

**Economic Diversification and Prospects for Sustainable Rural Livelihoods in a  
Dryland Agrarian Village: A Case Study in Bijapur District Karnataka, India**

By

Brenda K. Wilson

A Thesis  
Submitted to the Faculty of Graduate Studies  
In Partial Fulfillment of the Requirements  
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Master of Natural Resources  
Management

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## Abstract

India is among the world's fastest growing economies, but the Indian agriculture sector is still the largest source of employment in rural areas. Concerns regarding the weakened agrarian sector, ominous population growth, and intensified pressure on the natural resources base have prompted the Indian government to seek strategies that will boost agricultural productivity, reduce poverty, and improve the socioeconomic conditions of farmers. However, in the new paradigm for agricultural development, strategies must incorporate plans for sustainable solutions thereby closely linking goals of environmental sustainability with social and economic goals for present and future generations. Indeed, a shift in thinking has markedly evolved to such an approach with the holistic and people-centric concept of sustainable livelihoods. Sustainable livelihood approaches encompass the notion that initiatives must build on people's assets, knowledge, and capacities, which can be understood within their local context.

Economic diversification is recognized by the Indian government as a poverty reduction strategy for improving socioeconomic conditions of poor farmers and stabilizing agrarian village economies by promoting households to engage in alternative choices in the farm and nonfarm labor market for income sourced from diversified sources. The underlying rationale for diversification is that the adoption of new income-generating activities might reduce farmers' vulnerability when crops fail and improve livelihoods by reducing dependency on migration and external support for subsistence.

This research then, takes top-down ideas for economic diversification into an agrarian village for a bottom-up perspective from the rural poor for a consideration of prospective diversification strategies as sustainable livelihood alternatives. Relying on methods drawn from Participatory Rural Appraisal and Rapid Rural Appraisal such as participant observation, mini-questionnaires, semi-structured interviews, focus group discussions, secondary data sources, and mapping, the study explored the following objectives: (1) to explore the local context and livelihoods of poor and landless farmers; (2) to understand the characteristics of the local agricultural production environment; (3) to identify farm activities, from the farmers' perspective, that might help or hinder agricultural productivity and long-term sustainability; (4) to share and explore prospective diversification activities with farmers; and (5) to consider the feasibility and sustainability of favored diversification activities discussed, given the local context. The perspectives from the residents of Byalal Village in the dryland region of Bijapur District, Karnataka, India, were considered in the research.

The research indicates that economic diversification into activities – especially nonfarm activities – that do not heavily rely on local natural capital inputs may offer the best prospects for poverty reduction and sustainable livelihood outcomes for villagers, given the local agro-ecological potential and socioeconomic context. The future prospects for sustainable livelihood outcomes through diversification are optimal for several reasons: there is a strong interest by

locals (including seasonal migrants) to diversify income-generating activity locally for household livelihood security, there is evidence that some diversified households in Byalal have a more secured livelihood than non-diversified households, and there are local external supporting institutions that have the expertise in region-appropriate skills and technologies to facilitate diversification interventions. However, the local interest to diversify is not matched by their local capacity. There is a clear need for a scaling-up of local external institutions and linkages (farm extension and training programs and financial institutions, in particular) to strengthen the local capacity to diversify by removing barriers to entry for poor households and providing sustainable encouragement and support. The research also found that poor households in Byalal included households from all socioeconomic classifications in the village, which implies that the narrow focus of future diversification initiatives for farmers may be exclusive of other groups in the village who may also benefit from diversification. A number of complex and interrelated micro and macro processes were identified in the research that will likely influence livelihood outcomes from diversification. For example, traditional and cultural norms such as gender inequities in access to resources and divisions of labor, male alcoholism, and discrimination against widows and lower castes are potential limiting factors to sustainable livelihood outcomes from diversification. Other influences to be considered for sustainable outcomes from diversification include access to capital assets for poor households (i.e. physical, financial, social, human, and natural capital), land availability/limits to uptake new activities, scale of production of new activities as income alternatives, the role of Hinduism in household economic decision-making, market roles in a traditional barter economy, generational differences in livelihood goals, and the macro-political context of India. Future diversification interventions must commit to a long-term collaboration between villagers and supporting institutions for a sustainable, effective economic plan that is inclusive of the ecological and social dynamics of farming villages.

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## List of Acronyms

CPL	common property lands
DA	Diversification activities
DFID	United Kingdom Department for Agricultural Development
FAO	Food and Agriculture Organization (United Nations)
ft	feet
FG	focus group
GDI	Gender Development Index
GDP	Gross Domestic Product
GoAP	Government of Andhra Pradesh
GoI	Government of India
GoK	Government of Karnataka
GSDP	Gross State Domestic Product
ha	Hectare (1ha=2.471 acre)
HDI	Human Development Index
HIV	Human Immunodeficiency Virus
HYVs	High-yielding varieties
ICAR	Indian Council of Academic Research
IFAD	United Nations International Fund for Agricultural Development
KHDR	Karnataka Human Development Report
KHPT	Karnataka Health Public Trust
KI	key informant
km	kilometer
NGOs	Non-governmental organizations
PRA	Participatory Rural Appraisal
RRA	Rapid Rural Appraisal
Rs	Rupees (1USD=Rs 40 in 2007)
SHG	Self-help Group
SL	Sustainable livelihoods
ToT	Transfer of Technology
UASD	University of Agricultural Sciences - Dharwad
UN	United Nations
UNAIDS	The Joint United Nations Program on HIV/AIDS
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
WB	World Bank
WHO	World Health Organization
WMP	Watershed Management Program

## List of Kannada Words

Agarbatti	incense sticks (making them)
Agasi	flax/linseed
Bajra	millet
Bengal gram	chickpea
Dal	a type of pulse crop
Devaru	God (nonspecific)
Dhobi ghat	laundry facility
Gajanana	youth association
Hobli	village cluster
Horse gram	a legume
Jaggary	sugarcane product used as sweetener
Jeevamurtha	“life milk” – organic pesticide/fertilizer
Jowar	sorghum
Kasubi	safflower
Kharif	monsoon growing season
Lakh	Indian numbering system equivalent to 100,000; 100 lakh=1crore
Maidan	plateau
Panchayat	village leaders
Puja	worship
Rabi	dry growing season
Rangoli	drawing decor with colored powders
Taluka	subdistrict

# **Chapter 1: Introduction**

## **1.1 Preamble**

One of the greatest challenges in contemporary development is to sustain environmental integrity for present and future generations while also supporting rural livelihoods. Of major concern is that decisions on development often support economic goals with little or no regard to the environment and/or wellbeing of people. Given the complexity of such challenges, development approaches must be interdisciplinary and holistic rather than reductionist: environmental issues cannot be isolated from social or economic problems such as poverty and social distress. This research takes such an approach using a sustainable livelihoods (SL) framework to explore the multidimensional aspects of livelihoods for consideration of economic diversification as a development strategy for villagers living in a rural dryland region of South India.

## **1.2 Background**

### *1.2.1 Threats to rural livelihoods in India*

Approximately 1.1 billion people are living in extreme poverty, (Chen & Ravallion, 2004 cited in Sachs, 2005), three-quarters of whom reside in rural areas of developing countries (World Bank [WB], 2001). The rural poor are heavily concentrated in areas of poor land quality (i.e. low potential agriculture, fragile ecology, weak infrastructure, poor connectivity, and weakly functioning markets), yet the strong majority depend upon this land to support agricultural production to sustain their livelihoods and secure household food stocks. It is estimated that more than half of the world's population lives in marginal lands, a large proportion of which is prone to frequent shocks of droughts. Hence, about half of the two billion people living in

dryland regions are likely to be poor (United Nations Development Program [UNDP], 2001). Areas with moisture deficiency, having a growing period of less than 180 days, and a proportion of gross irrigated areas less than 40-50% define drylands for this study (Shah, 1998). Dryland populations are among the most ecologically, socially, and politically marginalized populations in the world (Reynolds *et al.* 2007).

Environmental degradation most severely affects the world's rural poor. Environmental problems including soil erosion, floods, droughts, and pollution threatens the livelihoods of 2.6 billion people globally (UNDP, 2007a); yet, poverty itself intensifies the struggle for survival and leaves the poor with few options to maintain environmentally sustainable livelihoods. Nonetheless, the dangers of anthropogenic ecological damage, including resources exploitation and lack of responsible resources management, are evident: large societies have fallen by committing ecological suicide through destroying their own resource base (Diamond, 1999). The sustainability of a society and its economy is thus contingent upon the sustainability of its natural resources.

India supports approximately 16% of the world's human population and 20% of its livestock population on merely 2.5% of the world's geographical area (United Nations Environment Program [UNEP], 2001) exerting considerable pressure on its natural resources. Pressure on India's natural resources will become the greatest in the world by 2020 (WB, 2008a) resulting from steady population growth, widespread incidence of poverty, and inappropriate management practices. This has already led to significant land degradation, resource scarcity, and rising externalities throughout the country. Environmental degradation has already affected approximately 57% of the land area in India, according to one study (Sehgal & Abrol, 1994 as cited in UNEP, 2001); and among the different categories of lands,

cultivated areas face the biggest problem with soil erosion accounting for 87% of land degradation in India (UNEP, 2001).

The rural areas of India are home to about 72% of the country's 1.1 billion people (WB, 2008a) with an estimated 27.5% living below the poverty line (Central Intelligence Agency [CIA], 2007). Most of India's rural poor depend on rain-fed agriculture and fragile forests for their livelihoods. Agriculture is the largest economic sector in India, and it plays a significant role in the growth and development of the national economy. Thus, the weakening of the agricultural sector over the last few decades is a major concern for the country in its ascent as an emerging market economy. According to the World Bank, the agrarian crisis in India is characterized by a slowdown in agricultural growth, low agricultural productivity, increasing natural resources degradation, and agricultural subsidies crowding out productivity-enhancing investments (WB, 2008a). The deterioration of agricultural performance is caused by a multitude of factors that go well beyond recent monsoon failures and include ecological, socio-political, and economic causes.

Farmers in Karnataka, along with farmers in other states, struggle to cope with the decades-long agrarian decline, which has left them in a state of socioeconomic distress. The most vulnerable groups in the rural sector worldwide are smallholder and landless farmers, women, pastoralists, artisanal fisher folk, indigenous ethnic groups, and displaced people; and smallholder farmers and the landless represent more than 90% of those who are vulnerable (Ryan, 2004). Therefore, one can assume that rural smallholder and landless farmers struggle the most in coping with the agrarian decline in India. The distress among farmers has manifested itself through a persistent and increasing number of suicides, occurrence of migration, loss of livelihoods, poverty, poor health outcomes, and family instability (Hanchinal

*et. al.*, 2007). The stable rate of seasonal migration is also of concern because it is an at-risk behavior associated with the spread of sexually-transmitted infections such as Human Immunodeficiency Virus (HIV) (Joint United Nations Program on HIV and AIDS [UNAIDS], 2001). India has a growing concern about the increased prevalence of HIV in Karnataka, one of the five states in which the most severe epidemics are occurring in India (Moses *et al.*, 2006).

To address these challenges, institutions including the Government of India (GoI), Government of Karnataka (GoK), the World Bank, the University of Agricultural Sciences in Dharwad (UASD), and the University of Manitoba (UM) have recognized the agrarian crisis and expressed commitment toward agricultural development and the welfare of farmers. These institutions have recommended economic farm and nonfarm diversification interventions as income alternatives among poor and landless farmers to stabilize village economies as a strategy for improvements in socioeconomic conditions of farmers. Agriculture can be a major source of growth for agriculture-based countries such as India and can reduce poverty and improve environments. However, this will require improving the asset position of the rural poor, making smallholder farmers more sustainable and competitive, and diversifying income sources toward the labor market and rural nonfarm activity (WB, 2008b). Thus, diversification strategies targeted for the poorest farmers will be essential for successful efforts by and for the Indian people.

Agricultural development, poverty reduction, and environmental protection have become closely interlinked, and an improved stewardship of natural resources will be critical for the future of agriculture. However, determining the optimal mix of agricultural-related activities to spur the economy and meet poverty alleviation goals remains elusive. New development strategies for poverty reduction have often either omitted or added the inclusion

for plans for long-term sustainability as little more than rhetoric. It is imperative that decision-makers not be shortsighted and that the commitment to achieve goals of sustainability move from rhetoric to reality. Those in India who heavily rely on natural resources and environmental services for their livelihoods may be at particular risk for further distress in the future, if agendas including economic diversification do not also consider environmental and human wellbeing. New technologies or strategies should complement and not conflict with livelihood systems of the poor; therefore, the chosen economic diversification strategies to improve conditions of farmers should be environmentally and socially sustainable to promote long-term stable and secure livelihoods.

### *1.2.2 Rural development for sustainable livelihoods: A paradigm shift*

Since poverty distribution, agro-ecological conditions, and socioeconomic settings vary considerably throughout the world, a reductionist top-down approach and panacea-like strategy for rural research and development for poverty alleviation is not effective. Strategies must instead be focused on context-dependent analyses with an exploration of specific local capabilities, production environments based on available resources and activities, current development pathways, and household livelihood strategies (Irz *et al.*, 2001) through a more holistic, interdisciplinary, dynamic, and whole-systems approach. Indeed, a shift in agricultural development has markedly evolved to such an approach with the concept of sustainable livelihoods (SL)<sup>1</sup> which encompasses a wider set of issues to include increasing emphasis on participatory approaches and empowerment of farmers with a focus on ecological sustainability. The concept of SL dates back to the work of Robert Chambers in the mid-1980s,

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<sup>1</sup>See Ellis (2000) for a comprehensive overview on sustainable livelihoods.

and since that time SL has become increasingly central to the debate about rural development, poverty reduction, and environmental management. Livelihoods include more than just income. Livelihoods are comprised of the resources (capital assets including natural, physical, human, financial, and social), the activities, and the access to these resources (mediated by institutions and social relations) that together enable the individual or household to ensure their minimum basic needs over time (Ellis, 2000). Coping and adaptive strategies are also a central feature of SL. “Sustainable livelihoods are derived from people’s capacity to access options and resources and use them to make a living in such a way as not to foreclose options for others to make a living, either now or in the future” (UNDP, 1998: p.1). SL approaches are multidimensional and emphasize strategies that simultaneously improve current and future productivity, reduce poverty, and protect the environment without weakening (and preferably strengthening) the resilience of the most vulnerable groups in the community (Norman, 2002).

### **1.3 Research Purpose and Objectives**

With a consideration of household disclosed preferences among livelihood strategies and the feasible set of strategies among which households can choose, the study of diversification behavior offers important insights as to what sorts of interventions might be effective in reducing poverty and vulnerability (Barret *et al.*, 2001). The purpose of this research was to explore prospective economic diversification activities for poor and landless farmers as sustainable alternatives, given the importance of sustaining environmental integrity for present and future generations while also supporting rural livelihoods in their social and economic goals. In this study, economic diversification referred to the strategy of differentiating sources of farm and nonfarm income, such as production and services, to sustain livelihoods at a household and village level (Mignone *et al.* 2007). The objectives of the study were:

- (1) to explore the local context and livelihoods of poor and landless farmers;
- (2) to understand the characteristics of the local agricultural production environment;
- (3) to identify farm activities, from the farmers' perspective, that may help or hinder agricultural productivity and long-term sustainability;
- (4) to share and explore prospective diversification activities with farmers; and
- (5) to consider the feasibility and sustainability of favored diversification activities discussed, given the local context.

#### **1.4 Significance of the Research**

This research falls within a growing body of literature about the incorporation of the holistic, interdisciplinary, and people-centered concepts of sustainable livelihoods as a practical framework for research pertaining to local sustainable development. The scholarly significance of this research stems from its attempt to explore the complexities of rural livelihoods and to contextualize the scope of prospective diversification activities to yield sustainable livelihoods outcomes in a poor, agrarian, dryland Indian village. The research findings will also be included in a 'needs assessment' report that will contribute to future economic diversification initiatives with UASD-UM collaborations in the study area.

The underlying logic for the research was threefold. First, the weakening of the Indian agrarian sector since the 1960s has resulted in socioeconomic distress among Karnataka farmers which has manifested itself through a persistent number of suicides, indebtedness, seasonal migration, and livelihood instability. This reality is especially evident in rural areas with marginal production environments where the livelihoods of poor and landless farmers are particularly threatened. Secondly, the Government of India has called for the implementation of economic diversification interventions to improve the socioeconomic conditions of poor

farmers by stabilizing village economies thereby reducing vulnerabilities to shocks and stresses intrinsic to social and ecological systems. Economic diversification, in turn, may decrease the current high incidence of seasonal migration and heavy dependence on external support for subsistence through the creation of new local income-generating opportunities. Seasonal migration occurs when incomes of the economically powerless fail to sustain basic needs. If poor farm households can sustain their livelihoods through economic diversification, then perhaps migration prevalence would decline, thereby increasing family stability, lowering rates of HIV and suicide, and improving local productivity (Hanchinal *et al.*, 2007). Thirdly, rationales in the new agricultural development paradigm call for strategists to engage local communities to find sustainable poverty-reducing solutions that link goals for environmental sustainability with goals for social and economic improvements of livelihoods.

### **1.5 Summary of Methods**

The research was grounded in the social constructivist paradigm using a qualitative research design with a case study strategy of inquiry in a rural village of Bijapur District in Karnataka, India. The case study utilized basic concepts of the SL framework from the International Fund for Agricultural Development (IFAD) as an exploratory and analytical tool for evaluating rural livelihoods. From the SL framework, the research objectives, and a review of literature, three major themes of exploration of rural livelihoods emerged which provided the breadth of the case study: livelihood strategies, environment and agricultural practices, and economic farm and nonfarm diversification activities. Within each theme, the behaviors, actions, and perceptions of villagers regarding social, economic, and environmental topics were the qualitative criteria that provided the depth of the case study and enabled the researcher to address research objectives. The livelihood strategies theme was created to address all

objectives, and methods were aimed at gathering information about the social and economic aspects of villagers such as capital asset endowment and access, household livelihood stability, strategies, and coping mechanisms. The environment and agricultural practices theme was created to address the first three objectives with a focus on generating data regarding farmers' perceptions about the environment and natural resource base, agricultural productivity and practice, and sustainable agriculture. The economic diversification theme addressed the last two objectives through discussions on farm and nonfarm diversification activities with villagers.

