

Dynamics and Development Pathways in the Semi-Arid Tropics: Dokur Village Profile

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Acronyms

AAY	Antyodaya Anna Yojana	IPG	International Public Good
AIDS	Acquired Immune Deficiency Syndrome	IPM	Integrated Pest Management
APGVB	Andhra Pradesh Grameena Vikas Bank	IRHS	Institute of Rural Health Studies
APL	Above Poverty Line	LPG	Liquefied Petroleum Gas
APSRTC	Andhra Pradesh State Road Transport Corporation	MCC	Mandal Control Centre
APWALTA	Andhra Pradesh Water, Land and Trees Act	NFBS	National Family Benefit Scheme
BC	Backward Caste	NGO	Non-Governmental Organisation
BPL	Below Poverty Line	NREGS	National Rural Employment Guarantee Scheme
Bt	<i>Bacillus thuringiensis</i>	ODI	Overseas Development Institute
CHIS	Community Health Insurance Scheme	OTS	One-Time Settlement
CIF	Community Investment Fund	PACCS	Primary Agriculture Credit Cooperative Society
CPRs	Common Property Resources	PDS	Public Distribution System
DRDA	District Rural Development Agency	PHC	Primary Health Centre
DWCRA	Development of Women and Children in Rural Areas	PRA	Participatory Rural Appraisal
FAO	Food and Agricultural Organisation	RFS	Regular Farm Servant
FC	Forward Caste	RMP	Registered Medical Practitioner
FCN/NFCN	Financial/Non-Financial Community Needs	RRB	Regional Rural Bank
FGM	Focus Group Meetings	SAT	Semi-Arid Tropics
HH	Household	SC	Scheduled Caste
HIV	Human Immunodeficiency Virus	SERP	Society for Elimination of Rural Poverty
HYV	High Yielding Varieties	SHGs	Self-Help Groups
ICDS	Integrated Child Development Services	ST	Scheduled Tribe
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics	STD	Subscriber Trunk Dialling
IFN	Individual Financial Needs	VEC	Village Education Committees
IKP	Indira Kranthi Patham	VLS	Village Level Studies
IMPI	Institutions, Markets, Policy and Impacts	VPS	Village Panchayat Secretary
INDIRAMMA	Integrated Novel Development in Rural Areas and Model Municipal Areas	VRS	Village Revenue Secretary
		WDC	Watershed Development Committees
		WUA	Water User Associations

Rainfed agriculture is the traditional source of livelihood in village Dokur.



1. Introduction

The Village Level Studies (VLS)¹ of the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) has proven to be one of the most valuable contributions to knowledge on the socioeconomics of the semi-arid tropics (SAT)² in India³ (FAO 2004). ICRISAT's landmark investigations are a series of studies on livelihood strategies among the rural poor meant to help them climb out of poverty (ICRISAT 2003). They provide important insights into changing household and village livelihoods, thereby aiding scientists to identify and understand⁴ socioeconomic, agro-biological, and institutional constraints to agricultural development in the semi-arid tropics.

In May 1975, ICRISAT's Economics Programme (presently known as the Global Theme on Institutions, Markets, Policy and Impacts) initiated village level studies in six locations in Andhra Pradesh and Maharashtra states of India. They were extended to the states of Gujarat in 1980 and Madhya Pradesh in 1981 in India and a few villages in Burkina Faso and Niger in Africa in 1982. In India, data collection during this initial phase continued every year until special purpose surveys followed in 1989 and 1992-94. However, recognizing the profound economic and social changes that have taken place in the SAT, especially over the 1990s, ICRISAT's social science research team, in partnership with national research programs and leading institutes worldwide, resumed these studies in Asia in 2001 with a larger sample and additional modules. The two surveys conducted in recent years have captured the changes that occurred since 1985.

The studies at the village level were designed primarily to suit multi-disciplinary research with collaborations among agro-biological and social scientists working in real farm situations. Findings and key information gathered from these studies helped in generating technologies that were feasible and acceptable to local farmers and the larger farming community. Furthermore, the selected locations have served as real testing grounds for technologies developed by ICRISAT for their wider adaptation and adoption (Binswanger and Ryan 1979). According to the World Bank, VLS as an international public good (IPG) is primarily designed to collect relevant farm-level data to assist ICRISAT's research programs in their task of generating new technologies suited to the needs and means of farmers in the SAT.

1.1 The village context: Background and history

Mahabubnagar district in Andhra Pradesh was one of the regions selected for village level studies representing the different agroclimatic ecologies of SAT India. Two villages, Aurepalle and Dokur, located in Kalwakurthy and Devarkadra mandals, respectively, were chosen from this poor and drought-prone district. The process of selecting Dokur village for VLS is described in Jodha et al. (1977); and the method and objectives of VLS and the selection of different agroclimatic regions of the SAT are elucidated in Binswanger and Jodha (1978).

1. ICRISAT's Village Level Studies (VLS) undertake the collection of longitudinal households panel data in selected states in the semi-arid tropics of India. They are renowned for their exhaustive information on agricultural production as well as rural consumption (Walker and Ryan 1990).
2. Semi-arid tropical regions are often characterized by scanty and uncertain rainfall, on which agricultural production largely depends, infertile soils, poor infrastructure, extreme poverty, rapid population growth, and high risks. This characterization of neglect also applied to social science research in the semi-arid tropics in the early 1970s (Walker and Ryan 1990).
3. While India had an abundance of survey information and secondary data, much of it was aggregative, partial, cross-sectional, and concentrated on non-SAT regions [see Adam and Woltemade (1970) for review of village studies in India]. Consistent household time-series database on a representative cross section of SAT villages was lacking.
4. An understanding of these issues enhances the effectiveness of research interventions. Hence economists are working with biophysical scientists and technology exchange specialists to develop and promote holistic solutions to the problems of smallholder agriculture.



Figure 1. The road map to Devarkadra mandal in Mahabubnagar district, where Dokur is situated.

Source: Maps of India, <http://www.mapsofindia.com/maps/andhrapradesh/districts/mahabubnagar.jpg>

(a) Location

Dokur (77°50'E 16°36'E) in Devarkadra mandal of Mahabubnagar district (16°73'N 77°98'E) is about 125 kilometers south of Hyderabad and can be reached via Devarkadra on the Hyderabad-Raichur road. The village is 5 kilometers to the west of Devarkadra on an untarred road (Figure 1). The village fell under the jurisdiction of Atmakur mandal in 1975-76 and now falls under Devarkadra mandal (Appendix 1).

(b) History

The region

Mahabubnagar region was once known as Cholarwadi or the 'land of the Cholas'. According to the Andhra Pradesh State Gazetteer, present Mahabubnagar district falls under Telangana region, which used to be part of the dominions of the core of the Satavahana dynasty (221 BC-218 AD), part of the Chalukyan dynasty in south India (between 5th and 11th century AD). In recent history, this district formed the core of Golconda State and Hyderabad State, ruled by the Qutub Shahi dynasty (1520-1687) and the Asaf Jahi dynasty (1724-1948), until it was taken over by New

Delhi in 1948. The region gained independence and joined democratic India on 18 September 1948.

Mahabubnagar is surrounded by Nalgonda, Hyderabad, and Kurnool districts in Andhra Pradesh, and Raichur and Gulbarga districts in Karnataka. Formerly known as "Rukmammappeta" and "Palamooru", the name was changed to Mahabubnagar on 4 December 1890, in honour of Mir Mahbub Ali Khan Asaf Jahi VI, the Nizam of Hyderabad (1869-1911). It has been the headquarters of the district since 1883. The history of Palamooru is difficult to decipher since the rulers always neglected this region. For most of the time, minor regional rulers such as Samasthans, Jamindars and Doras or landlords ruled this region. The ryotwari or freehold system of land tenure prevailed here. In 1901, half of the district not under the direct administration (khalsa) of the Nizam was gifted to office holders as payment (jagir) for services rendered during the Nizam's time.

Mahabubnagar is the largest district in Telangana region and the second largest in Andhra Pradesh, characterized by recurring droughts (because of erratic and scanty rainfall) and worsened by

overexploitation of meagre groundwater resources. It is the most backward district in the state of Andhra Pradesh with extreme poverty, low agricultural production, 89% of the population living in rural areas, and a low literacy rate⁵ (44% constituting 57% male and 32% female).

According to the Indian Census of 2001, Mahabubnagar has a population of 3,513,934, with males constituting 51% and females 49% of the population and a population density of 190 per sq. km. The district is divided into 5 revenue divisions, 64 mandals, 1347 gram panchayats, and 1553 revenue villages. It has 13 assembly constituencies and 2 Union parliamentary constituencies. The main languages spoken are Telugu and Urdu⁶.

The village

Dokur village was part of the dominions of the Nizam of Hyderabad in Mahabubnagar district from the later part of the 17th century. Its original name was Dakur, derived from the Indo-Persian Urdu word *daku*, meaning a gang of armed dacoits. It was located 2 km northeast of the present village. It is believed that dacoits would take shelter in Dakur and its nearby villages due to their rich foliage. The State Government archives provide extended evidence of the history of this village and the change in its name from Dakur to Dokur.

Dokur has characteristics representative of the much wider area of the semi-arid tropics: a long hot season between February and mid-June, with temperatures regularly reaching 40°C and relative humidity between 8 and 10%. The winter season between November and January has maximum daytime temperatures ranging between mid 20°C to low 30°C. The annual average rainfall in Dokur is 780 mm. The rainfall pattern favors farmers since the heavy rains at the beginning of the rainy (kharif) season in June mean that dryland crops are planted sufficiently early to assure their reaching maturity provided the remainder of the monsoon is adequate.



On average, droughts occur in 3 out of every 5 years.

Agriculture is the main traditional livelihood in this village. However, key agro-climatic constraints limit agricultural productivity. The salient agro-climatic features of Dokur are given in Table 1. About 80% of its soils are poor in fertility with poor water holding capacity and scarcely giving high yields. Soils are mostly shallow to medium deep alfisols (red soils with relatively high aluminium and ferric content) with a light texture. Though agricultural activity is intensive, groundwater resources are meagre. Out of the total cultivable land distributed in the village, 60% of the cropped area received irrigation support in 1975-78 and 26% in 2007-08. The remaining area is rainfed. Traditionally Dokur used to depend on community irrigation tanks. In later years, private sources like open wells and bore wells played an important role. Over a period of time, open wells became non-functional as bore wells began getting dug deeper and deeper. Since 2001, nearly 40% of the land has been left under fallow in Dokur during the rainy season due to failure of rains and consequent non-filling of the village tank.

A distinguishing feature of Dokur and the larger area it represents is the system of small lakes (tanks) that collect runoff during the rainy season. The extra water permits cropping during both rainy and postrainy (rabi) seasons. It has been estimated that over half of the total cropped area in Dokur is irrigated because of its tanks and wells. Tank building

5. Historically, a variety of factors have been responsible for the poor literacy rate, such as gender-based inequality, low retention rate and high dropout rate, low enrolment of girls in schools, occupation of girl children in domestic chores, social discrimination, and economic exploitation (GOI 2001).
6. Telugu belongs to the family of Dravidian languages and is the official language of the state of Andhra Pradesh. Urdu is an Indo-European language of the Indo-Aryan family which developed under Persian, Turkish, and Arabic influences in South Asia during the time of the Delhi Sultanate and Mughal empire (1200-1800).

Table 1. Agro-climatic features of Dokur village.			
Indicators	1975-78	2000-01	2007-08
Soil types	<i>Shallow and medium deep alfisols</i>		
Average size of operational holding (ha)	2.55	1.43	1.35
Irrigated area (%)	60	44.09	26.31
Cropping systems	<i>Paddy, sorghum, groundnut, and pigeonpea</i>	<i>Castor, paddy, sorghum, and vegetables</i>	<i>Castor, paddy, and sorghum</i>
Improved technologies partially adopted	<i>HYV paddy and fertilizer</i>	<i>HYV cultivars for both dry and irrigated crops; fertilizers and plant protection measures</i>	<i>HYV cultivars for both dry and irrigated crops; fertilizers and plant protection measures; use of tractors, power sprayers and threshers increased</i>

Source: Singh et al. 1982 and Singh and Hazell 1993 for 1975-78.

was one of the important activities kings and rulers undertook in the uplands and semi-arid area.

The major crops traditionally grown in Dokur are paddy, castor and groundnut, which owing to irrigation, can be grown in both seasons. Substantial amounts of sorghum are also raised, but only small quantities of pulses, mostly pigeonpea. This pattern of planting is prevalent in the tank command area. In drier areas, a pattern of less paddy and groundnuts and more sorghum predominates. The reasons for low crop productivity are recurrent drought, uneven rainfall, water scarcity, poor soils, prevalence of pest and diseases, and the poor economic condition of farmers.

Persistent droughts (3 out of every 5 years) and the resulting low crop-based incomes have led to villagers embarking on adaptive and coping strategies. A majority of households in Dokur is

dependent on labor earnings although they own small patches of land. Lack of employment opportunities in the village, specifically during recurrent droughts, have led to migration to cities in the state and outside it in search of non-farm employment such as driving, mud work, construction, canal digging, as watchmen and caste occupations (washerman, carpenter and barber). Even though the village has several ongoing government-sponsored projects/programs under the district administration's direct supervision to mitigate drought and its impact and to provide alternative livelihood options, only a few families of goldsmiths (kamsali/hamsala), weavers (padmasali), blacksmiths (kammari), potters (kummari), basket-weavers (medari), carpenters (vadla), and barbers (mangali) continue living in the village. Seasonal migration is rampant, and also increasing perhaps due to the non-availability of employment throughout the year (Figure 2).

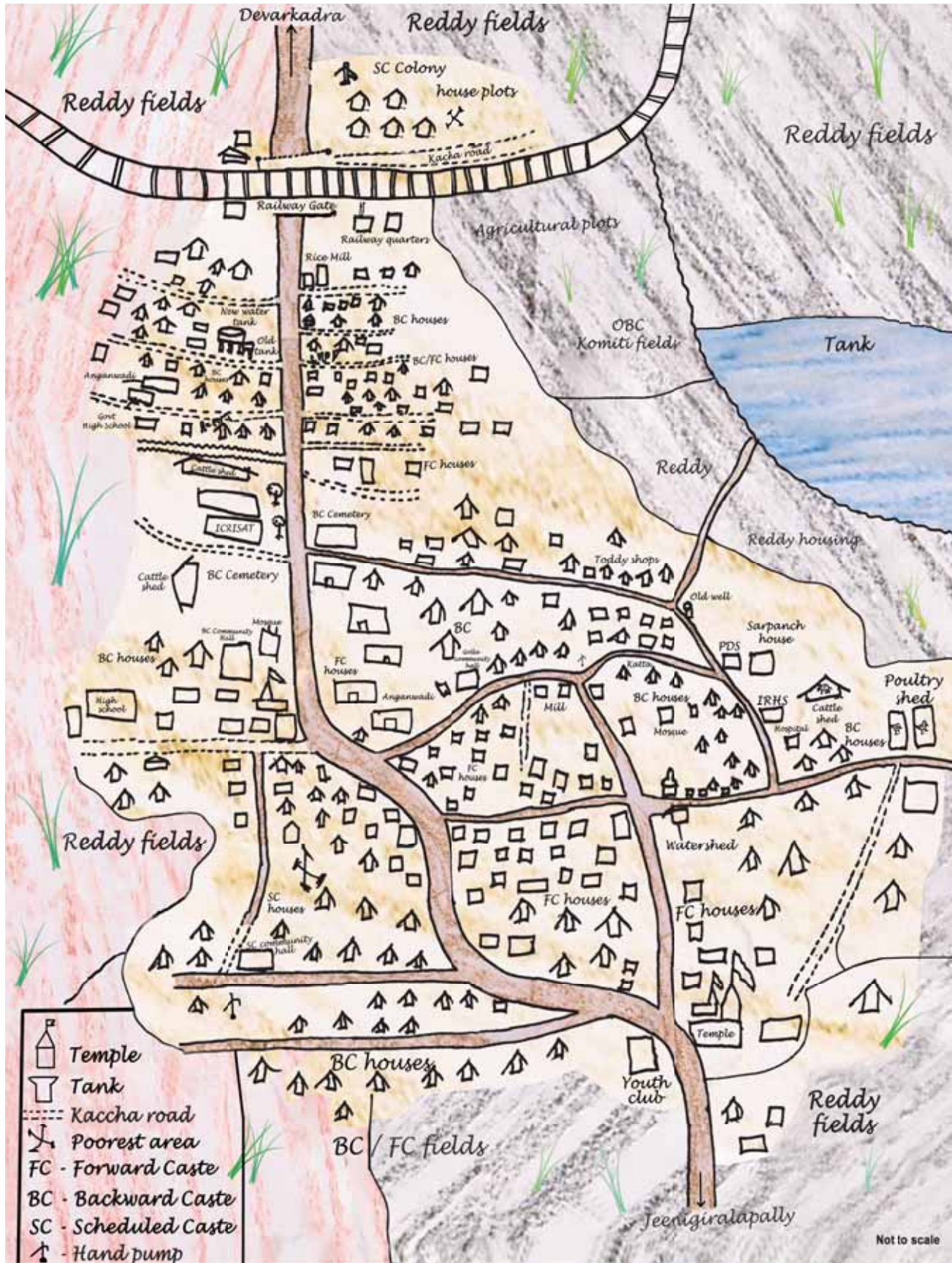


Figure 2. A social map of Dokur village.

Source: Gandhi 2008.

2. Village Level Studies (VLS): Methodology

2.1 Sampling procedure

Village level studies data on production patterns, expenditure, time allocation, prices, and socio-economic characteristics for a longitudinal panel of 240 households have been collected at regular intervals since mid-1975 in six carefully selected “typical” villages in three different agro-climatic zones in SAT India. Within each village, 10 households were randomly selected as representative of agricultural labor and non-landholding households, and another 30 were from a stratified (by size of landholding) random sample of cultivating households (Behrman and Deolalikar 1989).

2.2 Selection of location

Soil type, rainfall pattern and the importance of ICRISAT’s mandate crops (sorghum, pearl millet, pigeonpea, chickpea and groundnut) were the major criteria considered for selecting districts for the VLS panel data. Population, land utilization, extent of irrigation, yields, livestock, agricultural implements and machinery and availability of infrastructure facilities such as universities and research stations too played a role in the selection (Jodha et al. 1977; Walker and Ryan 1990).

Sub-divisions of the district (talukas) were selected based on agro-economic variables such as net sown area, average rainfall, extent of irrigation, and proportion of important crops. A village was chosen to represent typical characteristics of the taluka in terms of cropping pattern, land use, irrigation and soil type and importance of ICRISAT’s mandate crops. To select a village truly representative of a SAT village, those having special programs or more than normal support, with external resource transfers or located nearer towns and highways were not considered (Walker and Ryan 1990).

2.3 Selection of households

Census data was collected in each selected village. A total sample of 40 respondent households (30 cultivator and 10 labor) was selected. Among labor households, a random selection was made from those who do not own land or those who cultivate less than 0.2 hectare but whose main occupation and source of income is labor. To ensure equal representation of different size groups, the cultivator group was first divided into three (farm size) strata with identical number of households. Ten households were randomly selected from each stratum to ensure equal representation to all categories of households, ie, large, medium, small farms and labor, based on their operational holdings.

Information was gathered from the panel of 40 randomly selected households in each village from the cropping years 1975-76 to 1984-85 using 14 types of modules (covering socioeconomic, agro-biological and institutional variables). This information provided essential characterization of the SAT rural economy and facilitated ICRISAT’s research programs in their task of generating technologies suited to the needs and means of SAT farmers. Information was collected at 3-4-week intervals from the same respondents during the entire survey period⁷. The studies were suspended in Dokur in 1985. A one-year resurvey was conducted in Dokur in 1989 with different panel respondent households, which included 25% of the old households and 75% new households using the same set of modules. In the resurvey, 48 respondent households were selected to ensure representation of all categories. Under labor, 12 households were randomly selected from those who operated less than 0.2 ha of land, and also those who have labor as their main occupation. The remaining 36 house-

7. Information collected in rounds (interval of 3 to 4 weeks) was for the period from 1975-76 to 1977-78 and for the remaining period, data was collected (retrospective) on an annual basis. In 1978, routine data collection was stopped in the companion study village in each district. These were called “closed” villages and Dokur from Mahabubnagar district was included in this process. “Routine” data was collected for the complete ten-year period for one village in each region, ie, Aurepalle in Mahabubnagar, Shirapur in Sholapur, and Kanzara in Akola. These villages are arbitrarily referred to as “continuous” villages.

holds were randomly selected under the farm household categories; 12 each from small, medium and large farm size groups.

A study on nutrition conducted in 1992-93 with 80 households included all the households surveyed since 1975-85, their split-offs who were present in the village and a few households from the resurvey of 1989, with a couple of new households (Chung 1998). The Overseas Development Institute (ODI) conducted a survey during 2000-01 using a similar approach in selecting households surveyed since 1975-85, and added new households to reach the required sample size of 60. A summary of the selection of households in various surveys and studies from 1975-85 to 2007-08 is shown in Table 2.

2.4 Resumption of data collection in 2001 – second generation VLS

Since 1985, many changes have taken place in the village and household economies of the SAT. Diversification of rural incomes, degradation of land resources, climate variability, water scarcity, and droughts are having tremendous impact on villages and their economies. Incomes, assets, and consumption, and non-monetary indicators of well-being such as basic literacy, education and health have improved considerably. After 1985, surveys were conducted in 1989, 1993, 2000, and 2001 to gather additional information on these sweeping changes. In 2001, village studies were resumed in all six traditional VLS villages including Dokur. This initiative commenced with a fresh census of all households, and a more representative sample proportional to the number of households was included.

New modules were added to the existing ones of the first generation VLS. These modules were developed to capture information on livestock economics, investments in water exploration and soil conservation, benefits from government schemes and programs, and migration patterns. The second generation VLS serves as an effective tool for identifying major changes in the SAT village economy, particularly to develop priorities for research and policy.

2.5 The VLS household longitudinal panel: 1975 to the present

(a) Revisiting the original sample of VLS households – VLS I

A follow-up of the original or first generation VLS sample of 40 households was undertaken through Participatory Rural Appraisal (PRA). Of the original 40 households and their split-offs, 45 households remained in the village and were resurveyed in 2001-08. Table 3 describes the status of the different farm sizes of VLS households, including the split ones. Among the 10 original landless households in 1975, seven households migrated to cities and towns in search of employment and for other reasons. The remaining three households (HH nos. 3, 5, and 10) remained in the village along with their split families (six HHs in all). Out of these six households, three are doing better compared to 1975-85; two households have remained in the managed-to-get-by category, and one has remained extremely poor. From the Focus Group Meetings conducted in 2007-08, it was observed that more than 70% of the landless households now owned land and the remaining 30% continued to remain landless.

