years. Similarly, its production had decreased from 0.8 million tonnes (1970-71) to 0.1 million tonnes (2007-08) indicating a dismal scenario of pulse cultivation in the state. (Para 3.5)
- (xxiii) Important pulse crops grown in Haryana were chickpea or gram, green gram (moong), lentil (massar) and moth. Among various types of pulses, the share of Chickpea in terms of area (63.6 %) and production (66.2) was highest. (Para 3.5)
- (xxiv) India was the largest producer of Chickpeas in the world having a share of 64.1 per cent of global production. The total world production during 2008 was estimated to be 9.3 million tonnes, India being at the top rank (5.9 m. tonnes), poorly followed by Pakistan, (0.8 m. tonnes), Turkey (0.5 m. tonnes), Australia (0.3 m. tonnes), Iran (0.3 m. tonnes), Myanmar and Canada (0.2 m. tonnes) etc. (Para 4.2)
- (xxv) At all India level, area under Chickpeas had increased from 7.57 million hectares in 1950-51 to 10.33 million hectares in 1959-60 showing an increase of 36.5 % during the period. However, since then, the area under its cultivation decreased to 7.58 million hectares by the year 2007-08. During this period, Chickpeas production had increased from 3.65 million tonnes (1950-51) to 6.91 million tonnes (2007-08) showing a growth of 89.3 per cent during the period. (Para 4.3)
- (xxvi) The yield had increased from 482 kg per hectare in 1950-51 to 780 kg per hectare in 2007-08 registering a growth of 61.8 per cent. Therefore, growth in production was solely due to increase in productivity and not because of any area expansion.

- This productivity gain could, inter alia, be attributed to increased area under irrigation from 12.5 % in 1950-51 to 31.1% in 2005-06. (Para 4.3)
- (xxvii) Major Chickpea's producing states were Madhya Pradesh, Maharashtra, Rajasthan, Uttar Pradesh, Andhra Pradesh and Karnataka. Area-wise, M.P occupied the highest area under pulse (32.8 %), followed by Maharashtra (17.5%), Rajasthan (13.5%), Uttar Pradesh (9.0%) and A.P. (8.1%). The share of Haryana to all India in terms of area and production was very low (1.5 %) and marginally higher than eastern states of Bihar, West Bengal and Orissa. (Para 4.4)
- (xxviii) In Haryana, however, the area under Chickpeas cultivation had decreased from 1.06 million hectares in 1970-71 to 0.11 million hectares in 2007-08 showing an alarming decrease during last 36 years. Similarly, the production also decreased from 0.5 million tonnes (1970-71) to 0.05 million tonnes (2007-08) during this period. Thus the declining trend of Chickpeas cultivation in Haryana was fully exemplified. (Para 4.5)
- (xxix) The area under rice, wheat, oilseed and cotton were increasing over the years since 1966-67. Among these four major crops, rice area had increased by 4.59 times, wheat by 2.31 times, oilseeds by 1.90 times and cotton by 1.88 times since 1966-67. As against this, the area under pulses in general (in 2007-08) was only 14.6 % of area cultivated in 1966-67 and the area under chickpea (in 2007-08) was only 10 % of area cultivated in 1966-67. Thus there was declining trend of chickpea cultivation in the state. (Table 4.6)
- (xxx) During the period from 1966-76 to 2007-08, the share had increased for major food crops viz. rice (from 5.5% to 24%), wheat (from 21.0 % to 55.0 %), and non-food crops viz. oilseed (from 6.0 % to 14.6 %) and cotton (from 5.2% to 12.1 %). However, the share of area under total pulses in 2007-08 had decreased to 3.8 % from 32.7% in 1966-67 and the share of area under chickpeas (in 2007-08) had decreased to 2.4% from 30.2 % in 1966-67. Thus it was observed that farmers were switching over from pulses in general and gram in particular to economically more remunerative crops like wheat, paddy and oilseed in the state (Para 4.7)