The case study used methods drawn from Rapid Rural Appraisal (RRA) while trying to embody the principles of Participatory Rural Appraisal (PRA) (Chambers, 1994a). Methods included participant observation, mini-questionnaires, semi-structured interviews, focus groups, seasonal calendars, resource flow maps, transect walks, and secondary data sources. To address potential threats to validity and reliability, the researcher used a plurality of methods with triangulation and crosschecking. To mitigate study limitations posed by language, cultural, and gender barriers, and time restrictions, the researcher hired a male and female team of local and experienced research assistants to act as interpreters, assist in data collection, and to bridge the cultural gap.

## **1.6 Thesis Organization**

Six chapters organize this thesis. Following the introductory chapter, Chapter 2 begins with a literature review giving a multidisciplinary perspective of empirical studies on the interconnectedness between poverty, environment, agriculture, and economic growth with rationales for rural development in marginal production environments. It then presents a historic review of the decline of the Indian agricultural sector and its current impact on rural poor farmers. The chapter concludes with an overview of recent initiatives to improve

livelihoods of Indian farmers and a presentation of the SL framework used for the research. The third chapter describes the methodological considerations for using an SL framework as an analytical tool for the exploration of potential development strategies such as economic diversification. Chapter 3 also discusses potential threats to validity and study limitations. Two chapters of the thesis are devoted to the results and discussion of the study. The fourth chapter addresses Objectives 1-3 of the research and situates the data into the SL framework for analysis. Chapter 4 uses the SL framework as an organizational structure to present the complexity of rural livelihoods in the village. Chapter 4 concludes with a consideration of livelihood outcomes in Byalal in two ways. First, current livelihood outcomes at a village level are evaluated, given villagers' current household livelihood strategies; and secondly, the sustainability indicators presented in Chapter 3 are used to evaluate village livelihood outcomes. Prospective farm and nonfarm diversification activities and their feasibility for sustainable livelihood outcomes were shared with villagers, and Chapter 5 presents these, as well as addresses Objectives 4 and 5 of the research. The chapter concludes with a discussion of factors that may impact economic diversification as a general development strategy within the larger context of rural India. Based on reflections of Chapter 4 and 5, the final chapter concludes the thesis with a summary of the research, major conclusions, and recommendations.

## **Chapter 2: Adversities and Solutions for Indian Farmers in Drylands**

### **2.1 Introduction**

Distinguishing economic, social, and environmental aspects of sustainability enables researchers to conceptualize its many dimensions. This chapter explores the literature on agricultural development in relation to strategies that are sustainable for the rural poor who depend on agrarian systems for their livelihoods. Section 2.2 presents the literature on the poverty-environment debate at a larger scale and the arguments for agricultural development for economic growth as a whole. It also attempts to situate sustainable agriculture practices within the context of development strategies. Sections 2.3 and 2.4 narrow the focus on the deteriorating Indian agrarian sector and how the decline has resulted in poor livelihood outcomes for struggling Karnataka farmers. Section 2.5 includes a review of past initiatives that sought to improve the livelihoods of the state's struggling farmers and of the new call for economic diversification as the most recent strategy. The last section is a detailed description of the rural SL framework used in this study as an exploratory and analytical tool to evaluate livelihood outcomes of the poor.

### **2.2 Linking Rural Poverty, Environment, Agriculture, and Economic Growth**

#### *2.2.1 A Multidisciplinary Empirical Review*

The World Commission on Environment and Development (WCED, 1987) reported that poverty is a major cause and effect of environmental problems across the world. Although contentious, the relationship between poverty and environmental degradation has been described in the literature as a vicious cycle: poverty often leads to exploitation and degradation of natural resources because short-term development goals are pursued at the

expense of long-term environmental sustainability which reinforces the cycle with high population growth rates and increased pressure on the environment. However, a systematic exploration into the poverty-environment debate is necessary to increase our understanding of the linkage. Reardon and Vosti (1995) introduced the notion that there are different types of poverty and environmental changes; thus, expanding the debate to differentiate between types of each can have important implications for understanding this linkage. For example, the authors suggested that the criterion for poverty in poverty-environment analyses should not solely focus on measures of household income (welfare-poverty) but also on the ability of households to make minimum investments in resource improvements to maintain or enhance the resource base or to mitigate resource degradation (investment-poverty).

It is argued that the strongest link in explaining a country's measure of wealth and poverty is the relationship between a country's ecological zones and per capita income. However, many cross-country analyses of economic growth often place emphasis on institutional factors involved in poverty and have neglected the importance of the environment (Sachs, 2001). The effects of the environment on economic growth and socioeconomic activities are perhaps most significant for agriculture, one of the largest economic sectors worldwide. Although the agricultural sector only accounts for 7% of the world gross domestic product [GDP], the sector employs over one-third of the world's population (WB, 2008a). Agriculture is recognized as a unique instrument for development because of its multi-faceted contributions to national economic growth, providing livelihoods and food security for millions, and providing environmental services, yet agriculture has been largely underused for development (WB, 2008b). From a geographical perspective, approximately three-quarters of the world's most impoverished reside in rural areas of low

productive potential and environmentally-vulnerable areas; and of those persons an overwhelming 88% live in tropic (rather than temperate) regions (Ryan, 2004). Gallup and Sachs (2000) showed that in comparison to temperate regions, crop productivity was 27% lower in humid tropic regions and 42% lower in the dry tropic regions throughout the world. Furthermore, the disproportionate distribution of poverty geographically throughout the world – irrespective of differences in social, economic, and political histories - live in tropic-zone countries (Sachs, 2001; Ryan, 2004). This suggests that decision-makers for development cannot neglect the role of geographical, agro-climatic, and other environmental factors of poverty, yet often do (Sachs, 2001). The world still has a limited understanding of the problems of poor people living in less favorable environments (Ruben *et al.*, 2003).

Extensive literature suggests how investing in rural economic growth, especially in agriculture, can contribute to a country's total economy and through this to a reduction in poverty. Datt and Ravallion's study (1996) indicated that rural growth reduces poverty in both rural and urban areas but that urban growth does not alleviate poverty in rural areas. Rosegrant and Hazell (2000, as cited in Ryan, 2004) found in their review of Asian countries that countries with the highest success in poverty reduction have also achieved rapid agricultural growth and total economic growth through investments in the human capital of the poor. A cross-country study by Gallup and colleagues (1997) compared the effects of growth in GDPs within agricultural, manufacturing, and service sectors; they found that of the three sectors, a GDP increase from the agricultural sector leads to the highest percent increase in the incomes of the poorest. A later study by Datt and Ravallion (1998) investigated how the rural poor in India have benefitted from gains in farm productivity and found that higher farm productivity through higher wages and farm yields reduced absolute

poverty. More specifically, Irz and colleagues (2001) have shown that a mere 20% agricultural yield increase per hectare in India could lead to a reduction of at least 18% in the numbers of the poor.

Many studies also address a long-standing debate regarding the optimal allocation of resources between favorable and marginal production environments<sup>2</sup>. Some argue that there has been underinvestment in marginal production environments, which exacerbates conditions of impoverished people living in those areas. Others counter-argue that investments are justifiably low in marginal areas because the returns on investments are low and diverting resources away from favorable production environments would do more harm than good (Renkow, 2000). For example, Fan and colleagues (2000) focused on the occurrence of poverty in irrigated (favorable) areas versus rain-fed (marginal) areas in India. They showed that the Indian government has traditionally devoted more resources to irrigated areas than to rain-fed areas which has led to a 20% reduction in absolute poverty in irrigated areas between 1972 -1993; however, the level of poverty has remained mostly constant in rain-fed areas. The researchers argued that as investments in irrigated areas continue to increase, the marginal returns are diminishing, and it is now the rain-fed areas where marginal returns from government investments are largest. Nonetheless, Renkow (2000) reaffirms that the impact on productivity of improved agricultural technologies will be lower in marginal areas than in favorable areas; thus, Renkow supports agricultural research

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<sup>2</sup>Production Environment: the categorization of a production environment as “marginal” or “favorable” is derived from Renkow (2000) and is based on the biophysical and agronomic characteristics affecting agricultural production. Marginal production environments are less favorable production environments, i.e. areas with limited agricultural potential due to low soil fertility, steep slopes, insufficient rain or lack of irrigation, and usually with poor infrastructure and services (Renkow, 2000; Ruben *et al.*, 2003).

investments for favorable areas but recommends investments in infrastructure and institutional reforms for marginal areas. In contrast, Ruben and colleagues (2003) argue for more inter-regional balance in investments, concluding that even if investments in marginal production areas provide lower returns than favorable production areas, investments in sustainable agricultural intensification activities and regenerative technologies in marginal areas for the rural poor can make significant cuts in poverty, contribute to resolving environmental problems, and improve livelihoods. Poverty rates are highest in less-favorable areas, but most of the poor live in favorable areas; therefore, using agriculture to reduce poverty requires both investing in less-favorable areas to combat extreme poverty and in favorable areas to target the larger number of poor (WB, 2008b).

In summary, empirical research shows how the physical environment helps shape economic activity and that agricultural growth has strong poverty-reducing effects; therefore, there is much support for the rationale of decision-makers in developing countries to seek economic strategies aimed to increase agricultural growth. Nonetheless, environmental aspects must not be ignored. The evidence supports agriculture investments in marginal production areas for the poor even if returns are not as great as those seen in favorable production areas.

### *2.2.2 Lessons from the Green Revolution*

The Green Revolution was a food production movement initiated by the Rockefeller Foundation in 1944 in response to rapid global population growth and mounting fears of massive hunger. A transfer-of-technology (ToT) approach and the introduction of high-yielding varieties of cereal crops such as wheat, rice, and maize to dramatically increase farm productivity and rural incomes characterized the movement that targeted the developing

world. Regarded as one of the most important triumphs of targeted science in the past century (Sachs, 2005), the Green Revolution was successful in reducing global poverty and hunger. However, the movement is widely criticized for a number of reasons. First, it failed to place enough emphasis on the sustainability of increased productivity, the environment, and on human health and wellbeing. Activities to promote high-yielding grain varieties (HYVs) often required major inputs of water, pesticides, and fertilizers, which placed great stress on agro-ecological systems and jeopardized the health of both humans and livestock (Irz *et al.*, 2001). Farmers abandoned many traditional, more sustainable management practices because of the movement. Indeed, research suggests that low productivity in rain-dependent agriculture is due to sub-optimal management practices rather than low-physical potential (Pretty, 1995). Poor decisions in resource management together with intensified anthropogenic pressure on agro-ecological systems through population growth has led to resources degradation, pest- and weed- resistance problems, and poor health outcomes for farmers. The Green Revolution in India also resulted in unintended outcomes for women, especially the poor. For example, the shift toward large-scale agriculture and high-yielding rice technology increased the number of jobs for agricultural laborers but it decreased the number of women farmers resulting in an increased workload for poor women without any improvement in their standards of living (Agarwal, 1986). Secondly, the Green Revolution has been criticized as biased toward favorable production environments, although the majority of poor farmers reside in marginal production environments. The bias toward wealthier farmers has since increased inequality between the wealthy and poor. Furthermore, efforts to increase production will not help the poor if they are unable to earn enough money to afford it. Thirdly, the ToT approach of the Green Revolution largely overlooked the

underlying social factors impeding agricultural production that include access to land, resources, market, and power in decision-making. The Green Revolution particularly overlooked issues of gendered power-relations.

The Green Revolution taught many lessons. The positivist approach of the Green Revolution assumed that technologies are universal and exist independently of social context. This approach led to the generation of ‘magic bullet’ technologies for farmers that have been applied widely and irrespective of context; and although these technologies have transformed many agricultural systems, the modernization process has largely overlooked the needs of rural people because context affects outcomes and therefore cannot be ignored (Pretty, 1995). Too narrow an approach on production intensification can lead to the unintended consequence of defeating itself through the destruction of the resource base on which it depends. The adoption of sustainable agriculture<sup>3</sup> intervention strategies and regenerative technologies can minimize the risk of creating new or exacerbating existing problems in agro-ecological systems and can contribute to resolving critical environmental problems. In a recent study of 286 farm projects in 57 countries, researchers found that crop yields on farms in developing countries that used sustainable agriculture rose nearly 80% in four years and concluded that sustainable agriculture protects the environment in these countries while substantially improving the lives of farmers who adopt the resource-conserving practices (American Chemical Society, 2006). Pretty (1995) suggests the adoption of regenerative,

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<sup>3</sup> Sustainable agriculture: "The management and conservation of the natural resource base, and the orientation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generations. Such sustainable development (in agriculture, forestry, and fisheries sectors) conserves land, water, plant and animal genetic resources, and is environmentally non-degrading, technically appropriate, economically viable and socially acceptable." (Food and Agriculture Organization of the United Nations [FAO] 1991).

resource-conserving practices to increase agricultural production and finds that farmers adopting such technologies have doubled or tripled their crop yields with little or no use of external inputs. He further argued that it is in the poorer countries with tropic dry or humid climates where sustainable agriculture has had the greatest impact. Regenerative technologies include integrated pest and predator management, integrated soil and nutrient management, and integrated water management. These practices contribute to resource conservation and increased sustainable agricultural productivity. Examples of regenerative practices include multiple cropping, crop rotation, nutrient recycling, planting nitrogen-fixing crops with natural pesticide properties, use of organic fertilizers and green manure, composting, water harvesting, and conservation tillage to maximize soil infiltration and minimize water loss. Sustainable intensification practices are often accompanied by indirect economic and social benefits including a decreased need for expansion into nonfarm areas, reduced contamination and pollution of the environment, reduced costs incurred by households and the national economy, and a decreased likelihood of the breakdown of rural cultures (Pretty, 1995). Secondly, plans that do not include benefits for the poor will lead to a higher concentration of benefits from agriculture in favorable areas while leaving the poorest behind which exacerbates issues of poverty, environmental degradation, malnutrition, and health. Thus, including farmers of both genders from all socioeconomic classes, production environments, and landholding sizes in agricultural strategies can enable India to realize its full potential for agricultural production and productivity.

## **2.3 Agrarian Crisis: The Weakening of the Agricultural Sector in India**

### *2.3.1 The Rise of Urbanization and Rural Poverty*

India is the second most populous country in the world with a population of approximately 1.1 billion people (Census of India, 2001). It is one of the largest countries in the world both in area and population and is emerging as one of the world's fastest growing economies. Agriculture is still the largest source of employment in rural areas in India, though nonfarm activities are becoming increasingly important; thus, the weakening of the agricultural sector over the last several decades is of major concern for the country. Over the last few decades, the sector's contribution to the country's total GDP has continually declined though the number of agricultural laborers dependent upon it for employment remains the same.

India, since its independence from Britain in 1947, had its first advance in economic growth beginning in the mid-1960s with the Green Revolution. As a result, rural poverty was reduced and India was able to provide food to sustain itself even in years when monsoons failed to bring sufficient rainfall; however, India remained trapped with low economic growth until the 1990s when a major set of reforms was launched. The country then began to experience rapid economic growth, but it was mostly urban-led with investments mainly in industry and manufacturing. Public investments in agriculture steadily declined during the reforms of the 1990s, which further weakened the sector and worsened socioeconomic conditions of farmers. Meanwhile, the rural population has increased; and as land becomes increasingly scarce, land fragmentation increases which has increased the number of poor smallholder and landless farmers. In order to compensate for the reduction in farm size, the government tried to intensify land use, especially through irrigation. The results included a growing discrepancy in production and income between irrigated areas and dryland areas

which did not share the benefits of new technology; high and rising land prices; the fragmentation of smallholdings; an increase in landlessness; a rapid rate of deforestation; and the erosion of common resources (Pookpakdi, 1992).

The gap in standards of living between cities and rural areas has widened over the last few decades. Today, poverty in India is predominately a rural phenomenon, and approximately 70% of the Indian population and 75% of its poor live in rural areas (WB, 2008a). Although the country has seen a reduction in extreme poverty with its recent increase in urban-led economic growth, it continues to struggle with its high level of poverty, illiteracy, gender inequality, environmental degradation, and disease in rural areas. A priority for development now is to narrow rural-urban income disparities and rural poverty.

### *2.3.2 Agrarian Conditions in Karnataka*

Karnataka is one of four southern states in India and is the ninth most populated state with more than 52.8 million people (Census of India, 2001; Table 1). Approximately two-thirds of the state's population resides in rural areas (GoK, 2006). Agriculture is the mainstay of the people in the state with farmers and agricultural laborers forming about 56% of the workforce (Census of India, 2001). Over the last three decades the sector has suffered from a continuous slowdown in production and productivity and has experienced a subsequent regression of contributions to Karnataka's GDP. Setbacks for the agriculture sector are multifaceted.

The economy of the state was predominantly agrarian in character in 1956. The primary sector, which contributed about 60% of the state GDP in 1961 declined to about 43% in 1981, and then further declined to 26% in 2001-02 (Karnataka Human Development Report [KHDR], 2006). The most recent figures show that the agricultural

sector (including horticulture, sericulture, animal husbandry, fisheries, etc.) accounted for less than 20% of the state GDP in 2006-07 (GoK, 2007), and Karnataka is now one of the states with the lowest productivity compared to the all-India averages in many crops (Hanchinal, 2007). The large size of the workforce dependent on the agricultural sector is not proportionate with its small share in state GDP (KHDR, 2006). The sector had a growth rate of only 0.61% during the decade from 1993-94 to 2003-04 (GoK, 2007).