Table 2. Selection of households (HHs)¹ in different surveys in Dokur village conducted by ICRISAT.

Farm size	Operational holding (ha)	No. of HHs in 1975-85	No. of HHs in 1989	No. of HHs in 2001-04	No. of HHs in 2005-06	No. of HHs in 2007-08
Labor	< 0.2	10	12	20	23	25
Small	0.21 – 0.9	10	12	31	23	24
Medium	0.91 – 2.1	10	12	15	19	21
Large	> 2.1	10	12	14	29	28
Total HHs		40	48	80	94	98

1. The landholding class is characterized by its operational land holding, which is defined as owned land + leased in/shared in land – leased out/shared out land.

Table 3. The status of different farm sizes of VLS households, 1975-76 and 2007-08.

Farm sizes in 1975-76	Original HHs in 1975-76	HHs which have migrated permanently	Original HHs remaining in Dokur in 2007-08	Split HHs	Old HHs resurveyed in 2001-08 ¹	New HHs added in 2007-08	Total number of VLS respondents in 2007-08
Landless/labor	10	7	3	3	6	19	25
Small	10	3	7	2	9	15	24
Medium	10	3	7	3	10	11	21
Large	10	0	10	10	20	8	28
Total	40	13	27	18	45	53	98

1. Note that the status of the HH may have changed.

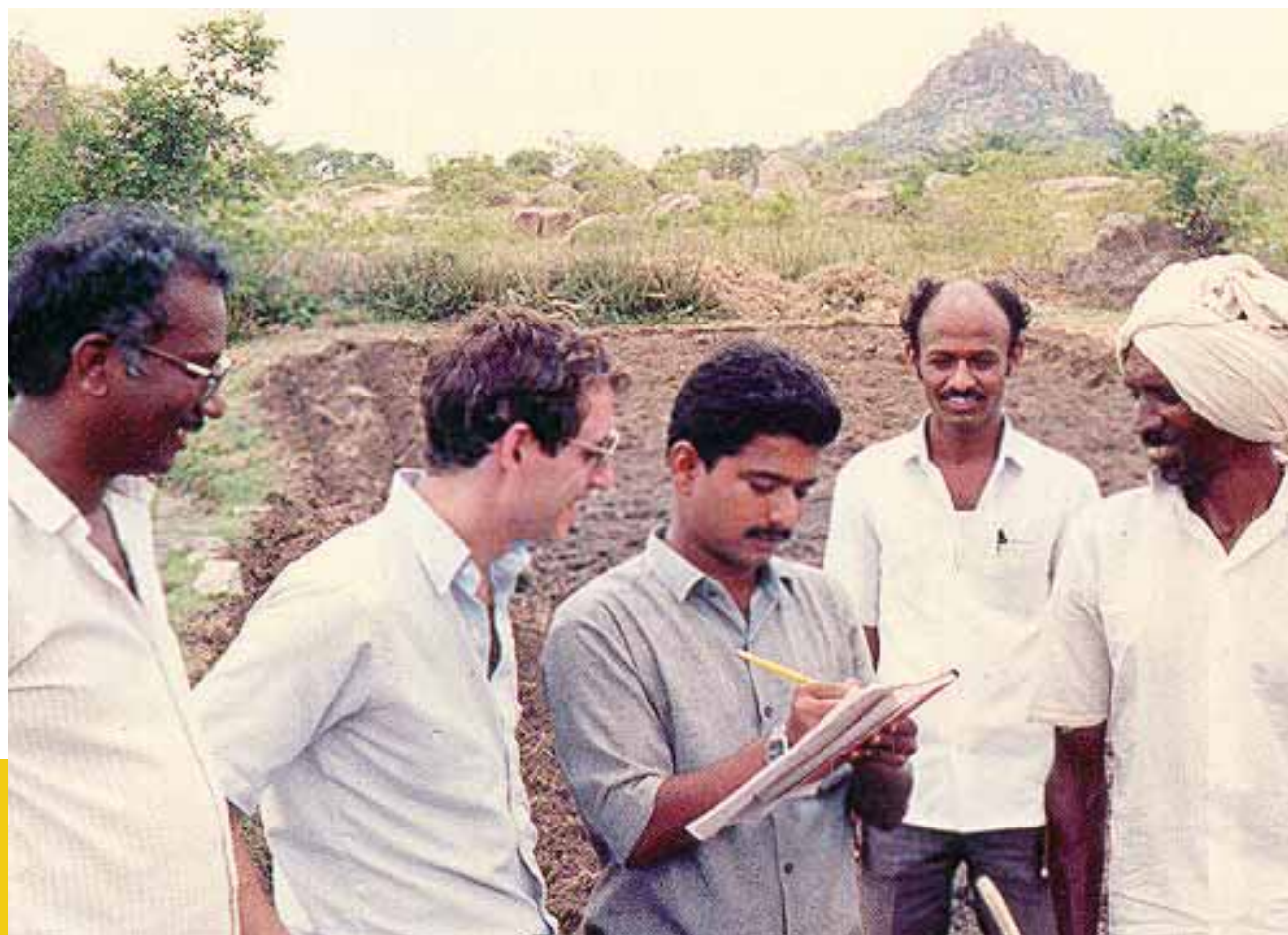
Of the 10 small households, three households (HH nos. 30, 33, and 34) migrated to cities and the remaining seven split into nine households. Out of the three migrated households, one household is better off, another stagnating and the other one worse-off. Among the 10 medium households, three households (HH nos. 40, 45, and 48) migrated to cities and the remaining seven were divided into 10 households. Among the original seven households presently living in the village, two households have improved economically, two are managing to get by and the status of the remaining three

households has further deteriorated. The original 10 large farmers split into 20 households, of which 30% are doing better, 25% have remained in the same state, and the remaining 45% are worse-off.

(b) Resurvey commencing 2001 – VLS II

The population of Dokur and the number of households in it have been increasing year after year. Over time, more than 70% of the panel respondents have undergone family divisions due to internal conflicts, leading to their fragmentation into nuclear families. Assets such as land, houses,

Resident investigators based in the village establish a good rapport with the village community, ensuring reliable data.



livestock and other consumer durables were divided equally or inherited among them. These developments, along with the addition or loss of members through marriages, births, and deaths, significantly altered family size. A few panel households have left the village in search of off-farm employment in nearby towns and cities. Hence only around 75% of the panel respondents represent the original group. Thus, an additional set of random households was added during the second generation VLS.

In 2001, census data of all the households was collected by classifying them into two main categories – labor and cultivator households. Labor households and cultivator households were classified according to the same definition as in Section 2.3. For the sake of comparative analysis, the size group classification that was used in the first generation VLS study was retained. Fifteen percent of the households (including the first generation VLS sample and the split-off) were selected in each category in the second generation VLS surveys during 2001-02. However, if the required number of households was not available from the first generation households in each category, a few new households were added to the sample based on random selection, to fulfil 15% of the households in that category.

Annual and biennial surveys were conducted with the same number of sample households from 2001-02 to 2004-05. Intensive weekly rounds of surveys commenced in 2005-06 with a large sample size, including all the split-offs from 1975-76 to 2004-05. The two field investigators posted in Dokur to collect socioeconomic and agro-biological data provided excellent field-level support. Reliable and accurate information could be drawn from the sample households because the field investigators stayed at the village site, thereby building a rapport with the villagers and facilitating easy interactions.

2.6 VLS survey instruments, special purpose surveys and role of resident investigators

(a) Instruments for data collection

Fourteen questionnaires were designed for the survey years 1975-76 to 1984-85. These were used to interview 40 panel households at intervals of 3-4 weeks throughout the year. The questionnaires pertained to family structure, cultivation practices, transactions, employment, and stock position of each respondent, giving insights into key issues such as demographic changes, socioeconomic issues, land use, cropping patterns, infrastructure investments and their maintenance, common property resources, government programs, etc.

Modules used in the first generation surveys were adapted for second generation studies with minor modifications. In order to reflect emerging issues, new modules on migration, social networks, health, government welfare programs, economics of livestock, investment on natural resource management (particularly soil and water conservation practices) were introduced in 2001. On completion of data collection from each respondent, the information gathered was transferred on to a code sheet. Table 4 describes the modules used for data collection, the schedule codes, and frequency of data collection.

Table 5 documents the total number of households under each of the surveys undertaken from 1975-76 to 2007-08. It may be noted that the size of the sample was revised from time to time: the first generation survey (1975-76 to 1984-85) had a sample size of 40 for each village; this increased to 60 in 2000-01 (ODI livelihood options study); to 80 in 2004-05 (biennial survey); and to 94 in 2005-06 (intensive rounds). Under the intensive round of surveys in 2007-08, the total sample size increased to 98 households. The selection of additional households was based on 15% of the total population of the village using a stratified sampling proportional to size method⁸. Annual surveys were conducted from 2001-02 to 2003-04, biennial surveys during 2004-05, and finally in 2005-06, the

8. The stratified sampling proportional to size method assigns a selection probability to each element in the population according to the size of each stratum.

Table 4. Details of the modules used for data collection in the VLS villages and their schedule codes.

<i>Schedule code</i>	<i>Modules</i>	<i>Frequency of data collection</i>
VLS-A	Household census schedule	Beginning and close of the study
VLS-C	Household member schedule	Beginning of the cropping year (July)
VLS-D	Plot and crop rotation schedule	Beginning of the cropping year (July)
VLS-E	Animal inventory schedule	Beginning of the cropping year (July)
VLS-F	Farm implement inventory schedule	Beginning of the cropping year (July)
VLS-G	Farm building inventory schedule	Beginning of the cropping year (July)
VLS-H	Cultivation schedule (till 1979)	Every 3-4 weeks
VLS-K	Labor, draft animal, machinery utilization schedule	Every 3-4 weeks
VLS-L	Household transaction schedule	Every 3-4 weeks
VLS-M	Monthly price schedule	First week of every month
VLS-N	Stock inventory schedule	Beginning of the cropping year (July)
VLS-P	Debt and credit schedule	Beginning of the cropping year (July)
VLS-Y ¹	Plot and cultivation schedule	Every 3-4 weeks
VLS-Z	Livestock schedule	Every 3-4 weeks

1. Module VLS-Y consists of Modules VLS-D and VLS-H. This module has been used since the cropping year 1980.

Table 5. Sample sizes of VLS generation I and II surveys.

<i>Description</i>	<i>Year</i>	<i>Total households</i>
VLS generation I survey (interval of 3-4 weeks)	1975-76 to 1984-85	40
VLS resurvey	1989-90	48
Food security study	1992-93	80
ODI livelihood options study	2000-01	60
VLS generation II survey (annual survey)	2001-02 to 2003-04	80
Biennial survey	2004-05	80
Intensive rounds (interval of 3-4 weeks); cost accounting method	2005-06	94
Intensive rounds (interval of 3-4 weeks)	2007-08	98

respondents were interviewed every 3-4 weeks in an intensive round of surveys.

(b) Special purpose surveys

Data was also collected on traditional farming from this village. Special purpose surveys (Table 6) and agro-biological investigations were carried out in the village (Table 7). Data collected from Dokur has been widely used for socioeconomic, agro-biological, and other econometric analyses in PhD and M Sc theses by students and researchers from leading universities and research institutions worldwide (Table 6). This longitudinal database, by virtue of its quality and

richness, has attracted researchers worldwide and formed the basis of a number of publications.

Special purpose surveys in the second generation VLS

Social networks and development programs: A special survey on social networks and the impact of development programs (2005-06) was designed and conducted along with the regular VLS survey. Social networks were identified and their functioning in the VLS villages was studied. Data was also collected on the processes followed in the identification of rural poor and on the implementation of developmental programs.

Table 6. Data from special purpose surveys conducted in Dokur from 1975-77 to 2008-09, used by students and researchers.

<i>Topic</i>	<i>Year</i>	<i>Households</i>	<i>Reference</i>
<i>Household time allocation</i>	1975-77	Respondents	JG Ryan
<i>Price information</i>	1975-78, 1980-85	Key informants	MV Oppen
<i>Nutrition and health</i>	1976-78	Respondents	JG Ryan / PD Bidinger
<i>Tenancy</i>	1976-78	Respondents	NS Jodha
<i>Risk attitudes</i>	1977	Respondents	HP Binswanger
<i>Fertilizer use history</i>	1977-78	Respondents	D Jha
<i>Labor relations</i>	1979-80	Key informants and respondents	VS Doherty
<i>Well ownership and group action</i>	1979-80	Respondents	VS Doherty
<i>Social relations</i>	1981-82	Respondents	VS Doherty
<i>Price and yield expectations (from Dokur and two nearby villages)</i>	1982-83	30 well owners	TS Walker
<i>Evolution of common property resources</i>	1984	Key informants	NS Jodha
<i>Retrospective family history</i>	1984-85	Respondents	World Bank study
<i>Benefits and cost of land fragmentation</i>	1985	Respondents	V Ballabh
<i>Pesticide use history</i>	1985	Respondents	CS Pawar
<i>Alternative indicators (nutrition) study</i>	1992-93	80 HHs; old VLS HHs (with split-off families) and non-VLS HHs	Kim Chung (ICRISAT-IFPRI study)
<i>Understanding livelihood options</i>	2001	Respondents	UK Deb / GD Nageswara Rao / Y Mohan Rao / Rachel Slater
<i>Social capital and migration: A study of development pathways in Dokur Village</i>	2004	VLS and non-VLS respondents	BVJ Gandhi / R Padmaja / MCS Bantilan
<i>Linkages and social networks and development programs</i>	2005-06	Respondents	Pramila Krishnan / R Padmaja
<i>Household tracking survey</i>	2005-06	Original VLS HHs (including split-offs)	Stefan Dercon / Reena Badiani
<i>Four-monthly health and shocks survey</i>	2005-07	Respondents	Stefan Dercon
<i>Migration survey</i>	2006	Respondents	Reena Badiani / Stefan Dercon
<i>Livelihood insecurities in the semi-arid tropics of rural Andhra Pradesh; Focus on migration and HIV/AIDS</i>	2006-07	VLS and non-VLS sample	BVJ Gandhi / MCS Bantilan
<i>Study on addressing extreme poverty in low-income countries: Risk and shocks</i>	2007	VLS and non-VLS sample	BVJ Gandhi
<i>Social networks and relationship</i>	2008-09	VLS and non-VLS sample	R Padmaja / MCS Bantilan

Table 7. Agro-biological investigations carried out in Dokur.		
Research phase	Topic investigated	ICRISAT research unit involved
Description/ diagnosis	Extent of timely post-harvest cultivation practices and reasons for adopting crop planting directions	Cropping Systems, Farming System Research
	Incidence of pests, diseases and weeds in farmers' fields	Crop Protection Division
Design	Response to rhizobium and fertilizer application and their interactions in groundnut and pigeonpea	Microbiology Unit, Legumes Program
	Herbicide yield response	Cropping Systems, Farming System Research
	Response of foliar disease-resistant groundnut varieties compared to susceptible varieties and fungicide	Crop Protection Division, Groundnut Improvement Program
Extension/training	Field days for farmers (once in 2 years)	GT-Institutions, Markets, Policy and Impacts (IMPI), Economics Program

Tracking survey. A massive effort was launched in 2005-06 to track all the members of the original VLS households. The sample was extended to all households including split-offs from the original households residing in the village. Information continues to be collected from all temporary and permanent migrants as and when they return to the village. Likewise, an attempt was made to track migrants residing in nearby villages, districts, and cities. Under this survey, seven schedules, three individual level (and mutually exclusive) forms, and four household forms were used for data collection.

Active participation is key to collecting information.



Four-monthly health and shocks survey. This survey conducted in 2005-07, was mainly intended to ascertain the health status of individual households, dietary patterns and child labor and anthropometrical data of all family members belonging to the sample households recorded at four-monthly intervals. Information was also collected on crop plot-specific shocks, labor-specific shocks and shocks pertaining to off-farm work.

Migration survey. Similar to the tracking survey, under the migration survey, information on both the magnitude and duration of migration between 1975 and 2005 was collected from the village in 2006. Migration has been split into two components: temporary migration which consists of movements away from the village for short-term periods of work and permanent migration consisting of individuals who are no longer considered residents of the village. Apart from tracking the nature and scope of migration flows, some of the basic socioeconomic features of the households were also captured in this survey to understand the poverty and income dynamics.



Resident investigators collecting socioeconomic data.

(c) Role of resident investigators

Studies at the village level were focussed on collecting high quality and reliable data with the assistance of resident VLS investigators⁹. Resident investigators play a very critical role in monitoring agro-ecological, social and economic activities engaged in by the farming community of the village (Bhende 1983; Kshirsagar 1983). They collect data on farm inputs, labor utilization, outputs, consumption, marketing, etc at fortnightly intervals. In general, social bonds developed between the sample households and village investigators due to their close interactions, built a rapport between them. This enabled investigators to obtain reliable and accurate information from respondents. The following steps were taken to sustain the households' active participation in the survey and provision of valuable information:

- Arranging annual or biennial educational trips for respondents to host institutions and agricultural

research centers to keep them updated about new technologies developed

- Distribution of a small quantity of seeds of ICRIASAT mandate crops
- Biological research on farmer's fields by providing all inputs
- Conducting medical camps and providing medicines
- Collecting soil samples from households' fields and analyzing them to provide feedback
- Investigators participating in social events in the village and maintaining regular contact with people, irrespective of caste, political background, and social and economic status.

In a way, the village serves as a laboratory for social scientists, where field observations are obtained and experiments can be carried out to test prospective technologies. A remarkable aspect of these studies since they began in Dokur has been the very close rapport established with the village population and the farmers.

9. The first resident investigator was posted in Dokur village in May 1975. This investigator had a university education in agricultural economics, came from a rural background, and spoke the local language Telugu. His main responsibility was to collect and code data on the schedules documented (Binswanger and Jodha 1978). However, since June 2005, two village investigators were posted in the village, due to an increase in the sample of households. These investigators were given several weeks of intensive training in interviewing techniques, data coding, report writing, farm level agro-biological experimentation etc, before they were permanently assigned. They were intensively supervised by senior staff, who used to make monthly trips to the village until 1975-85 and every quarter from then onwards.

3. General Features of Dokur Village

3.1 General perspectives and changes comparing the last three decades

Table 8 chronicles the significant events that have occurred in Dokur from 1650 to 2008. These timelines were based on peoples' perception of the village during village Focus Group Meetings (FGM) during 2007-08. Among the significant milestones were the formation of the village (1650); establishment of the Gram Panchayat (1959); setting up of a post office (1960); government supply of electricity (1962); setting up of an elementary school (1966); ICRISAT investigators come to the village (1975); Gram Panchayat office building comes up (1993); watershed project programs begin (1994-96); outbreak of a cholera epidemic (1938 and 1972-73) and the occurrence of severe droughts (1972-73, 2001-02 and 2004-05).

Table 9 compares the basic features of the village in 1975-76 with 2007-08. Since 1975, road transport facilities have improved immensely and the village is now connected to nearby villages and towns by Andhra Pradesh Road Transport Corporation

(APSRTC) buses. Since 2000, autorickshaws too have been plying in the village.

The village had no means of communications during 1975-76 but by 2007-08 there were around 20 telephone connections, with 40% of households intending to own mobile phones. The number of newspapers, radios and televisions has increased and they are playing an important role in creating awareness and knowledge dissemination among villagers. By 2007-08, over 200 households owned television sets. In September 2008, a railway station was sanctioned. Rupees 650,000 was sanctioned by the railway authorities towards this. Under the leadership of the village president, villagers helped build the railway platform at a cost of Rs 350,000. Trains are likely to stop there in the near future. Tax collected from land transactions were voluntarily given by the Gram Panchayat towards village development.

There has been a change in the lifestyle of the villagers, particularly at the household level. In 1975, the only source of fuel for household cooking

People in the village going about their daily chores.



Table 8. A chronicle of significant events that occurred in Dokur between 1650 and 2008.

Year	Event	Year	Event
1650	Formation of Dokur village	1993	Gram Panchayat office comes up
1905	Railway track laid across the village	1993	Public Distribution System (PDS) program begins
1938	Cholera outbreak	1994	Water tank constructed
1940	Construction of a mosque	1994-96	Watershed project programs begin
1958	Construction of Anjaneya Swamy temple	1997	Youth club started
1959	Gram Panchayat set up	1998	Good cropping year
1960	Post office comes up	1998-99	Self-Help Groups (SHGs) start functioning
1962	Electricity for households	2000	Yadava community hall established
1966	Elementary school started	2001-02	Drought year
1972-73	Severe drought	2002-05	Watershed project programs
1972	Cholera outbreak again	2002	Scheduled Caste (SC) community hall constructed
1974	Private health clinic set up	2003	New Gram Panchayat office constructed
1975	ICRISAT unit set up	2004	Railway gate constructed
1978	Private school started	2004	Cement and concrete roads built under the food for work program
1984	Private school closed	2004-05	Drought year
1988	Water reservoir constructed	2006	Backward Caste (BC) community hall constructed
1988-89	Good cropping season	2006	Chikungunya infection in the village
1989	Institute of Rural Health Studies (IRHS) set up	2007	Elementary school upgraded to high school
1991-96	Severe drought years	2006	National Rural Employment Guarantee Scheme started
1992	Rice mill started	2007	Renovation of Eshwar temple
1993	Anganwadi set up	2008	New Anganwadi center started

Source: Gandhi and Bantilan 2009.

was firewood, coal, and cow dung cakes. By 2006, families had cooking gas connections obtained through government-sponsored programs or through local providers. By 2007, the number of cooking gas connections had increased to 90 along with 9 biogas plants.

The supply of subsidized rice and wheat through the Public Distribution System (PDS) has had an impact on consumption patterns. The PDS is meant to ensure food security to all groups, particularly to those living below the poverty line (BPL). Under the scheme, the government supplies subsidized rice, kerosene and sugar to all ration cardholders through fair price shops in the village. Different ration cards are allotted to households based on their income level. White cards are given to households who own less than 5 acres of land and fall under the BPL group. They are eligible for 4 kgs of rice per person per month at Rs 5.25 per kg, and a maximum of 16 kgs. This scheme was revised in

April 2008, providing rice at Rs 2 per kg with a maximum of 20 kgs to beneficiaries. The disabled, widows and those above 65 years too fall under the BPL category and are eligible for 10 kgs of rice a month free under Annapurna Padhakam. Non-land owning households also fall under the BPL category and are eligible for 35 kgs of subsidized rice per

A fair price shop in the village.