- (xxxix) Among the sample farmers, majority (44 %) of them had studied up to secondary/ higher secondary / inter level, followed by those who had completed primary education (30%), and graduates (5%). The level of illiteracy among the sample borrowers was at 21 per cent. (Para 5.18)
- (xxxii) In the study area of Bhiwani and Hisar districts, Wheat and Oilseed were the main rabi crops together occupying more than 55 per cent of the gross cropped area. Chickpeas, an important pulse crop, occupied 18 to 23 per cent of GCA in Bhiwani district and 17 to 18 per cent of GCA in Hisar district. (Para 5.18)
- (xxxiii) Across the farm size categories, the proportion of area devoted for Chickpeas was observed to be more on 'small and marginal farms' (23.6 %) compared to 'other farms' (18.2%) in Bhiwani district whereas in Hisar district the proportion of area put under Chickpeas was observed to be more on 'other farms' (18.3%) compared to 'small and marginal farm' (17.7%). (Para 5.19)
- (xxxiv) The A1 cost (of chickpea cultivation) per acre was estimated to be Rs. 3305 for SMF, Rs. 3419 for OF and Rs. 3343 for all the sample farmers taken together. The higher cost observed for OF could be attributed to more intensive use of inputs like fertilizer and pesticides. (Para 5.26)
- (xxxv) Human labour constituted the largest component of the cost of cultivation for the sample farms. It was 25.7%, 17.8% and 23% for SMF, OF and all farmers categories respectively. Human labour cost (23%) was followed by the cost of seeds (21.8%). (Para 5.27)
- (xxxvi) The average return over cost A1 was worked out to Rs. 5419 for SMF, Rs. 4619 for OF and Rs. 5152 for all sample farmers taken together. This showed that the return per acre of farm was higher in SMF than in OF. It could be attributed to more intensive use of per unit land. The return over A2 cost was worked out to Rs. 3326 for SMF, Rs. 2536 for OF and Rs. 3069 for all sample farmers. Similarly, the return over A2 plus family labour were at Rs. 1526 for SMF, Rs. 1496 for OF and Rs. 1282 for all sample farmers. (Para 5.29)
- (xxxvii) The traders and millers were a demoralized lot as their business had slowed down over the years. The reasons highlighted were decline in area under

- cultivation of Chickpeas during last 20-25 years owing to switching over to other more remunerative crop like wheat and oil seed, improved availability of irrigation facility making other crops economically more profitable, unsuitability of tube well water for chickpea cultivation and non availability of canal water (which was suitable for its cultivation) in the study area. . (Para 6.14)
- (xxxviii) A host of factors affecting the demand and supply side of Dal mills made these processing units price uncompetitive in comparison to their competitors in Delhi, which was also very close to the study area. As a result, slowly and slowly all such mills in Hisar and Bhiwani districts were getting closed. Some of the factors which adversely affected the processing units included availability of raw material in adequate quantity through out the year, applicability of VAT (4%), Mandi fee (1%), stiff competition form Dal millers situated in Delhi, competition from better quality of Dal (M.P.) variety available at cheaper rates in the market, shortage of labour and uninterrupted supply of electricity, etc. (Para 6.15)
- (xxxix) The processing of chickpea resulted in production of final products (82 per cent) i.e. dehusked whole pulses and by products (18%) viz. dehusked and split pulses, fine dust powder, brokens, husk, unhusked pulses. (Para 6.18)
- (xl) The average cost of operation of gram dal was estimated at Rs. 22215 per MT. Its break up indicated that the raw material cost was Rs.20,500 (92.3 per cent), followed by the sales tax of Rs. 820 (3.7 per cent), mandi tax of Rs. 205 (0.9 per cent), cost of electricity/other utilities at Rs. 155 (0.7 per cent), etc. (Para 6.20)
- (xli) The total sale proceeds from one MT of gram dal was estimated to be Rs. 23675 of which Rs. 21320 (90.1 per cent) was contribution from sale of dehusked gram dal, Rs. 1375 (5.8 per cent) from sale of husk and Rs. 980 (4.1 per cent) from sale of brokens, etc. (Para 6.21)
- (xlii) The gross proceeds realized from sale of final product and by products for one MT of raw material used were estimated at Rs. 23675. The net proceeds realized after deduction of the operational cost (Rs. 22215) was estimated at Rs. 1460 per MT. The margin for processing of one MT of gram dal was estimated at 6.57 per cent. (Para 6.22)