**Table 1.** Census data (2001) and human development statistics (2005): Bijapur District compared to Karnataka State (Source: Census of India, 2001; KHDR, 2006)

<b>CENSUS DATA (2001)</b>	<b>Bijapur District</b>	<b>Karnataka - statewide</b>
Total Population	1.81 million	52.8 million
Rural population	1.41 million	34.8 million
Urban population	396,089	18 million
Ratio (rural/urban)	3.55	1.9
%Scheduled caste	18.5	
%Scheduled tribes	1.66	
<b>DEVELOPMENT INDICATORS (2005)</b>	<b>Bijapur District</b>	<b>Karnataka - statewide</b>
HDI rank (out of 27 districts)	23 ( <i>down from 21<sup>st</sup> in 1991</i> )	NA
GDI rank (out of 27 districts)	21 ( <i>down from 20<sup>th</sup> in 1991</i> )	NA
Avg. Life expectancy at birth (yrs)	62.6	66.1
Total male literacy rate	69.94	76.10
Total female literacy rate	43.47	56.90
Rural female literacy rate	37.32	48.01
Rural families living below poverty line (%)	42.00	33.00
Female workforce participation rate (%)	28.50	31.09
Agricultural wages for males (Rs/day at current prices)	82.89	58.00
Agricultural wages for females (Rs/day at current prices)	37.33	38.00

There have been a number of ecologically related setbacks for agricultural production and productivity in the last few decades, which have contributed to the agrarian crisis. Most of Karnataka lies on the Deccan Plateau, which consists of the most arid regions in India. The northern *maidan* (plateau) region of Karnataka has a tropic semi-arid climate, and it includes the district of Bijapur. Much of this region is considered a marginal production environment because it faces severe agro-climatic and resource constraints (GoK, 2006) which have reduced agricultural productivity. The agricultural extent of Karnataka's arid land is highly

dependent on the vagaries of the southwest monsoon (KHDR, 2006) and is drought-prone. Successive droughts from 2001 – 2004 have caused the food grains production to decrease substantially; and to make matters worse, Karnataka is one of the states with the lowest proportion of cropped area under irrigation (GoK, 2006). Only 64% of the land in Karnataka is cultivated (KHDR, 2006), but over 70% of cultivated land is un-irrigated (GoK, 2007). Because only 36% of the potential gross cropped area is irrigated (Hanchinal, 2007), there is much room for improvement. The agro-ecological constraints of Karnataka have an economic impact as well: the majority of crops throughout the state are of low-value because farmers have no other crop options given these constraints (GoK, 2006).

Political and socioeconomic setbacks have also contributed to the agrarian crisis in Karnataka. The benefits from the Green Revolution in the 1970s, targeted for favorable production environments, largely evaded the bulk of poor farmers since most live in marginal production environments. Additionally, the economic reforms of the 1990s in Karnataka and other states included a reduction of spending on rural development and infrastructure, which resulted in an increase in unemployment – especially among women. The agricultural sector received less than its due share of public resources as well as private investment, and its budgetary allocation for development has not been satisfactory (GoK, 2006). This has created a stagnation of net income flow into the farm sector. Furthermore, the agricultural marketing sector has not developed sufficiently to ensure stable and remunerative prices for produce (GoK, 2007). Fragmentation of land holdings has also contributed to the decline in productivity. Increased land fragmentation results in lower production per person and increased poverty; and land shortages and poverty lead to unsustainable land management practices and land degradation (UNEP, 2001). The number of land holdings in Karnataka has

increased in the last five years, but the average size of holding has decreased from 1.95ha to 1.74ha (GoK, 2006). This has resulted in a rise in the number of the state's poor and landless farmers. More than 73% of Karnataka farmers fall into the category of small and marginal farmers with an average holding of less than 1ha of land (GoK, 2007).

### *2.3.3 Farmers in Distress: Suicide, Migration, and HIV*

The agrarian crisis has cast a long shadow over farmers, which has resulted in widespread distress— especially among the poor and landless – as their socioeconomic status deteriorates in several states including Karnataka. The reforms that distributed huge finances to push in an industry-driven agriculture further exacerbated problems leading to an environmental catastrophe and has destroyed millions of rural livelihoods (Share the World's Resources [STWR], 2008). Because of the decline in the size of landholding, increase in input cost, decrease in output prices, and unfavorable macroeconomic policies during the period of liberalization, agriculture in India is no longer a remunerative activity for farmers (Talule & Rasal, 2008). The distress has manifested itself through a persistent and increasing number of suicides, occurrence of migration, loss of livelihoods, poverty, poor health outcomes, and family instability.

An estimated 11,000 Karnataka farmers have reportedly committed suicide since 1996 (Hanchinal, 2007). Several studies have investigated the causes for the spate of suicides among farmers throughout India, and they have found that the factors are of a wide range and vary among states (Table 2).

**Table 2.** Main reasons leading to suicides as cited by victims' families: A state comparison  
(Source: Deshpande, 2008 as cited in Talule, 2008)

Reasons	Andhra Pradesh	Karnataka	Maharashtra
Indebtedness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Crop failure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Prices crashed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Investment loss	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Behavioral		<input type="checkbox"/>	
Health-related			<input type="checkbox"/>
Quality of input	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Family disputes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Land disputes		<input type="checkbox"/>	<input type="checkbox"/>
Social dispute/reputation		<input type="checkbox"/>	<input type="checkbox"/>
Marriage in family		<input type="checkbox"/>	<input type="checkbox"/>
Others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Agriculture has become a relatively unrewarding profession due to unfavorable price regimes and low value addition causing abandoning of farming and increasing migration from rural areas (GoI, 2002 as cited in Talule & Rasal, 2008). The net income of farmers has remained almost constant whereas the Consumer Price Index is changing fast which has forced some farmers below the poverty line (GoK, 2006). The widened gap between input and output prices reduced profitability for farmers and has become the reported reason of 40% of farmers' willingness to leaving agriculture, if substitute business is available (Talule & Rasal, 2008). Farmers reported that they feel they are at the lowest rung in the social hierarchy, not because of social factors, but largely due to the neglect of the agriculture sector including its low share of the state's budgetary allotment and its failure to attract public and private investments (GoK, 2006). High interest rates charged by rural moneylenders have led the way for higher incidence of farmers' indebtedness. Deshpande (2002) identifies the agrarian crisis and indebtedness of farmers as a major cause for suicides in Karnataka. Approximately 82% of farmers who committed suicide were debt-ridden (Talule & Rasal, 2008). A mismatch in socio-cultural "forwardness" and economic "backwardness" of Karnataka's farmers may also partially explain the distress: socio-culturally, most farmers belong to upper

and middle castes, have a relatively high level of literacy, have undergone progressive social reform, are exposed to greater modernity (TV, radio, internet, etc.), and have more exposure to liberalization and globalization compared to other states; but economically, most are small, marginal, or landless farmers, have a high incidence of debt, deal with inadequate irrigation development, are environmentally unsustainable in practice, and lead in lower crop productivity compared to all India averages in pulses, oil seeds, coconut, and cashew crops (Hanchinal, 2007). Talule and Rasal (2008) suggest that it is not poverty, but rather the loss of socioeconomic status, uncertainty of income, unbearable debts, unfulfilled needs, and the inability to decipher the factors that are responsible for the downslide of economic conditions that make farmers desperate.

Given the social and economic hardships, it is not surprising that many rural farmers engage in seasonal or circular migration<sup>4</sup> to urban areas for employment, and the rising number of poor and landless farmers in Karnataka has raised concerns about migration. Migration is a known risk behavior associated with the spread of sexually transmitted infections such as HIV (UNAIDS, 2001). Karnataka is one of the five states with the highest HIV prevalence in India (NACO, 2006) with sex work being the critical driver of transmission (Moses *et al.*, 2006). Migrant workers, especially those traveling from rural homes to urban areas for employment, are particularly vulnerable to HIV due to the increased likelihood of high-risk sexual behavior (UNAIDS, 2001), and this can have serious implications for the migrant returnee's family and village. There is increasing evidence that the epidemic has spread from urban to rural populations in Karnataka and is most severe in

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<sup>4</sup> "Seasonal and circular migration": short term, repetitive or cyclical mobility which is adjusted to the annual agricultural cycle (Deshingkar & Short, 2003).

rural border districts including the Mumbai-Karnataka corridor (UNAIDS & World Health Organization [WHO], 2006); and it is most likely because of seasonal or short-term migration from these areas (Halli *et al.*, 2006). Furthermore, migration can be disruptive because it destabilizes the family and community.

When the incomes of the land-poor and landless fail to sustain their basic needs, migration becomes an integral strategy for survival. The impetus for migration activity pertains to the environment: nearly all studies have identified the main drivers of seasonal migration as the worsening situation of dryland agriculture created by drought, crop failure and poor terms of trade (Deshingkar & Start, 2003). Contrary to common perceptions, migration to cities has not been the main cause of rural poverty reduction: 80% of the decline in rural poverty is attributable to improved conditions in rural areas rather than to out-migration of the poor (WB, 2008b).

## **2.4 Poor Farmers in Karnataka**

### *2.4.1 Landholding classifications and characteristics of poor farmers*

Traditionally, three systems of agricultural land tenure were prevalent in India: *Ryotwari* (property rights held by the holder), *Mahalwari* (community ownership), and *Zamindari* (ownership of several villages by a single family). With the introduction of various agrarian reforms such as land ownership ceilings and abolition of the *Zamindari* system, land tenure is now more balanced (Misri, 2002); however, the average holding in India today is small and fragmented. The five major categories of land holding are: marginal (below 1ha), small (1-2ha), semi-medium (2-4 ha), medium (4-10ha), and large (10ha and above). Small and marginal farmers in Karnataka, who cultivate only 34.4% of the total cultivable area, account for 72.9% of the total holdings (GoK, 2006). Landless farmers make up 50-60% of the

northern Karnataka population (Hanchinal *et al.*, 2007). Of the total number of workers for the agricultural sector in Karnataka, 26.5% are agricultural laborers, most of who are landless (GoK, 2007).

Poor and landless farmers are highly concentrated in marginal production environments, which pose a number of challenges to agricultural productivity including agro-ecological constraints, low irrigation, resources degradation, and lack of access to resources and technologies to maintain or improve agricultural productivity. Frequent exposure to extreme economic and social hardships affects poor and landless farmers. The average household annual income among smallholder farmers is only Rs 52,650 (\$1250USD) whereas the incomes among non-agricultural households in the state, depending mainly on industry or services, are over Rs 75,000 per annum (\$1785USD) (GoK, 2007). Even less fortunate are the landless agricultural laborers who depend heavily on wages earned from farm ventures as their main or only source of livelihood. The seasonal demand for agricultural labor results in extremely low household income levels. The average daily wage for agricultural laborers is well below the statutory minimum wage (Rs 69/\$1.60USD in 2007), and the majority are not only asset poor but are also socially disadvantaged due to discriminatory social practices based on caste (GoK, 2007). The low incomes of the households of poor and landless farmers makes them vulnerable because they are often unable to maintain savings that would help them to cope with economic shocks such as crop failures or major illnesses or deaths in the family. The high suicide rate between smallholder and landless farmers is suggestive of a mismatch between GDP growth and wealth distribution in India in which this group of farmers has long been marginalized (GoK, 2006). Additionally, most find it difficult to afford the education of their children beyond primary

school thereby limiting the possibility of upward social mobility of future generations (GoK, 2007). Many smallholder farmers and landless agricultural laborers are unskilled and illiterate and are often involved in labor-intensive work, which often leads to adverse health outcomes. For example, India is the fourth largest fertilizer consumer in the world (UNEP, 2001), and constant exposure of agricultural laborers to chemical toxins in fertilizers and pesticides creates health hazards to both humans and livestock.

#### *2.4.2 Women farmers*

On a global level, women do most of the work in agriculture but men largely own the land, control women's labor, and make agricultural decisions in patriarchal social systems (Sachs, 1996). The lack of power for women in decision-making is a major hindering factor for the growth of the agricultural sector. Furthermore, women—especially those living in developing countries—play a major role in managing natural resources. Their tasks in agriculture, animal husbandry, and in households make them managers of the environment; and women have a profound connection and knowledge of the ecological processes around them.

Although South and East Asia have demonstrated remarkable reductions in gender inequality by narrowing the economic gap (United Nations Population Fund, 2005), Indian women continue to confront inequality in social and economic opportunities including restrictions in occupational choices and equal wages. In 2004, men earned Rs 82.89 per day for agricultural labor while women earned only Rs 37.33 per day in Bijapur District (KHDR, 2006). A noteworthy feature of agricultural laborers in Karnataka is that the percentage of women overrides the percentage of men. The percentage of women in the sector is 58% compared to 42% of men (GoK, 2006). A case study conducted in Karnataka revealed that there are women of all landholding classifications; however, more than 75% of rural women

are smallholder and marginal farmers (Indian Council of Agricultural Research [ICAR], 2003). The study showed that women of large land holdings lead comfortable lives and are free from drudgery-prone activities, whereas women of landless families, who participate in labor-intensive activities on the farms of others, suffer exposure to activities that are health hazards. Farm women are confronted with the challenges of illiteracy, drudgery, health hazards, psychosocial burdens, maintaining their households, and caring for family members (ICAR, 2003).

### **2.5 Past and Present Initiatives to Improve Livelihoods for Farmers**

The GoK has recognized the urgency for the alleviation of distress among farmers in Karnataka. However, the agrarian crisis continues to confront farmers in India. In 2003, the GoK began paying money to families of farmers who committed suicide. In the 2004 elections, the rural sector denounced the neglect and demanded that the government invest in rural development; and the policies of the newly elected government made promises to redress the shortfall in rural growth (Sachs, 2005). In 2006, the Prime Minister of India announced a relief package known as the Vidarbha Package (including measures such as rescheduling agricultural loans, grants to increase investments in agriculture, etc.), and in early 2007 the GoK announced a waiver of agricultural loans to provide further relief to farmers (GoK, 2007). However, cases of suicides continued unabated throughout 2007.

In its latest five-year rural development plan<sup>5</sup> (2007-2012), the GoI recognized the need for economic diversification interventions and processes to stabilize village economies. The GoK

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<sup>5</sup> See Planning Commission – Government of India (2008) Eleventh Five Year Plan (2007–2012): Agriculture, Rural Development, Industry, Services and Physical Infrastructure. Volume III. Delhi: Oxford University Press.

appointed the Official Group of the Government of Karnataka to carry out a series of multidisciplinary discussions in June-August 2007. Their primary task was to identify strategies for the improvement of the economic conditions of farmers with “a view to maximize the incomes of farmers’ households and to minimize the risks faced by them in the context of Karnataka’s agricultural situation” (GoK, 2007). Twenty groups of broad recommendations transpired from these discussions as strategies for improving agricultural productivity and other related farmers’ activities (Table 3).

**Table 3.** Groups of recommendations from the Official Group of the GoK for the improvement of economic conditions of farmers (Source: GoK, 2007)

1. Creating multiple sources of farm income	11. Agric. research, education, & extension
2. Empowering small farmers through group approach	12. Development of dairy farming
3. Measures to restore soil health & fertility	13. Developing poultry industry
4. Watershed development & moisture conservation	14. Livestock farming for meat production
5. Optimizing benefits of irrigation	15. Overcoming stagnation in sericulture
6. Improving seed replacement rate	16. Farmers’ welfare: special attention needed
7. Development of horticulture	17. Upliftment of agricultural laborers
8. Universalizing access to agricultural credit	18. Promoting non-agric. activities in rural areas
9. Augmenting infrastructure for processing & storage	19. Karnataka Agriculture Mission 2007
10. Agricultural marketing & exports	20. Public sector investment proposed

Many of the GoK recommendations in Table 3 share a common theme of improving conditions among farmers by promoting economic farm and nonfarm diversification of income-generating activities among farmers as pathways out of poverty. With rapid rural population growth and slow expansion in agricultural employment, creating jobs in rural areas is a huge and insufficiently recognized challenge; and a priority is to create more jobs in both the agriculture and non-agriculture economy (WB, 2008b).

Rural livelihood diversification is “the process by which rural families construct a diverse portfolio of activities and social support capabilities in order to survive and improve their standards of living” (Ellis, 1998: p.4) and may be associated with success at achieving livelihood security under improving economic conditions as well as coping with livelihood

distress in deteriorating conditions (Collier, 1988; Preston, 1989). More specifically, economic diversification was emphasized in this study which refers to a strategy of differentiating sources of farm and/or nonfarm income, such as production and services, to sustain livelihoods in households and villages (Mignone *et al.* 2007). Economic diversification of farm and nonfarm activities may stabilize the economies of rural villages thus minimizing exposure to production risks inherent in agriculture and may provide income alternatives for farmers living in more risky, marginal production environments such as the northern *maidan* region of Karnataka. This area is heavily reliant on monsoon rainfall and is susceptible to drought and crop failure, which can lead to loss of farmers' livelihoods; thus, it is necessary that farmers have at least two sources of income (GoK 2007). The new motto developed by the Official Group of GoK is "no field with one crop and no farmer with one income". Furthermore, interventions that may stabilize rural village economies, such as economic diversification, may provide farmers with the additional benefit of an alternative to migration (Hanchinal *et al.*, 2007).

There are several different categories of income sources that are distinguished when referring to diverse income portfolios and not all investigators follow the same conventions for categorization (Ellis, 1998); therefore, a basic classification is used in this research to distinguish farm from nonfarm income sources. For the purpose of this study, farm income refers to in-cash or in-kind income generated from own-account farming whether on owner-occupied land or on land accessed through share tenancy including income from crop or livestock; and nonfarm income includes in-cash or in-kind income generated from agricultural labor *on other farms* through harvest share systems or non-wage labor contracts (also referred to as off-farm income) as well as income from non-agricultural sources

including nonfarm business, rental income from leasing property, and urban-to-rural remittances (Ellis, 2000). Farm diversification activities (DA) include crop or livestock diversification to increase farm income or to reduce farm income variability (Dixon & Gulliver, 2001). Nonfarm DA include small commerce, farm labor, un-skilled labor for construction, long-haul trucking, and seasonal migration (Reardon & Vosti, 1995). Table 4 presents proposed DA initiatives from UASD.