Table 9. A comparison of Dokur village in 1975-76 and 2007-08.

Description	1975-76	2007-08
Total geographical area (ha)	1358	1358
Total cultivable area (ha)	1192	1303
Total non-cultivable area (ha)	166	55
Total irrigated area (ha)	381	84
Total dry area (ha)	811	1219
Average annual rainfall (mm)	787 (1975-81)	627 (2002-07) ¹
Source of irrigation	Tanks (3) and open dug wells (80)	Tanks (3) and borewells (200)
Total no. of households	313	519
Total population	1783	2816
Total no. of families	150	515-525
Average family size	6	5
Education levels (average)	7 th class (Upper primary)	10 th class (High school)
Total no. of graduates	7	35
Pupils studying outside the village	20	100
Literacy level (%)	16 ²	60 ³
Livestock population (%)	80	20
Milk production (per day)	NA	400 liters
Electrification of HHs (%)	60	90
Sources of credit	Moneylenders	Co-op bank (PACCS) at Koukuntla, SBH and APGVB at Devarkadra, and moneylenders
Post office	Yes	Yes
DWCRA groups (SHGs)	Nil	33 (30 active; 3 defaulters)
Anganwadi center	Nil	1
General shops	8	10
Fair Price Shops (PDS)	1	1
Flour mills	1	3
Rice mills	Nil	1
Private medical practitioners	1 RMP	1 RMP and 1 IRHS clinic
No. of tractors	Nil	8
Threshers	Nil	2
Power sprayers	Nil	8-10
Radio	50	4
TV	Nil	> 200 HHs
Drinking water	10 Hand pumps and 8 wells	185 taps
Cooking gas connections	Nil	90 HHs
Telephones	Nil	20
Mobile phones	Nil	40% HHs
Biogas plant	Nil	9 HHs
Migration	Hyderabad (5-8 months, 20 persons)	Gujarat, Maharashtra and Hyderabad (>8 months/about 1000 persons)
Wage payment mode	In kind	In cash
Wages (Rs)	Male (3-5); female (2-3)	Male (60-80); female (35-50)
Cost of hiring a bullock pair per day (Rs)	7-10	250
Cost of hiring a tractor per hour (Rs)	Nil	350
Productivity (kg/ha)	Paddy (1850-3700 kgs/acre), groundnut (rainfed: 400-1200; irrigated: 1000-2100) (avg. 1975-79)	Paddy (1600-1750), castor (600-1000), groundnut (rainfed: 620-1250; irrigated: 1500-2150) (avg. 2003-2007), post-rainy season sorghum (670-1000), 70% of the area used SWC measures
Soil & water conservation methods (S&WC)	Nil	

1. Mandal Revenue Office, Devarkadra, 2008.

2. Government of Andhra Pradesh, 1971.

3. Government of Andhra Pradesh, 2001.

Source: Ashokan et al. 1991 for 1975-76 and Focus Group Meetings, 2007-08 for 2007-08.

month at Rs 3 per kg through the Antyodaya Anna Yojana (AAY) Padhakam. With the heavy subsidy on rice, it has become the staple food for almost all households. The other category of households in the village who are above poverty line (APL) are given green cards and not eligible for food subsidy.

The income levels of households in Dokur more than doubled in real terms between 1975-78 and 2001-04. While income from agriculture declined, that from non-farm labor, business, salaried jobs, caste occupations and out-migration increased significantly. The incidence of poverty declined from three-fourths of households to one-third over these three decades. Consumption levels improved considerably although a few households still suffer from energy and protein deficiencies.

Dokur has three irrigation tanks (one big and two small) and a large tank called *peddacheruvu*, which used to be full in the 70s and 80s and support two paddy crops in the command area. But during the last one decade, less water has been available in the tanks due to scanty rainfall and cessation of inflows from the catchment area. The entire

command area has been lying fallow and many open wells have dried up. Over the last two decades, irrigation has declined in the village. The share of irrigable area was only 26% of the gross cropped area in the village.

A change in cropping pattern has been observed since 1975 due to various reasons. Sorghum has replaced paddy and the area under post-rainy season sorghum is expanding. Agricultural lands that were used to cultivate paddy, an irrigated crop, are now constrained by water scarcity. Since residual moisture can meet the need of sorghum, 60% of the traditional paddy area has been replaced by post-rainy season sorghum.

In general, awareness among farmers has increased through exposure to government programs. Awareness has increased among some households through their active involvement in political and government programs combined with frequent visits to urban areas such as Hyderabad, Pune, Goa, Surat, Baroda and Ahmedabad. To some extent, this influenced changes in traditional practices such as child marriages, which are now a thing of the past

The village's large tank or peddacheruvu.



(except among the sheep rearing community). On the other hand, expenses on dowry and social functions have been on the rise.

3.2 Population

According to the VLS census in 1975, Dokur had a population of 1783 with an average family size of 6. There were 313 households during this period constituting 76 labor households (24.3%), 226 cultivator households (72.2%), and 11 other households (3.5%) belonging to artisans, traders, etc.

In 2007, the total population was 2816 with an average family size of 5. The number of households during this period increased to 519. Compared to 1975, the population and number of households had increased by 58% and 69.3% respectively. It has been observed that the importance of the traditional joint family system had declined over the years, with only 5-10 households practising it.

3.3 Caste structure

The village households are broadly categorized into five major castes – Forward Caste (FC), Backward Caste (BC), Scheduled Caste (SC), Scheduled Tribe (ST), and Minority. Each category is further classified into sub-castes. In 2007, there were 24 castes in the village, the dominant ones being the Reddys (Kapus) who are influential and rich. Among the Scheduled Castes, the Mala and Madigas are poor and less influential in the social hierarchy of the village. Backward Caste households constitute 66.47%, Forward Caste 18.11%, Scheduled Caste 13.68%, and minority 1.35% (Table 10) of the village.

3.4 Literacy and education

Literacy rates and awareness of educational opportunities have significantly improved in the

A high school class in progress.



Table 10. Distribution of households by caste and category, 2007.

Caste	No of households	Percentage of households
Forward Caste	94	18.11
Brahmin	1	0.19
Reddy	85	16.38
Vysya	8	1.54
Backward Caste	345	66.47
Balija	1	0.19
Battu	8	1.54
Bichhagalla	2	0.39
Boya	44	8.48
Chakali	9	1.73
Gowda	21	4.05
Jogi	5	0.96
Kamsali/Hamsala	1	0.19
Kummari	3	0.58
Kurma/Golla	52	10.02
Mangali	7	1.35
Medari	11	2.12
Musti	41	7.90
Padmasali	5	0.96
Telaga	126	24.28
Vadla	7	1.35
Vasishta	2	0.39
Scheduled Caste	71	13.68
Madiga	64	12.33
Mala	7	1.35
Scheduled Tribe	2	0.39
Yerukula	2	0.39
Minority	7	1.35
Muslim	7	1.35
Total	519	100.00

village. The literacy rate increased from 16% in 1975 to 60% in 2001. Standards of education have improved due to better facilities provided by the village administration with financial support from the district education department. Government-sponsored school education facilities have been enhanced from primary to higher secondary levels (10th class).



Kutcha (left) and pucca houses in the village.

Private schools are springing up in Dokur and neighboring villages. In recent years, there have been instances of pupils from well-to-do families moving to towns and cities to pursue higher studies after completing their secondary education from the village school. Improved education levels were noticed in the 11-15, 16-20 and 21-25 age groups in 2007. Nevertheless, the illiteracy rate among the young males and young females remains high, ie, 33% and 50% respectively. An improvement in education levels of pupils belonging to the Scheduled Caste and Backward Caste, which was partly facilitated by the free supply of textbooks to school-going children and the mid-day meal program, goes to show that government efforts to promote education have been fruitful. The impact of such programs was more evident among the younger age group (11-15 years). Radio, newspapers and television sets too played an important role in disseminating information and generating awareness.

3.5 Housing, sanitation and energy

Dokur is a picturesque village with mud-covered stone houses grouped in a rather random fashion. Narrow streets separate houses, most of which consist of one or two rooms with perhaps a small barred window for ventilation. Mud floors are the norm, but wealthier residents have floors of shahbad stone. Roofing ranges from thatch to a sturdier wooden framework covered with thatch and mud. Sanitation levels are very poor, with only a few rich households having better facilities compared to poor households. Most of the houses were built during the 1980s, with few pucca concrete houses belonging to well-to-do families. The village is also under the consideration of Indiramma Gruha Padakam, a State Government

scheme providing financial assistance through banks to economically poor families to construct pucca houses. The village administration has identified a list of beneficiaries under this program.

Almost all the households in this village use traditional stoves with wood as the primary source of fuel, even though many have other energy sources such as LPG cylinders and kerosene. About 90% of the households have electricity connections and 80% of them own electrical devices such as fans, television sets, etc. About a third of the households have toilets, generally of the pit type, but without a water connection.

3.6 Village institutions and general infrastructure

Dokur's general infrastructure has been gradually built since 1975. Various development measures have been taken up by the village administration. The village gram panchayat, an elected body comprising of a president, vice-president and representative ward members, is responsible for the village's day-to-day administration, welfare and development activities. Villagers elect its president and members every five years. The president is responsible for village development, collecting house taxes and obtaining funds from the government for purposes ranging from education and sanitation to providing drinking water, road construction and installing street lights. Dokur's present gram panchayat (2006-10) was elected unanimously without the usual conflicts associated with electoral processes, for which the State Government rewarded it Rs 500,000 towards village development and welfare. The composition of Dokur's gram panchayat in 1975 and 2006 is given in Table 11.



Dokur's Gram Panchayat office.



The village's source of potable water.

Table 11. Composition of Dokur's gram panchayat body in 1975 and 2006.

Village gram panchayat	1975	2006
Patwari	1	-
Mali patel	1	-
Police patel	1	-
Village president	1	1
Vice-president	1	1
Ward members	-	10
Reserved for women	-	-
Backward Caste	-	3
Other castes	-	1
Reserved for men	-	-
Scheduled Caste	-	1
Backward Caste	-	2
Other castes	-	3
Village Panchayat Secretary	-	1
Village Revenue Officer	-	1

Source: Focus Group Meetings, 2007-08.

Besides the elected body, the village administration has two important administrative support staff appointed under the supervision of the gram panchayat president. One is the Village Revenue Secretary (VRS) or village patwari, who maintains records on land, crops grown in the village, land transactions, and land ownership (pattadhar) pass books. The other is the Village Panchayat Secretary (VPS) or mali patel connected to the mandal office, to assist and advise the president and disseminate

information on various programs to farmers. The president and ward members are strong supporters of the ruling political party, even though they are not elected by party association. Before the 1980s, people exercised their vote based on the advice of village leaders. Currently, a majority of households are supporters and sympathizers of political parties.

Electricity came to Dokur in 1962, and is used for domestic purposes, farming, lift irrigation and commercial purposes. The village has an overhead tank that supplies safe drinking water to all households, for which the village administration charges a minimum fee. There are also borewells (200 for irrigation and 8 for drinking purpose) and a tank for non-potable water. In 1975, the village set up a general post office, a fair price shop and flour mills. At about the same time, 10 small provision and stationary shops were set up. Most laborers and small farmers exchange their in-kind wages and farm produce for groceries and other provisions.

3.7 Cooperatives

Dokur has a Primary Agriculture Credit Cooperative Society (PACCS) that lends to different groups of farmers. It is attached to the district central cooperative bank. Farmers must be members of PACCS to avail short-term loans (in cash and kind). Repayment is made in cash after harvest. Though PACCS have different loan schemes for farmers, the informal credit market dominates due to its easy



Loans have become easier with banks such as this one in Devarkadra.



Rice is the staple food in Dokur.

accessibility. Majority of farmers do not borrow from PACCS, Regional Rural Banks (RRBs) (Andhra Pradesh Grameena Vikas Bank) and Scheduled commercial banks due to lack of collateral, various constraints and other banking procedures. In addition to PACCS, farmers are able to get their loans from State Bank of Hyderabad located at Devarkadra and from Andhra Pradesh Grameena Vikas Bank (APGVB) located at Koukuntla, 12 kilometres away from the village, and started in 1999¹⁰.

3.8 Nutrition

Rice is the staple food in Dokur, which farmers grow over large areas during both seasons. Pigeonpea is the most commonly consumed pulses. Small quantities of sorghum are consumed, so is groundnut oil for cooking purposes. Most of the households in the village spend about half their incomes on food grains and other food items. Supply of subsidized rice through fair price shops has had a great impact on food consumption levels. Farmers generally grow cereals, pulses, and vegetables to meet their household needs. An increase in the consumption of fruits, vegetables, pulses, oils, egg, meat, milk and milk products and alcohol has been observed in the village.

3.9 Healthcare facilities

Healthcare facilities in the village have improved since 1975. Health workers appointed by the

government provide health services. The Primary Health Centre (PHC, 30-bed hospital) is 7 kms away in Devarkadra mandal. In addition, the Institute of Rural Health Studies (IRHS) clinic established in the 1980s has been providing basic health services to villagers in Dokur and neighboring villages. Villagers can also consult the local registered medical practitioner (RMP) at a minimum fee either in cash or kind. Veterinary facilities are available in the nearest village.

Free general health camps have been conducted from time to time since the 1990s at the PHC, providing treatment for ailments and diagnosing critical cases of tuberculosis, AIDS, gastroenteritis, malaria and cataract. The government's subsidized toilet construction scheme under which Rs 1000 was provided to improve sanitation, has benefited 110 families. The Government helped 60 families and an NGO (SHARAD) helped 50.

Table 12 compares the general health status of migrants and non-migrants in Dokur village. Compared to non-migrating villagers, the health of the migrants was relatively poor, with 36% of the households complaining of ill-health and of considerable difficulties in handling daily tasks, especially at the migration sites. The majority of the sick migrants were from SC and BC communities. Only two households from the FC community reported poor health, and this was due to the fact that they had suffered a recent accident. The IRHS reported that the migrants were mostly diagnosed with allergies, injuries, infection in their feet, as well

10. This bank was known as Sangameshwara Grameena Bank till 2006.

Table 12 Health status (%) of the VLS households.

	<i>Migrants¹</i>	<i>Non-migrants²</i>
General		
<i>Very good: able to do daily tasks easily</i>	12	48
<i>Good: generally able to do daily tasks</i>	44	38
<i>Poor: substantial problems with daily tasks</i>	36	11
<i>Very poor: unable to do any tasks</i>	8	3
Sexual		
<i>Suffering from sexual health related illness</i>	29	11
<i>Recovering from sexual health related illness</i>	17	2
<i>Never had problems with sexual health</i>	54	71
<i>Declined to comment</i>	2	16

1. n=63.
2. n=86.
Source: Gandhi et al. 2008.

as a high rate of sex-related illnesses. For non-migrant villagers, there was the clinic within Dokur for emergencies, the mandal primary health care

centre a mere four kilometers away and the district General Hospital a half hour bus-ride from Dokur village (Gandhi et al. 2008).

IRHS health clinic in Dokur.



4. Natural Resources

4.1 Rainfall

Figure 3 presents data on monthly rainfall patterns in Devarkadra mandal, Mahabubnagar mandal and Dokur. The distribution of rainfall has been highly erratic in this semi-arid region. In Devarkadra mandal, the average monthly rainfall ranged between 32.2 mm and 75.5 mm from 1988 to 2007.

The monthly rainfall in Dokur ranged between 51.3 mm and 81 mm from 1975 to 1981 and between 60 mm and 72.4 mm from 2005 to 2008. On an average, 75% of the total rainfall in a year is received during July, August and September. Delayed monsoons and uneven distribution of rainfall during critical stages of crop cultivation have become commonplace in recent

years. In Figure 4, years were classified as normal years, drought years and very bad years based on monthly rainfall between 1998 and 2006 in Devarkadra mandal. It was observed that since the 1980s, frequent droughts have plagued Dokur every three years in a span of five years, severely affecting dryland crop production.

4.2 Groundwater

Dokur has a large tank, which all through the 1970s and 1980s, used to get filled up to support two paddy crops a year in the command area. But during the past one decade, the tank has held little water due to scanty rainfall and cessation of inflows

The cracked earth spells doom for dryland crop cultivation.



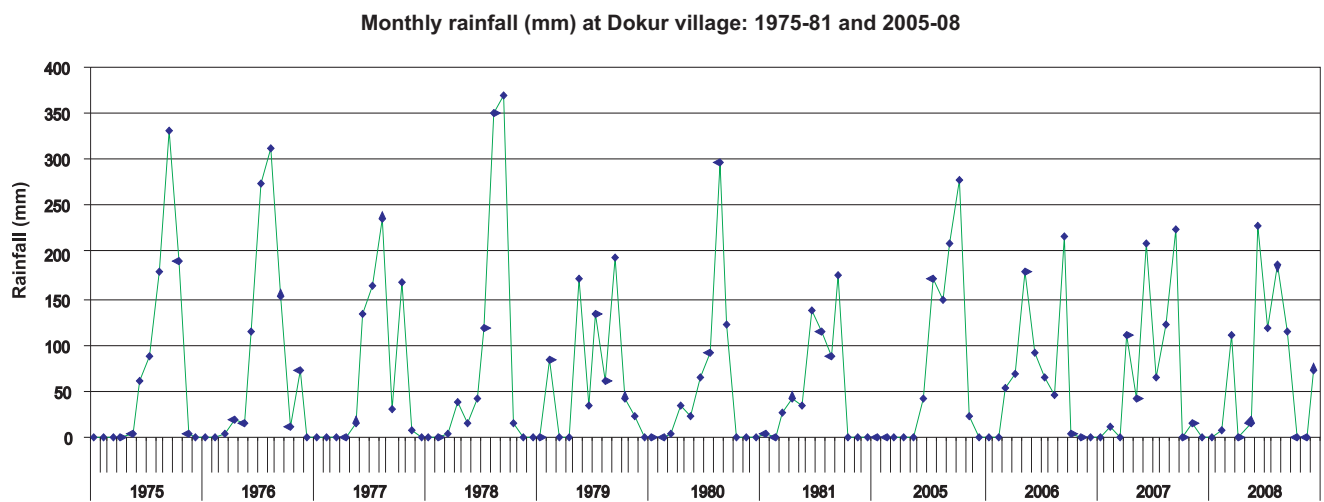
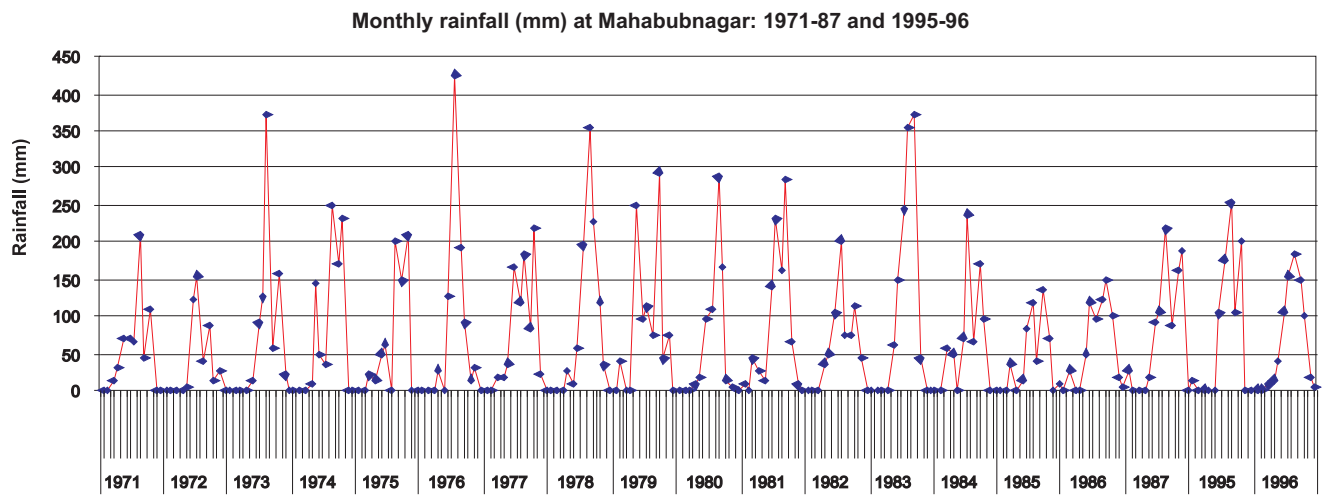
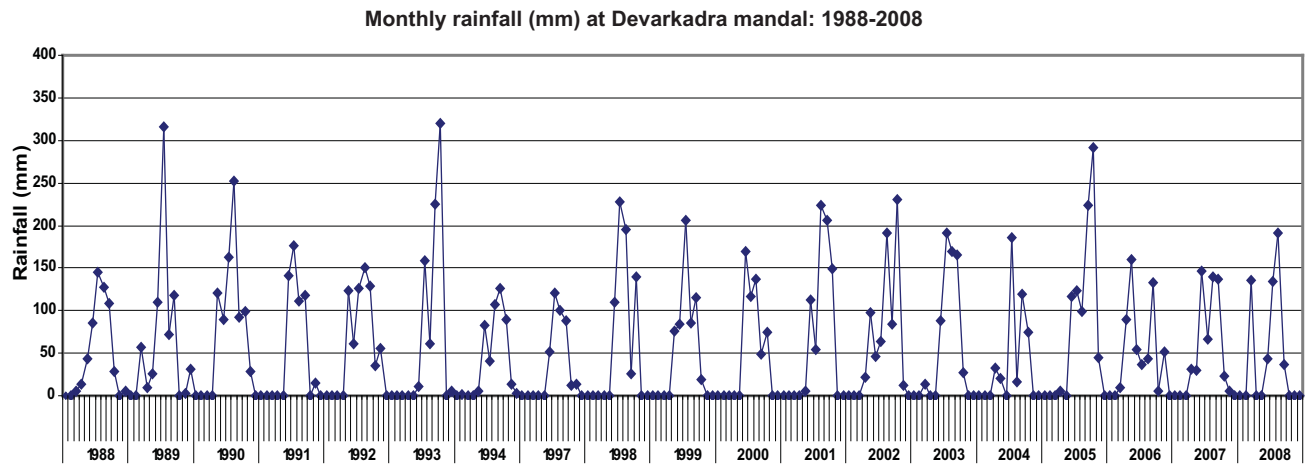


Figure 3. Monthly rainfall (mm) in Devarkadra mandal (1988-2008), Mahabubnagar mandal (1971-87 and 1995-96) and Dokur village (1975-81 and 2005-08).

Source: Mandal Revenue Office, Devarkadra, 2008.