(xlili) Producer → Dal Miller → Retailer → Consumer (Channel no. 2) was the most preferred channel by farmers for routing their marketable surplus (70 % of total share) to the consumers. This was the most preferred channel mainly because farmers were able to shorten the supply chain and increase their share in the consumer's rupee. (Para 6.25)

Emerging Issues

Cultivation Aspects

- Pulses were predominantly grown in rainfed areas where moisture stress was enormous and hence production and productivity were lower.
- Since pulses were mainly grown in rainfed areas and on marginal lands, farmers were not keen to use high quality/variety seeds and other inputs like fertilisers and pesticides.
- Lack of timely rainfall and moisture stress in rabi season were the major problems in study area for cultivation of chickpea crop.
- Most of the farmers preferred using their own seeds for which the seed replacement rate was quite low. This affected the yield and production of the crop.
- Increased availability of ground water irrigation over last 20 – 25 years had induced farmers to switch over to economically more remunerative rabi crops like wheat and oilseed in place of chickpea.
- On the one hand, salinity of water was very high in the study area which was not suitable for cultivation of Chickpea. On the other hand, the availability of canal water which was better suited for chickpea was vary limited.
- Adoption of recommended agronomic practices such as weeding, application of rhizobium culture, and application of pesticides were not followed up scrupulously leading to low productivity. However, some progressive farmers wren adhering to the prescribed practices and getting good yield in the area.
- Chickpea crop was more risky and susceptible to pests and diseases. It was very much prone to weather fluctuations also.

Processing Aspects

- Low availability of marketable surplus was the main reasons for the closure of the major processing units in the districts. The reasons highlighted were decline in area under pulses cultivation in last 20-25 years mainly due to switch over to other more remunerative crops like wheat and oil seed, enhanced availability of irrigation facility making other crops more profitable, unsuitability of tube well water for pulse cultivation and non availability of canal water which is more suited for pulse cultivation in the study area.
- As more and more irrigation facilities were available over a period of time, farmers were shifting to wheat and oilseed that fetched better returns in irrigated conditions.
- Shortage of labour was another problem for Mill owner, as local labourers preferred moving to more remunerative places like Delhi, Chandigarh, Faridabad, Karnal and other neighboring industrial centres.
- Lack of demand for Dal from neighbouring states like Punjab, Himachal Pradesh and J.K had also adversely impacted the processing units in the district. They face uneven competition from their Delhi counterparts.
- A value added tax (VAT) of 4 per cent was being levied to Dal Millers in Haryana while VAT was not being charged to Dal Millers in Delhi. This rendered the Dal Millers of the study area uncompetitive in comparison to their counterparts in Delhi as far as price is concerned.
- Market fee of 1 per cent of total sale was also levied in Haryana Mandis adding further to the costs for the processing units. This market fee was not being charged in Delhi markets.
- The mills were operating for limited period of three to four months (March to June/July) in a year. They were also operating at low level of their capacity owing to lack of demand for their finished products. So they are not able to reap the benefit of economies of scale leading to non-viability of units over a period of

time. The lack of infrastructure like uninterrupted supply of electricity and water were another constraint faced by the processing units.