**Table 4.** UASD-proposed DA initiatives for poor and landless farmers (Source: Hanchinal *et al.*, 2007)

Area of Benefit	Proposed Farmer Activity
Environment	Biopesticides; Green manure; Vermi-composts; Water retention ponds; Agroforestry
Social Support	Self-help groups; Candle- making, Doll-making
Family	Toy-making; Self-help groups (i.e. women’s empowerment)
Community	Pasta/ noodle-making; Clothing production; Textile design
Production	Livestock/poultry; Dairy activities; Organic production; Horticulture; Sericulture; Medicinal plants/spices
Management	Exhibitions and Field days; Community warehouses

## 2.6 Sustainable Livelihoods: IFAD/DFID Framework

A number of development agencies such as the United Nations (UN) International Fund for Agricultural Development (IFAD) and United Kingdom Department for International Development (DFID) have adopted the concept of sustainable livelihoods [SL]. IFAD has placed considerable emphasis on ways to implement a framework for SL as an analytical tool to understand livelihoods of poor people since 2002. The original SL framework (Figure 1):

“...places people, particularly rural poor people, at the centre of a web of inter-related influences that affect how these people create a livelihood for themselves and their households. Closest to the people at the center of the framework are the resources and *livelihood assets* that they have access to and use. These can include natural resources, technologies, their skills, knowledge and capacity, their health, access to education, sources of credit, or their networks of social support. The extent of their access to these assets is strongly influenced by their *vulnerability context*, which takes account of trends (i.e. economic, political, technological), shocks (i.e. epidemics, natural disasters, civil strife) and seasonality (i.e. prices, production, employment opportunities). Access is also influenced by the prevailing social, institutional and political environment, which

affects the ways in which people combine and use their assets to achieve their goals. These are their *livelihood strategies*.” (IFAD, accessed 2008).

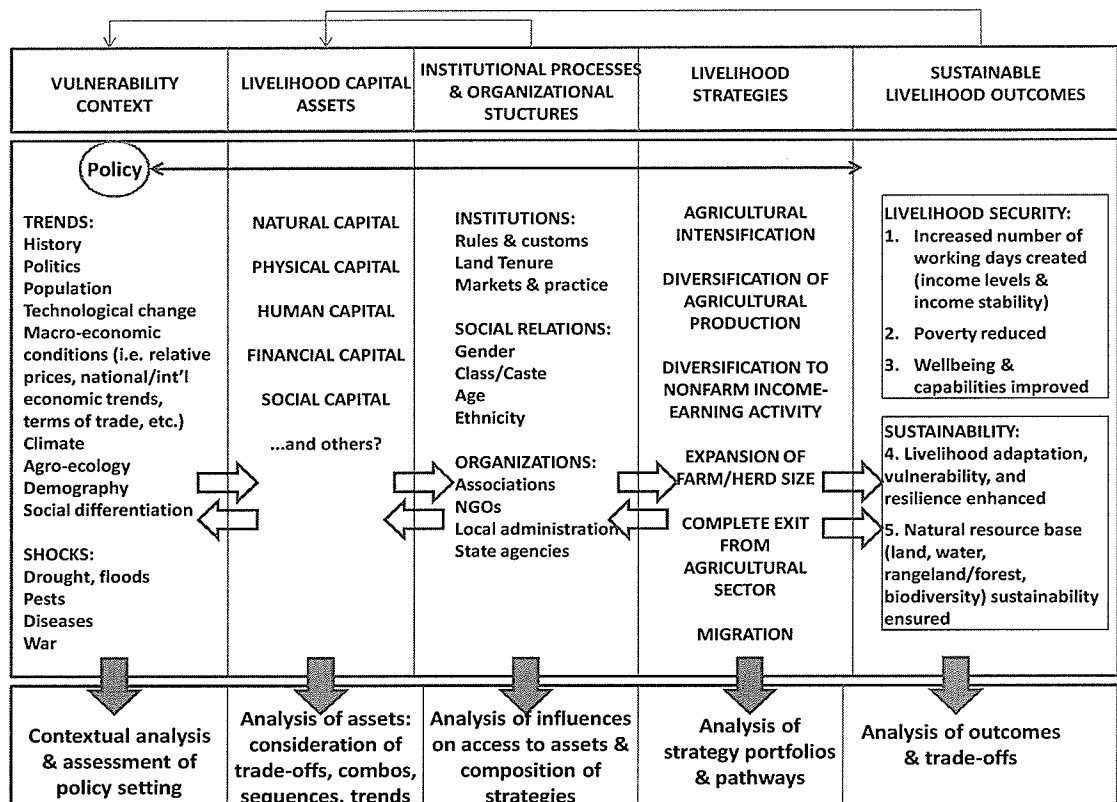


Figure 1. The SL Framework (Source: adapted from the IFAD/DFID Framework and Scoones, 2005).

Five main categories of capital contribute as resources (or assets) in the SL framework. Natural capital refers to the natural resource base (soil, water, trees) and environmental services that yield products used for human survival; physical capital refers to assets brought into existence by economic processes such as production equipment and technology and basic infrastructure; human capital refers to the education, skills, and health status of individuals; social capital refers to the social networks (including relations of trust, reciprocity and exchanges, common rules and norms) in which people participate and from which they can derive support that contributes to their livelihoods; and financial capital refers

to cash that can be accessed to produce or consume goods or make investments and also includes access to credit (Ellis, 2000).

Access to these resources is an important element of SL and is highly differential and context-specific. Access is mediated through social relations and norms (including ethnicity, caste, gender, etc.), which determine the differential ability of people to claim and make use of assets. Access is influenced by the vulnerability context and by policies, institutions, and processes, which affect the way people use their assets to achieve livelihood goals. Policies and institutions include both enabling agencies and service providers; and processes pertain to influences from markets, politics, culture, and rights (IFAD, accessed 2008).

The UN Food and Agriculture Organization (FAO) has identified five main farm household strategies to improve agrarian livelihoods (listed in order of importance for rain-fed mixed systems such as Bijapur District): diversification of production and processing; intensification of existing production patterns (more output per unit area through increases in capital or labor inputs); diversification to off-farm income-earning activity; a complete exit from the agricultural sector within a particular farming system; and expansion of farm or herd size (Dixon & Gulliver, 2001). Research has been focused principally upon intensification of crop and livestock production and far less focused on livelihood diversification among smallholder farmers in developing countries and increasing sustainability of land use (Dixon & Gulliver, 2001). The ability to pursue livelihood strategies is contingent on tangible and intangible assets that people can access. Furthermore, the pursuit of livelihood strategies is often accentuated by trade-offs and current trends.

Various livelihood strategies and combinations of strategies lead to livelihood outcomes. The outcomes of livelihood strategies will be of significance not only in terms of

livelihoods and natural resources, but also on how they impact the particular context and hence the further development of livelihood strategies. Livelihood outcomes may be sustainable or unsustainable. Livelihoods are sustainable when they accumulate stocks of assets and increase their capital base over time, can maintain or enhance its capabilities and assets both now and in the future, are resilient when faced with external shocks and stresses, are not dependent on external support, maintain long-term productivity of natural resources, and do not undermine the livelihoods of others or the natural resource base (Chambers & Conway, 1992). As follows, an unsustainable system is one that depletes capital thus leaving less for future generations. Poverty is an example of a poor livelihood outcome due to unbalanced or unsustainable sets of assets, an inability to cope with shocks or stress, or to the lack of support (if not outright obstruction) by institutional or political processes. Very few livelihoods qualify as sustainable in all dimensions; nonetheless, sustainability is a goal even if “full” sustainability is never achieved. Sustainability is a process rather than an endpoint.

## **2.7 Summary**

Farmers in Karnataka are facing livelihood challenges characterized by socioeconomic and agro-ecological hardships within a deteriorating Indian agrarian sector; and the most vulnerable to this agrarian crisis include the poorest farmers: the smallholder, marginal, and landless. A significant number of farmers in Karnataka are landless; therefore, any measures taken to mitigate problems must include an increased participation of landless and economically powerless farmers in the economy. Institutions including the GoK have recommended economic farm and nonfarm diversification of farmers’ activities to improve conditions among farmers by reducing vulnerability to crop failures. However, in the pursuit for development strategies as pathways out of poverty, decision-makers cannot be

shortsighted. It is often the abandonment of traditional management practices, sometimes because of misguided development efforts, that threatens lands in many arid and semi-arid areas of the world. It has been argued, for example, that agricultural strategies of the Green Revolution in the 1970s failed to incorporate long-term sustainability into their approach. Degradation of natural resources, especially land degradation in cultivated areas, has continued relentlessly due to population increase, land fragmentation, and poor natural management decisions made in the past. In the new paradigm for agriculture, decision-makers must consider ways in which agricultural development can contribute to finding sustainable solutions for its failures thereby closely linking solutions to environmental sustainability and improvement of livelihoods. For that reason, implementation of any potential economic diversification activities as a development strategy must simultaneously support the goals of environmental and livelihood sustainability, and SL approaches can guide decision-making efforts. Given the heterogeneity of physical geography, agro-ecological conditions, production environments, and socioeconomic conditions throughout the world, SL must be considered at local levels on a case-by-case approach. Indeed, dryland regions of the world experience adversities not known to other agro-climatic regions of the world; therefore, solutions must be region-specific.

## **Chapter 3: Research Methodology**

### **3.1 Introduction**

Wellington and Szczerbinski (2007) define methodology as the activity of choosing, reflecting upon, evaluating, and justifying the methods you choose. A reflection of the relationship between philosophical paradigm, strategy of inquiry, and specific methods can help the researcher translate approach into practice. This chapter explains in detail the methodology that guided the research in Byalal Village.

### **3.2 Social Constructivism**

Paradigms for scientific inquiry can be defined by addressing three components: methodological (how an investigation is performed), ontological (how the investigator defines truth and reality), and epistemological (how the investigator comes to know truth or reality) (Lincoln & Guba, 2000). Although the researcher more closely associates her philosophical standpoint with the participatory/advocacy paradigm, she felt that her lack of experience and time constraints placed limitations on her capacity to take any political action for empowerment as part of the research process; therefore, the researcher chose to conduct this study within the social constructivist paradigm as a safer, but more attainable route. The concepts of social constructivism emerged from Mannheim and from other works including Berger and Luckmann's (1967) *The Social Construction of Reality* and Lincoln and Guba's (1985) *Naturalistic Inquiry*. The social constructivist holds the assumption that humans construct meanings as they engage the world they are interpreting and make sense of it based on their historical and cultural perspectives. Thus, the constructivist approach is used by investigators who believe that interpretations of human behavior should not only include the

external and observable factors but should also include the subjective and inter-subjective contexts as well. Epistemologically, constructivists believe knowledge and cognition of individuals are contingent upon the contextual frameworks through which they are mediated and are comprised of multiple interpretations; hence, subjectivity is intrinsic to social constructivism (Kim, 2003). Ontologically, the constructivist emphasizes personal meanings made by both researcher and participant in that the researcher recognizes that their own background shapes their interpretation (Plack, 2005). The social constructivist paradigm was deemed most appropriate for this study because livelihoods and poverty issues are complex and require investigation into both objective and subjective factors; and the researcher acknowledges that the participants of the study have built upon their knowledge and have created meanings to construct their realities through interactions with each other and their local context.

### **3.3 Qualitative Research Design**

Global environmental issues, including local agro-eco-social systems, are complex and involve huge uncertainties which demand a different scientific approach in which judgment plays a more recognized part (Chambers, 1994b). The qualitative research design is a method of inquiry that allows for uncertainties because it allows flexibility and innovation. Qualitative research crosscuts disciplines and enables the researcher to study a phenomenon in the natural setting where human behavior and events occur, and the researcher can deploy a wide range of interpretive tools to gain a strong understanding of the subject (Denzin & Lincoln, 2005). In this way, the researcher can access motives, class, and power relationships that create and represent places, people, and events (Limb & Dwyer, 2001). This approach

seeks subjective understanding of social reality rather than quantitative measure such as statistical descriptions (Limb & Dwyer, 2001). Bodgan and Taylor (1975) claim that when we reduce people to statistical aggregates, we lose sight of the subjectivity of human behavior. Thus, qualitative research is compatible within the social constructivist paradigm in that it focuses on process more than products and aims to uncover the meanings of reality rather than its individual components. Qualitative research was the appropriate method of inquiry for this study because the researcher attempted to establish the meaning of a phenomenon from the views of participants (Creswell, 1994). More specifically, the research involved a holistic exploration of the village-level context with Indian villagers for consideration of future prospects of income-diversifying activities and their capacity to promote sustainable livelihoods and a sustainable environment. In consistency with the assumptions held by the constructivist paradigm and in consideration of the differences in culture, the researcher gathered data in the village over an extended period of time, used qualitative interviewing tools composed mostly of open-ended questions, and took measures to be unimposing as possible of her own perceptions.

Although qualitative research has many advantages, the researcher acknowledges that the approach has drawbacks as well. Critics of the qualitative research design state that its subjectivity hinders replicability and that it is not good for generalization and prediction (Patton, 1990). However, reliability pertains to the stability and credibility of data-collection measures, which researchers can establish without replicability (Wellington & Szczerbinski, 2007). Furthermore, although measures of reliability and validity are often used to evaluate research approaches, these terms have meanings and assumptions within the positivist-objectivist paradigm, and others have questioned their use in qualitative work (Long &

Johnson, 2000). The validity procedures reflected in the constructivist paradigm present criteria with labels distinct from quantitative approaches, such as trustworthiness and authenticity (Creswell & Miller, 2000). Another concern in qualitative research is the role of the researcher and the incidence of bias. The quality of research and the subsequent output of the work are contingent upon the in-depth experience, knowledge, and skills of the researcher (Patton, 1990). The researcher addressed setbacks of qualitative approaches by employing the use of data triangulation (see section 3.5), member checks, journal-keeping, and by hiring a team consisting of three Indian research assistants with previous research experience and familiarity with the local context (see section 3.8).

### **3.4 Sustainable Livelihoods: Methodological Considerations**

Within the constructivist paradigm of knowledge, the fundamental concepts of sustainable livelihoods [SL] using the IFAD framework (see Figure 1) as described earlier was adopted to aid the researcher in her ability to build a holistic and integrated view of livelihoods and to address the sustainability component underlying research objectives. In this study, the framework was used as an exploratory and analytical “process” tool to enable the researcher to explore the local context and identify key constraints and opportunities for economic diversification interventions. The intention of this thesis was for research and field investigation rather than development and intervention purposes; therefore, the framework was not used explicitly or as extensively as outlined by IFAD.

The key elements that were considered in this SL analysis were: given the context (poor socioeconomic conditions in an agrarian rural dryland Indian village), what combinations of *livelihood resources* (different types of capital) are available to follow what combination of *livelihood strategies* (in this case, specific focus was on farm and nonfarm

diversification) with what *livelihood outcomes* (sustainable or unsustainable livelihoods) (Scoones, 2005). A key issue is the scale or unit of analysis at which an SL assessment takes place. Livelihood strategies, for example, can be described at an individual, household and village level, or at regional or national levels (Scoones, 2005). The units of analysis for this research were household (resources and strategies) and village (outcomes) levels.

A comprehensive analysis of all constituents within the framework was beyond the scope<sup>6</sup> of this research. Such exhaustive analysis of all elements within the framework is not appropriate in all cases; therefore, the investigator may apply instead the principle of ‘optimal ignorance’ to seek out only what is necessary to know about a particular case (Scoones, 2005). Along these lines, the framework functioned as a checklist of issues to explore micro linkages in the village throughout the research process so that multiple perspectives could be considered. Macro linkages were considered less extensively but are briefly discussed in Chapter 5.

To assess livelihood outcomes and the prospects for SL, a set of established indicators for sustainability are necessary. However, the literature<sup>7</sup> on this subject is abounding and variable in part because the definition of ‘sustainability’ remains elusive. Methods for choosing SL indicators range from top-down to bottom-up approaches and can

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<sup>6</sup> This research acknowledges the essential focus on both macro and micro linkages and their influences on the livelihoods of rural people. Indeed, an understanding of the effects of policies on people and people on policies (the policy-making process itself) is remarkably important, but knowledge is limited. The isolation of rural areas has led to an underestimation of these effects, and the focus of rural development has tended to remain micro and local (DFID, accessed 2008). However, instead of considering macroeconomic policy or design of state institutions as a principle concern of public policy, attention needs to be directed equally toward grassroots-level capacities (Krishna, 2002). Nonetheless, an in-depth exploration of macro linkages was beyond the scope of this research.

<sup>7</sup> See Bell & Morse (1999).

be quantitative or qualitative in nature. Consistent with a constructivist approach, the researcher went to the field with the intention of defining indicators with participant input beginning with their own definition of ‘sustainability’; however, the concept was not understood by most villagers (see section 4.3.3). Given time and resources constraints for this research, the researcher had to quickly adapt to the local reality; subsequently, indicators for sustainability were established by the researcher from the literature. Scoones (2005) suggests five indicators of SL, three which focus on the livelihoods component and two which focus on the sustainability component: (1) the ability of various livelihood strategies to create gainful employment; (2) poverty reduction (usually assessed through quantitative measures and is beyond the scope of this research); (3) wellbeing and capability (notions of not only human capital but also factors such as self-esteem, security, happiness, stress, vulnerability, power, exclusion, material concerns); (4) resilience (the ability of a livelihood to cope with and adapt to stresses and shocks); and (5) environmental sustainability (ability of a system to maintain productivity when subject to shocks or stress and is indicative of avoidance of resources depletion). There is no algorithmic solution to measuring sustainability, as this would be inappropriate given the subjectivity of the matter (Scoones, 2005). Based upon these suggestions, the researcher established indicators and qualitative criteria, which are summarized in Table 5.

**Table 5.** Sustainable livelihood indicators and qualitative criteria used to evaluate livelihood outcomes.

Indicators	Qualitative criteria
Wellbeing/Capability	Availability and access to capital assets
	Livelihood stability & security
Livelihood Adaptability [Resilience]	Identification of local vulnerabilities (Crisis: shocks/stresses)
	Coping measures taken during crisis
	Positive/negative social changes in village over time
Environmental Sustainability	Changes in the environment/natural resource base over time

### 3.5 Case Study Strategy

Yin (2009) states that the need for a case study strategy emerges from the desire to understand social phenomena, and he defines a case study as:

“an empirical inquiry that investigates a contemporary phenomenon within its real-life context especially when the boundaries between phenomenon and context are not clearly evident,”

and that the:

“case study inquiry copes with technically distinctive situations in which there will be many more variables of interest than data points, and as one result relies on multiple sources of evidence with data needing to converge in a triangulating fashion, and as another result benefits from the prior development of theoretical propositions to guide data collection and analysis” (Yin, 2009: p.18).