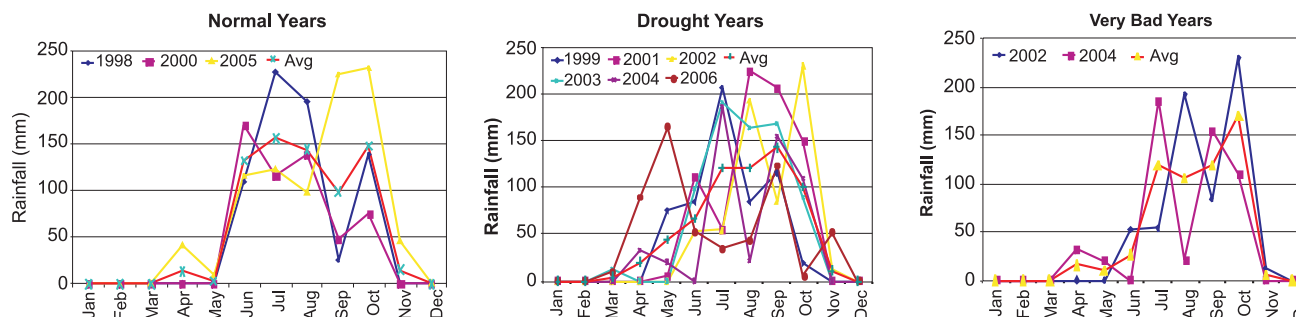


Figure 4. Classification of years as normal years, drought years and very bad years based on monthly rainfall (mm) data of Devarkadra mandal, 1998 to 2006.

Source: Mandal Revenue Office, Devarkadra, 2008.

from the upper catchment. As a result, most of the command area under the tank lay fallow and majority of open dug wells, which were earlier a major source of irrigation for cultivation of paddy, groundnut and other irrigated crops, dried up as water tables declined year after year.

While the source of water from the large tank became unreliable, farmers invested substantially in water exploration. Most of the investments that were made after 1985-2005 were on borewells and in-well bores. Drilling of borewells is a profitable but risky activity with a low success rate of striking water. Farmers who had high success rates in irrigation investments were better off while those with low success rates were unable to pay back loans taken.

Farmers' income from crops began to fall after 1992, primarily due to low rainfall and exploitation of wells and borewells that affected groundwater availability. Over the last 10 years, farmers have been unable to grow paddy as tanks didn't fill up and open wells dried up. Most farmers have kept their lands fallow. A third of the area is now either permanently under fallow or long fallow, resulting in a significant decline in agricultural activity.

Particularly, the deficit in irrigation has led to decline in paddy cultivation.

Electricity for agricultural operations has been subsidized in Dokur. With the change of guard in the State Government in 2004, arrears of electricity bills of farmers relating to agricultural consumption were waived. Electricity for agricultural operations is being supplied free to eligible farmers since May 2004. There are about 200 agricultural pumpsets in Dokur under this category. Through its Rythu Sadassu, Rythu Chaitanya Yatras, Polam Badi and Rythu Bandhu programs, the Government has been advising farmers about latest cultivation technologies and on ways to achieve higher yields and greater incomes with lower production costs.

4.3 Soil classification

There are four major soil types in Dokur village (Table 13). These are dubba, erra, nalla, and regadi. Dubba is a mixture of soil and sand with a higher percentage of sand. Soil depth is between 30 cm and 60 cm. Because of the sand, the soil is very easy to cultivate and water infiltration is rapid. Erra soils (red soils) have lower sand content and are harder

The different soil types: Erra, nalla, and chouldu.



Table 13. Soil types in Dokur village.

Soil types	Area (in acres)	% of soils out of the area
Dubba	90	3.0
Erra	1646	54.8
Nalla	400	13.3
Regadi	NA ¹	NA
Other types		
Choudu	150	5.0
Galusu	645	21.5
Ondru	70	2.3

and stickier, varying in depth between 45 cm and 90 cm. Crops cannot survive very long without rainfall on these soils. Nalla are shallow black soils with about 60 cm depth which fall short of the heavy, deep black soil type (regadi). These soils have higher clay content and are more fertile; crops can survive in them for longer periods without rainfall. Regadi soils are deeper black soils and are very hard when dry and sticky when wet. The depth of the soil is usually between 90 cm and 275 cm. And when they are dry, 5-45 cm cracks develop in them. Water infiltration is slow, but storage is excellent. These soils are thought to be the most productive. The soil is red and its depth is usually less than 30 cm. Apart from these soil types, there are three more types: Choudu refers to a white, salty substance that appears when the soil is dry (sodic soils); galusu are red pebbles; and ondru is silt deposited by runoff (Dvorak 1988).

Gully control structures built to retain soil and water in the fields.



4.4 Soil conservation measures

The Central and State Governments run several schemes to encourage farmers to take up soil conservation on a cost sharing basis. Watershed development programs helped farmers build field bunds, contour bunds, check dams, gully control structures and repair tanks, strengthen bunds, remove silt, deepen tanks and level land. Most of the investments made were toward building field bunds to restrict soil erosion, silt removal and levelling fields under the watershed management programs supported by the Government (see section 6.1 for more details).

4.5 Environmental changes and coping strategies

Most villagers perceived changes in the weather and the reduced availability of water, indicating a rainfall deficit. More than 70% observed its distribution had become highly erratic. Based on formal group meetings in November 2008, about 80% believed that the onset of monsoon was getting delayed. About 90% felt that water availability in wells and borewells had decreased over the years. Water availability in irrigation tanks was observed to have decreased too. Many farmers also perceived a change in other climatic patterns. Majority agreed that both winter and summer temperatures had soared. They estimated that recurrent drought had curbed their income by 50-60%.

Households have been adopting several measures to cope with drought, and their responses depended on whether the drought lasted for less than a year or more than a year (Table 14). A large percentage of

Coping with non-farm work in times of drought.



Table 14. Coping mechanisms adopted by Dokur households in the face of drought lasting less and more than a year.

<i>Drought lasting a year or less</i>	<i>Drought lasting over a year</i>
<i>Cutting consumption expenditure</i>	<i>Deferring major expenses (marriage, development work in agriculture)</i>
<i>Substitution of high-priced food with low-priced food</i>	<i>Sale of assets like jewellery, livestock and land (including uncultivable land and wasteland)</i>
<i>Using stored food stocks</i>	<i>Migration in search of non-farm employment</i>
<i>Using cash savings</i>	<i>Borrowing from different sources at a high rate of interest</i>
<i>Sale of livestock</i>	<i>Using less inputs (fertilizers, pesticides, etc)</i>
<i>Postponement of partial loan repayments</i>	<i>Preference for crops requiring less water and input costs</i>
<i>Taking fresh loans in cash and kind from village moneylenders, friends and relatives</i>	<i>Postponement of loan repayments</i>
<i>Greater participation in the labor market</i>	

Source: Focus Group Meetings, 2007-08.

Table 15. Impact of droughts on farmers and their coping mechanisms between 1984-85 and 2007-08.

<i>Parameter/coping strategy</i>	<i>1984-85</i>	<i>2001-02</i>	<i>2007-08</i>
<i>Number of drought years in the last 10 years</i>	2	6	3
<i>Average shortfall (%) in income due to drought</i>	30	56	45
<i>Households adopting different coping strategies (%)</i>	25	88	80
<i>Borrowing money¹</i>	45	32	31
<i>Depending on savings²</i>	22	4	6
<i>Reducing consumption expenditure³</i>	12	6	3
<i>Selling draft animals and other assets⁴</i>	12	9	2
<i>Shifting to non-farm labor work⁵</i>	5	28	32
<i>Migration⁶</i>	4	11	21
<i>Shifting to other occupations⁷</i>	0	9	5

1. Informal sources of borrowing from moneylenders until the 1980s and from formal sources such as banks starting in the 1990s and from women SHGs 2000 onwards.
2. Household level savings in cash and grain stocks and savings made through SHGs.
3. Cut in input use and consumption expenditure at the household level.
4. Sale of animals, gold, silver and land.
5. Shift towards non-agricultural occupations.
6. Migration to distant places for work to meet family needs.
7. Shift to other occupations such as dairying, selling vegetables, setting up grocery shops, driving tractors and autorickshaws, etc.

Source: ICRISAT VLS Surveys 1981-85; 2001-02 and Focus Group Meetings, 2007-08.

households resorted to borrowing money, shifting to non-farm work, migration, reduced consumption and disposal of assets to cope.

The impact of drought on farmers and their coping mechanisms is given in Table 15. Among the coping mechanisms adopted were deferring long-term loans, marriage of female children and major investment in agriculture; seeking

more employment opportunities (farm/non-farm); migration to cities/towns in search of better employment opportunities; reduction in the consumption of alcohol, toddy, meat, oils, and milk; substituting higher priced food with lower priced food; curtailing food consumption; mortgage/sale of gold, silver and land, sale of livestock; and crop diversification.

A typical diversified farming system in Dokur village.



5. Factors of Production, Sources of Income, Technology Adoption and Institutions

5.1 Factors of production

(a) Labor and wages

Labor. It is becoming increasingly difficult to get enough daily wage labor to complete farm operations (Ghodake and Ryan 1981). While Dokur appears to have had a labor surplus in all seasons ten years ago, there is currently a shortage because: (a) around 30-40% of the population has temporarily migrated to cities (such as Hyderabad, Goa, Pune, Bombay, Surat, Baroda and Ahmedabad) seeking off-farm employment; (b) households who acquired land in recent years prefer to complete farm operations on their own land instead of working for wages; (c) higher demand for labor resonated from growing more commercial crops; and (d) parents prefer to send their children to school rather than offer their labor for wages.

Daily wage rates for both human labor and bullocks have been increasing. Regular farm servants (RFS) who used to work for big landowners in the village a decade ago are no

longer easily available since (i) there are better opportunities for higher paying daily wage non-farm employment; (ii) they do not want to work throughout the year as permanent labor and; (iii) lands can be acquired through leasing-in.

Non-farm employment has gained prominence. There were limited opportunities of work in the village because of persistent drought and fallowing of lands in the command area of the village tank. Labor is now hired on a contractual or casual basis. Labor supply has shifted to the non-farm sector and in very recent years, labor households have been migrating long distances in search of work.

Labor wages. Field operations like weeding and transplanting are traditionally performed only by women. Similarly, men conventionally carry out operations like plowing, puddling, pesticide application, etc. Some operations are performed by both. A wide gap still exists between wage rates for men and women. Daily wages are invariably higher for men for farm as well as non-farm work (Table 16).

Labor has increasingly become a scarce resource.



Table 16. Real wage rates (Rs per day as per 2007-08 prices) in Dokur between 1975-76 and 2007-08.

Labor	1975-76	1984-85	1991-92	2001-02	2007-08
Male	22.3	46.7 – 56.0	63.5 – 76.2	66.8 – 80.2	80.0 – 100.0
Female	16.0	23.3 – 32.7	25.4 – 38.1	33.4 – 40.1	50.0 – 60.0
Child	16.0	23.3 – 32.7	25.4 – 38.1	33.4 – 40.1	-
RFS	8585.5	18676 – 23345	16504	13365 – 16038	12000 – 15000
Bullock pair	55.5	233.5 – 280.1	253.9 – 380.9	267.3 – 334.1	200.0 – 250.0
Tractor	429.3	420.2	507.8	401.0 – 467.8	350.0 – 400.0

Wages have increased due to the 'shortage' caused by migration and engagement in non-farm activities. Villages prefer payment of wages in cash than in kind. The terms of employment are casual labor and contractual. This gives labor greater freedom with respect to the time and payment of wages than is the arrangement for traditional farm servants. While wage rates doubled between 1984-85 and 2007-08 (in real terms), laborers no longer want to work as regular farm servants in the village.

(b) Land

The picture that emerges from the retrospective data on land market in the study village is generally consistent with three trends in the distribution of land ownership: (1) decreasing relative landlessness; (2) broadening equality; and (3) declining farm size (Walker and Ryan 1990).

Land holdings in Dokur are highly fragmented and scattered due to family divisions. More land transactions are being done compared to 30 years ago. Land divisions between father and sons have been mainly due to internal conflicts and family divisions. During 1975, very few households controlled agricultural land. But in the course of time, some households inherited highly fragmented ancestral lands and later, further divided them among sons, leading to a decline both in the size of ownership as well as the operational holding. Majority of the households acquired land by purchases, more so after the 1990s. About 70% of the labor and farmer households belong to the small and medium farm size group who purchased land from big landlords. The value of agricultural land has increased

tremendously since 2004, with values per acre having risen tenfold from Rs 20,000 in 2000 to Rs 200,000 in 2008.

Land remains a major component of the asset base among households and contributes an average of 70% to the total asset of households in Dokur. The average total asset of large farmers is around 10% of the village average. Net production assets contribute around 60% to average total assets. Due to family split-off/divisions, assets were divided in 80% of the VLS panel households. The average total asset per household is around Rs 80,000.

(c) Changes in land ownership

More people now own agricultural land in the village compared to the 1970s. In the course of time, some households inherited highly fragmented ancestral lands. Based on baseline data of 1975-85, about 70% of the original VLS panel of households purchased land from big landlords. Each household now owns land in more than two locations. Those engaged in caste occupations, particularly Golla (Kurma or shepherds) acquired more land than other caste households.

(d) Land distribution and land tenancy

Land distribution. Majority of households received land under the Land Tenancy Act or as a gift under various Government welfare programs. About 150 hectares of Government land were distributed in the village between 1970 and 1985. Landless households acquired land mainly under government welfare programs and through land transactions. Common Property Resources (CPRs) drastically declined in the village. Many more people now own land in the village than in the past

as landowners have subdivided their land among their sons and erstwhile landless labor households have acquired some land (Walker and Ryan 1990). Thus both relatively and absolutely, large landowners have lost ground to small landowners. Land partitioning has taken place in response to increasing population pressure and because of significant increase and diversification in income sources. In the first generation VLS, we observed a considerable share of land leasing, both fixed renting and share cropping – which is also called reverse tenancy (defined as larger owners leasing in land from small owners). But, reverse tenancy has now disappeared because of labor scarcity. Currently, many small farm households own land in the command area of the large village tank.

Land tenancy. Resource adjustment is the main reason for leasing in and leasing out land. Tenancy agreements were entered into by mutual consent and not by coercion. At present, marginal and small farmers lease in or share in land in order to use their excess human labor and bullock more effectively. Since big landowners are not in a position to cultivate their entire land due to non-availability of regular farm servants in the village and the increase in maintenance cost of bullocks, majority of them lease or share out part of their land to tenants. Few landowners left the village after leasing out their entire land to villagers. Thirty years ago, big landowners leased in/shared in land from marginal and small farmers.

(e) Irrigated land

Access to irrigation has significantly influenced the welfare of households in the village. A few farmers had access to irrigation during the 1970s; they owned open dug wells and had access to water resources (tanks). More farmers now have access to irrigation as they have drilled borewells (over 250 feet deep) with support from government subsidies. However, as groundwater exploitation increased with greater number of borewells, open dug wells have dried up completely.

(f) Land degradation and natural resource management

Fertility of both rainfed and irrigated lands has been declining due to soil erosion; excessive use of

chemical fertilizers, particularly on cotton and paddy; non-adoption of appropriate cropping patterns based on soil tests; low or non-application of farmyard manure; and non-adoption of crop rotation. Farmers favor commercial crops because of their higher profitability compared to cereals (cotton after cotton or castor after castor in rainfed land and paddy after paddy in irrigated land).

5.2 Sources of income and changed occupational patterns

Agriculture, farm and non-farm wage labor, migration, caste occupations, running rice and flour mills, plying autos, running private telephone booths and general shops, and selling milk are some of the income sources in Dokur. Households have more diversified sources of livelihood as majority of households have acquired knowledge, education and skills. The share of crops, labor and livestock in the net household incomes has declined. Net incomes from crop production have fallen drastically due to a decline in cropped area under paddy and groundnut and also due to the increasing cost of cultivation in the last 10 years.

With agriculture's decline in importance over the years, the non-farm sector, caste occupations and migration became more important sources of income. Table 17 compares the share of different sources of income in the net annual income of households in 1975-78 and 2007-08. Despite the general decline in the viability of agriculture, net household incomes increased. Net household annual income and per capita income of sample households increased by 83% and 70% respectively in 2001-06 compared to 1975-78 (Rao 2009). Between 1975-78 and 2001-06, there were drastic changes in the distribution of net incomes. The share of net crop income fell significantly, from 46.1% in 1975-78 to a mere 8% in 2001-06. During the same period, the share of income from farm labor declined drastically from 46.3% to 11.1% and the share of non-farm income (including caste occupation and migration) increased from a mere 5.6% to 73.7%. It may be noted that the trend is not significantly different during the normal year (2007-08) and drought years (2001-06), except for a measurable change in crop livestock and farm labor

Table 17. Share (%) of different sources of income in the net annual income of VLS households, 1975-78 and 2007-08.

Sources of income	1975-78	2001-06 (Drought years)	2007-08 (estimates*) (Normal years)
Crops	46.1	8.0	13.6
Livestock	2.0	7.3	9.3
Farm labor	46.3	11.1	7.1
Total farm	94.4	26.4	30.0
Non-farm labor	5.6	49.8	47.5
Caste occupation	0.0	5.0	5.1
Migration	0.0	18.9	17.4
Total	100	100	100

*Based on ICRISAT follow-up survey 2008.
Source: Singh et al. 1982 for 1975-78 and Rao 2009 for 2001-06.

as sources of income as shown in the last two columns of Table 17. Income from caste occupations and migration were classified under other sources in the 1975-78 survey but with its measurable increase, was listed separately in 2001-06. All the above changes increased in real terms as the values of 1975-78 were adjusted for the prices of 2001-06.

By and large, income shares of crops, livestock and

agricultural labor declined over the years, while those from non-farm income, caste occupations, migration and other sources increased. Income sources have become more diversified now than three decades ago. The net income earned from sheep and goats was substantial in the village. Both sheep and buffaloes contribute to income gain. Caste occupations and income from migration have emerged as important sources of income, in the same way as sale of milk has become significant in certain households in the village.

Sources of livelihood. The decline in income from crop production has been primarily due to droughts and consequent diversification of income outside agriculture. Non-farming activities such as business, self-employment, migration, plying autos, driving, tailoring and salaried jobs were sought as alternative options. New livelihood opportunities were created for households that had grown richer due to increase in land values, enabling them to invest in education or business. Poorer households were left with the option of taking up non-farm labor activities by migrating to cities and other places for higher wages.

Self-employment through caste occupation in the non-farm sector is common.





Non-farm activities are sought as alternative sources of income.

In 1975, over 77% of households' main income came from agriculture and related work. By 2007, only 43% of households depended on agriculture and agriculture related activities whereas 57% depended on non-agricultural income sources. Table 18 provides insights into primary and secondary occupations in Dokur between 1975 and 2007.

Income increase from out-migration were enabled by higher literacy rates and greater

exposure which facilitated their participation in external labor markets and salaried jobs.

Migration. Labor tends to migrate when local employment opportunities are inadequate. Prospects of better wages and year-round employment also encourage migration. Income from seasonal migration in 2007 (30% households) and income from agriculture and related work (21% agriculture, and 22% farm work) were equally important. This marked a drastic change since 1975-78 and goes to show that while households

Table 18. Percentage of households engaged in primary and secondary occupations in Dokur between 1975 and 2007.

Occupation	Primary source				Secondary source			
	1975	1989	2001	2007	1975	1989	2001	2007
Agriculture	53	44	18	21	45	51	25	30
Business	4	5	2	2	5	4	1	1
Carpentry	2	2	1	1	-	-	-	-
Farm work	24	33	17	22	28	30	37	40
Government job	3	2	2	2	5	2	1	-
Migration earnings	-	-	37	30	-	-	4	12
Milk sale	-	-	1	2	-	-	4	4
Private job	-	-	2	4	-	-	1	3
Regular job	-	1	-	1	-	-	2	-
Sheep rearing	5	-	4	5	3	8	1	2
Toddy sale	-	-	2	3	-	-	-	2
Washing clothes	1	1	1	1	-	-	-	1
Contract labor	-	-	2	1	-	-	3	-
Others	10	14	11	5	15	5	20	5

Source: Deb et al. 2002 and VLS Census: 1975, 1989, 2001 and 2007.

having adequate land may prosper through modern agricultural production technologies, households with almost no land may opt for seasonal migration as a main source of livelihood.

Migration to far off places such as Hyderabad to work in construction projects has been increasing and has become an important source of income for many poor families in Dokur, especially when rainfall plays truant. A broad assessment of migration trends reveals that seasonal migration is the most important form of labor mobility for the poor, especially in drought-prone Dokur. Though rural-to-rural migration continues to be important, rural-to-urban migration appears to be growing faster because of the numerous opportunities in urban construction, manufacturing and service sectors. Seasonal migrants return to the village before the monsoon to continue work on their fields if the monsoon is good. Otherwise, a great proportion of them migrate in search of employment.

Many households in Dokur mainly depend on labor earnings though they own land. Non-availability of

employment opportunities in the village has led to migration to cities such as Hyderabad, Pune, Goa, Mumbai, Surat, Baroda and Ahmedabad. Migrants seek non-farm jobs such as driving, mud work, construction, watchman and canal digging and caste occupations including washing clothes, carpentry, goldsmith and toddy tapping (Table 19).

Among the total households in Dokur in 2007, more than 30% were involved in seasonal out-migration as a source of livelihood. Almost 60% of the migrant households belonged to the Madiga and Telaga castes (Table 20). Most migrant households belong to the Backward Castes and Scheduled Castes, indicating that these households are under tremendous pressure to secure their livelihoods within the village but are forced to migrate due to insecure employment opportunities.

Limited seasonal out-migration from Dokur started in the 1970s. However, the trend has significantly increased since 1992-93 due to greater population pressure and non-availability of year-round work within the village (FGMs 2007-08). The more

Labor tends to migrate when local employment opportunities are inadequate.