- Historically, processing activities were strong in both the districts, but slowly these units are becoming unviable and getting closed. The prospects for future growth were also bleak for a host of reasons discussed earlier.
- The facilities for Quality Testing Laboratories in the sample dal mills were virtually non-existent.
- There was no existing practice of contract farming with the chickpea growers for procuring raw material.
- The backward and forward linkages were not very strong so as to give fillip to this industry.
- The sample mills were not undertaking extension works in terms of promotion of good seed varieties and sprinkler irrigation, etc.
- The major problems of present day mills are low recovery, separation of whole pulse from dehusked whole pulse, high cost of milling, especially due to oil treatment, frequent breakdowns and high cost of maintenance.
- The sample units were using sun drying which reduced the capacity utilisation of the units during rainy season. The modernization of Dal mills by installation of elevators, polishers, etc. may provide opportunity and scope for bank finance.

Action Points

Cultivation Aspects

Major thrust for improving the prospects of pulse crops in general and chickpea in particular must involve a strategy to increase the area under cultivation and also increase the productivity of the crop in the area. This required following interventions:

- New varietal programme may be undertaken for irrigated area. Seed variety that could be grown in irrigated field conditions may help increase the area under pulses.
- Seed intervention need to be undertaken in a vigorous way so as to supply right quality and quantity of seeds at an affordable cost to the farmers.

- Enhancement of seed replacement rate could be major thrust through supply of certified seeds by Government agencies.
- The extension mechanism need to be strengthened by involvement of scientists from Agricultural Universities and KVKs. Helpline phone numbers with subject experts should be made available to the farmers for discussion and redressal of their problems at affordable cost.
- The training programmes may also be arranged in collaboration with agencies like Universities, KVKs and Research Institutes.
- The opportunity provided by the launching of Village Development Programmes of NABARD could be roped in to increase awareness of farmers about latest agronomic practices and varietal development programmes with specific reference to pulse crops.
- Arrangement could be made for capacity building of progressive farmer through their exposure visits to such areas/states where innovative technology have been adopted for cultivation of pulses. NABARD's programme of Capacity Building for Adoption of Technology (CAT) could be an important tool for exposure visits of interested farmers.
- The outreach of Farmers Club launched by Rural and Semi Urban branches of banks could be leveraged for propagation of latest agronomic practices, varietal programmes, market information relating to price and cooperative marketing of final produce to have better price discovery.

Processing

- VAT, Mandi Tax, etc. need to be rationalised in Haryana State. As ascertained from dal millers in the study area, VAT was not being charged to Dal Mills in Delhi. The same facility may be made available to processing units in Haryana also so that level playing field is assured to all the players operating in this segment.
- The uninterrupted supply of raw material was a prerequisite for running any processing unit. Hence, efforts may be made from all angles for ensuring supply

of raw material throughout the year. This calls for incentivising the cultivation of chickpea in the study area and removing the bottlenecks in this sector.

- Market fee of 1 per cent levied in the local mandis in the study districts also need rationalization for providing level playing field to them as the same was not charged in Delhi mandis. Nearness to Delhi was not helping the cause of processing units in the study area.
- Providing financial assistance for the establishment, expansion and modernization of Dal mills also involves opportunity for the banking sector. This could be encouraged by bankers through direct counseling of Dal Mill owners in the study area.
- Availability of infrastructure facilities like un-interrupted electricity and water supply, better road connectivity and telecommunication would go a long way in enhancing the viability of moribund Dal mills in the area.