Bogdan and Biklen (1982) describe a case study as an in-depth examination of one setting, subject, depository of documents, or particular event. Case studies can be illuminating and insightful and can provide an in-depth understanding of phenomena in an exploratory style. A case study design is used when the researcher poses “how” and “why” questions, has little control over events, and focuses on contemporary events rather than historical events (Yin, 2009). Because the nature of this research was largely exploratory, the conditions and contextual factors were beyond the control of the researcher, and the focus was on a contemporary event within a real-life context, the case study strategy was adopted.

There are both strengths and shortcomings of the case study approach. Case studies should be insightful, illustrative, accessible, strong on reality, and attention holding; yet, they may not be generalizable, representative, replicable, rigorous, or repeatable (Wellington & Szczerbinski, 2007). Traditional prejudices against the case study method include the following concerns: lack of rigor, little basis for scientific generalization, cases may take too long resulting in massive and unreadable documents, and concern that the new emphasis in

case study research to establishing causal relationships has led to a downgrading of the case study for research (Yin, 2009). To address these potential threats to trustworthiness, the researcher used a plurality of methods with triangulation, crosschecking, and member checks. Triangulation is a way of seeking converging evidence to give strength to conclusions by drawing evidence from multiple methods (Wellington and Szczerbinski, 2007). Member checks included “taking...specific descriptions or themes back to the participants and determining whether these participants felt they are accurate” (Creswell, 1994: p.196) at the end of each interview session.

This case study was bound by place, time, and event: rural livelihoods were explored in a socioeconomically depressed Indian village within the context of the current agrarian crisis as described in Chapter 2. From the SL framework, the research objectives, and a review of literature, three major themes for exploration of rural livelihoods emerged which provided the scope and breadth of the case study: livelihood strategies, environment and agricultural practices, and economic farm and nonfarm diversification. The researcher recorded the behaviors, actions, and perceptions of villagers regarding social, economic, and environmental topics within each theme, which were the qualitative criteria that provided the depth of the case study and enabled the researcher to address research objectives.

The researcher created the livelihood strategies theme to address all research objectives and provided a consideration of human, social, physical, and financial capital assets at the household level. Methods were aimed at gathering information about the social and economic aspects of villagers such as stability and security of household livelihoods and their livelihood strategies; household expenditure/investment priorities and their present credit/debt situation; village crisis and coping mechanisms; and positive and negative social

changes in the village over time. The environment and agricultural practices theme was created to address the first three objectives and included a consideration of villagers' natural capital assets with a focus on generating data regarding their perceptions about the environment and natural resources, agricultural productivity and practice, sustainable agriculture, and environmental changes over time. The purpose of the economic diversification theme was to address the last two objectives of sharing and exploring prospective farm and nonfarm economic diversification<sup>8</sup> with participants and then consider the feasibility and sustainability implications of favored diversification activities. As described by Hill (2005), a social ecology framework for sustainability and social capital, used for the consideration of the feasibility and long-term sustainability of each diversification activity, was achieved by asking respondents the following questions regarding each: 1) What diversification activities have you already achieved? 2) What have you wondered about doing next in terms of potential diversification activities? 3) What resources and supports might you need to actually do this? 4) What barriers might get in the way? 5) What might you need to overcome them? 6) What future environmental positive or negative impacts, if any, might this activity have? The last question did not come from Hill (2005), but was added by the researcher as a sustainability indicator for livelihood outcomes because outcomes can be determined by consideration of the effects of potential livelihood strategies and their future impacts on the environment (Scoones, 2005). During this assessment, participants were first given time to brainstorm ideas for new DA and to share

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<sup>8</sup> Along the lines of qualitative designs that are interactive-adaptive in approach, the original list (see Table 4) of farm and nonfarm diversification activities for exploration in the village originated from Hanchinal *et al.* (2007) was modified throughout the research process to reflect the realities of villagers more accurately. See Chapter 5 for the emergent list of diversification activities.

their past diversification experiences, if applicable, in a bottom-up approach. Then, the researcher shared a few DA from the GoK and UASD with participants, in a top-down approach. The various DA shared by the researcher in focus groups and interviews evolved throughout the research process. For example, if the researcher found in her review of data from interviews and questionnaires that certain DA were not discussed then the researcher brought them up at the next interview. Likewise, if the researcher saw that villagers in the questionnaires had listed original and interesting DA ideas, she brought these up in interviews too.

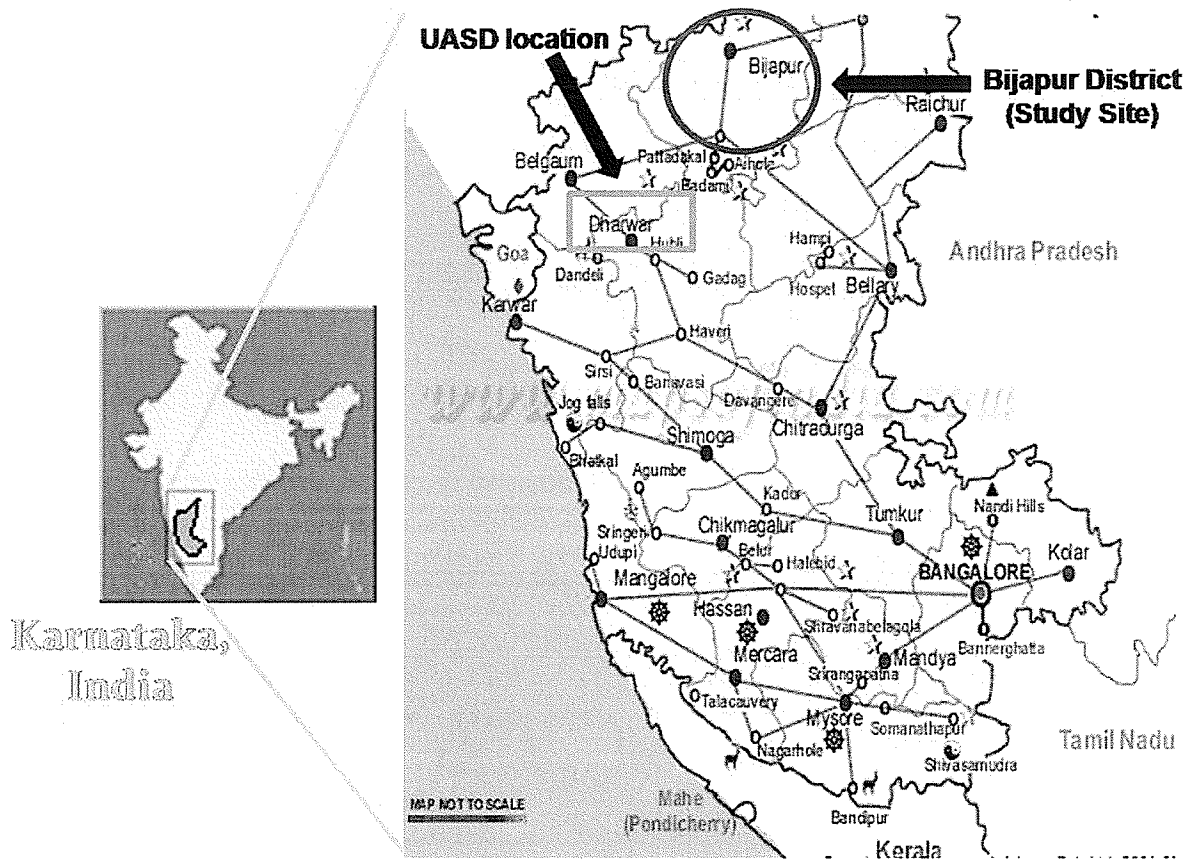
### **3.6 Site Selection**

The nature of the case study was instrumental, given that specific selection criteria were established for the case study site. Site selection occurred in two phases: Phase I (District Selection) and Phase II (Village Selection). The researcher, based on the literature review, predetermined the selection criteria for each phase. After consultation with UASD officials and with key informant Dr. Shiva Halli (a UM professor living in India at the time of this research), the selection criteria were modified and selections were determined.

Karnataka is comprised of 29 districts, and the twelve northern districts of the state are within the jurisdiction of UASD (Figure 2). Each district is divided into *talukas* (sub-districts). The selection criteria for Phase I included: (1) marginal agriculture production environment<sup>9</sup> (i.e. drought-proneness, insufficient rain and/or lack of irrigation, and evidence of land degradation), (2) prevalence of farmer suicide & seasonal/circular migration, (3)

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<sup>9</sup> See Chapter 2.2 for rationale.



**Figure 2.** Location of Karnataka, India and Karnataka district map. (Source: [www.mapsofindia.com](http://www.mapsofindia.com))

socioeconomic depression<sup>10</sup>, (4) large number of smallholder and landless farmers, (5) convenient entry point with preference to areas familiar with or supported by UASD<sup>11</sup>. According to UASD, Bijapur (southeast corner), Raichur, and Gulbarga Districts met the criteria. Dr. Halli recommended Bijapur District for the following reasons: although Bijapur District as a whole may not be considered as poor a district as Raichur or Gulbarga, the southwestern portion of Bijapur could be considered as poor – particularly Basavana

<sup>10</sup>The official term used by the Government of India to classify depressed or underdeveloped regions is Backward Regions. The official approach of defining Backward Regions takes into consideration natural capital, agronomic potential, and socio-political factors. The categories of Backward Areas identified by the GoI include hilly areas, areas of tribal concentration, chronically flood affected areas, drought prone areas, coastal regions, and desert areas (Government of India, 1980).

<sup>11</sup> Criteria 2-4 are based on preliminary considerations in the proposal of Hanchinal *et al.* (2007).

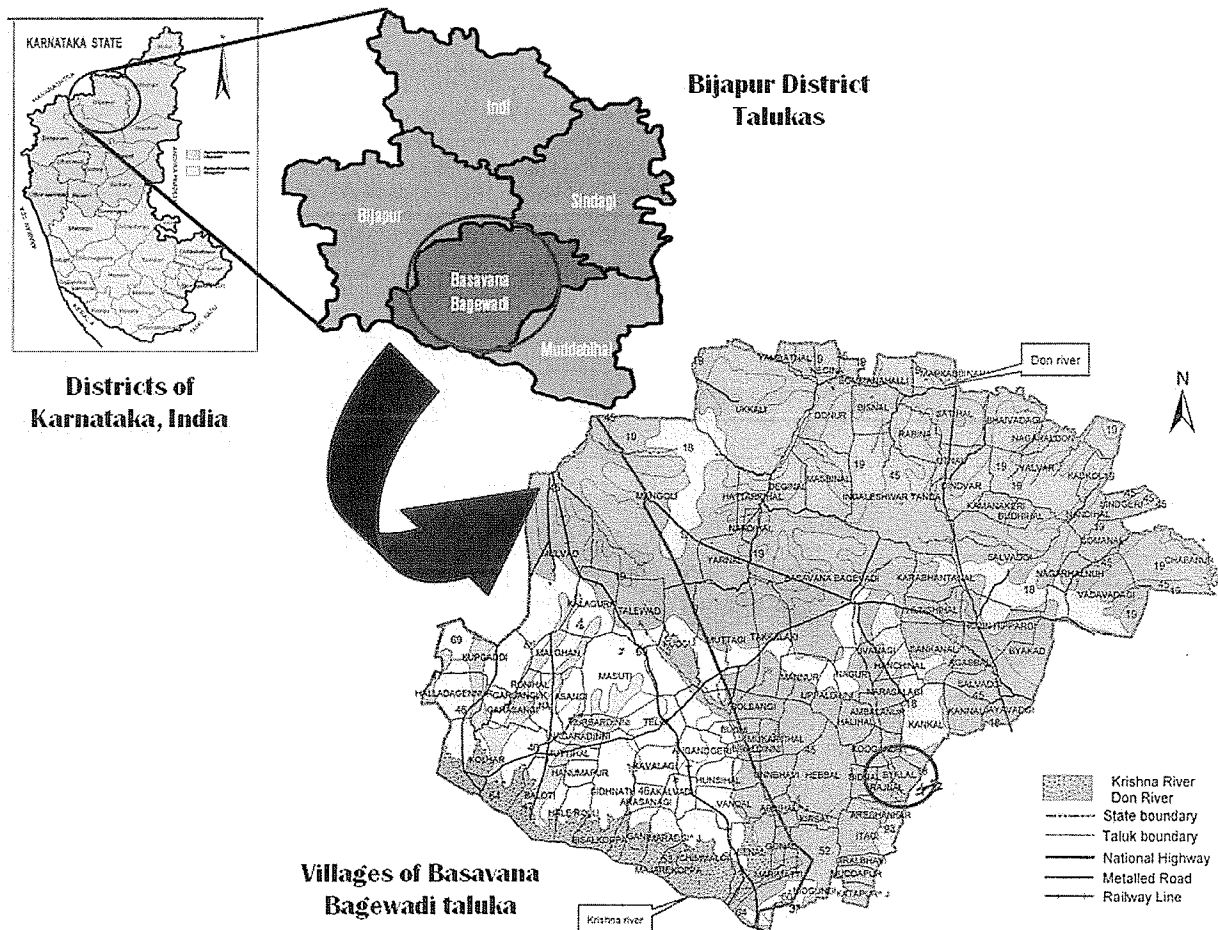
Bagewadi (B. Bagewadi) *taluka*; Dr. Halli is from Bijapur and could provide help with logistics. Consequently, B. Bagewadi *taluka* was chosen for the study area.

According to the Census of India (2001), there are approximately 660 villages (not including places listed as wards or towns) in B. Bagewadi (Figure 3). Criteria produced by the researcher for Phase II included: (1) same criteria as Phase I, (2) population between 1000-2500, (3) interest, especially among poor farmers and migrants, in exploring prospective diversification activities, (4) general awareness of environmental changes and fluctuation of agricultural productivity, and (5) friendliness/approachability of villagers and willingness to participate. Upon consultation with Dr. Halli and associates from Karnataka Health Promotion Trust<sup>12</sup> (KHPT)–Bijapur and KHPT–B. Bagewadi locations, the researcher narrowed potential case study sites down to four villages: Takkalki and Byalal (located in the southern part of the *taluka*) and Bisanal and Rabinal (located in the northern part of the *taluka*). The researcher visited each village and recorded observations of the agricultural production environment and village context and met with village leaders to discuss project feasibility. Representatives from all villages expressed strong interest to participate in the study and all were approachable and friendly. Furthermore, all villages reported a high number of smallholder and landless farmers, high occurrence of farmer indebtedness and migration, recognition that environmental degradation to some extent was occurring, and all reported that, to the best of their knowledge, no external institution (government organizations, NGOs, or UASD) has ever come to their village to provide

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<sup>12</sup> KHPT is an organization founded as a partnership between the GoK and the University of Manitoba that is funded by the Bill and Melinda Gates Foundation. KHPT conducts HIV prevention projects in several districts and was thus a reliable source of information. KHPT locations in Bangalore, Bijapur, and B. Bagewadi were able to contribute logistical support and village-specific information during Phase II selection.

support. As such, the final decision was difficult. One southern village (less developed) and one northern village (slightly more developed) were chosen for the case study. The southern village of Byalal was chosen over Takkalki because Byalal was the most underdeveloped of all four villages and the locals seemed genuinely enthusiastic to participate. Rabinal was chosen as the northern village because of their reported identification of the link between environmental degradation and decrease in agricultural productivity.



**Figure 3.** Map of Bijapur District *talukas* and location of Byalal Village in B. Bagewadi *taluka* (Source: UASD & UASD-Bijapur Station)

Although two villages were chosen for the case study; the number of villages actually included in the study was determined during the period of fieldwork at the researcher's

discretion which was time-dependent. The time allocated for fieldwork was eight weeks, and the researcher felt that it was important to collect sufficient amounts of data for the first village before moving to the second village. As it turned out, eight weeks was an appropriate amount of time to collect an ample amount of data for one village; thus, Byalal was the only village included in the case study. A shorter time in Byalal would have compromised the trustworthiness of the study, but a longer time in Byalal would have been unnecessary because the researcher began to get repetitious results and the research team perceived that the villagers were slowly getting bored with the study.

### **3.7 Rapid Rural Appraisal and Participatory Rural Appraisal**

Rapid Rural Appraisal (RRA) and Participatory Rural Appraisal (PRA) are recognized as part of a paradigm shift where reductionism and linear thinking gave way to holistic and open-systems thinking (Chambers, 1994b). RRA emerged in the late 1970s and is defined as an approach to quickly develop a preliminary understanding of a situation using specific research techniques chosen from a range of options (Beebe, 1995). RRA is largely extractive-elicitive with its main objective as data collection by outsiders. RRA is an appropriate approach when confronted with time constraints as a reliable means to achieve results within a short time period, and it is characterized by a systems perspective, triangulation of data, and iterative nature of data collection and analysis (Beebe, 1995). Researchers consider RRA less flexible and more top-down in approach than PRA. PRA emerged in the mid-1990s and has roots deeply embedded in participatory approaches described by Paulo Freire's *Pedagogy of the Oppressed* (1968) and has evolved from agroecosystem analysis and RRA. PRA is defined as a "family of approaches and methods to enable rural people to share, enhance, and

analyze their knowledge of life and conditions, to plan and to act” (Chambers, 1994a: p.953). PRA is a sharing-empowering approach with its main objective as analysis, planning, and action by insiders. To this extent, PRA is intended to enable locals to conduct their own analysis and implies radical personal and institutional change (Chambers, 1994a).

This research was mostly extractive in nature, had pre-established objectives and methods, and the language barrier, time restriction, and inexperience of the researcher were not conducive for locals to participate throughout the research process; therefore, to claim that the study was participatory in nature is not accurate. However, the researcher attempted to incorporate the principles to which both RRA and PRA subscribe so that the nature of the research process was along the continuum of the RRA-PRA nexus (Table 6).