<i>Nature of employment</i>	<i>Distance</i>	<i>Place</i>	<i>Gender</i>	<i>Wage rate</i>
<i>Non-farm work like canal digging, construction, laying roads, hamali (loading and unloading), etc.</i>	<i>100-1000 kms</i>	<i>Hyderabad in AP; Pune, Goa and Mumbai in Maharashtra; and Surat, Baroda, Ahmedabad in Gujarat</i>	<i>Male, female</i>	<i>Rs 10,000 in advance (1000 per month) plus free food and accommodation</i>
<i>Washermen and barbers (caste occupations)</i>	<i>> 600 kms</i>	<i>Goa and Pune</i>	<i>Male</i>	<i>Rs 3000-4000 per month</i>
<i>Driving of jeep, taxi and trucks, etc</i>	<i>125 kms</i>	<i>Mahabubnagar and Hyderabad</i>	<i>Male</i>	<i>Rs 2500-3000 per month</i>
<i>Service boys in hotels, bar-cum-restaurants and lodges</i>	<i>125 kms</i>	<i>Mahabubnagar and Hyderabad</i>	<i>Male</i>	<i>Rs 2000 per month and free food and accommodation</i>
<i>Laying underground cables and water pipes</i>	<i>25-125 kms</i>	<i>Mahabubnagar and Hyderabad</i>	<i>Male, female</i>	<i>Rs 80-100 per day</i>
<i>Driving autos</i>	<i>5-125 kms</i>	<i>Devarkadra, Mahabubnagar and Hyderabad</i>	<i>Male</i>	<i>Rs 150-200 per day</i>
<i>Monthly salaried jobs in shops, companies and other establishments</i>	<i>5-125 kms</i>	<i>Devarkadra, Mahabubnagar, Hyderabad</i>	<i>Male</i>	<i>Rs 2500-3500 per month</i>
<i>Maid servants in homes</i>	<i>25-125 kms</i>	<i>Mahabubnagar and Hyderabad</i>	<i>Female</i>	<i>Rs 400-800 per month</i>
<i>Carpenter, goldsmith, barber and other caste occupations</i>	<i>10-30 kms</i>	<i>Devarkadra, Mahabubnagar and Hyderabad</i>	<i>Male</i>	<i>Rs 100-150 per day</i>

Source: Focus Group Meetings, 2007-08.

<i>Caste</i>	<i>No. of households</i>	<i>Households (%)</i>	<i>Migrant households (%)</i>
Boya	27	5	11
Chakali	10	2	4
Gowda	4	1	2
Madiga	55	11	22
Musti	21	4	8
Mala	2	0	1
Reddy	25	5	10
Telaga	90	17	36
Vadla	2	0	1
Others ¹	12	2	5

1. Includes Balija, Brahmin, Golla Jogi, Hamsala, Mangali, Medari, Vysya and Yerukula.

educated, skilled and literate population of the village are finding salaried jobs for higher wages in towns and cities. About 1000 people out of 2816 (more than 35%) of Dokur's population are seasonal migrants (within the state of AP) to Hyderabad, Nizamabad, Pochampadu and Mahabubnagar, and outside the state to Gujarat and Maharashtra.

Five to six years ago, when irrigated paddy was the most labor intensive crop grown in both rainy and postrainy seasons in Dokur, farmers used to face labor shortage during the peak season and both male and female labor could get employment within the village throughout the year.

The situation has changed dramatically with persistent drought and uneven distribution of rainfall at critical stages of crop growth becoming the norm in the last six years. Productivity of both irrigated and rainfed crops has declined and the area under paddy has drastically declined due to non-availability of water in tanks/wells and failure of borewells. This has created low demand for labor in the village, forcing villagers to seek employment opportunities elsewhere. About 30 service caste households (washermen and barbers) have permanently migrated to Goa and Pune. Majority of laborers have migrated to Hyderabad to pursue mud work, construction, work as hamalis (loading and unloading), take up private salaried jobs as watchman, driver or waiter or run an STD booth. Laborers receive Rs 60-75 per day depending upon the type of work and gender. Monthly salaries vary between Rs 1500 and Rs 3000.

Out-migration to Maharashtra and Gujarat has been increasing in Dokur in the last 3-4 years because each worker is paid an interest-free advance of Rs 10,000-12,000 by the labor contractor who belongs to Dokur or its surrounding villages. Advances are used to clear old debts, repair/construct houses and meet marriage expenses, and are deducted from the salary. Workers are employed for 9-10 months on a monthly salary of Rs 800-1000. They are entitled to holidays on national festivals and once a fortnight. Contractors provide them free transportation to and from the work place, food and accommodation. A contract document is drawn up between the contractor and worker in the presence of villagers, containing information about the

advance paid and detailed terms of employment. If a worker leaves the job midway through the contract, he is bound to repay the remaining advance to the contractor at an annual interest rate of 36%.

Information about employment opportunities, nature of work, terms and conditions and wage rates (for men and women) in Hyderabad and other towns trickles down to the village mainly from visiting relatives and migrants. Those who have studied up to class 10 and beyond work on salaried jobs (part and full time) while the rest work as daily-rated workers.

Backward Caste families depend on more diversified sources of income than those belonging to the Scheduled Caste. Majority of Forward and Backward Caste families have 2-4 sources of income, while Scheduled Caste families have at most two sources of income.

Migration and commuting are very likely to continue because of wage differentials, improving communications, infrastructure and transport facilities. However, migration continues to be highly expensive and risky, especially for the poor, because the overall policy environment and institutional system is not migrant friendly. Travelling, finding accommodation, negotiating work and pay rates, accessing government services (health, education and subsidized food) and remitting money home are all constraining to poor migrant workers.

Livestock. Over the recent years, the contribution of livestock to the overall income of the household

While the overall livestock population in the village fell, small ruminants were increasingly reared by households.



in Dokur has declined. Insufficient fodder, increase in maintenance cost, shortage of grazing land and labor shortage have been some important reasons. The number of draft cattle declined very sharply. Around 60% of farmers belonging to the small and medium farm size group did not own even a pair of bullocks but were hiring bullocks or tractors to complete farm operations. While the livestock population (cows, young cattle, and unproductive animals) in the village fell by 60% from 1975-76 to 2007-08 (see Table 9), small ruminants reared by households increased because of high meat prices. In fact, rearing of sheep and goats is an important caste occupation (golla or kurma) in the village.

Farmers belonging to small and medium farm size and labor groups were able to acquire land from big landowners. They leased-in or shared-in land from big farmers who have reduced their livestock resources by 60% due to labor shortage. About 60% of small and medium farmers do not have bullock pairs. Some households are managing with improved she buffaloes and jersey cows to sell milk. It has become difficult to find grazing land as common property resources have fallen drastically due to population pressure. In this vicious circle, a reduction in the number of livestock led to low or non-application of farmyard manure for dryland crops.

5.3 Cropping pattern

The crop calendar is characterized by cropping seasons. The first season, kharif or rainy season, lasts from June to September. The second season, rabi or postrainy, is from October through January. The third season, summer, is from February to May. The months of April to May are spent in field preparations in the drylands. Rainy season cropping begins in June and continues up to the second week of July. Interculturing begins in the month of July, lasting till September.

All rainy season crops except castor and pigeonpea are short-duration crops with harvesting usually taking place from October through early November. The castor crop is ready for the first picking in October followed by 5-7 pickings in

January. Pigeonpea is harvested from the last week of December until early January. Postrainy season planting starts in September-October and crops are ready for harvesting between January and February. Rainy season paddy is planted in June-July and harvested in November-December. Postrainy season paddy is planted in December-January and harvested in March-April.

Cropping patterns in the village have changed in response to changes in weather patterns, technological improvements, relative crop prices, etc. The crop area usually grown to groundnut is currently used to cultivate castor due to the problem caused by wild boars. Castor and castor-based intercrops occupy about two-thirds of the rainy season area. Castor is a low-input crop that fetches a high price.

Table 21 presents the acreage and percentage of crops grown in Dokur village during the 2001-04 cropping season. Castor occupied 27% of the rainy season area and 37% of the area intercropped with pigeonpea in the rainy season. Paddy was grown in irrigated conditions under borewells and continues to be the favourite crop in irrigated lands, accounting for 16% of the rainy season area and 42% of the postrainy season area. Some irrigated area was allocated to fruit trees like sweet orange and mango and also vegetables. These crops covered both rainy and postrainy seasons. Sorghum hardly occupied less than 3% of the rainy season area but was grown in 30% of the postrainy season area. Farmers would wait until the month of August for the monsoons so that the tank filled up. During this time a few farmers would plant sorghum as an early postrainy season crop. Sorghum along with pigeonpea was grown in 2.5% of rainy season area. Finger millet was grown in 0.6% of the area in the rainy season. Other crops like groundnut, fodder and vegetables covered 2% of rainy season area and 10% of postrainy season area. Around 55% of the land was left fallow during the 2001-04 rainy season due to failure of rains and non-filling of the village tank. Cash crops dominated the cropping system in Dokur in 2001-04.

Table 21. Acreage (ha), percentage (%), and productivity (kg/ha) of different crops in Dokur village, 2001-04.

Crop	Acreage (ha)			Percentage of different crops			Average productivity (kg/ha)
	Rainy season	Postrainy season	Total	Rainy season	Postrainy season	Total	
Paddy	8.70	3.90	12.6	16.00	42.30	19.80	4129
Maize	1.01	0.00	1.01	1.90	0.00	1.60	1007
Sorghum	1.41	2.77	4.18	2.60	30.10	6.60	666
Finger millet	0.34	0.47	0.81	0.60	5.10	1.30	988
Sorghum + pigeonpea	1.38	0.00	1.38	2.50	0.00	2.20	283 + 84
Maize + pigeonpea	0.30	0.00	0.3	0.60	0.00	0.50	
Fodder	0.88	0.17	1.05	1.60	1.80	1.60	
Pigeonpea	0.13	0.00	0.13	0.20	0.00	0.20	163
Cotton	1.97	0.00	1.97	3.60	0.00	3.10	779
Vegetables	0.00	0.13	0.13	0.00	1.40	0.20	
Fruit crops	1.21	0.00	1.21	2.20	0.00	1.90	
Gherkins	0.14	0.37	0.5	0.20	4.00	0.80	4899
Castor	14.52	0.24	14.75	26.70	2.60	23.20	556
Groundnut	0.20	0.67	0.87	0.40	7.30	1.40	1582
Castor + pigeonpea	20.30	0.00	20.3	37.40	0.00	32.00	399 + 66
Other crops	1.82	0.49	2.33	3.50	5.40	3.60	
Ladies finger	-	-	-	-	-	-	1663
Smooth cucumber	-	-	-	-	-	-	1158
Grand total	54.31	9.21	63.52	100.00	100.00	100.00	

Source: Rao and Kumaracharyulu 2007.

5.4 Adoption of new technology

Table 21 also presents data on average crop productivity in Dokur. Productivity of all dryland crops has increased since 1995, particularly castor and sorghum, due to the adoption of improved varieties (over 90%) and better management practices. The role of women in decision-making, with respect to use of new technologies has increased. To make up for soil nutrient deficiency, use of chemical fertilizers for dryland crops has increased in recent years, while application of farmyard manure remained low. Mechanization has increased in the village. Several tractors, threshers and sprayers are available within the village on rent. The rental market for machinery has developed rapidly in the past 10 years. The number of tractors increased from 1 to 8 and power sprayers up to 25. The adoption of high-yielding varieties (HYV) of castor, pigeonpea, groundnut and sorghum has been increasing. While progressive farmers, relatives and friends continued to be the most important sources of information on new technologies, input dealers

served as a source of information on improved seeds and plant protection chemicals.

The last 3-4 years since 2004 have seen a decline in productivity due to delayed rains, long dry spells at critical stages of crop growth, excess rainfall at flowering and grain formation and severe pest and disease infestation.

In fact, high-yielding cotton varieties have been introduced in the village; and also in recent years, seed companies have begun promoting *Bacillus thuringiensis* (Bt) and other high-yielding varieties of cotton. But unlike other areas in Andhra Pradesh where Bt cotton has been successfully adopted, this technology failed to be adopted in Dokur due to persistent drought.

Pest and disease incidence. Pests cause great damage to castor, paddy and pigeonpea. Blast, leaf folder and brown plant hopper are the major pests affecting paddy. Jassids and semi looper are major pests of castor. Pod borer and leaf folder are the major pests in pigeonpea. Farmers use pesticides to



Mechanization and an improved rental market for machinery are evident in Dokur.

control pests and diseases. Endrin was the first pesticide used by the villagers in Dokur in the 1980s, which was later banned by the Government of India. Monocrotophos and endosulfan are most commonly used against a wide range of pests.

Diseases and weeds are also important constraints of some crops. Since farmers lack knowledge on the kind of chemicals to apply and often buy what shopkeepers give them, they need information about integrated pest and disease management strategies. Though the government is encouraging integrated pest management (IPM) techniques, farmers haven't shown much enthusiasm due to lack of knowledge, poor extension facilities and practical problems in adopting some components.

5.5 Institutions: Markets and credit access

Markets. Linkages between the village and markets have improved, as reflected in the cropping patterns and utilization of farm produce. Farmers now have better market orientation and sell most of their produce in the market. Lack of storage facilities and the immediate need for cash are imperative explanations for the immediate disposal of produce. Farmers report that they are not facing any problem selling their produce in the market. Earlier, most of them would sell their produce within the village, with commission agents and traders visiting the village buying the produce at a mutually agreed price. Farmers now realize that their produce can fetch a higher price if they are directly linked to the market. However, they feel they are not getting a remunerative price for crops



A shop selling inputs.



The Wednesday weekly market in progress.

and wonder why the buyer has the right to fix the price of their produce. In reality, the farmer plays no role in fixing the price of his produce. The farmers strongly felt that the Government should take the opinion of producers while fixing the price of agricultural produce. Farmers also complained that while input prices had doubled in the last three years, the harvest price of sorghum had not increased by even 10% during the same period.

Credit and indebtedness. While the PACCS and Andhra Pradesh Grameena Vikas Bank (earlier known as Regional Rural Bank run by Sangameswara Grameena Bank, the lead bank of the district) were the lead sources of credit for households, informal credit arrangements have decreased in the village. For example, informal chits (saving-cum-lending groups) and women's SHGs have also become important sources of credit, which helped in reducing the importance of moneylenders. Fifteen years ago, around 12-15 moneylenders were providing loans for agriculture, to whom more than 80% of the households were indebted given the usurious interest rates that ranged between 24% and 36%. Recovery problems and government intervention reduced the role of these moneylenders.

There has been a change in the attitude of borrowers. Most farmers borrow from Government-owned financial institutions like the PACCS, Grameena banks and commercial banks. Households who have land on their names become members of the society by paying a membership fee. The society supplies cash and in kind loans on a short-term basis to members. Farmers repay these loans in cash after harvesting their crops. They also borrow from commercial banks to dig wells, purchase implements, bullock cart, milch animals, and sheep and goats.

Tata Institute of Social Sciences' figures (TISS 2005) have suggested that around 150,000 farmers have committed suicide over the past 10 years, unable to repay debts owed to moneylenders. To give a boost to the agricultural sector, in February 2008 the Government of India announced a loan waiver of Rs 60,000 crores (Rs 600 billion) of farm loans for about 40 million farmers across India. This relief is expected to help the government deal with its agrarian crisis. The Debt Waiver and Debt Relief scheme introduced by the Government covered all agricultural loans disbursed by scheduled commercial banks, regional rural banks and cooperative credit institutions. The amount eligible for debt waiver¹¹ or debt relief¹²

11. Under the debt waiver scheme, for small or marginal farmers, the entire 'eligible amount' is waived.

12. Through debt relief, other than the small and marginal farmers, there will be a one-time settlement (OTS) scheme under which the farmer will be given a rebate of 25 per cent of the 'eligible amount' subject to the condition that he pays the balance 75 per cent of the 'eligible amount'.

comprises the loan amount together with applicable interest (i) disbursed up to 31 March 2007 and overdue as on 31 December 2007 and remaining unpaid until 29 February 2008. Agricultural loans, which were rescheduled and restructured during 2004-06, were also considered

eligible for a waiver or a one-time settlement (OTS) under the same scheme, which ended on 30 June 2008. For Dokur village the total amount of loans waived off by the Cooperative Bank for 100 farmers was Rs 2,300,000 (short-term loans of Rs 700,000 and long-term loans of Rs 1,600,000).

Farmers have access to credit through banks and cooperatives in Devarkadra, 5 kilometers away.



Pro-poor government welfare programs focus especially on women and children.



6. Government Welfare Programs

6.1 Role, functions, benefits and impact

Households benefited partly from government development and welfare programs ensuring land distribution, subsidized agricultural machinery and inputs, housing and the PDS. Schemes for self-employment, free LPG connections, drought relief and family planning also helped households receive direct benefits. Table 22 gives some details of the different programs and their benefits that have accrued to villagers in Dokur.

(a) Public distribution system

To cater to beneficiaries under the public distribution system (PDS), the village fair price shop receives 106 quintals of rice, 6 quintals of sugar, 1540 litres of kerosene, 6 quintals of pigeonpea dal (split grain) and 6 quintals of oil from the district civil supplies department. Rice, sugar and kerosene too are supplied at subsidized rates. The village's pro-poor PDS is very strong and meant to ensure food security for all groups.

In Dokur, 600 families have white cards and 10 families pink cards (defined in Table 22). About 48 families have benefited from Antyodaya cards (meant for landless labor with no caretakers), receiving 35 kgs of rice per family per month at Rs 3.00 per kg and 2 families (poorest of the poor and with no income) receiving about 10 kgs of free rice per month per member under the Annapoorna Padhakam.

Rs 2 per kg rice scheme. On 9 April 2008, the Andhra Pradesh government relaunched the Rs 2-a-kg rice scheme for below poverty line (BPL) families. The scheme provides rice at Rs 2 per kg to economically poor families, 25 years after it was first introduced in the state in April 1983 by the then Telugu Desam government led by N T Rama Rao. The scheme was subsequently scrapped by the Congress regime which raised the price to Rs 3.50 per kg in 1992. N T Rama Rao re-introduced the

scheme in January 1995 on regaining power in 1994. When N Chandrababu Naidu came to power in 1995, the scheme was scrapped in July 1996 and the price of rice raised to Rs 3.50 per kg and further raised to Rs 5.25 per kg in 2000.

Prior to this scheme, rice was being supplied to BPL families who are white cardholders through ration shops at Rs 5.25 per kg. The number of people covered under this scheme in Dokur far exceeds the actual number of households, meaning some households possess more than two cards! The Government has increased the annual income eligibility limit for this scheme from Rs 60,000 to Rs 75,000, enabling about 20 pink cardholder families to be eligible for white cards that get them rice at Rs 2 in the public distribution system.

Families falling below the poverty line with ration cards are provided 4 kgs of rice per head, subject to a maximum of 20 kg per family per month, supplied through government-run fair price shops. This is to provide food security to the poor. The scheme comes into effect when the open market price of rice (of the same quality) is about Rs 15 to Rs 20 a kg. About 65 million out of the total population of 82.2 million are estimated to benefit from it in the state. The civil supplies department of the Government of Andhra Pradesh is setting up toll-free telephone lines at the state level and wings headed by joint collectors at the district level to receive complaints and ensure the smooth operation of the scheme.

The government has also been supplying red gram at Rs 30 per kg and palmolein oil at Rs 60 per kg to BPL ration cardholders from 1 May 2008.

(b) INDIRAMMA (Integrated novel development in rural areas and model municipal areas)

The primary aim of this program, launched in 2007, is to provide pucca (concrete cement roof) houses, drinking water supply, individual sanitary latrines,

Table 22. Government welfare programs in operation in Dokur and their beneficiaries.			
Program	Purpose	Benefits	Beneficiaries
Public Distribution System (PDS)	Subsidized rice, kerosene and sugar	Subsidized supply per month (rice -106 quintals; kerosene - 1540 litres; sugar - 6 quintals; dal - 6 quintals; oil - 6 quintals; and iodized salt - 3 quintals)	600 white card (ie, earning less than the annual income eligibility limit) and 10 pink card (earning more than the annual income eligibility limit) holders
Antyodaya Anna Yojana (AAY) Padhakam	Rice to the poorest of the poor	Supply of 35 kgs of rice at Rs 3 per kg	48 households
Annapoorna Padhakam Pension scheme	Support to the aged Old people, widows and physically handicapped	Free supply of 10 kgs of rice Total amount spent per month - Rs 20,600 (each beneficiary gets Rs 200 per month)	2 households 103 persons: 55 old persons, 46 widows and 2 physically handicapped persons (PHCs)
Indiramma Gruha Nirmanam	Housing scheme; subsidies are given for constructing houses	Loan of Rs 31,500 to each applicant; Rs 2500 deducted as the first instalment from the loan amount	246 households sanctioned
Anganwadi Program	Supplementary nutrition, immunization, health check-ups, pre-school education provided; children below 6 years, pregnant and lactating mothers benefit. Reduces incidence of mortality, morbidity and malnutrition	Total amount spent - Rs 6000 per month towards nutrition, food and staff salaries (Rs 2100)	46 children (6 months to 72 months); Rs 2.00 per child per day 12 Pregnant women and nursing mothers; adolescent girls (under KSY); Rs 2.30 per beneficiary per day
Mid-day meal scheme	Lunch to school children in classes 1-7 on every school day	Total amount spend per month: Rs 14,950	299 boys and girls; Rs 2 per child per day
Self-Help Groups (SHGs)	Each group consists of 15 members; savings are made by women who each contribute Rs 30 per month to the group and Rs 11 per month to the gram sangam	Government provides a revolving fund of Rs 25,000 (Rs 10,000 subsidy + Rs 15,000 loan) to each group Thrift amount is pooled and given as loan to members; production or investment based on the priorities determined by the group	33 active groups (23 groups formed in Nov 2007) and a total of 400 members
National Rural Employment Guarantee Scheme (NREGS)	Guarantees employment as wage labor; helps in arresting migration	100 days of wage employment in a year to every household; insurance of Rs 50,000 to cardholder Total amount spent so far – Rs 1,000,000	250 persons from 100 families (100 male and 150 female) Total amount spent - Rs 1,000,000 as on Dec 2008 ensuring 10,000 employment days
Protected drinking water	Supply of protected drinking water to all households and to village schools	Total amount spent on construction of tank and pipelines – Rs 1,500,000	Construction of storage tank (180 taps to households and 5 taps for common use)
Construction of toilets	Maintaining the cleanliness of the village	Providing Rs 2000 to construct individual toilets to ensure sanitation in the village	20 households

Continued...

Continued...

Program	Purpose	Benefits	Beneficiaries
Sheep, goat deworming program	Deworming program for sheep and goat	Rs 9500 worth of deworming medicines given free every	21 shepherds benefited 3914 sheep and goats
Sheep pox and goat pox	Preventive and control vaccination	6 months; Rs 9000 worth of medicine was given away free	About 20 shepherds benefited
Development activities by the gram panchayat	Various development activities undertaken by the Gram Panchayat	Total amount spent by the Gram Panchayat between 2001-06 - Rs 2,905,000	Construction of new school building - Rs 1,000,000; renovation of old school building - Rs 240,000; laying CC roads - Rs 500,000; drains Rs 200,000; internal roads - Rs 300,000; Mudiraj community hall - Rs 250,000; Yadav community hall - Rs 150,000; SC community hall - Rs 150,000; and bus shelter and welcome arch Rs 115,000
Other programs	Water conservation, drought, health, Back-to-school programs (to bring dropouts back to school); banning child labor, etc.	Various programs on depending on need and Government priority	50 households

Source: Focus Group Meetings, 2007-08 and Gram Panchayat Office, Dokur, 2008.