**REPORTS PUBLISHED UNDER THE EVALUATION STUDY SERIES OF THE NATIONAL
BANK FOR AGRICULTURE AND RURAL DEVELOPMENT**

A. Reports published by the Head Office of NABARD

Sr. No	Title of Evaluation Study Reports	Year of Publication
1	*Minor Irrigation scheme - Construction of New Wells and Installation of Pumpsets thereon in Solapur District, Maharashtra	1977
2	*Minor Irrigation Scheme - Installation of shallow Tubewells in Karnal District, Haryana	1977
3	*Bhadra Land Development Project - Scheme for Reclamation and Development of Land, Karnataka	1977
4	*Land Development under Nagarjuna Sagar Project, Miryalguda Talluka, Andhra Pradesh	1977
5	*Dairy Development Scheme in Jagadhri Block of Ambala District, Haryana	1978
6	*Dairy Development Scheme in Moga Area of Faridkot District, Punjab	1978
7	*Poultry Development Scheme in Mulkanoor, Karimnagar District, Andhra Pradesh	1979
8	*Mechanised Fishing Boats in South Kanara District, Karnataka	1979
9	*Development of Acid Gardens in Nellore District, Andhra Pradesh	1981
10	*Groundwater Irrigation in Kota District, Rajasthan	1982
11	Minor Irrigation in Bhojpur District, Bihar	1982
12	Development of Grape Cultivation in Bijapur District, Karnataka	1982
13	River Lift Irrigation Scheme in Pune District, Maharashtra	1982
14	*Dairy Development Scheme in Western Uttar Pradesh	1982
15	*River Lift Irrigation Scheme in Kolhapur District, Maharashtra	1982
16	Sheep Rearing in Nalgonda District, Andhra Pradesh	1982
17	*Development of Coffee Plantation in Lower Plains Area, Madurai District, Tamil Nadu	1982
18	*Public Tube wells and River Lifts in Orissa	1984
19	Power Tillers in Hooghly District, West Bengal	1985
20	Commercial Poultry in Krishna District, Andhra Pradesh	1986
21	Dugwell Irrigation in Palghat District, Kerala	1986
22	Tractors in North Bihar	1986
23	Dairy Development in Darjeeling District, West Bengal	1987
24	Tractors in Varanasi, Ghazipur and Jaunpur Districts, of Eastern Uttar Pradesh	1987
25	Tractors and Power Tillers in Tamil Nadu	1987
26	Minor Irrigation in Muzaffarnagar District, Uttar Pradesh	1987
27	Dairy Development in Quilon District, Kerala	1987
28	Dugwell Irrigation in Dhenkanal District, Orissa	1988
29	Bamboo and Shallow Tubewells in Purnea District, Bihar	1988
30	Dugwell Irrigation in Nasik District, Maharashtra	1988
31	Calf Rearing in North Arcot, Salem and Coimbatore Districts, Tamil Nadu	1988
32	Minor Irrigation in Allahabad District, Uttar Pradesh	1988
33	Coconut Development in Quilon District, Kerala	1988
34	Minor Irrigation in Purulia District, West Bengal	1988

35	Sprinkler Irrigation in Semi-arid Areas, Rajasthan	1989
36	Dugwell Irrigation in Amravati District, Maharashtra	1989
37	Marine Fisheries in Coastal Gujarat and Maharashtra	1989
38	Financing of Shallow Tube wells under Massive National Programme in Haryana	1989
39	Financing of Apple Orchards in Hill Districts, Uttar Pradesh	1991
40	Work Animals and Animal Driven Carts in Meerut District, Uttar Pradesh	1991
41	Inland Fishery in Krishna District, Andhra Pradesh	1991
42	Bio-Gas Plants in Nainital and Rampur Districts, Uttar Pradesh	1991
43	Impact of NFS Investments	1994
44	Lift Irrigation Schemes in Maharashtra	1995
45	Mandawan Watershed Project Under Indo German Watershed Development Programme-Maharashtra	1999
46	Self Help Groups in Tamil Nadu	2000
47	Micro Finance for Rural People- An Impact Study	2000
48	Non Farm Sector Investments - An Impact assessment	2002
49	SHG - Bank Linkage Programme for Rural Poor in India - An Impact Assessment	2002
50	Cold storage Units Financed Under Capital Investment Subsidy Scheme : An Impact Assessment	2003
51	Infrastructure for Agriculture and Rural Development: An Impact assessment of Investments in Rural Roads & Bridges under RIDF	2004
52	Commodity Specific Study – Grapes	2006
53	Commodity Specific Study – Cotton	2006
54	Commodity Specific Study : Potato	2006