**Table 6.** The RRA-PRA continuum. (Source: adapted from Chambers, 1994a: p. 959)

Nature of Process	RRA	←-----→		PRA
<b>Mode</b>	Extractive	Elicitive	Sharing	Empowering
<b>Outsider’s Role</b>	Investigator	-----	-----	Facilitator
<b>Information owned, analyzed, &amp; used by</b>	Outsiders	-----	-----	Local people
<b>Methods used</b>	Mainly RRA, sometimes PRA	-----	-----	Mainly PRA, sometimes RRA

Principles shared by RRA and PRA include:

- *Reversal of learning*: learning from locals; gaining from their knowledge;
- *Rapid and progressive learning*: flexibility and adaptability in methods to achieve goals; iterative in nature with crosschecking;
- *Offsetting biases*: being relaxed, being unimposing instead of lecturing, seeking out marginalized groups, etc.;
- *Optimizing tradeoffs*: relating the costs of learning to the usefulness of information such as making decisions on what is worth knowing/measuring and what is not, etc.;

- *Triangulation*: systematically combining a number of different methods and cross-checking data through plural investigation to enhance reliability and validity;
- *Seeking diversity*: seeking variability as opposed to averages.

(Beebe, 1995; Chambers, 1994c; Mukherjee, 1993).

Along these lines, the researcher acted as investigator rather than facilitator and stressed a bottom-up approach to learn from the villagers. Participants were notified beforehand that there were no right or wrong answers and that the researcher was not affiliated with any NGO or government organizations; and so, participants were encouraged to answer questions freely. However, if answers suggested lack of awareness on certain topics deemed critical by the researcher, such as health hazards and the application of inorganic pesticides, then the researcher would inform the participant about potential dangers of applying pesticides without proper precautionary methods as described by UASD-Bijapur Station. Throughout the research process, the team purposively sought out participants of diverse backgrounds and experiences (i.e. sex, age, education, caste, economic sector, landholding size) including marginalized persons.

### **3.8 Research Methods**

In keeping with the triangulation principle of RRA and PRA, the researcher selected a variety of methods to address the research objectives. Methods included participant observation, mini-questionnaires, semi-structured interviews, focus group discussions, resource flow maps, transect walks, and review of secondary data sources for data collection. Additionally, the researcher kept field notes, a daily log, and a journal using recommendations from Beebe (1995) and Bernard (2006).

The research process took an interactive-adaptive approach (Nelson, 1991). The research was interactive through participation in various social activities of participants. The research was adaptive by opting for semi-structured interviews and focus groups to allow questions to evolve throughout the research process. The inherent flexibility of the approach became a crucial asset at the early onset of the study when the researcher discovered upon arrival in Byalal that village migrants had departed just two weeks prior (see section 3.9).

Data used for addressing Objective 1 of exploring the local context of the poor were based on participant observation, questionnaire I, seasonal calendars, semi-structured interviews, and secondary data sources. Data used for addressing Objective 2 and 3 of understanding the characteristics of the local agricultural production environment and identifying farmer activities and how they may affect productivity and sustainability were based on preliminary literature reviews, transect walks, resource flow maps, secondary data sources, questionnaire II, semi-structured interviews, and the focus group with elders. Data used for Objective 4 and 5 of sharing and exploring prospective diversification activities and assessing the feasibility and sustainability of favored activities included participant observation, questionnaire III, semi-structured interviews, focus groups, and preliminary literature reviews. Data for Objective 5 was further supported with literature reviews after fieldwork and secondary data sources.

### *3.8.1 Assembling and Working with a Research Team*

To mitigate issues of language, cultural, and gender barriers and time restrictions, the researcher took the suggestions of Kapborg and Bertero (2001) and hired a team of local research assistants prior to fieldwork commencement to act as interpreters, to collect data rapidly, and to bridge the cultural gap. The team was recruited with the help of Dr. Halli and

KHPT. Two males and one female were hired; and all lived in Karnataka, had post-secondary education and previous fieldwork experience, and were bilingual in Kannada and English.

Upon arrival in Bijapur, the team was subjected to an intensive training session covering the research study details and a discussion of individual roles and responsibilities. All team members were given research tools at that time, which were critically reviewed by the team for clarity, wording, sequence, format, and cultural appropriateness. After making modifications, the team translated the tools and consent forms from English to Kannada. One team member took on the role of interpreter and research assistant leader, as he was most comfortable with the English language. The other two team members played salient roles in collecting data with mini-questionnaires and as secondary note-takers during interviews and focus group discussions. Given the patriarchal society in India, the presence of a female assistant was especially important during interviews with women, as her presence may have lessened the likelihood of female participants to feel discomfort in the presence of male research assistants. She also worked as advisor to the researcher on what behaviors were culturally appropriate in social settings and considered to be in accordance with the typical roles of women. Team meetings were held daily to review and clarify notes and observations. During meetings, the team also discussed modifications of questions when the validity of responses was in doubt.

Working with a research team was both challenging and rewarding. The fieldwork period was intense with few days of rest between. It was a rigorous process characterized by three-hour roundtrips to and from the village, staying for long and hot hours in the village collecting data, and working late hours into the night at the guesthouse (often without power)

on transcription and translation of data. As a result, the researcher was able to gather a considerable amount of data during a relatively short data collection period, and this was made possible only with the help of her dedicated and hardworking team. Even so, working with a team (especially when language interpretation is required) was demanding. It required strong management and organization skills, flexibility, empathy, respect, and most importantly, patience.

### *3.8.2 Participant observation*

Participant observation was an important tool for data collection and triangulation. It played a particularly salient role in data collection for Objectives 1 and 2: understanding the local context and identifying characteristics of the agricultural production environment. Participant observation required time, access, acceptance, and tact (Wellington & Szczerbinski, 2007) and consisted of establishing connection to a new community, learning how to act so that people could go about their usual business, taking time to reflect on what has been learned, and to write about it convincingly (Bernard, 1988). Observation was helpful to identify what crops are grown, to what extent land degradation was occurring, which methods and technologies of farming are used, and to understand the typical daily lives of Byalal villagers.

On the first day of fieldwork in Byalal, the researcher and team met with village elders in the primary school for a formal introduction. The team established a continuous rapport to build trust with locals. The entry point to the village included a man who was a former village leader and several local schoolteachers. They encouraged the team to come as often as possible and allowed the usage of village temples and the community center as needed; however, they advised the team to leave the village no later than 18:00. At that time, most of the male farmers return from work and begin to drink alcohol, which often leads to

quarrels. After the meeting, a male villager (scheduled tribe) gave us a tour of the interior village and its surrounding farmland. He also introduced us to several villagers including one male (scheduled caste) who would later emerge as a key informant.

The relationship between villagers and research team developed into friendship at an early stage. Villagers received the team kindly throughout the duration of the study. A few villagers with cell phones felt comfortable to contact team members at leisure for personal or business reasons. The team always made time for casual conversation and on several occasions enjoyed visits while sitting on blankets in the fields and chatting with farmers. It was mostly during these occasions when the team was offered tastes of farmers' produce such as stalks of sugarcane, fire-roasted corn on the cob, freshly pulled groundnuts, or lentils – an activity that was perceived by the researcher as both an enjoyable activity for the team as well as a source of great pride to the farmers. Villagers frequently invited the research team to participate in daily activities and social events held in the village or surrounding area. The team accepted invitations often to better understand the local context as well as to ensure continued good relations with the villagers. The team participated in weed pulling, school luncheons, market days, socializing and tea time in village tea cafes, and attending social festivities.

### *3.8.3 Mini-Questionnaires*

Questionnaires in qualitative research aim at determining trends, patterns, or themes in experiences as part of analysis of a specific context without seeking to make generalizable claims about whole populations (Robinson, 1998 as cited in McGuirk and O'Neill, 2005). They are composed of a structured set of questions and are increasingly used to gather more complex data of a qualitative nature in relation to the environment, quality of life, and

community networks (McGuirk and O'Neill, 2005). Throughout the research process, the research team personally administered three different mini-questionnaires (QI, QII, QIII), each composed of six to ten questions (**Appendix C**). Thirty-three villagers participated in QI, thirty villagers participated in QII, and thirty-three villagers participated in QIII. The content of each questionnaire related to the broader research question and objectives by addressing each of the three emergent themes (QI-livelihood strategies, QII-environment/agriculture practice, QIII-DA). Given the conciseness of each questionnaire, every question transpired from the literature review, and the researcher carefully scrutinized each for its relevance to the research purpose. The format of questions were open and closed; however, most closed questions included an 'Other (please specify)' option to increase the potential for in-depth and nuanced responses. The questionnaires were useful for the identification of variability in the understanding and interpretation among Byalal villagers on a broad range of topics related to the study. Furthermore, the questionnaires were a powerful source of information that was constructive in the continuous evolution of the semi-structured interview and focus group questions. In addition, the questionnaires were used as a method of discovering diverse and interesting participants for in-depth interviews and focus groups.

Decisions about samples in qualitative research are a compromise between cost, the need for accuracy, the nature of the research problem, and the art of the possible" (de Vaus, 1995: p.78). Given that specific statistics of Byalal were not available for the creation of sampling frames, generalizability to a broader population of the village was not possible.

Alternatively, purposive opportunity sampling by socioeconomic classification<sup>13</sup> was used in

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<sup>13</sup>Definitions and structure of socioeconomic classification that emerged in this study are detailed in Chapter 4.

the selection of participants for questionnaires. Sampling for QI was unrestricted to include village participants from all socioeconomic groups (farm and nonfarm sectors) for the collection of data on livelihood security and strategies inclusive of all perspectives. Sampling of QII was restricted to include participants from villagers in the farm sector for the collection of data on agricultural productivity, environmental perspectives, and identification and feasibility of sustainable agriculture practices. Sampling for QIII was originally restricted to 'poor and landless farmers' to explore current and prospective economic diversification activities in consistency with the purpose of the research; however, sampling was later expanded to include poor villagers of the nonfarm sector as well (see section 4.4.1). In particular, participants of QI who reported an unstable income or who reported that they migrate or depend on migrant remittances to support their livelihood were purposefully recruited to participate in QIII.

#### *3.8.4 In-depth Semi-structured Interviews*

The semi-structured interview is a useful tool to learn how communities operate (Russell & Harshbarger, 2003). Semi-structured interviews are conducted in a manner in which dialogue between interviewer and respondent is structured around a specific topic but allows for queries to emerge according to responses received. The researcher used semi-structured interviews with mostly open-ended questions to generate in-depth data from villagers on demographic, socioeconomic, and environmental characteristics to address all research objectives. The interview schedule was structured to cover topics within the three themes of livelihood strategies, environment/agriculture practice, and diversification activities (**Appendix D**). Although original questions emerged from the literature review, as the local reality became more familiar, the researcher modified or created new questions throughout

the fieldwork. A review of data from questionnaires was also useful for interview question modification. A few core questions were consistently asked of all respondents for consistency purposes; however, the researcher always took liberties to stray from the interview schedule to increase the potential for obtaining nuanced information.

The researcher used purposeful opportunity sampling for selection of individual respondents throughout the research process, and respondents were often recruited from completed questionnaires. Like questionnaires, sampling for interviews was originally restricted to the inclusion of ‘poor and landless farmers’ but was later expanded to include poor villagers from the nonfarm sector as well (see section 4.4). Respondents included poor<sup>14</sup> male and female villagers from all socioeconomic classifications with a diverse range of backgrounds such as former village leaders, landholding and landless farmers, migrants, laborers, business owners, and diversified and non-diversified villagers. Twenty semi-structured interviews were conducted, and each lasted approximately 60 to 105 minutes. Respondents chose the location of interviews. Most often, they chose to have interviews on their farmland or in their home or business place. Both the researcher and at least one additional member of the research team took notes, and a digital recording device was also used to record all interviews. Transcription and translation of interviews were conducted within one or two days after each interview.

A key informant emerged as a result of semi-structured interviews and informal conversations with villagers early in the research process. Key informants are described as people who are approachable, who understand the information required, and who are glad to

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<sup>14</sup>The “poor”, in this context, referred to households who were asset-poor and investment-poor as described by Reardon and Vosti (1995). Households with insecure and unstable livelihoods were considered poor. See Chapter 4.4.1.

provide or find the information sought (Bernard, 2002). The key informant participated in an extensive semi-structured interview, met with the research team on several occasions for informal conversations for additional contributions to data collection, and participated in resource flow maps. The key informant was extremely kind and helpful. He always made time for the research team and assisted in participant recruitment for focus groups.

### *3.8.5 Focus groups*

Group interviews where individuals can freely discuss and debate issues helped to identify variability within the community (Beebe, 1995). The purpose of the focus group discussions was to capitalize on the opportunity to observe and understand communication and group dynamics within the village and to triangulate, verify, and expand upon data collected from in-depth interviews. The researcher conducted a series of three focus groups throughout the fieldwork, each of which lasted 60 to 90 minutes. Each group was composed of between five to eight participants and was homogenous to some extent, given the cultural context (i.e. patriarchal society). For example, the first focus group (FG1) consisted of a self-help group (SHG) of women farmers whose husbands own less than 5 acres, the second focus group (FG2) consisted of members of a young men's association, and the third focus group was composed of village elders. Groups were not of mixed gender but were of mixed castes.

The first two focus group discussions began with a group activity creating daily, weekly, and seasonal calendars. After the group activity, topics discussed had special emphasis on addressing Objectives 4 and 5 through an in-depth exploration of the feasibility of prospective diversification activities (DA) (**Appendix E**). As in the questionnaires and interviews, focus group participants were first given time to share their successes with DA and to brainstorm and explore other prospective DA. Then, the researcher shared additional

DA for exploration. The third focus group discussion (FG3) consisted of six male village elders. Topics of discussion included environmental, agricultural, and social changes over time to address Objectives 1-3.

Respondents chose the location for focus groups. The SHG chose to have the focus group during their lunch break on the farm where they were working. The other two focus groups chose to have their discussions at the community center in the village. As with the interviews, both the researcher and at least one additional member of the research team took notes, and a digital recording device was also used for recording discussions.

#### *3.8.6 Seasonal Calendars, Mapping, and Transect Walks*

Additional methods, as suggested by Chambers (1994a), were seasonal calendars, mapping, and transect walks. The researcher drew daily, weekly, and seasonal calendars with the guidance of participants of focus groups, given that participants were illiterate. The researcher considered calendars as a useful tool to understand gendered roles and to assess similarities and differences. Awareness of the already very busy lives of women, in particular, was imperative when making conclusions regarding DA feasibility and prospects for sustainable livelihood outcomes. Elements that emerged from the calendar activity included types of crops by season, farm and nonfarm social and economic activity, and time of seasonal migration.

The resource flow map (RFM) exercise was used as a learning tool for the researcher to visualize the typical farm systems of Byalal farmers and the flow of resources within and external to farm systems. Diagrams of farm systems illustrate structural complexity and interrelationships between various components of farmers such as the variety of natural resources and livelihood diversity characteristics of farmers. An understanding of farming

systems can be useful within SL where agricultural research and development strategies are determined. The household, its resources and resource flows, and their biophysical, socioeconomic, and social interactions are collectively referred to as a farm system; and a farming system is defined as a population of farm systems within a similar context (Dixon & Gulliver, 2001). Field research on farming systems has contributed to the appreciation of the complexity, diversity, and risk-proneness of many farming systems; the knowledge, professionalism and rationality of small and poor farmers; and their experimental mindset and behavior (Chambers, 1994a). Two RFM were obtained during the fieldwork for comparison: one RFM drawn by the researcher of an irrigated large-sized farm on behalf of the participant and one RFM drawn by the key informant of his rain-fed large-sized farm. Towards the end of fieldwork, the research team drew a village social map, which provided a visual aid of the social and physical elements of a typical rural agrarian village in the region.

Transect walks with farmers, as described by Mukherjee (1993), were particularly insightful for making observations while discussing aspects of land use, agricultural practice, and farm and nonfarm diversification practices witnessed en route. Transect walks were also key for verification of information reported by respondents such as bund placement for soil and water conservation, location of common property lands, and a check dam structure built by a watershed management program (WMP).

### *3.8.7 Review of secondary data sources*

A review of secondary data sources provided the researcher with an objective view of trends in the agricultural sector and the environmental production area of the study. Secondary data sources collected included research papers, booklets, and extension training schedules from UASD-Bijapur Station, informational brochures from UASD, informal conversations with

researchers from UASD and UASD-Bijapur Station, local census data from the *panchayat* office, and a photograph of the village map from the *taluka* headquarters. The only official map of Byalal at the *taluka* headquarters was drawn in 1952 and was in extremely poor condition; therefore, only a photograph of the map could be obtained.

Informal conversations were held throughout the fieldwork, which provided valuable contributions to the research. Informal conversations were defined by the researcher as unstructured conversations conducted with the intention to collect pertinent information that contributed to the research process. The researcher conducted at least twenty informal conversations by this definition both in and outside the village. The benefits yielded from informal conversations with scholars from external institutions such as UASD, UASD-Bijapur Station, and KHPT were twofold: information was used to construct and modify questionnaire and interview questions prior to going to the field; and information contributed to the data itself. Informal conversations inside the village with teachers and visiting farmers from surrounding villages, for example, also increased the richness of the data.

### **3.9 Limitations and Threats to Reliability**

The short fieldwork period and the status of the researcher as an outsider including language and cultural barriers were the main limitations to this research. Eight weeks of fieldwork was insufficient to fully explore the complexity of livelihoods. A fieldwork period that covered at least one complete growing season would have been helpful to fully realize agricultural roles and practices among farmers and laborers from sowing time to harvest.

An additional limitation was the actual timing of the fieldwork from mid-October through early December. The underlying rationale was that increasing rural productivity through diversification of economic activity in the village could lower prevalence of seasonal

migration thereby increasing family stability, lowering rates of HIV infection, and offering a possible means to escape poverty. Thus, a major focus was to gather perceptions of poor and landless migrants, especially regarding their interests regarding prospective diversification activities. However, UASD-Bijapur Station informed the researcher upon arrival that seasonal migrants in Bijapur District typically leave in late October or early November of each year and do not return until June. The key informant in Byalal confirmed that the research team had just missed the majority of migrants by two weeks. A few migrants had not yet left, and the research team took measures to seek them out for participation. To further compensate, the team sought to include participants who depended on migrant remittances for household livelihood security, former migrants, and those who had never migrated but were considering it.