Government programs target the poorest of the poor.



drainage, power supply to every household, road facilities, pension to eligible persons, weavers, widows and the disabled, primary education to all, special nutrition to adolescent girls/pregnant and lactating women and better health facilities in all the villages over a period of three years in a saturation mode and to improve the living standards of the people.

Pension schemes

These schemes help vulnerable groups like the aged, disabled and widows. Beneficiaries receive Rs 200 per month. Totally, 103 people benefited from old age pensions, 46 from widow pensions and 2 from physically handicapped pensions. Apart from these pensions, 4 families in the village benefited by Rs 5000 from the National Family Benefit Scheme (NFBS) (provided to families following the sudden death of an earning member aged between 35 and 45).

Indiramma Gruha Nirmanam

This is a mass housing scheme for the homeless. The process of identifying beneficiaries began in



Subsidies are given for constructing houses.

January 2008. The Government has constructed 98 houses so far, another 104 houses are in the final stages of completion and 44 more houses were sanctioned in December 2008.

The beneficiary must construct a house on not less than 20 sq meters as per the approved design type of the "Self Help and Mutual Help" concept without involving contractors/middlemen. The beneficiary must be below the poverty line, with an annual income not exceeding Rs 20,000; must not be a beneficiary of any other housing scheme or possess title over land proposed for the construction of a house; and must have the capacity to repay the loan within the stipulated period.

Indira Kranthi Patham (IKP)

The activities of the Development of Women and Children in Rural Areas (DWCRA) and Velugu were integrated under a programme called Indira Kranthi Patham (IKP). This integration was meant to implement programs for strengthening SHGs and with the objective of women empowerment and poverty alleviation.

Indira Kranthi Patham is a statewide poverty reduction project to enable the rural poor to improve their livelihoods and quality of life through their own organizations. It aims to cover all rural poor households and is implemented by the Society for Elimination of Rural Poverty (SERP), Department of Rural Development, Government of Andhra Pradesh. SERP is an autonomous society registered under the Societies Act, and implements the project through the District Rural Development Agencies (DRDAs) at the district level. IKP builds on more than a decade-long, statewide rural women's self-help groups movement. The project mandate is to build



Integrating nutrition programs with informal education via anganwadis.

strong institutions of the poor and enhance their livelihood opportunities so that they become less vulnerable. A Community Investment Fund (CIF) is the major component of the project, which is provided to the self-help groups/village organization/Mandal Samakhyas to support a wide range of activities for the socioeconomic empowerment of the poor.

Anganwadi

Anganwadi programs are targeted at improving the nutrition and health of young children, women (particularly those pregnant and lactating) and adolescent girls. To combat malnutrition and augment healthcare, the Integrated Child Development Services (ICDS) integrates supplementary nutrition programs with informal education through anganwadis and health care for children below six years of age and pregnant and lactating women. To ensure access to basic healthcare services, a community health worker is provided. Motivated and qualified local women are recruited to work as anganwadi worker and anganwadi helper. To prevent dropouts and encourage enrolment, anganwadi centers take care of infants, and enable older girls to go to school. The back-to-school programs help dropouts re-enter the formal education system at a level appropriate to their age. On an average, each child beneficiary under this scheme receives nutritious food worth of Rs 3000 every month.

(c) Self-Help Groups (SHGs)

A Self-Help Group is a small voluntary association of poor people, usually from the same socioeconomic background. They come together to solve their common problems through self-help and mutual help. SHGs have three types of groups. One group

deals with development of natural resources; the second group deals with development of human resources; and the third group deals with employment generation. Water User Associations (WUA) and Watershed Development Committees (WDC) are self-help groups organized for the development of natural resources at the village level. Village Education Committees (VEC) and the Mother's Committees are organized for the development of human resources at the community level. The activities of DWCRA, Individual Financial Needs (IFN), and Financial/ Non-Financial Community Needs (FCN/NFCN) receive support from the Gram Panchayat. Village Education Committees (VECs) formed in Dokur constructed two high school buildings and a compound wall using government funds. Students received books free of cost.

Economic empowerment of women through SHGs

What began as a small experiment of promoting thrift among women from BPL families almost a decade ago has been transformed into a mass-

based movement to end poverty in the village. An SHG is a group formed by the community women, with a specified number of members, say 15 to 20. The poorest group of women come together during an emergency or disaster, for social reasons, for economic support, conversation, social interaction and cultural interactions. Under this program, each woman saves one rupee per day and deposits it into the group fund. The State Government assists SHGs by providing a revolving fund. SHGs are not only encouraging thrift but are also able to take small loans out of the corpus available with the group. The group corpus consists of savings, government assistance and bank loan. Members initially use the loan out of the group corpus for their personal needs. However, in the long run, such loans are utilized for income generation activities. SHGs are popularly known as DWCRA groups.

Distribution of benefits and assistance under different schemes and programs of the government are made through the Gram Panchayat. These include the revolving fund to eligible DWCRA groups, loans to SHGs, gas connections under

Collecting savings through SHGs has led to a perceptible improvement in the status of women in Dokur.



Deepam, and pensions for the widowed, disabled and aged. Initially, 10 women's SHGs were formed in Dokur; and over the years these groups increased to 33 – Bhavani Mahalakshmi Sangam (Podupu), Mallikarjuna Mahila Sangam, Mahalaksami Mahila Sangam, Veeraguruvu Mahila Sangam, Jagadeshware Mahila Sangam, Madhavi Mahalakshmi Mahila Sangam, Harita Mahila Sangam, Akhila Mahila Sangam, Kaveri Mahila Sangam and Swati Mahila Sangam, etc – each consisting of 15 members depositing Rs 30 per month in the bank. The government also contributes some revolving fund to this deposit. These SHGs help out in setting up enterprises – managing milch animals, chicken centers, photo studios, eateries, cloth stores, etc. So far, the total loans given by these groups amounts to Rs 3,000,000. A total of 400 members were enrolled in these groups.

SHGs have been functioning very effectively in Dokur. Joining the group has helped members avail loans from the State Government and from banks to be used to buy milch animals, goats, on social occasions and on farming. This massive self-help movement has led to a perceptible improvement in the socioeconomic status of rural women. Due to constant efforts of the government, women have become very active, assertive and are concerned with issues relating to them and their surroundings.

Pavala vaddi

Pavala vaddi (25 paise interest) is a concept of providing loans to women SHGs at a cheaper interest rate (3%) as against the existing rate of 12% in commercial banks. The State Government pays the differential rate of interest to banks under this unique scheme which was unveiled as a poverty alleviation program through the SHGs earlier in the 90s. All these programs were consolidated under the umbrella of Indira Kranti Patham.

(d) National Rural Employment Guarantee Scheme (NREGS)

The National Rural Employment Guarantee Scheme (NREGS) provides enhancement of livelihood security, giving at least 100 days of guaranteed wage employment in a year to every

household, and an adult member volunteer who can do unskilled manual work. The scheme commenced in Dokur in June 2006.

The Gram Panchayat under the supervision of the Sarpanch carries out the registration of households at the village level. A wage seeker and his family members can register under this scheme by submitting an application at the Gram Panchayat. A register maintained there is sent to the Mandal Control Centre (MCC) to enter information regarding the wage seeking household. The MCC allocates a job card ID. A household job card is generated for each wage seeker and handed over to the Gram Panchayat. The Gram Panchayat fills up the job card, affixes the photograph of the household head, and attests the same before handing it over to the household.

All transactions are entered electronically on computers and a pay slip is generated for every 14 days. Every mandal under NREGS is provided with computers and two operators. The design is virtually foolproof and ensures that those who work are paid fully. Everyone enlisted for 100 days of work is registered and has a postal savings account. All job cardholders were also insured for a sum of Rs 50,000.

Under this scheme, wage employment was provided to 100 families comprising of 250 individuals (100 men and 150 women). The scheme is scheduled to continue upto 2011. The work done under this scheme includes desilting the Vanam Reddy, Bandam, Yerra canals to Kummari Kunta, restoring a minor irrigation tank, land development and land levelling. This scheme has been helping arrest in and out migration of labor.

(e) Supply of drinking water

The village Gram Panchayat, with support from a local NGO and contributions from villagers, constructed three water storage tanks to supply protected drinking water to all households and schools in the village. The Gram Panchayat collects Rs 10 per month towards their maintenance, electricity charges and salaries of the technical operator. There are 185 tap connections in the village (180 of these are charged a monthly fee and 5 are public taps). The total amount



Land development under NREGS guarantees employment to villagers.

spent on the construction of the tanks and pipelines was Rs 1,500,000.

(f) Free electricity

Farmers were given free electricity by the Congress-led government which took office in May 2004, as part of its election manifesto promising power for irrigation. The free electricity scheme was a response to reports that farmers were committing suicide because of crop failures triggered by water shortage. This government decision seems to have put tremendous pressure

on the state's electricity distribution system with a significant increase in the number of illegal connections.

(g) Programs for farmers

Officials of the agriculture department disseminate information on techniques to improve productivity, with the intention of increasing food grain production, productivity and reducing the cost of cultivation (crop rotation/mixed crops). These include promoting Integrated Pest Management (IPM) techniques

Supply of drinking water through public taps.



and use of green manure, and improving water management by training farmers and extending extension services to them. For example, the adoption of IPM techniques is encouraged by supplying neem cakes at 50% subsidy to small farmers owning less than 5 acres of land. To mitigate the effects of drought, the government implemented a drought relief program in 1999-2000. Furthermore, the Government provides a 50% subsidy (equivalent to Rs 50,000) on borewells to SC and BC families that own less than 5 acres of land.

(h) Community Health Insurance Scheme (CHIS) – Rajiv Aarogya Sri

The objective of the program is to improve access of BPL families to quality medical care involving hospitalization and surgery through an identified network of health care providers. In the initial phase, the scheme provides coverage for the following: heart ailments, cancer, neurosurgery, renal diseases, burns, Poly trauma cases, but it does not include motor vehicle accidents. Many people are approaching the Government to provide financial assistance to meet hospitalization expenses for surgical procedures.

(i) Free veterinary camps

Free veterinary camps were conducted in Dokur. De-worming of sheep was taken up for the entire sheep population along with the general treatment of animals.

(j) Cheyutha camps

Special camps were conducted for the welfare of the disabled. The distribution of financial benefits consisted of APSRTC bus passes, income certificates, caste certificates, nativity certificate for admission into educational institutions, house site documents (pattas), among others.

(k) Watershed management

Heavy investments were made on watershed development programs by constructing field bunds, strengthening tank beds and check dams in Dokur village. This had a major impact on the productivity of rainfed crops in the watershed due

to the retention of soil and water in the field itself. The Government has taken a number of steps to maintain the structures and condition of the tank. Rs 500,000 was sanctioned to the village for tank repairs, strengthening of the bund, silt removal, and deepening, and building contour bunds and gully controls. Villagers contributed Rs 30,000 by *Shramadanam* (voluntary labor). A total of Rs 700,000 was sanctioned for Dokur village under the watersheds program, of which Rs 560,000 was sanctioned to construct tanks, bunds, rock lining, strengthen the existing bund, silt removal, etc.

Loans were provided to farmers to promote horticultural crops such as sweet orange, lemon, mango and avenue plantations to strengthen field bunds. A component of subsidy was also involved. Two check dams were constructed in Dokur at a cost of Rs 50,000 each. A teak plantation was planted along feeder channels connecting one tank to another as well as gully control structures, for which Rs 275,000 was spent. Watershed user groups are functioning in the village to regulate water distribution, maintain tanks and implement soil & water conservation measures.

Water Users Associations were formed to improve linkages between the irrigation department and farmers' organizations; make irrigation systems more sustainable by involving farmers in irrigation management; improve the productivity of irrigated agriculture; and expand irrigated areas. This enabled farmers to gain experience in undertaking maintenance work and also to understand the complexity of maintaining and operating irrigation systems. Steps to increase general awareness among farmers on the importance of maintenance were reiterated to ensure proper management of water.

In order to disseminate technical knowhow on agriculture and irrigation, presidents of water users' associations were given training on execution of maintenance works, water regulation, etc. NGOs are working in Dokur village in close coordination with DRDA in training, capacity building, skill development and building SHGs.

(l) Other programs

The village has an education program for illiterate



A check dam built under the watershed management program.

adults. Instructors are selected from the village to conduct tutorials at night and books and slates are provided free of cost.

Programs related to family planning are in operation in Dokur. The Government encourages married couples to adopt family planning measures to limit the number of

children to two. It does this by providing Rs 1000 as compensation to white cardholder couples who have undergone family planning operation after two children. In addition, Rs 500 is provided to women during pregnancy and Rs 500 for post-operative care and to ensure intake of nutritious food.

Eliciting farmers' perceptions through focus group meetings in Dokur village.



7. Perception of Development Factors and Constraints

In order to find out the development factors that contributed to development of Dokur village since 1975 and constraints to livelihood pathways, a series of focus group meetings were conducted: with women, men and mixed groups. Participants belonged to different castes and farm size groups in the village. Their views on factors contributing to development and constraints faced were sought. They also threw light on the present status (social and economic) of the original 45 respondents. Appendix 2 summarizes responses of farmers to development issues and constraints over the last two decades years, from 1984-85 to 2007-08. Overall, farmers in the village felt that Dokur had undergone significant transformation.

Table 23 presents the past and present welfare assessments obtained from the original VLS households themselves during focus group meetings held in 2007-08. Participants felt that 4 sample households in the village (9%) had become poor, 28 households (62%) were maintaining status quo and the remaining 13 households (29%) were better off compared to 1975-76. Almost one-third of the panel households (32%) had left the village in search for off-farm employment to nearby towns and cities.

In addition to the Participatory Rural Appraisal (PRA) and survey techniques to gather information,

discussions were held to ascertain significant factors that contributed to Dokur households' development and the economic constraints being faced.

7.1 Development factors

(a) Successful borewells

Productive investments have been made in drilling borewells. Commercial banks provided loans for digging wells and borewells during the initial years. Most farmers invested huge amounts in drilling borewells, since water is crucial for the success of crop production in drought-prone Dokur. The average depth of borewells in Dokur was 180 feet, but a few farmers drilled to over 250 feet. There are currently 200 borewells in the village. Farmers grow castor in rainfed land on red soils and extend this crop to irrigated lands. Farmers also used to grow paddy and groundnut under irrigated conditions. It is noted, however, that the success rate of drilling borewells has been only 25%.

(b) Growing two crops a year

Under irrigated conditions, paddy and groundnut were grown in both rainy and post-rainy seasons under community tanks, open wells and borewells with electric motors. Depending upon the

Table 23. Past and present welfare self-assessments of VLS households.

Conditions	2007	2005	1990	1975	Compared to other HHs
<i>Very rich</i>	0	0	0	0	0
<i>Rich</i>	11	2	0	9	0
<i>Comfortable</i>	18	30	22	20	5
<i>Manage to get by</i>	40	33	51	38	53
<i>Never enough</i>	22	28	18	20	33
<i>Poor</i>	9	7	9	11	9
<i>Very poor</i>	0	0	0	2	0

Source: Focus Group Meetings, 2007-08.

availability of water in the wells, vegetables are also grown. Tanks and borewells are the primary sources of irrigation. About 200 hectares of land used to be irrigated by three tanks till the 90s. Tank water was mostly used to irrigate paddy. After the 90s, due to continuous drought, tanks dried up and the entire land was kept under fallow during the rainy season. Subsequently, the same area is sown to postrainy sorghum. Continuing this crop cultivation pattern will depend entirely on future availability of water in the area.

(c) Growing commercial crops

Weather conditions and fluctuating prices have led to changes in cropping patterns over time. In the last few years, majority of farmers in Dokur have shifted to commercial crops such as castor and cotton. However, pest problems with cotton led to a few farmers discontinuing cotton production. The area under sorghum and millet intercrop and other minor crops has declined due to low profitability. Castor has replaced this area and is now the dominant crop in Dokur. Farmers are growing it on rainfed land and in the irrigated area.

(d) Use of high-yielding varieties

The village has seen a series of shifts in crop varieties grown. More than 95% of cropped area is covered with improved varieties and hybrids.

Farmers are using improved varieties of rice such as *BPT*, *Sona massuri* and *Hamsa* in both rainy and postrainy seasons; so yields are growing year after year. In the case of castor, improved varieties such as *Aruna*, *Kranthi*, *Naubharath* and high-yielding hybrids like *Gujarat GAUCH-1* are being used. Traditional varieties of sorghum (*thella jonna* and *patcha jonna*) and pigeonpea (*erra kandulu*) are being cultivated.

(e) Better crop management

Paddy, castor and sorghum yields increased due to adoption of improved seed and better management practices. Soil and water management strategies are very important for sustainable agriculture, especially in SAT areas, . Harvests have improved due to adoption of technologies such as improved seed, and better management practices for pest and disease control.

(f) Diversification of income and agriculture

At present, households have more diversified sources of livelihood with greater education, knowledge and skills. While households continue with agriculture, they are increasingly diversifying their sources of income with labor earnings from farm and non-farm work, livestock, poultry, caste occupations, salaried jobs, business, handicrafts and migration remittances. The shift to more

Diversifying sources of income through poultry.



profitable crops, adoption of new technologies, as well as other alternative income options enable households to improve their livelihoods.

(g) Increased wage labor

Wage rates for both men and women increased for both farm and non-farm activities in the village. Income through labor earnings occupies an important place in the total average household income. Labor income is derived from both within and outside the village. All labor households, including small and medium farmers, are participating in the labor market, especially Scheduled Caste and Backward Caste farmers.

Contract type employment has been increasing in Dokur, where laborers are paid better compared to the existing daily wage rate in the village. Laborers prefer wages in cash rather than in kind. The demand for labor for non-farm work is increasing because of the construction of new houses within the village, the food for work program and national rural employment programs.

(h) Income from migration

Migration of labor to cities and towns in search of better employment is rampant in Dokur. Failure of agriculture and the concomitant loss of income have prompted families to migrate. Non-availability of year-round employment, low productivity of crops due to drought, poor quality of soil, and the poor economic condition of farmers may have also encouraged migration. Out migration in Dokur began to increase in the 1990s, mainly because many households were unable to secure year-

round employment within the village. There are negligible alternative employment opportunities or low labor demand; and low wage rates prevail for farm and non-farm activities.

Other important reasons for migration are the lack of demand for services of caste occupations such as the goldsmith, potter, weaver, washerman and barber within the village; declining area under irrigated crops; lack of cultivable land; lack of employment opportunities for the educated in the village; lack of interest in working as labor within the village and aspirations for urban life.

Migrants are usually involved in construction activities, loading and unloading goods (*hamali*), private salaried jobs as watchmen, drivers, and waiters in hotels and lodges and operating telephone (STD) booths. The average monthly income of these migrants ranges from Rs 2000 to Rs 4000 for an average of 20-25 days of employment. Migration definitely helped improve the social and economic welfare of these households in terms of meeting basic consumption expenditure, repaying debts, improving skills, savings and the general standard of living.

(i) Appreciation of land values

Over the last two years or so, real estate prices in Hyderabad and its surrounding areas have seen a sharp rise. With the completion of the International airport at Shamshabad, the price of land along National Highway 7 has soared significantly. Farmers started selling their lands

Dokur has seen an increase in land values.



in Dokur and bought other cultivable land in surrounding Mahabubnagar at reasonably lower prices. The impact of this appreciation in Dokur was tremendous; land values rose by 10-15 times.

(j) Increased women participation and empowerment

Women in Dokur have been socially and economically empowered. They participate actively in decision-making related to agriculture, children's education and marriage. The self-help group movement has been taken up as women-based group action in this village. It not only inculcates thrift among women but also enables them to borrow small loans as a group.

Thanks to their membership in SHGs, more than 60% of the women in the village have taken up economic activities related to agriculture and allied activities. Even illiterate and unskilled women engage in small business activities. The participation of women in the SHG movement has led to regular savings, more frequent (monthly) group meetings to discuss social issues related to their day to day life; access to immunization services; access to safe cooking fuels (ie, LPG) under the Government promoted scheme of Deepam; financial assistance from banks and repayments; and greater self-confidence and self-esteem. The benefits also include greater awareness about society and the community; voluntary participation in community activities like laying roads, planting trees; conserving the environment; construction of water harvesting structures; donating to victims of natural calamities; campaigning on social issues like dowry, child marriage, untouchability, AIDS; helping to reduce crime against girls and women; rescuing and rehabilitating orphaned children, counselling adolescent girls and supporting widows and destitutes.

(k) Government welfare programs

Households benefit from different government welfare programs like PDS, pension schemes, housing schemes, support to self-help groups and other subsidies which provide substantial opportunities to enhance their incomes and help them rise above the poverty line. Health conditions

in the village improved due to the availability of health care facilities and supply of protected drinking water. Better roads were constructed and sanitation improved under the food for work program. Marketing facilities improved due to improvement in roads, communication and transport. The number of pucca houses with better facilities such as cooking gas connections, television sets, refrigerators, telephones, vehicles (two, three and four wheelers), provision shops, and newspapers increased. Literacy rates increased by 60% and the number of school-going children increased with Government providing free textbooks and the mid-day meal scheme. The village school was upgraded to 10th class and a number of private English-medium schools have been established at the mandal headquarters in Devarkadra.

The Government has also taken several measures to mitigate the financial problems of farmers hit by successive crop failures owing to persistent drought over the last decade. These include a one-time waiver of electricity arrears; free power supply; and extension of interest on short-term and long-term crop loans. The free power supply was intended to bring down the cost of inputs.

7.2 Development constraints

(a) Lack of rainfall

Late monsoons and uneven distribution of rainfall at critical stages of crop growth became regular problems in Dokur during the last decade. Decline in groundwater levels too have led to major changes in agricultural activities and cropping patterns. On an average, 75% of the total rainfall is received during June, July, August and September. The number of rainy days and quantum of rainfall have fallen. Tanks have not received adequate water since 1992 and most of the open dug wells have dried up. The number of borewells has increased and farmers are drilling deeper than 200 feet with barely 25% success.