** Reports are out of stock*

B. Reports Published by Regional Offices of NABARD

Sr. No	Regional Office	Title of Evaluation Report	Published Year
1	AndhraPradesh	Public Tubewells in Khamman District, A P	1988
2		Development of Grape Gardens in Ranga Reddy District, AP	1989
3		Dugwell Irrigation in Chittoor District, AP	1989
4		Mango Orchards in Krishna and Khammam, AP	1991
5		On Farm Development in Khammam&Krishna, AP	1995
6		Inland Fishery in West Godavari, Andhra Pradesh	1996
7		Dairy development in Krishna District, Andhra Pradesh	1999
8		Poultry layer Investment in Andhra Pradesh	2000
9		Food (Mango) Processing in Visakhapatnam and Chittoor districts	2001
10		Sheep Rearing in Mahabubnagar and West Godavari districts	2002
11		Sericulture Investment in Andhra Pradesh	2003
12		Rural Non Farm Sector Investment in AP	2005
13		Micro finance for Micro enterprises	2006
14		Commodity Specific Study : Mango	2007
1	Assam	Private Shallow Tube wells & Lift Points in Assam	1989
2		Inland Fishery in West Tripura District, Tripura	1992
3		IRDP in Nagaon district	2000
4		FM (Power tiller) in Sibsagar District	2000
5		Impact of RIDF Investments on Rural economy	2007
1	Bihar	Shallow Tube wells in Bihar	1988
2		Deep Tube wells in Bihar	1989
3		Dairy Development in Begusarai & Singhbhum in Bihar	1989
4		MI Schemes in Samastipur District, Bihar	1996
5		IRDP in Ranchi District on Bihar	1997
6		Cold Storage in Bihar	2004
7		Million Shallow Tube well Programme in Bihar	2005
1	Chhatisgarh	MI Investments in Chhasttisgarh	2005
2		Impact assessment of RIDF investments in Chhattisgarh	2006
3		Commodity Specific Study : Groundnut	2007
1	Jharkhand	Rural Non Farm Sector Investment	2006
1	Gujarat	Poultry Development Scheme in Gujarat	1988
2		Dairy Development Scheme in Mehasana, Gujarat	1989
3		Lift Irrigation Scheme of Ukai Left Bank Main Canal - Gujarat	1991
4		Financing of Tractors in Mehasana & Rajkot Districts, Gujarat	1992
5		Investments Financed under IRDP in Valsad District, Gujarat	1994
6		Marketyard in Jetpur	2003
7		Marine Fisheries in Junagarh	2003
8		Buffalo Financing in Sabarkantha	2004
1	Himachal Pradesh	Dairy Development in Mandi district	1997
2		Apple cultivation in Himachal Pradesh	2004
3		Rural Roads and Bridges financed under RIDF in Himachal Pradesh	2006
1	Jammu & Kashmir	IRDP in Baramullah District, Jammu & Kashmir	1992
2		Tractors in Jammu District, Jammu & Kashmir	1995
1	Karnataka	Grape Gardens in Bangalore and Kolar Districts, Karnataka	1989