While data triangulation addresses validity issues, threats to reliability were nonetheless identified in the field. To address threats and limitations, a mixed-gendered research team composed of locals with fieldwork experience was hired to assist the researcher as described in section 3.7. Nonetheless, there is an extensive amount of literature on problems that may arise in qualitative research when researcher and participants do not share the same culture and language (Patton, 1990). The primary language (Kannada) and country of the study area were not familiar to the researcher; therefore, the language and cultural barrier may have limited the flow of information. Translating a language can be extremely complex and questionable in its accuracy because social, cultural, and other contextual meanings can be lost in translation. An interpreter was used as a means to overcome these problems; however, the use of an interpreter poses its own questions about the validity and reliability of qualitative research particularly during interviews because there

are several opportunities for misinterpretation of information to occur, and it leaves open the possibility that the interpreter might summarize or modify what is being said by participants unknowingly by the researcher. Hence, it is an understatement to say that the interpreter played an important role in the research process. Indeed, there were moments when the other research assistants challenged something the interpreter translated to the researcher. To resolve these disputes, the team would probe the participant for verification.

At times, the reliability of respondents' answers was questionable. Although respondents, prior to participation, were encouraged to answer truthfully and informed they would not benefit financially or otherwise through participation, a few respondents were found to be misrepresent their income stability. More specifically, two respondents reported earnings less than they actually received and reported income instability from various income sources. The team speculated that the most likely reason for dishonesty in responses was that respondents might have thought it would help them receive financial assistance.

### **3.10 Data Analysis**

Microsoft Excel was used to organize and represent data from questionnaires. QSR NVivo 8, a qualitative data analysis software, was used to analyze data from all sources in search of concepts, themes, and regularities. Data analysis proceeded in two phases as described by Rubin and Rubin (2004). The first phase included the preparation of transcripts, creating an initial coding structure, and then systematically coding all data. The initial coding structure was built using the three emergent themes as the parent nodes with child nodes (i.e. concepts, themes, topical markers, events) derived from questionnaire and interview questions. Data was then coded, and emergent nodes were added to the initial coding structure. At the end of this phase, 188 child and grandchild nodes were created. The second phase of data analysis

was a systematic examination and synthesis of the nodes into groups for comparisons, patterns, or connections. Nodes were then grouped into five data sets representing the five research objectives outlined in Chapter 1 for data presentation.

### **3.11 Ethics Approval, Consent, and Anonymity**

The Policy #1406 (University of Manitoba Policy and Procedures S. 1400, Policy 1406), states that the Research Ethics Board must approve any research under the auspices of the University of Manitoba that involves human subjects. Following this policy, the researcher sought and received approval of the University of Manitoba Research Ethics Board (**Appendix G**). Interviews proceeded only after verbal consent from participants was given. Consent forms were translated to the local language and were read to participants by a member of the research team (**Appendix H**). Participants were assured that their information would remain confidential.

## **Chapter 4: Rural Livelihoods in Byalal Village**

### **4.1 Introduction**

This chapter offers a multidimensional exploration of the realities of villagers living in the agrarian dryland village of Byalal using the sustainable livelihoods (SL) framework as an analytical tool. In this way, the chapter offers a holistic depiction of the complexities of rural livelihoods and local context. The five capital assets of the SL framework constitute livelihood building blocks and are thus used in section 4.2 to present data, which allows for a picture of the local context to emerge. Section 4.3 is a presentation and discussion of the data regarding the agricultural production environment and identifying farmer activities, from their perspective, that help or hinder productivity and long-term sustainability. Section 4.4 returns to the SL framework and presents data on household livelihood stability, current household livelihood strategies, and coping mechanisms most likely taken when livelihoods become unstable. Section 4.5 explores the final component of the SL framework, livelihood outcomes at village-level, with a discussion of the sustainability of current livelihood strategies and an evaluation using the sustainable livelihood indicators presented in Table 5. The contextual components of livelihoods (i.e. featured in the SL framework as “vulnerabilities” such as historic/socioeconomic trends and shocks such as natural disasters and “structures and processes” of the political realm such as social relations, institutions, and organizations) are inseparable from the realities experienced by Byalal villagers. Descriptions of contextual components of livelihoods were thus difficult to separate from descriptions of capital assets, strategies, and outcomes; therefore, Chapter 4 and 5 feature contextual aspects throughout.

## 4.2 The People of Byalal: Livelihood Context and Capital Assets

### 4.2.1 Village Overview and Demographics

According to its villagers, Byalal has a history that extends back to at least five centuries during the Muslim rule of the Bijapur Sultanate by the Adil Shahi dynasty. A few remnants from earlier centuries remain scattered throughout the village today including a deserted mansion whose architectural style is a testament of its age and status of its former inhabitants. Descendants of these former rulers still live in Byalal today and belong to the highest caste. The agrarian village of today is dominantly characterized by its hot and arid climate, a small and rudimentary village center, and surrounding rough terrain. Prominent features of the landscape include fields with recently sown crops, vast areas of wasteland and grazing areas for livestock, gullies and evidence of run-off, and failed crops of sorghum and millet. Crops in Byalal are under dryland agriculture, as much of the area is rain-dependent and drought-prone. Because the majority of households depend on farm income for livelihoods, droughts and subsequent crop failures increase the vulnerability of villagers as a major threat to livelihood outcomes. Village farmers do not live directly on their land, and some must walk several kilometers to their fields daily. The communal and residential area of the village is centrally located and is where people of all castes live, albeit in distinct caste-denominated sections (**Plates 1-3**). **Appendix F** is a rough depiction of this area drawn by the research team. Surrounding this area are fields, half of which are cropland while the rest is common property lands such as wasteland, grazing areas, or patches of scrub forest (**Plate 4**).

Byalal is remotely located from the *taluka* headquarters of B. Bagewadi and is socioeconomically under-developed. A number of traditional aspects characterize social life in the village. Most villagers born in or nearby Byalal will live there until death. In fact, many

villagers have never traveled beyond B. Bagewadi *taluka* headquarters located 20km away. One woman farmer said: “Most of the people here have never gone beyond Bagewadi, except for those who migrate. Gol Gumbaz [a 16<sup>th</sup> century mausoleum in Bijapur City] is such a famous landmark and is so close to this village and yet I have never seen it” (FG1). Agriculture is the key sector of the Byalal economy, and most of the population embraces livelihoods that are subsistence in orientation, and to a lesser extent commercial farming done through local markets in *taluka* headquarters. Within the village, bartering for goods and services is a prominent form of economic transactions among villagers. The following examples are typical in Byalal: a labor contractor receives an annual payment of four quintals of grain worth Rs 8K for his services; a barber provides services in exchange for *jowar* (sorghum); and exchange of milk or curd for grains. The family traditionally arranges all marriages, usually entail a marriage between relatives (cousins or uncle-niece). Upon marriage, the woman will live in the village of her husband. Farming goes back numerous generations for most families, and they expect sons to take over the farms of their fathers upon retirement. Farmers take great pride in their achievements. One retired farmer elder said, “At peak season, I would sleep in the field...the reason for this is because I had worked so hard and I was proud of my achievements, so I would sleep in the fields to savor my success” (A1).

Table 7 presents the most recent village demographics from the local *panchayat* office in B. Bagewadi. The *panchayat* office could not verify the accuracy of their statistics. Half of the population belonged to lower castes (Scheduled Castes and Scheduled Tribes), and the ratio of females to males was nearly equivalent. Approximately 65% of villagers were illiterate, and the literacy rate was lower for females than males. The majority of

villagers are Hindu but there are several Muslim households as well. The research team identified 14 castes: Upper Castes (Brahmin, Swamy, Lingayath), Other Backward Castes (Gowda, Kuruba, Hadapad, Holaya, Bajentri, Goniga, Badigar), Scheduled Tribes (Nayaka, Valmiki), and Scheduled Castes (Madiga, Chalavadi, Madari).

**Table 7.** Byalal village demographics (Age 18+), 2001. (Source: *Panchayat* Office, B. Bagewadi)

Acreage	1523 acres
Total Population	1071
Population Female	534
Population Male	537
Literacy Rate Total	35.2%
Literacy Rate Female	20.9%
Literacy Rate Male	49.71%
Scheduled Caste Population Total	460
Scheduled Tribe Population Total	83
Landowners	165 (78 smallholders & 87 largeholders)

#### 4.2.2 Natural Capital: Land, Water, and Biodiversity

Byalal covers an area of 1523 acres. There is little heterogeneity of natural vegetation across the landscape, and forest cover is scarce. Within the village center, there are a few shade trees that provide shelter from the sun; however, small shrub-like thorny trees, known locally as the ‘jolly tree’, are the most common flora throughout the surrounding landscape. The quality of the black Deccan soil is described by farmers as generally fertile, but soil erosion is taking place in several areas. The topography of the area is gentle to undulating with a general land slope that declines toward a large reservoir located in the neighboring village in Muddebihal *taluka*. Byalal farmers complained that because of the land slope, “the monsoon rainfall flows downward to the next village, and sometimes the fertile soil goes along with it” (FG3). Academics at UASD-Bijapur Station suggest soil loss in the area due to erosion at 12-43 tons per hectare per year. Natural fertility of the soil has also declined according to a few farmers.

Water is the primary limitation among natural resources in Byalal, and it is the most cited reason for lowered agricultural productivity and livelihood insecurity among farmers.

As of 2001, there were 29 open wells and 13 borewells in Byalal, which meant that only 25% of landowners had irrigation for their fields (assuming that all 165 landowners were cultivators). Because of an increase in irrigation facilities, the level of the underground water table has decreased. Some farmers have dug borewells up to 500ft deep yet never found water. Digging for borewells is a risky investment for farmers. One farmer attempted to dig for water twice, taking loans each time. Both times, he hit rock, and he lost a total of Rs30K. To determine the location to dig, geologists can be hired for consultation; however, this is considered too costly so most farmers will hire 'special' locals described as having a sixth sense or who have visions that enable them to predict where groundwater can be found. During the process, this person will use a black beetle leaf or the twig of a neem tree to find groundwater. According to the village key informant, these 'special' locals are more accurate than geologists at finding groundwater for wells.

#### *4.2.3 Household Economics: Socioeconomic Classification and Financial Capital*

The farm household economic model treats the household as a single decision-making unit maximizing its welfare subject to a range of income-earning opportunities and a set of resource constraints, and it can be comprised of members working away in urban centers or abroad but who continue to maintain strong rural family connections (i.e. seasonal/circular migrant family members) (Ellis, 1998). According to the 2001 *panchayat* statistics (Table 7), there were 164 households in Byalal, and the average family size was 6.5. Households in Byalal are typically composed of near and extended kinship living together under one roof. To understand local household economics, a socioeconomic structure was developed throughout the fieldwork: non-diversified farm sector (income from crops or livestock only; subdivided into smallholder, largeholder, and landless farmers), non-diversified nonfarm

sector (extractive and commerce; subdivided into labor, business, and other), and diversified income households (households with two or more sources of income; subdivided into farm-diversified, nonfarm-diversified, and farm/nonfarm-diversified). **Appendix G** presents respondent household data using the final socioeconomic classification structure.

Challenges emerged when trying to situate households into a socioeconomic structure, which have important implications for the research. First, classifying households by income strategy was difficult because, in practice, there are potentially countless variations in the mixtures of different types of income sources and strategies for households so that typifying households became a fastidious and onerous process. Not surprisingly, most households to some extent were already diversified in their income-earning strategies. The ‘farm-diversified’ category was perhaps the most elusive and had to be further defined. All farmers, for example, had diversified crops so that all farmers in the ‘non-diversified farm sector’ were income-diversified to the extent that they were incurring income from more than one crop type. To differentiate between the non-diversified and diversified farm sectors, the latter evolved to represent those households which received income from one of the following integrated farm systems: agro-forestry, agro-pastoral, or agro-silvo-pastoral systems. Secondly, although each respondent was asked to disclose all income-earning activities within their household, the team discovered that respondents frequently forgot to mention certain income-earning activities such as the charcoal production business or migrant remittances; thus, it is likely that more households are diversified than the study revealed. For example, according to a village key informant, approximately 60% of the village population had recently left for seasonal migration activity in Goa, so it is also likely that more households than reported depend on migrant remittances to secure household

livelihoods. A third challenge of household classification was the ambiguity of the term “landless farmer”. Whereas the two categories of landholdings as recognized by UASD and the local *panchayat* office were straightforward (smallholders own less than 5 acres and largeholders own 5 acres or more), the definition of a “landless farmer” is uncertain. Even among academics within UASD, there was a discrepancy as to how they defined a landless farmer. Is a “landless farmer” synonymous to an “agricultural laborer” who does not own land, or are “landless farmers” land tenants of property owned by someone else for agriculture production? To address this challenge, the researcher came up with two classifications to describe landless farmers: landless farm tenants (agriculturists incurring farm income and includes those who access land through cash/share tenancy or who are landless but participate in animal husbandry as pastoralists or other allied sector activity for farm income) and landless agricultural laborers (members of the nonfarm sector incurring income from labor and includes those who are landless and work as laborers on farms owned by others). Landless farm tenants were merged into the farm sector category by landholding size rented.

#### *Farm Income*

The farm sector is the primary economic sector in Byalal. In 2001, Byalal had 165 landowners of which 78 were smallholder farmers and 87 were largeholder farmers (see Table 7). The *panchayat* did not record statistics on the landless; and though not definitively established by this study, the number of villagers that fell within this category was considerable. Out of 87 individual respondents, nearly half depended on farm income alone for household livelihood security and an additional 36% were diversified households, which depended partially on farm income for household security (**Appendix G**). Farm income in

Byalal included income from own-account farming of both small and large landholdings whether through owner-occupied land or land accessed through cash/share tenancy. Major commercial crops grown in Byalal are drought-tolerant cereal crops such as *jowar* (sorghum) and *bajra* (millet), *dal* (pulses) such as lentil and *bengal gram* (chickpea), groundnut, and sunflower. In addition to these crops, Byalal farmers with irrigation grow cash crops such as onion, garlic, and wheat. Other crops grown to a lesser extent included chili, maize, *kasubi* (safflower), *horse gram* (a type of legume), and *agasi* (linseed/flax). Those participating in animal husbandry accrue income mostly from sheep/goat-rearing and dairy production from buffalo. Only one person interviewed raised poultry (small-scale) to supplement their income. No one depended solely on his or her income from animal husbandry to secure their livelihoods.

#### *Nonfarm Income*

Nonfarm income in Byalal comes from a number of sources. The most common sources reported were income earned through wages from labor either in agriculture or construction and from business. The following businesses were identified in Byalal: tailoring (3 persons), charcoal production (at least 4 persons), chili-grinding (1 person), general stores/tea cafes (5 locations), government-run fair trade store (1 person), tom tom transport (5 persons), bangle-selling (2 persons), labor contracting (1 person), or work as subagents for Agri Gold farmer investment company (4 persons). Less common nonfarm income sources reported included urban-to-rural migrant remittances from family members; rental income from leasing land, housing, or livestock for manuring; cook/janitor for the school, sex work (8 persons), and

*devadasi*<sup>15</sup> (8 women). Very few respondents (less than 20%) reportedly depended upon nonfarm income alone to support their livelihoods, and only one person depended on a single nonfarm income source for his household. This man was a largeholding Brahmin landowner of 26 acres who accrued income from rental payments in kind/cash through harvest-share land tenancy (**Appendix G**). Indeed, all other households depending on income from business or other nonfarm ventures besides labor were income-diversified.

#### *Diversified Income*

Households with two or more sources of income fell into this category; and subdivisions of this category included farm-diversified (i.e. farmers using agro-pastoralism, agro-forestry, or agro-silvo-pastoral systems), nonfarm-diversified (i.e. business-labor or business-sex worker/*devadasi* or two businesses or labor-seasonal migration, etc.), and farm/nonfarm-diversified. Few farm households participated in agro-pastoralism, and only one farmer (irrigated) in the village participated in agro-silvo-pastoral integrated farming. Farm/nonfarm-diversification was most common, with over one-third of respondents reporting (**Appendix G**). Those in this category largely consisted of smallholder irrigated and rain-fed farm households and largeholder rain-fed farm households also accruing income from agricultural labor on others' farms, seasonal migrant remittances, and/or business and landless households accruing income from animal husbandry and also agricultural labor, migrant remittances, and/or business. All persons working in business had a second or third source of income, which usually included agricultural labor.

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<sup>15</sup>*Devadasi* comes from the Sanskrit language (“deva” = God, “dasi” = servant or slave). Originally, *devadasis* were women dedicated to different Gods and Goddesses through marriage. Following this dedication, these women performed various temple roles and duties including sexual services to male priests or other temple affiliates. See O’Neil *et al* 2004 for more information.

### *Financial Capital*

Financial capital refers to the stocks of money or other savings in liquid form, access to credit, and easily-disposed assets that could be liquidated. As previously mentioned, villagers participate in barter terms of trade for goods and services. In this way, financial capital often existed in the form of grains or other goods in exchange for services. Most households of the study were in debt and owed money plus interest to their lenders including households from every income classification, education level, caste (except Brahmin), and age. When asked if in debt, one farmer replied: "To be a farmer is the same thing as to be in debt!" Farmers typically obtained loans from other villagers, micro-finance companies, or banks in B. Bagewadi; and they officially took loans for house construction, to start a business, children's education, medical expenses, or farm improvements/construction. However, a few respondents admitted to using loan money for marriages or other social events. All respondents complained about the difficulty in receiving loans from financial institutions; and, in addition to water shortage, it was the most frequently cited reason among villagers for livelihood insecurity. Along these lines, inability to receive loans was a major limitation to households interested in adopting livelihood strategies such as economic diversification. Farmer respondents linked their ownership or access to irrigation facilities to loan eligibility from financial institutions. Farmers stated that they are unable to get loans because they live in dryland areas with no irrigation. One male farmer said, "The banks will send out an extension officer to look at our assets, and then they conclude that we will be unable to repay a loan because we have no irrigation. So, they reject us" (FG2). Another male farmer said, "If we can get water then we can grow grapes and limes, and then the bank will come to us and ask us 'How much money do you want?'" (FG2). Other cited problems associated with

getting bank loans included providing proof of completion of 10<sup>th</sup> standard (education) and other official documentation required of loan applicants such as updated land entitlements.