(b) Drought

Drought is considered by farmers in Dokur as the most important production constraint, due to

which crop incomes are very low. A majority of households in Dokur mainly depend on labor earnings even though they own small land holdings. They reported that drought and uneven distribution of rainfall at critical stages of crop growth were persistent for many years, affecting crop production. Since 1993, income from agriculture had become unreliable due to recurrent droughts and failure of borewells.

(c) Failure of borewells

The depletion of water through indiscriminate drilling of borewells and the failure to provide supplemental irrigation from other sources has resulted in frequent crop failures and heavy losses to farmers. Thus the Government of Andhra Pradesh amended the APWALTA (Andhra Pradesh Water, Land and Trees Act) in 2004 to regulate drilling of wells. However, more stringent laws are required for the proper regulation and monitoring of water. Collective action is critical to managing water scarcity in the village. Community group action needs to be stimulated in Dokur again, for it appears that every farmer has been inclined to think only for himself in terms of digging more borewells, leading to a continuing fall in the water table.

(d) Lack of irrigation

With village tanks not filling up and open dug wells drying up, farmers are investing in borewells. The cost of digging a borewell is approximately Rs 70,000. When it fails, the farmer is in trouble. Between 1990 and 2006, 40% of the attempts at

striking water by digging borewells failed. There is now a desperate search for water for cultivation in this once agriculture-based village.

(e) Unscheduled power cuts

As a significant number of farmers are dependent on power supply to run their borewells, unscheduled power cuts cause considerable unrest in the farm sector. Farmers have been agitating and putting pressure on the State Government to ensure about seven hours of daily power supply.

(f) Continuous crop failure

Drought has been a serious production constraint. Crop stand establishment is often poor as early season rains are frequently erratic. Thus farmers increasingly grow dryland crops like castor, pigeonpea, sorghum and millets. Some farmers plant 4-6 rows of castor and one row of pigeonpea. During years of late or erratic monsoon, shootfly can become a serious problem, leading farmers to substitute millet for sorghum and then castor. The main yield reducers in pigeonpea are lack of rainfall and the pod borer. Farmers feel that chemical control is probably not economical because pigeonpea plant stands are low in most fields due to drought. For castor, drought, semi-loopers (*Achoa janata*) and root rot disease caused by water stagnation are important production constraints. In paddy production, water scarcity together with unreliable power supply are critical constraints.

Dry open dug wells such as this one testify to the lack of rainfall.



(g) Wild boar menace

Crop damage by wild boars is a very serious production constraint adversely affecting crops such as groundnut. With this menace, groundnut area and production have fallen steeply during the past decade. The area under groundnut has now been replaced with castor in rainfed areas and paddy in irrigated areas.

(h) Higher maintenance cost and lower returns

Several farm operations have high maintenance costs with low returns. In Dokur, the livestock population, especially of cows and young stock, declined due to a rise in the maintenance cost and shortage of fodder and labor. The cropping pattern changed from low-priced cereals to cash crops such as castor and cotton. Real wages rose with labor preferring contractual jobs with higher wages. Timely availability of labor for farm operations and finding a regular farm servant to work throughout the year has become difficult. Increasing pest and disease incidence requiring application of pesticides on castor and paddy, led to greater cost of cultivation and lower profits.

As mentioned earlier, indiscriminate drilling of borewells and their failure led to heavy losses. Expenditure on digging a borewell involved the following: about Rs 35 a foot for the first 200 feet and Rs 10 extra for every additional foot dug. Since a borewell requires protection in soil, a casing 40 to 60 feet long would cost about Rs 95 a foot. All in all, a 250-foot borewell would cost around Rs 15,000. An additional Rs 25,000- Rs 35,000 is needed for a pumpset. Given its 25% success rate, it is important to ask why farmers continue to pursue the commercial drilling of borewells.

(i) Non-remunerative price of farm produce

For many years until early 2000, farmers in Dokur growing sorghum, castor and paddy were faced with declining non-remunerative prices. During this period, while the price of agricultural commodities had been declining, input prices had been rising through the cropping season. Prices reached rock bottom during harvest and peaked when farmers exhausted their stocks. In the absence of an effective government mechanism to shield farmers from price fluctuations, farmers continued to be vulnerable.

(j) Health problems

As regards health facilities, the mandal has one primary health center which needs upgrading in terms of the quantity of medicines available or the capacity to treat common health problems. An Institute of Rural Health Studies (IRHS) clinic was set up in the 80s to cater to the health needs of the people in Dokur and its surrounding villages. The village also has a local clinic with a registered medical practitioner (RMP). However, these facilities are inadequate during emergencies.

Most women migrants suffer from malaria and diarrhoea. Based on VLS records gathered by Gandhi et al. 2009, about 10% of households have tuberculosis and 70% reported skin diseases and rashes. Long working hours of women migrants in addition to household work, coping with stress at work, and children at home, malnutrition, and irregular diets are taking a toll on their health.

7.3 Major findings

Perception of development factors and constraints elucidated in this section was very similar to findings from objective data presented in the previous sections.

8. Livelihood Pathways: Case Studies

An analysis of livelihood pathways was undertaken to trace changes in household welfare and poverty dynamics in Dokur village. This tool was used for analyzing development pathways and economic mobility relative to the income position of a household during a common benchmark year. The economic condition of a household may improve, deteriorate or not change over time, depending on

the condition of each household's asset base, investment levels, own behavior, social interactions, government policies and many other related factors.

In the last 30 years, the livelihoods of 60% of the households in Dokur have improved, 20% of them showed no change in status and the condition of the remaining 20% were reported to have

Tracking livelihood dynamics and development pathways through village level studies.



deteriorated. The villagers believe that among the many important reasons for this change in economic status that directly and indirectly impacted the families, the following played a critical role: education, earlier investments, societal norms, State and Central Government welfare policies such as poverty alleviation programs and subsidies.

This section presents six studies to illustrate different scenarios depicting different development pathways of households: (1) improved (rich and very rich); (2) stagnant (no change); and (3) decline (poor and very poor), based on wealth ranking ie, current asset status with respect to landholding, livestock, and farm and non-farm wage labor earnings. Two FGMs were conducted in the village during 2007-08 – one with only women and the other with a mixed group consisting of both men and women from different caste and farm size

groups (labor, small, medium and large) – to elicit information about the economic status of the respondents in 1975-76 (first generation VLS survey) and the present status of the same households. Table 24 lists the factors contributing to the improvement, stagnation and decline in the development pathway of households in Dokur. Out of the total 45 VLS households (including split households) in the village, six households were randomly selected under each category. Detailed inquiries on household endowments and other relevant data were elicited through personal interviews with each randomly selected household. Using the first generation VLS (1975-85) data as base for comparison, an analysis of the changes and patterns of sustainable development, alternative livelihood options and pathways out of poverty were documented. A comparison of the wealth status of the original VLS households in 1975-76 and 2007-08 is presented in Table 25.

Table 24. Factors contributing to the improvement of, stagnation and decline in the development pathways of households in Dokur.

<i>Improved</i>	<i>Stagnant</i>	<i>Decline</i>
<i>Migration to cities and towns for employment</i>	<i>Unsuccessful investment in drilling borewells</i>	<i>Failure of borewells, loss of invested money, and low repayment capacity of money borrowed at high rates of interest</i>
<i>Successful borewells</i>	<i>Impact of continuous drought</i>	<i>Inferior soils, poor crop harvest</i>
<i>Acquired more land and other productive assets</i>	<i>Limited access to irrigation, dried up tank and open wells</i>	<i>Inadequate year-round employment in the village</i>
<i>Converted dryland into irrigated land and grew two paddy crops in a year</i>	<i>Old age, health problems and prolonged illness</i>	<i>Poor asset position</i>
<i>Diversified sources of income--farm, non-farm and migration</i>	<i>More dependent family members</i>	<i>Dependence on daily labor market for farm and non-farm labor, and low wage rates</i>
<i>Successful businesses, trade, contracts, shopkeeping, etc</i>	<i>More female children and dowry and marriage expenses</i>	<i>More female children, dowry and marriage expenses</i>
<i>Family members working hard to save</i>	<i>Loss in business</i>	<i>Sudden death of an earning family member</i>
<i>Caste occupation and agriculture</i>	<i>Land disputes</i>	<i>Old age, health problems and prolonged illness</i>
<i>Salaried jobs</i>	<i>No demand for and income from certain caste occupations</i>	<i>Other shocks such as death of sheep and goats</i>
	<i>Agriculture the only source of income</i>	<i>Dependence on dryland crops, low yields due to late monsoons and uneven distribution of rainfall at critical stages of crop growth</i>

Source: Focus Group Meetings, 2007-08.

Table 25. Comparison of the wealth status¹ of the original VLS households in 1975-76 and 2007-08.

S No.	HH No.	Caste ²	HH head self-assessment (a)	Researcher (b)	Field investigators (c)	Focus Group Meeting (d)	Overall/ranking (a,b,c,d)
1	3/275	BC	3	3	4	3	3
2	5/276	BC	6	6	6	6	6
3	5/277	BC	4	4	4	4	4
4	5/278	BC	5	4	5	5	5
5	7/280	SC	4	4	4	4	4
6	7/281	SC	6	5	7	6	6
7	30	BC	4	4	4	3	4
8	30/200	BC	4	4	4	3	4
9	32	BC	2	2	2	2	2
10	32/284	BC	3	3	3	3	3
11	35	BC	4	4	4	4	4
12	36	BC	4	4	5	4	4
13	37	BC	4	5	4	3	4
14	38	BC	5	5	5	6	5
15	39	BC	6	6	6	6	6
16	41	FC	4	4	4	4	4
17	42	BC	6	6	6	6	6
18	43	FC	2	2	2	2	2
19	44	BC	5	5	5	5	5
20	46	BC	5	5	5	5	5
21	47	BC	3	3	3	4	3
22	47/256	BC	3	4	3	4	3
23	47/257	BC	4	5	4	5	4
24	47/258	BC	5	5	5	6	5
25	49	BC	3	3	3	3	3
26	50	FC	2	2	2	2	2
27	50/201	FC	3	3	3	3	3
28	50/207	FC	2	2	2	2	2
29	51/205	FC	4	5	4	4	4
30	51/259	FC	4	4	4	4	4
31	51/260	FC	5	5	4	5	5
32	52	BC	5	5	5	5	5
33	52/287	BC	5	5	5	5	5
34	53	FC	4	4	3	3	4
35	54	FC	4	4	3	4	4
36	54/288	FC	2	2	2	2	2
37	55	BC	4	4	4	4	4
38	55/289	BC	4	4	4	5	4
39	56	BC	5	5	5	5	5
40	57	BC	4	4	4	4	4
41	57/203	BC	4	4	5	5	4
42	58	FC	4	4	4	4	4
43	58/290	FC	3	3	3	3	3
44	58/291	FC	3	3	3	3	3
45	59	BC	4	5	5	5	5

1. 1 = very rich; 2 = rich; 3 = comfortable; 4 = managed to get by; 5 = never enough; 6 = poor; and 7 = very poor.

2. FC = Forward Caste; BC = Backward Caste; SC = Scheduled Caste.

Source: Focus Group Meetings, 2007-08.

8.1 Case study 1: Moving up the development pathway

Household A¹³ (HH no. 43) belongs to the Forward Caste community. The household consists of the household head, his wife, and three sons and a daughter. In 1975, this household was randomly selected for the ICRISAT VLS studies under the medium farm group with agriculture as their primary source of income. At that time, household A owned 2 acres of irrigated land and managed 10-12 livestock, mostly for manure and milk purposes. Apart from agriculture, both husband and wife used to earn from daily wage labor. This led to a saving of Rs 10,000 during 1975 through 1985. In 1985, the household head purchased 6 acres of dryland at Rs 10,000 per acre from his savings and cultivated commercial crops such as castor, cotton and pulses, yielding bumper crops and good returns.

Household A continued to cultivate the same crops over the years. The household head sent all his children to school and they were all educated up to classes 10 to 12. Since 1988, two of his sons have been helping him, increasing their income from agriculture. His daughter's vocational occupation of tailoring too brought in a regular income.

The elder son who had been living with the family, moved to Hyderabad with his wife after their marriage and set up a provision store with an STD booth, xerox machine and soft drinks, earning him a regular income.

The second son began a business of buying old electric pump sets from nearby villages, repairing them and selling them at a profit at Devarkadra and Mahabubnagar. The third son used to sell milk (25-30 lts a day) in Devarkadra. He built a cattle shed at Rs 15,000 and maintained 16 milch animals. Now, he has spent Rs 150,000 to start his own hardware shop at Devarkadra and is also involved in real estate dealings which bring in good profits. He also earns commissions on every LIC insurance policy he secures.

With the savings of his sons, five borewells were successfully dug in their dryland with an investment of Rs 50,000. The area under irrigated crops increased, allowing them to harvest two crops a year, thereby enabling the family to spend Rs 150,000 for the only daughter's marriage in 1998. The second son received Rs 110,000 as dowry in 2000, which was used to renovate the house at a cost of Rs 60,000 and buy a motorcycle for Rs 35,000. Over time, this household acquired

Development pathways:

- Concentrated both on agriculture and milch animals and used to sell milk at Devarkadra
- Both wife and husband worked very hard; participated in the daily wage labor market
- Saved continuously to buy both dry and irrigated land from time to time
- Grew commercial crops like castor and cotton, used improved varieties of crops and followed better management practices
- Provided better education to children
- Son successfully invested in business (repairing and selling of old electric motor pump sets, real estate business, and LIC agency) and gained profits year after year
- Successfully dug borewells in their own fields
- Grew three paddy crops (early rainy, rainy, and summer) in a year
- Was able to generate different sources of income, saved a good amount of money and participated in local chits.

13. As per ICRISAT's VLS policy, the real names of the respondent households, their identity and age have not been disclosed to ensure confidentiality.

cooking gas, a television set, a telephone, furniture and some gold and silver jewellery.

In 2006, the family purchased 4.5 acres of irrigated land for Rs 160,000 and spent Rs 10,000 on a borewell that failed. In 2007, 3.5 acres of dryland was purchased for Rs 185,500 and again 2.75 acres of irrigated land with a borewell were bought for Rs 275,000. Though they own 2 bullocks, 3 milch animals and 3 calves, they have been unable to maintain them due to shortage of labor and grazing land.

The household grows paddy under irrigated conditions and castor, pigeonpea and sorghum in the dryland, earning an average income of Rs 50,000 per year. Currently, only 3 borewells fitted with submersible pump sets are working. In 2006, the family constructed a 'pucca' house spending Rs 700,000 and recently bought a car for Rs 420,000, with half the amount based on a loan. The family saves up a part of the income to contribute towards monthly installments of private chits valued at Rs 375,000. Additional income is generated from lending money to villagers and known people at high rates of interest.

8.2 Case study 2: Laborer turns large farmer

Household B (HH no. 32) belongs to the Backward Caste community, whose prime occupation is sheep rearing. The household consists of the household head, his wife, 6 sons and a daughter. Householder B was married in 1965 and was separated from the joint family. He inherited 0.75 acres of wetland (tank irrigation) and 7 sheep from his father. He continues rearing sheep and also cultivates the land acquired from his father. In 1986, he purchased 6 acres of land at Rs 5000 per acre from the sale of sheep and goats and income from agriculture. Besides his own land, he regularly used to lease-in land from village farmers to cultivate rice, sorghum and castor.

Householder B and all his sons and their families live in a joint family system. All the family members, including women, are actively involved in family activities, the caste occupation, and a combination

of farm and non-farm employment. The income from different sources is accumulated and distributed for household expenditures and other endeavors.

In 1992, householder B bought 5 acres of land in two phases, at Rs 50,000 per acre. By 1998, his total land under irrigation amounted to 13.5 acres (5 under tank irrigation and 8.5 acres under borewell irrigation) along with 14 acres of dryland. Land values of both irrigated and drylands range between Rs 1 lakh and Rs 3.5 lakhs depending on the location of the land.

He sold 1 acre of land in 2006 for Rs 65,000. He has 3 good borewells out of a total of 7, each 150-200 feet deep with submersible motors of high horse power. The major crops he grows are sorghum, groundnut, pigeonpea, green gram, and rice, depending on water and rainfall. He has 4 bullocks and 3 cows and hires tractors to cultivate his land. He uses both alternatively. His elder son and fifth son help him in agriculture.

Apart from agriculture, the other main and assured source of income is sheep rearing. The 7 sheep he inherited from his father have now grown to 280. He rears them and sells them for a regular income. His 4 other sons help him in sheep rearing and selling.

The second son (HH. no. 32/284) was separated from the joint family in 1998 at his behest. His father initially disinherited him but about 4-5 years later gave him 3 acres of land (1 acre of wet land and 2 acres of dryland) and 30 sheep, which he utilized to generate a steady income. He currently holds the same assets and an additional 1 acre of leased-in land. Currently the sheep herd has increased to 150; he sold 100 of them recently, fetching him a good income. He purchased a plot at Rs 73,000 and bought himself an insurance policy for Rs 23,000. He has also been saving Rs 3000 per year through the local chit fund. He borrowed Rs 8000 from village moneylenders at 24% interest to purchase two bullocks and Rs 70,000 to buy a house plot.

Householder B derives income from both the farm and non-farm. All the sons, their wives and grown

Development pathways:

- Purchased land at regular intervals with his own savings
- Increased income from caste occupation -- rearing sheep and goats and selling them
- All family members were involved in both farm and non-farm work
- Participated in both farm and non-farm wages
- Leased-in land from village farmers on a regular basis on fixed rental
- Grew assured crops like paddy and castor
- Successfully dug borewells
- Grew two paddy crops in a year
- Regularly saved through local chits (private mutual fund) and insurance policies
- Purchased house plots keeping in mind the fact that his sons may separate in the future
- Though his sons were all married, they remained part of the joint family and helped in farming and sheep rearing.

up children take part in wage labor during both the season and non-season. He also earns an income from lending money at higher interest to villagers. He also constructed a house in 1985 and extended it in 1991 and purchased plots worth Rs 5 lakhs in key areas in the village for his sons.

8.3 Case study 3: Status quo

Household C (HH no. 47) belongs to the Backward Caste community. The household head is the second son of the originally randomly selected VLS respondent in 1975. The other family members of household C are his mother, elder brother (who died recently) and his two younger brothers and seven sisters. During 1975, this household was classified under the medium farm size group with agriculture as their only occupation. His father (the original respondent) was the only earning member in this household during that period. He possessed 4 acres of irrigated land on which the whole family depended. Nobody was able to undertake wage

labor due to their social standing in the village. Fortunately, he managed to send his children to school. Since there was no other source of income except agriculture, he would regularly borrow from village moneylenders to maintain his household. Due to severe financial problems faced by his household, all the sons were forced to search for jobs immediately after their secondary school education. But their efforts proved unsuccessful. In 1977, the elder brother opened a small provision shop in the village and got married in 1978. The dowry he received was used to invest in his business, which yielded good returns and has steadily improved over the years. The income from the business and other savings were used for the marriage of their six sisters, spending nearly Rs 50,000 on each.

In 1982, his elder brother passed away due to serious illness, leaving behind a wife and son. After the death of the elder brother, household C took care of his elder brother's family, particularly his son. The elder

Factors causing no change:

- Non-participation in both farm and non-farm labor markets
- Borrowed money frequently to maintain the family
- Spent lots of money on the marriage his six sisters and their dowries
- Household was split among four brothers
- Repayed old debts at high rates of interest.

brother's son was under the care of household C until his marriage in 2004. Currently, the elder brother's son takes care of his own agriculture and earns a living as wage labor participating both in farm and non-farm labor. He now owns a house worth Rs 80,000 and an acre of irrigated land worth Rs 100,000 on which he grows paddy.

Household C got married in 1982. The dowry he received was used to set up his provision shop, the profits from which were used to buy a plot and construct a house at an expense of Rs 25,000. In 1989, he opened a cloth store with the help of a bank loan. He also purchased milch animals in 1990, which yielded some income.

During 1991, his father (the original respondent) passed away due to old age. Upon his father's death, he became the head of the household. As head of the household, his responsibility further increased. Nevertheless, he continued to successfully run his businesses; out of his savings, he was able to purchase 6 acres of land in 1993. He started growing paddy twice a year on this land and earned a sizeable income during subsequent years. He cleared all their debts and later acquired household appliances (such as a television, furniture, and cooking gas) as well as gold and silver jewellery. Meanwhile, his third brother got married in 1998 and received a dowry which was used to successfully drill two borewells in 1999 and 2001, at a cost of Rs 30,000 each. These provided a crucial water source for his crops. Apart from this, he owns a house and an acre of land. It may be noted that household C does not have any children. Currently he is running a provision store, but this does not fetch any measurable income.

In 2002, the four brothers split and shared the total land of 4 acres equally. The third brother (HH no. 47/257) established a provision store in the village, from which he earns Rs 4000 a month. Apart from this, he has a house and an acre of irrigated land. He leased out his one acre of land to his brother.

The fourth brother (HH no. 47/256), living with a wife and two children, is dumb by birth. He leased out his one acre of land to his elder brother's son and participates in the labor market along with his

wife. At present, he has a house worth Rs 70,000 and an acre of land worth of Rs 100,000.

8.4 Case study 4: Managing to get by

Household D (HH no.35) is a woman-headed household (wife of late original VLS respondent) belonging to the Backward Caste community. The household consists of household head, her brother and a daughter. Householder D possesses one acre of land under tank irrigation, a small house and depends on both farm and non-farm wage labor.

Householder D used to grow rice on her land, but since it had no borewell, she had to depend on rainfall and tank water. Income from agriculture was meagre due to low yields as they continued to use local varieties. She leased-out the land for a fixed rent (in kind) of 3 bags of paddy. Since then, she has depended on farm and non-farm wage labor earnings of an average of Rs 50 per day.

Her daughter studied up to class 5 and got married in 1984 to her uncle (brother of household D). Both depend on wage labor for their livelihood, working in the village and then migrating to the nearby mandal to do mud work, earning on an average Rs 50 (women) and Rs 100 (men) per day. The couple has two daughters, who were both sent to school. The income from wage labor is partly used for day-to-day expenses and the rest is saved. In 2004, their 10-year-old first daughter got married off with a dowry of Rs 45,000 and 24 grams of gold. Their son-in-law is an assistant in a medical shop earning Rs 1500 a month. In 2007, the second daughter also married without a dowry to an assistant in a local medical shop who earns Rs 1500 a month.

Managing to get by factors:

- Depended on farm and non-farm wage labor
- Received old age pension from the Government and daughter took care of the expenses
- Received rent from the leased-out 1 acre of land.

At present household D gets Rs 200 per month as old age pension from the government through a self-help group. Her daughter takes care of the household expenses and other needs. She has an acre of land valued at Rs 1 lakh and receives rent from it; a house worth Rs 90,000; and gold and silver worth Rs 30,000. She lent Rs 20,000 of her savings to friends and relatives, but has also borrowed Rs 18,000 from villagers.