2		Borwell Financing in Chitradurga and Kolar District, Karnataka	1990
3		Development of Coffee Garden in Karnataka	1992
4		Sericulture Development in Mysore& Hassan Districts, Karnataka	1993
5		Lift Irrigation Schemes in Belgaum, Karnataka	2000
6		Poultry Development in Bangalore and Bangalore District	2001
7		Drip Irrigation Programme in Chitra Durga	2002
8		Dairy Development in Kolar and Shimoga district	2003
9		Sericulture in Kolar and Tumkur districts	2003
10		Fuelwood Development Projects in Karnataka	2003
11		Participatory Irrigation Management Institutions in Karnataka	2004
12		Gherkin AEZ - Karnataka - Commodity Specific Study with special Reference to Contract Farming	2005
13		Cost Models for SHG vs. MFI Model	2006
14		Commodity Specific Study: Sugarcane	2007
1	Kerala	Betelvine gardens in Trivandrum District, Kerala	1988
2		Broiler Poultry Development in Ernakulam District, Kerala	1990
3		Development of Rubber Plantation in Kottayam District, Kerala	1991
4		Fisheries Development in Kollam District, Kerala	1992
5		Farm mechanisation in Palakkad and Ernakulam Districts	1995
6		RNFS in Malappuran and Kozikode Districts, Kerala	1998
7		Sprinkler Irrigation in Arecanut garden in Kasaragod district	2002
8		Dairy development in Kollam district	2002
9		MI in Kasargod and Kannur District in Kerala	2003
10		Rural Non Farm Sector Activities	2004
11		Self Help Group in Waynad district	2004
1	Madhya Pradesh	Dugwell and Shallow Tubewell Irrigation in Narsinghpur, MP	1988
2		Tractor Financing in Raisen and Vidisha, MP	1989
3		Commercial Layer Poultry Development in Indore District, MP	1992
4		IRDP in Sagar District, Madhya Pradesh	1994
5		Rural Non Farm Sector in Ujjain district	2005
1	Maharashtra	Lift Irrigation Schemes in Ahmednagar District	1988
2		Well Irrigation in Aurangabad District	1991
3		Poultry Development in Pune District	1991
4		Grape Gardens in Nasik District	1993
5		Land Development in Kukkadi Project	1995
6		IRDP in Yavatmal District	1998
7		Farm Mechanisation in Ahmednagar district.	1999
8		Post Harvest Centres (pre cooling etc) for export of Grapes	2001
9		Rice Mills in Maharashtra	2003
10		Cold Storages in Maharastra	2004
11		Impact of RIDF Investments on Rural Economy	2006
1	Orissa	Betelvine Gardens in Puri District, Orissa	1989
2		Tractors in Sambalpur District, Orissa	1989
3		Dairy Development in Cuttack&Ganjam, Orissa	1992
4		Brackish Water Prawn Culture in Puri, Orissa	1994
5		Minor Irrigation in Sambalpur District, Orissa	1997
6		Shallow Tubewells inCuttak and Puri districts	2000

7		DRIP & PLI Training in Ganjam district.	2002
8		Group financing Under Farm mechanisation in Orissa	2003
9		Investment under RIDF in Rural Bridges	2004
10		SHG-Bank Linkage Programme in KBK Region in Orissa	2005
11		Impact of RIDF Investments in Orissa	2006
12		Commodity Specific Study: Cashewnut	2007
1	Punjab & Haryana	Poultry Farming in Punjab	1987
2		Dairy Development in Karnal and Rohtak Districts	1987
3		Tractors in Haryana	1994
4		Grape Gardens in Hissar District , Haryana	1998
5		Inland Fisheries in Patiala and Bathinda, Punjab	2000
6		Financial Viability of Tractors in Punjab.	2001
7		RNFS in Ludhiana and Sangrur of Punjab.	2001
8		Water Conveyance System in Rewari & Mahendergargh Districts	2001
9		Cold storage in Jalandhar, Ludhiana & Patiala Districts in Punjab	2001
10		Dairy financing in Kurukshetra & Kaithal Districts of Haryana	2002
11		Self Help Group in Karnal Gurgaon and Bhiwani district	2002
12		Poultry (Layer) in Sangur and Gurdaspur Districts in Punjab	2003
13		Tubewells in Bathinda, Hoshiapur and Ropar Districts of Punjab	2003
14		Agro Processing Units in Haryana	2003
15		Rural roads in Mukatsar district in Punjab	2003
16		Financing of Dairy Development (buffaloes) in Patiala and Sangur districts of Punjab	2004
17		Tractor Financing in Kaithal and Faridabad Districts of Haryana	2005
18		Impact assessment of RIDF Investments in Haryana	2006
19		Commodity Specific Study : Sugarcane	2007
20		District Rural Industries project: An evaluation Study in Ambala District of Haryana	2008
1	Rajasthan	Minor Irrigation Structures in Kherwara P.S., Udaipur District	1988
2		Tractors in Alwar District, Rajasthan	1991
3		Market Yard in Kekri - Ajmer District, Rajasthan	1991
4		Borewell in Jodhpur District, Rajasthan	1993
5		IRDP in Alwar District, Rajasthan	1995
6		Poultry in Ajmer District, Rajasthan	1995
7		Sprinkler Irrigation in Barmer District, Rajasthan	1997
8		Dairy Schemes in Bharatpur Districts	1999
9		Water Management Schemes in Jaipur Districts	2000
10		Minor Irrigation in Bikaner district	2001
11		Orange Cultivation in Jhalwar district	2002
12		Rural Non Farm Sector in Bhilwara District	2006
13		Poultry (Layers) in Ajmer District	2006
14		Cost Models for SHG vs. MFI Model	2006
15		Commodity Specific Study : Groundnut	2007
1	Tamil Nadu	Poultry Development in Salem, TamilNadu	1988
2		Dugwell Irrigation in Tamil Nadu	1989
3		Tea Gardens in Nilgiris District, Tamil Nadu	1990
4		M I Investments under MAP in Tamil Nadu	1991
5		Jasmine Investments in Salem and Madurai Districts, Tamil Nadu	1992

6		Mini Dairy in Coimbatore & Periyar Districts, Tamil Nadu	1994
7		Marine Fisheries in Tamil Nadu	1998
8		Sericulture in Tamil Nadu	1999
9		IRDP in Tamil Nadu	2000
10		Modern Rice Mills in Tamil Nadu	2001
11		Coconut Development in Tamil Nadu	2002
12		MICP under KfW - NB VII in Ramnad & Trichy District	2002
13		District Rural Industries Project in Tirunelveli district	2003
14		Cold Storages in Tamil Nadu	2003
15		Rural Roads in Tamil Nadu	2003
16		Combine Harvesters in Tiruvallur and Salem Districts of Tamil Nadu	2005
17		Tea in Tamil Nadu: A Commodity Study in Nilgiris and Coimbatore Districts	2006
18		Comparative Cost Models for SHGs in Tamil Nadu – A Study in Villupuram District	2006
19		Commodity Specific Study: Cashewnut	2007
1	Uttar Pradesh	Minor Irrigation Scheme in Jhansi District, UP	1988
2		Tractors in Western Uttar Pradesh	1992
3		Inland Fishery in Azamgarh & Deoria Districts,UP	1994
4		NFS in Moradabad District, Uttar Pradesh	1994
5		Saghan Mini Dairy, Allahabad District, UP	1996
6		Mushroom Cultivation in Dehradun District, U P	1997
7		Grape Gardens in Muzaffarnagar District, UP	1998
8		MI in Rae Bareilly District, Uttar Pradesh	1998
9		Poultry (Broilers) Farming in UP	2005
10		Impact Assessment of Investments under RIDF	2006
11		Commodity Specific Study : Sugarcane	2007
1	Uttaranchal	RNFS Study in Udham Singh Nagar District of Uttaranchal	2006
1	West Bengal	Inland Fisheries Scheme in Nadia, West Bengal	1987
2		Betelvine Gardens in Midnapore, West Bengal	1989
3		Bullock and Bullock carts in Malda, West Bengal	1991
4		Poultry Farming in (Broiler) in Midnapur District, West Bengal	1999
5		MI Schemes in Birbhum District, West Bengal	2000
6		Floriculture in Midnapore District of West Bengal	2003
7		Modern Rice Mills and Mustard Oil mills in Bankura Nadia districts	2003
8		Impact Assessment of SCP and TSP in West Bengal	2005
9		Rural Godowns in West Bengal	2006
10		Cost Models for SHG vs. MFI Model	2006