8.5 Case study 5: Trapped in acute poverty

Household E (HH no. 42) belongs to a Backward Caste community. Household head is the son of a late original VLS respondent. In 1975, this household was classified as belonging to a medium farm group. The household consists of household E, his wife, son and 2 daughters. In 1975, he owned 2.75 acres of irrigated land and a house. He was also a private tutor to school children in the village.

He cultivated his land from 1976 to 2002 with crops such as rice and sorghum. But as he was not able to obtain a decent income from agriculture, he leased-out the land for a fixed rent. All the children were sent to school. He sold 0.75 acres to arrange for the marriage of his elder daughter in 1992, spending Rs 25,000 including dowry. He soon came to know of his son-in-law's undesirable character and was forced to support his daughter's family for 3-4 years. When his son-in-law died, he had to bear the expenses. Moreover, he had to take care of the daughter and her children.

Factors that contributed to acute poverty:

- Sold land to perform his two daughter's marriages; paid their dowry and repayed old debts
- No financial support from his government-employed son
- Expenditure on his wife's treatment
- Received old age pension from the Government and remittances from his younger daughter.

Household E's son was educated up to class 12 and worked as a ticket collector in the Andhra Pradesh Road Transport Corporation at Hyderabad. Household E had to spend Rs 20,000 on his son's marriage as he fell in love with a girl and married her without a dowry. In 2000, the son asked his father to stand guarantor for a loan from a village moneylender to construct a house in Hyderabad. Household E borrowed Rs 15,000 on interest and did not repay the moneylender within the stipulated time. Under pressure, he had to sell part of his land towards loan repayment. At present, his son earns Rs 12,000 a month but does not support his father.

Household E's second daughter has completed her education (12 class) and is now working as a private tutor in the village. Together, father and daughter earn Rs 2,000 a month. Until she got married, this was the family's only source of income. In 2002, he sold the remaining 2 acres of land for Rs 100,000 and deposited the proceeds in a bank. His second daughter's marriage cost him Rs 50,000 and 30 grams of gold. At present, he gets Rs 200 per month as old age pension from the government and about Rs 300 per month from his second daughter. In the last one year alone he has spent Rs 6,000 on his wife's medical treatment. Other than the house valued at around Rs 50,000, the family owns no assets.

8.6 Case study 6: Continuing destitution

Household F (HH. no. 7/281) belongs to the Scheduled Caste community. Household F consists of a lady, her husband, two sons and a daughter. Householder F is the daughter of an original VLS household (HH. no. 7/280). The main occupations in this family are agriculture and wage labor.

The husband of household F is the main income earner, who owns 3 acres of land and 2 bullocks. He is also involved in his caste occupation, that of a cobbler. In 1991 he was arrested by the police on grounds of providing shelter and food to naxalites and a special court sentenced him to a 15-year jail term, including three years of rigorous imprisonment in Cherlapalli jail. While in jail, he was trained to be a cobbler. For over two years, brothers of household F

helped the family. The husband was prematurely released from jail in August 2006 for his good conduct. On the recommendation of jail authorities, the State Government sanctioned him a loan of Rs 50,000 through the AP Grameena Vikas Bank to set up a shoe repair shop under a self-employment scheme. He spent Rs 10,000 on setting up the shop and Rs 40,000 on renovating his collapsed house.

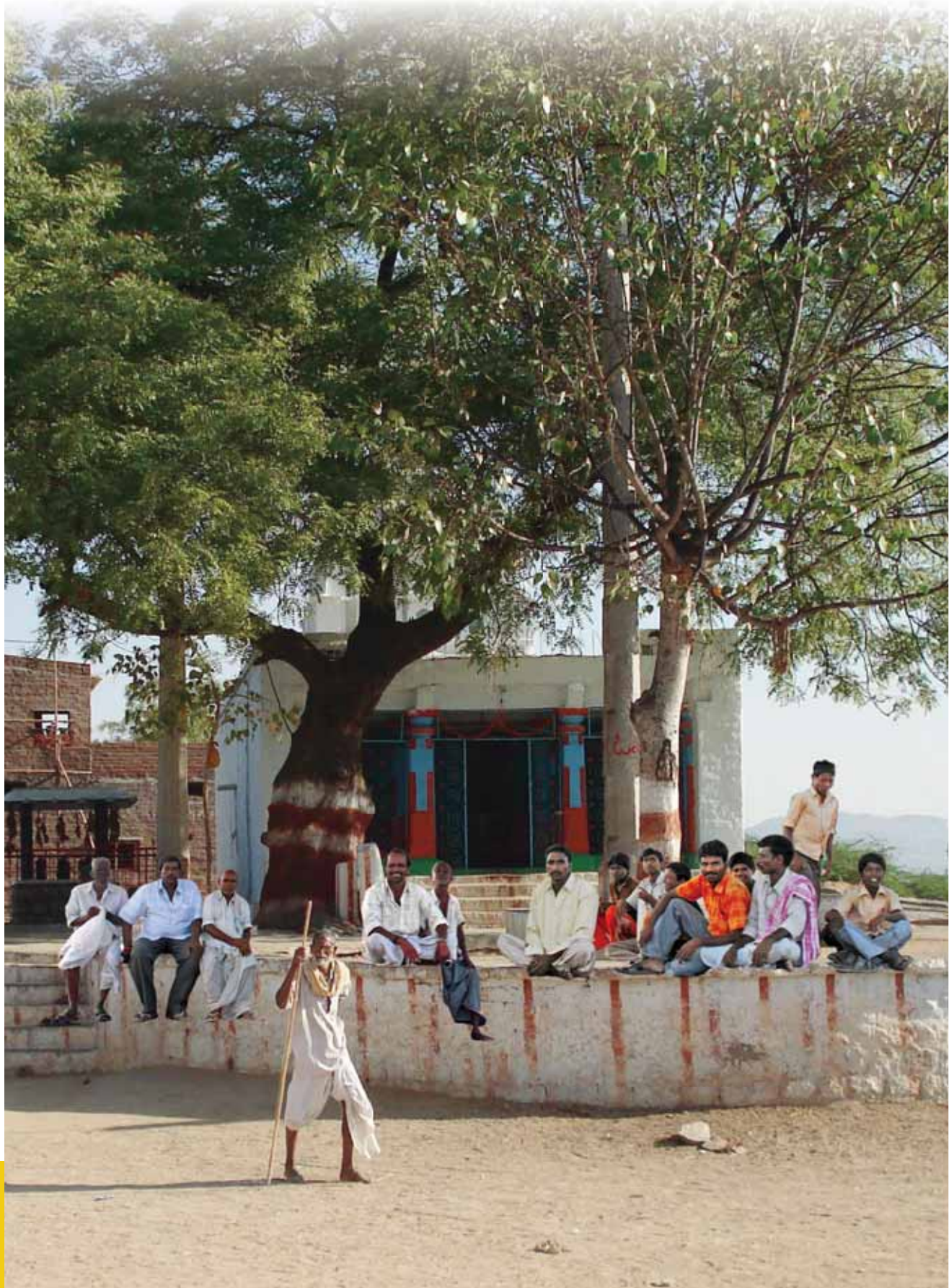
The income from this source of livelihood is meagre. The husband's land has been lying fallow for 14 years due to his court case and sentence. Since it is a dryland, the chances of leasing are low. Wage labor with an average income of Rs 40-50

(women) and Rs 80-100 per day is the only option left to run his household. Recently this household registered under the National Rural Employment Guaranteed Program where both husband and wife undertake wage labor to earn Rs 80-100 (men) per day. The household is also eligible to get 20 kgs of rice per month under the Public Distribution System. The husband of household F borrowed Rs 20,000 at 3% interest per month and has been unable to pay the interest due to his low income. Household F have two sons and a daughter. They aspire to educate their children and have a regular source of income.

Factors leading to destitution:

- The major earning member (husband) was jailed for a long period, leading to a loss of income
- Land was kept fallow for 14 years
- Was unable to repay old debts taken at high rates of interest due to low income
- Received rice and other benefits from the Government to cope with shocks.

Strategically located in the centre of the village, the temple serves as a regular venue for religious, social and cultural activities.



9. Conclusion

This profile chronicles the dynamics and pathways of development of Dokur's village economy. It provides a good overview for scholars and development practitioners worldwide who continue to cite the findings from Dokur village as part of their analysis of the decision-making process and technological change in the SAT. It presents a useful introduction to the VLS studies which aim at broadening the understanding of rural labor, financial markets, risk attitudes and technological change in the rural SAT economy, which, in turn, can help design new technologies and policy changes for rainfed agriculture.

During the last 30 years, the livelihood situation in Dokur has changed substantially. Food security of poor households improved due to greater diversity in livelihood options, providing substantial opportunities for the poor to enhance incomes and move out of the poverty trap.

The share of crop incomes were seen to be declining due to repeated droughts as households turned to non-farm sources of livelihood, including trade and business. Several landless households have acquired land, either through government distribution schemes or through purchases. Poor households acquired land or increased their holdings, thus reducing their participation in the labor market.

Non-farm employment opportunities increased due to higher education, better skills and technical knowledge. There was a shift from caste occupation (eg, cobblers, barbers, washermen, and potters) to businesses, truck driving, government service, and even migration in search of other means of livelihood. Daily wage labor turned to opening small shops, mechanic shops, vegetable selling and group farming by leasing in land, and livestock rearing. Regular farm servants shifted to day labor within the village or in nearby towns. Small and marginal farmers in some cases shifted from agriculture to business, contract work, financing and deriving rental income from hiring tractors. Seasonal out-migration as a source of livelihood has significantly increased with around one-third of the population migrating to cities in search of off-farm employment. With labor contractors providing an

advance of Rs 10,000-12,000 to each family willing to migrate to Mahabubnagar, Hyderabad, Maharashtra and Gujarat for off-farm work, around 10 households have permanently left the village.

Formal credit sources have reduced the role of the private moneylenders, but the latter still constitute an important source of credit.

The reduction in poverty incidence over time may be partly attributed to the benefits accruing from Government welfare programs like PDS, old age pension schemes, housing schemes and support to self-help groups. Women are playing an important role in decision making on cropping patterns, input use, adoption of improved agricultural technology and managing farm operations.

The case studies give insights into development pathways in village Dokur. They reveal that the household's welfare may improve, deteriorate, or not change over time depending on the condition of each household's asset base, their investment decisions including education, societal norms and social interactions and access to welfare programs, among others.

This profile of Dokur is an illustration of a village whose transformation was driven not by agriculture but by the opportunities presented by diversification into non-agricultural sources of livelihood and even migration. It has shown that higher education, improved awareness, and women empowerment have facilitated this process. However, though livelihood options have increased and have provided substantial opportunities for the poor to enhance incomes and move out of the poverty trap, the increasingly non-viable nature of farming in Dokur presents a challenge to rural development practitioners and policymakers. Innovative technologies addressing water scarcity and frequent droughts, institutional arrangements linking farmers to markets and appropriate investments in managing the natural resource base and supplemental irrigation are imperative to give an impetus to rainfed agriculture as a source of livelihood among the rural poor in SAT villages like Dokur.

References

- Adam J and Woltemade UJ.** 1970. Studies of Indian village economies. *Indian Economic and Social History Review* 7(1): 109-137.
- Asokan M, Bhaskar Rao V and Mohan Rao Y.** 1991. Agro-economic profile of selected villages in Mahabubnagar region of Andhra Pradesh. *Village Level Studies Miscellaneous Paper*. Patancheru 502 324, Andhra Pradesh, India: International Crops Research Institute for the Semi-Arid Tropics. 38 pp.
- Behrman JR and Deolalikar AB.** 1989. Agricultural wages in India: The role of health, nutrition, and seasonality. Washington DC, USA: International Food Policy Research Institute. 11 pp.
- Bhende MJ.** 1983. Agro-economic profile of selected villages in Sholapur region of Maharashtra State (India). *Economics Program Village Level Studies and Miscellaneous Paper Series*. Patancheru 502 324, Andhra Pradesh: International Crops Research Institute for the Semi-Arid Tropics. 49 pp.
- Binswanger HP and Jodha NS.** 1978. Manual of instructions for economic investigators in ICRISAT's Village Level Studies. Vol. 2. *Village Level Studies Series*. Economics Program, Patancheru 502 324, Andhra Pradesh: International Crops Research Institute for the Semi-Arid Tropics. 196 pp.
- Binswanger HP and Ryan JG.** 1979. Village level studies as a locus for research and technology adaptation. Pages 121-129 *in* Proceedings of the International Symposium on Development and Transfer of Technology for Rainfed Agriculture and the SAT farmer, 28 August- 1 September 1979, ICRISAT Center, Patancheru 502 324, Andhra Pradesh: International Crops Research Institute for the Semi-Arid Tropics.
- Chung KR.** 1998. The contribution of ICRISAT's mandate crops to household food security: A case study of four rural villages in the Indian semi-arid tropics. *Information Bulletin* no. 52. Patancheru 502 324, Andhra Pradesh: International Crops Research Institute for the Semi-Arid Tropics. 36 pp.
- Deb UK, Nageswara Rao GD, Mohan Rao Y and Slater R.** 2002. Diversification and livelihood options: A study of two villages in Andhra Pradesh, India 1975–2001. Working paper no. 178. London, UK: Overseas Development Institute. 54 pp.
- Dvorak KA.** 1988. Indigenous soil classification in semi-arid tropical India. *Resource Management Program, Economics Group, Progress Report 84*, Patancheru 502 324, Andhra Pradesh: International Crops Research Institute for the Semi-Arid Tropics. 38 pp.
- FAO (Food and Agriculture Organization).** 2004. Report of the fifth external programme review of the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT). Rome, Italy: FAO. 139 pp.
- Focus Group Meetings. 2007-08.** Tracking livelihood dynamics and development pathways in village Dokur. Unpublished field reports of Global Theme on Institutions, Markets, Policy and Impacts. Patancheru 502 324, Andhra Pradesh: International Crops Research Institute for the Semi-Arid Tropics.
- Gandhi, BVJ.** 2008. The unheard voices: Poverty dynamics in rural India, Insights from Maharashtra and Andhra Pradesh. Human Development Network, Social Protection Unit (HDNSP) consultancy report. Washington DC, USA: The World Bank. 40 pp.
- Gandhi BVJ, Bantilan MCS and Parthasarathy D.** 2008. Livelihood risk from HIV in semi-arid tropic of rural Andhra Pradesh. *Research Paper No. 2008/49*. Helsinki, Finland: United Nations University-World Institute for Development Economic Research. 26 pp.
- Gandhi BVJ and Bantilan MCS.** 2009. Poverty and vulnerability through time: Insights from VLS. *Social Analysis Series Paper no. 2*. Patancheru 502 324, Andhra Pradesh: International Crops Research Institute for the Semi-Arid Tropics. (Forthcoming).
- Ghodake RD and Ryan JG.** 1981. Human labor availability and employment in semi-arid tropical India. *Indian Journal of Agricultural Economics* 36 (40): 31-44.
- GOI (Government of India).** 2001. Census of India 2001. Ministry of Health. New Delhi, India: GOI. <http://www.censusindia.gov.in>
- Government of Andhra Pradesh.** 1971. Census 1971: District Census Handbook, Mahabubnagar. Hyderabad, Andhra Pradesh: Directorate of Census Operations.

Government of Andhra Pradesh. 2001. Census 2001: District Census Handbook, Mahabubnagar. Hyderabad, Andhra Pradesh: Directorate of Census Operations.

ICRISAT (International Crops Research Institute for the Semi-Arid Tropics). 2003. SATrends. Patancheru 502 324, Andhra Pradesh. Issue 28, March 2003: ICRISAT.

Jodha NS, Asokan M and Ryan JG. 1977. Village study methodology and resource endowment of the selected villages in ICRISAT's Village Level Studies. Economics Program, Unpublished Occasional Paper no. 16. Patancheru 502 324, Andhra Pradesh: International Crops Research Institute for the Semi-Arid Tropics. 51 pp.

Kshirsagar KG. 1983. Agro-economic profile of selected villages in Akola region of Maharashtra State in India. Village Level Studies Series, Economics Program. Patancheru 502 324, Andhra Pradesh: International Crops Research Institute for the Semi-Arid Tropics. 46 pp.

Maps of India. 2009. <http://www.mapsofindia.com/maps/andhrapradesh/districts/mahubnagar.jpg>.

Rao KPC. 2009. Village level studies, 1975-2008. Presentation prepared for BMGF-ICRISAT project launch meeting on the Tracking Change in Rural

Poverty in Household and Village Economies in South Asia, 30 June – 2 July 2009, Patancheru 502 324, Andhra Pradesh, India: International Crops Research Institute for the Semi-Arid Tropics.

Rao KPC and Kumaracharyulu D. 2007. Changes in agriculture and village economies. Research bulletin no. 21. Patancheru 502 324, Andhra Pradesh, India: International Crops Research Institute for the Semi-Arid Tropics. 132 pp.

Singh RP, Asokan M and Walker TS. 1982. Size, composition and other aspects of rural income in the semi-arid tropics of India. Economics Program Progress Report no. 33, Patancheru 502 324, Andhra Pradesh: International Crops Research Institute for the Semi-Arid Tropics. 28 pp.

Singh RP and Hazell PBR. 1993. Rural Poverty in the Semi-arid tropics of India: identification, determinants and Policy interventions. Economic and Political Weekly 28(12/13): A9-A15.

TISS (Tata Institute of Social Sciences). 2005. Causes of farmers' Suicides in Maharashtra: An enquiry. Tuljapur, Osmanabad 413 602, Maharashtra: TISS. 47 pp.

Walker TS and Ryan JG. 1990. Village and household economies in India's semi-arid tropics. Maryland, USA: The Johns Hopkins University Press. 394 pp.

Appendix 1. A map of Devarkadra mandal.



Source: Records of the Mandal Revenue Office, Devarkadra, 2008.

Appendix 2. Comparison of farmers' perceptions, 1984-85 to 2007-08.

Areas	1984-85	2007-08
Rainfall pattern and climate	(1) Adequate rainfall and good distribution; (2) Normal temperatures.	(1) Late monsoons, erratic rainfall and low rainfall; (2) Three out of five years were drought years; (3) Temperatures have increased in all seasons.
Irrigation	(1) Only a few farmers had access to irrigation; (2) Three irrigation tanks and more than 70 open dug wells were important sources of irrigation.	(1) Tanks have not had water since 1992, except in 1998 and 2004 for a few months; (2) Open dug wells dried up completely; (3) Number of borewells increased and a few farmers drilled bores over 300 feet deep; many borewells dried up; (4) Probability of successfully drilling borewells is about 25%.
Land	(1) Most of the land was under the control of a few landlords; (2) Land values were low; (3) Land was more consolidated; (4) Quality of land was better due to application of farmyard manure.	(1) Land holdings have become highly fragmented and scattered due to family division; (2) Landless households acquired land mainly under Government welfare programs; (3) Shepherds (Kurmas) acquired more land than other caste farmers; (4) Land values rose in the last two years from Rs 20,000 to Rs 200,000.
Cropping pattern	(1) Irrigated paddy, sorghum, groundnut, pigeonpea, and castor.	(1) Castor, HYV paddy, rabi sorghum; (2) Farmers stopped growing sorghum and groundnut because of low productivity due to drought and low profitability; (3) The population of wild boars increased causing damage to food crops. So, farmers started growing castor, which gives better income and is not affected by wild boars.
Livestock	(1) Greater number of livestock consisting of bullocks, milch animals and other young cattle; (2) Big landowners maintained around 20-30 livestock.	(1) The number of local cows, young cattle, and bullocks declined, due to increase in maintenance cost and shortage of fodder and labor; (2) Milch animals increased and selling milk became the main source of income for 20 families in the village; (3) Sheep population increased and became a major source of income for shepherd families.
Labor	(1) Labor shortage; (2) Low wage rates, mostly paid in kind; (3) Laborers were in the control of big landlords; (4) More than 80 laborers were working as RFS with big landlords on low monthly salaries (bonded labor).	(1) Due to continuous droughts and decrease in paddy area, labor did not have enough work and migrated to cities and towns; (2) About 40% of the village population has migrated to cities in search of employment opportunities due to non-availability of work in the village; (3) Labor who acquired land preferred to work on their own land rather than on other farmers' fields; (4) The availability of RFS fell from 80 to 10; (5) Out-migration to far off places has been increasing; (6) Labor contractors provide an advance ranging between Rs 10,000 and Rs 12,000 to each family member for off-farm work.
Livelihood diversification	(1) Farmers had limited opportunities; (2) Majority of households depended upon agriculture and labor earnings.	(1) Farming had limited opportunities due to decline in net crop incomes, reduction in cropped area under paddy and groundnut and increase in the cost of cultivation; (2) Majority of households have more diversified sources of livelihood due to increased awareness, education and skills; (3) Diversification has taken place from agriculture to business, milk selling, contract work, and tractor hiring within the village or nearby towns; (4) Within the village, diversification has seen casual labor shifting to livestock rearing (milch animals, sheep and goats), setting small mechanic shops, and vegetable vending.
Credit	(1) Village moneylenders (8-10 individuals) played a major role in providing loans for agriculture and consumption than financial institutions; (2) The interest rate ranged between 18-36%; (3) more than 60% of the households were indebted to village moneylenders.	(1) Due to persistent drought and non-availability of employment opportunities, majority of the villagers borrowed money for different purposes; (2) Default rate has been very high due to non-repayment of borrowed loans; (3) Other sources of finance such as private chits have sprung into prominence; (4) Women SHGs (30 groups) are active and their members can borrow for income generation activities.
Technologies	(1) A majority of farmers (80%) used improved paddy cultivars. All farmers used local cultivars of groundnut, sorghum and pigeonpea; (2) A few farmers (25-30%) adopted chemical fertilizers and plant protection chemicals for dryland crops; (3) No tractors were available.	(1) Crop area is covered (100%) with improved cultivars (varieties and hybrids); (2) All farmers are applying chemical fertilizers to both irrigated and dryland crops; (3) Around 10 power sprayers and 2 threshers are available for threshing castor; (4) Around 8 tractors are available on rent in the village.
Pests and diseases	(1) Pests and disease incidence was not severe; (2) Farmers used to manage even without spraying.	(1) Pests and diseases increased in paddy, castor and pigeonpea due to changes in climatic conditions and adoption of improved cultivars; (2) Farmers are spraying chemical pesticides 2-3 times on paddy and castor to control pests and diseases.

Source: Focus Group Meetings, 2007-08.