In regards to villagers with the ability to save money, the research identified two mechanisms: self-help groups [SHG] and farmer investment schemes. Female villagers belonging to SHG were able to save between Rs10-50 per week. Some villagers opted to invest money through their local agent from Agri Gold (a farmer investment company). One interviewed Agri Gold agent reported that he has 99 Byalal customers. Savings invested in Agri Gold accrue interest over time; and the agent reported that as of April 2008 Agri Gold had paid out a sum of Rs 3.5 lakh to Byalal customers.

#### *4.2.4 Life in the Village: Gendered Farm and Labor Roles*

Because the majority of villagers depended upon the farm sector or agricultural labor for household livelihood security, the research focused on identifying gendered farmer and laborer roles in the community. If economic diversification activities explored in Chapter 5 are to be a potential livelihood strategy adopted by households, it is of particular relevance to recognize roles and responsibilities already in existence. The daily routines of women in Byalal are arduous. Unlike men, women carry a “double burden” of carrying a job in a place of employment while rarely being relieved of domestic responsibilities (Tables 10 and 13). On the farm, seasonal jobs of women typically include clearing of land for seasonal preparation, soil fertility management, and crop maintenance activities such as sowing, weeding, and harvesting (FG1). However, farmers that are more affluent hire agricultural laborers to assist them throughout the season, especially during harvest. Female farmers and agricultural laborers work long hours every day in the fields doing a number of tasks including some traditionally done by men such as tending to livestock, plowing, and assisting

in bund reparations. Women rarely take time off from their responsibilities for rest or vacation, even during the off-season months of April and May (Tables 8 and 9). Indeed, the only days they will not do work are during festivals or marriages. Domestic responsibilities include preparing food, washing clothes, cleaning house, and fetching firewood and water. Some women also balance their domestic work and employment with participation in community activities (see section 4.2.7).

Some women also participate in multiple income-generating activities such as agricultural labor and work in a general store/tea café. Many women in the village belong to households that depend on seasonal migration for household livelihood security. Migrants leave Byalal in mid-October and return during March for *rabi* harvest. Wives of seasonal migrants are in charge of the household and all other responsibilities during that time. There are female seasonal migrants of differing ages and castes as well. Female migrants with young children are heavily reliant upon other household family members to take over childcare duties. One 40-year-old female interviewee who had three daughters described the decision to migrate and the burden of labor here:

“My husband is an alcoholic, and he is now too sick to work. I have to migrate to Goa for work. I do construction labor, and I have to lift and move heavy stones. For the past 10 years I have been migrating to Goa because work is too hard to find here year-round. I will leave for 6 months to Goa and then return home. Earlier, I got Rs20 per day for labor work here in this village. It has since increased to Rs30 per day; but in Goa I can make Rs50 per day. I leave next week for Goa. There, I do construction work like lifting sand which is very difficult for me. I go to Goa to support my children for their clothes and education. If not for this, the Rs30 per day I earn in Byalal would be enough for our food. But I need more to support my children, so I migrate” (A3).

**Table 8.** Female SHG participants' seasonal calendar. (Source: FG1)

Kharif	June	Land preparation: cleaning land	
		Repairing bunds	
	July	Apply manure	
		Sow <i>kharif</i> seed after first rainfall	
	August	Weeding & crop maintenance	
		Those with irrigation will sow onion & garlic	
September	Weeding & crop maintenance		
End of Sept.- Beginning of Oct.	Harvest		
	October	Land preparation	
Rabi	November	Apply manure &/or chemical fertilizer (DAP)	
		Sow <i>rabi</i> seed & hope for rain within 15 days	
		Weeding & crop maintenance	
	December	Weeding & crop maintenance	
	January	Weeding & crop maintenance	
	February	Weeding & crop maintenance	
	End of Feb.- Beginning of Mar.	Harvest	
	End of Mar.- First wk of April	<i>Udagi</i> "Hindu New Year": 1-day festival on the day of the new moon	
	Off-season	April-May	Off-seasonal work: domestic work, <i>sandiga</i> "rice preparation" for spices

**Table 9.** Female SHG participants' weekly calendar. (Source: FG1)

Monday	Market Day in B. Bagewadi for purchasing goods/supplies
	Farm work (Farm rotations as needed within SHG)
Tuesday	Farm work (Farm rotations as needed within SHG)
Wednesday	Farm work (Farm rotations as needed within SHG)
Thursday	Attend weekly market in Muddebihal to sell produce (only if men are not available to go)
	Farm work (Farm rotations as needed within SHG)
Friday	Puja "worship" in the morning; housework & cleaning
	Farm work (Farm rotations as needed within SHG)
Saturday	Farm work (Farm rotations as needed within SHG)
Sunday	Farm work (Farm rotations as needed within SHG)

**Table 10.** Female SHG participants' daily calendar. (Source: FG1)

5:00-6:00	Wake up & clean house
6:00-9:30	Prepare breakfast & take bath
9:30-10:00	Eat breakfast
10:00-14:00	Go to field for agricultural work, especially weeding. [15 minute break during summer months]
14:00-15:00	Eat lunch
15:00-18:00	Return to field for agricultural work
18:00-18:30	Return home, tea time
18:30-19:00	Puja
19:00-20:30	Prepare dinner & clean house
20:30-21:30	Eat dinner
22:00	Go to bed

Males generally perform farm tasks such as plowing, threshing of grain, bund construction and reparation, and tending to livestock (Tables 11-13). Tending to livestock included bringing fodder and water, and collecting milk. Males reportedly perform many of the same agricultural tasks as females such as sowing, weeding, and harvesting (FG2), although the researcher observed only females pulling weeds each day throughout fieldwork. Pesticide application is also a male role (FG3). Males also took on the task of transporting and selling produce at the weekly market in Muddebihal (Table 12). Dryland male farmers of all landholding sizes, as compared to farmers with irrigation facilities, often engaged in multiple income-earning activities such as agricultural labor on the farms of others, charcoal production, or a business. A key informant said that of the 60% of the village population who recently migrated to Goa most are males working as construction or agricultural laborers. Unlike women, men rest after work each evening or enjoy time visiting with friends, and they do minimal work during off-season months (Tables 11 and 13). Some men are involved in community groups such as *Gajanana*, a youth men's association (see section 4.2.7). Alcohol abuse is a male activity adopted by many in the village. This activity takes place each evening beginning at 6pm. On two occasions, the team observed alcohol abuse during the day.

**Table 11.** Young men's association participants' seasonal calendar. (Source: FG2)

Kharif	June	Land preparation: plowing & cleaning land Repairing bunds
	July	Apply manure/chemical fertilizer. Sow <i>kharif</i> seed after first rainfall
	August*	Weeding & crop maintenance
	September	Weeding & crop maintenance
	End of Sept.- Beginning of Oct.	Harvest
	October	Land preparation Apply manure &/or chemical fertilizer (DAP) Sow <i>rabi</i> seed & hope for rain within 15 days
Rabi	November	Weeding & crop maintenance
	December	Weeding & crop maintenance
	January	Weeding & crop maintenance
	February	Weeding & crop maintenance
	End of Feb.- Beginning of Mar.	Harvest
	End of Mar.- First wk of April	<i>Udagi</i> "Hindu New Year": 1-day festival on the day of the new moon
Off-season	April-May	Rest, minimal work such as plowing, attend marriages.

\*August is a very auspicious month known as "Shravana". It is a time for worshipping Shiva and his son Ganesh. During this month they worship the snake, and lots of festivals take place during this month. They will take off either a Tuesday or Friday each week to worship their own god.

**Table 12.** Young men's association participants' weekly calendar. (Source: FG2)

Monday	Market Day in B. Bagewadi for purchasing goods/supplies Farm work
Tuesday	Farm work
Wednesday	Farm work
Thursday	Attend weekly market in Muddebihal to sell vegetables (onion, tomatoe, green chilis, eggplant, okra, coriander, etc.) but not cereals Farm work
Friday	<i>Puja</i> "worship" in the morning; housework & cleaning Farm work
Saturday	Farm work
Sunday	Farm work

Note: Will take a day of rest on days of new & full moon for worship at temple.

**Table 13.** Young men's association participants' daily calendar. (Source: FG2)

5:00-6:30	Wake up; one man exercises early; those that own livestock clean and feed ox
6:30-8:00	Take bath & eat breakfast
8:00-13:00	Go for farm work: activity depends on time of year
13:00-14:00	Eat lunch
14:00-18:00	Farm work; will work later during harvest time
18:30-19:00	Last farm activity is to graze ox
19:00-21:00	Return home; wash up; visit with friends; watch TV if power is available (approx. 20-25 ppl own TVs but power is too intermittent)
21:00-22:00	Eat dinner; watch TV/relax
22:00	Go to bed.

#### *4.2.5 Physical Capital: Infrastructure, Tools, and Technology*

Economic production creates physical capital and includes infrastructure, tools, and technology. Byalal is located at the outer *taluka* boundary and is 20km away from the centrally located B. Bagewadi *taluka* headquarters. Additionally, the road conditions between the headquarters and Byalal are in extremely poor condition. In an automobile, it took the research team approximately one hour to travel the 20km from B. Bagewadi headquarters to Byalal; however, the time it takes villagers to travel by ox and cart or by auto-rickshaw is even longer. A bus is also available for transportation between B. Bagewadi and surrounding villages including Byalal. However, since Byalal is the final destination on its route, the bus stays overnight in Byalal. It departs very early in the morning (6:30am) and is the last to arrive at night (8:30pm) making bus transportation an inconvenient option for Byalal villagers. Landlines as well as cell phones make communication possible. Several villagers own cell phones, and as many as 20 households own televisions.

Housing conditions vary substantially, but village public buildings (school, temples, and community center) are well-built and stable. According to a former village leader, the government has a scheme, which gives Rs40K per household for housing construction. A new house in the village costs between Rs38-40K. He also said that the government gives Rs6K annually per village leader for village development. There are no indoor plumbing or sanitation facilities in Byalal. In this way, villagers must excrete bodily wastes outdoors in and around the village.

Drinking water comes from four hand pumps placed intermittently within the village (**Plate 5**). The government built a new drinking facility tower that would provide piped water to villagers four months ago; however, it is still not operating and no one in the village knows

why. The village also has a government-constructed *dhobi ghat* (laundry facility); however, due to an unrelenting problem of power shortage it is not in use. Instead, female villagers do laundry in a large open well owned by a farmer who has allowed villagers to use it.

Physical capital assets relevant to agriculture observed in Byalal include inputs such as seed, fertilizer, pesticides available at businesses and the *panchayat* office in B. Bagewadi; machinery such as an owner-occupied thresher machine that is rentable and three grain mills; an owner-occupied tractor available for rent from the neighboring village of Kanakal (Rs250 per hour; 1hour=1 acre); 29 open wells and 13 borewell irrigation facilities; and traditional technology such as the ox-drawn plow. Irrigation facilities are scarce in Byalal. Most could not afford to dig for water, and those who could experienced severe financial losses when they were unable to find water because of depleted groundwater levels. Byalal villagers have reportedly been fighting to get irrigation for over 20 years. The most recent attempt entails an expansion of irrigation to dryland areas from nearby Alamatti Dam, but political decision-makers from the GoK and the Government of Andhra Pradesh (GoAP) have stalled this action. The GoK is pushing for a height increase of the dam that would supposedly provide irrigation for 121 dryland villages including Byalal. However, the GoAP has not approved the construction out of concern for water security of its own villages. Once a year, for at least two years now, villagers from the 121 villages have undertaken collective action to demand construction of the lift irrigation facility. To attend this event, Byalal villagers must walk 160km. UASD-Bijapur Station academics were uncertain about when or if the dispute will be resolved.

Even farmers with irrigation facilities have experienced lowered productivity due to power shortages, a problem that has been ongoing for at least four years. The intermittent

supply of electricity is indeed a major constraint with far-reaching consequences. The power shortage affects productivity for farm and nonfarm livelihoods. According to the villagers, the shortage of power supply has been a problem for the last four years, and it is worse during post-monsoon months. The GoK provides electricity to farmers free of charge, but the quality of service is poor because of erratic and limited supply, which can result in crop losses from forgone irrigation. For example, largeholder farmers were unable to pump water to all cultivated areas due to insufficient and unpredictable power supply resulting in reported crop failures and inability to expand production on their farms. One largeholder woman farmer of 13 acres said:

“We have an open well 30ft deep, but the current power supply can only feed 5ac. The power supply lasts only an hour per day now. We used to get at least three hours of electricity during the day, but now it has reduced to only one or two hours per day. Our wheat crop is suffering because of the electricity shortage. Water cannot be pumped to the fields so the land is getting dry” (A2).

The intermittency of power availability has also led to depletions in financial capital through losses associated with labor wages. To illustrate, one male largeholder farmer, age 55 said:

“Earlier we used to get power supply in the mornings from 6am to noon or from noon-6pm continuously for 6 hours. If they would provide predictable power supply like this, it would be very useful for us. The main problem to us is that the power is not continuous; therefore I do not know when to tell the laborers to come for work. If the power supply goes off during times for agricultural activity, the hired labor has to sit without doing any work and we farmers still have to pay them. Since we can't predict when we will have power, we cannot tell the laborers when they should come. In turn, it is a loss of money for farmers” (A19).

The local branch of the Karnataka State Energy Department responsible for electricity seems to be incapable of supplying power to Byalal and surrounding villages. Not only was electricity insufficient in Byalal, but also the researcher experienced the inconvenience of intermittent and long-lasting power outages first-hand throughout fieldwork

in Bijapur City. Unpredictable power outages in Bijapur were a daily occurrence with periods without power lasting as long as 8 hours. According to UASD-Bijapur Station, power supply has always been a local problem especially post-monsoon; however, at the time of fieldwork it was worse than usual due to problems at the Raichur District hydroelectric power plant. Expansion of power generation capacity and transmission networks is not only necessary to improve agricultural productivity but it is imperative for the social and economic development of underdeveloped rural and urban areas throughout Karnataka. Exacerbating the power shortage problem, a transformer in the village has been broken for five months and no one has come to fix it. Toward the end of fieldwork, a representative from the electricity department appeared in Byalal and an angry crowd confronted him. The electricity department removed the transformer, presumably for repair.

#### *4.2.6 Human Capital: Health, Education, and Knowledge*

Human capital is constituted by the quantity and quality of available labor, which can be determined by health, education, knowledge, and skill levels. The nearest health clinic is located in the neighboring village of Kanakal about 7km from Byalal. According to a key informant, the most common health issues, aside from Chikungunya, are minor problems such as cold, cough, and fever. Malaria outbreaks occur irregularly with the most recent cases transpiring last year. Within the last six months, two married males (both migrants) died of HIV/AIDS. Cases of cancer were emerging more frequently over the last few decades among both the old and young. In regards to local suicide incidence, the key informant adamantly denied that suicide among farmers was a local problem, and that if it did happen that the reason was not indebtedness:

“I have heard all this talk about suicides among farmers and that it is supposedly so high, but this has not occurred in this village or others around here. As for those who do commit suicide, I am sure it is not related to loans and debt. It must be some other problem” (A6, KI).

Health problems have increased over the last four decades according to village elders. “Earlier we did not have a nearby health clinic or vaccines. Now, we have both but we have all kinds of disease; and bad habits such as smoking, drinking alcohol, and extramarital affairs have increased,” said one male elder (FG3). In addition to increased bad habits, elders also blamed poor quality of hybrid variety produce and the elevated use of chemical pesticides on current poor health outcomes:

“Earlier, we used the local variety of produce, and we never used to have health problems. Even if we had health problems we could eat ginger and jaggary (sugarcane product) paste and everything would be alright. But now, we eat hybrid varieties, and we get all kinds of diseases” (FG3).

“It used to be that village children would be breast-fed until age 7. But now, pesticides are showing up in breast milk, so they use formula to feed children instead. Children today are weak because of this. The increase in agricultural chemicals has also caused longevity of villagers to decrease. The average person used to live to be 100, but now it has declined to age 60” (A1).

The village has one school which is designated for children at primary education level (1<sup>st</sup> – 4<sup>th</sup> standard out of 12 standards). Village teachers said that of the 200 school-age children in the village only 80 attend. The teachers believed that families kept children at home to support the family. The majority of respondents who were 40+ years of age had less than 4<sup>th</sup> standard education although two men interviewed had completed post-secondary education (**Appendix G**). Respondents younger than 40 varied in their extent of education: half had less than 4<sup>th</sup> standard education, a quarter completed between 5<sup>th</sup>-9<sup>th</sup> standard, and the remaining quarter completed their secondary education.

The skill levels of villagers appeared to be largely even among economic specialties, particularly among farmers. In other words, no farmers emerged that were particularly more innovative or knowledgeable than others. Knowledge and skills of farmers were largely spread through oral tradition within families and shared among neighbors. Access to specialized knowledge was not easily available to Byalal villagers: most are illiterate; remoteness of Byalal's location places constraints on capacity to obtain new information; and according to villagers, there have been no prior visits from UASD, GO, or NGO farmer extension workers for transfer of technologies (see the following section). All farmers said that their main external source for advice was the owner of a pesticide store in B. Bagewadi. The transfer of knowledge and skills within nonfarm sectors included oral tradition within families and training programs outside the village.

There was a shortage of labor within the village. Largeholding farmers, in particular, complained about the untimely manner of labor availability. One male respondent expressed his frustrations when he said, "If we have money, then we don't get good rain. And if we get good rains then we don't have money. When we do not need laborers, they are everywhere. But when we need them, we cannot find them because they will leave for work elsewhere" (A1). Another respondent even had to quit farming altogether due to labor shortage:

"Before six years ago, I used to cultivate my 26 acres. A few years back the hired labor was happy if we gave them 25% of the output, but due to the labor shortage they said it is not profitable if they get only 25% output. So, they started to demand 50% of the output. If we said 'no', then no one came forward to do labor. There is no other way but to just accept it. Since I could not do all the work, I now rent out all my land and will only supervise farm activities but cannot do the work" (A16, KI).

Deficient quantity of labor is the result of high occurrence of out-migration of Byalal villagers. Villagers migrate to do labor for higher wages or because local work is not available throughout each growing season. In addition, an increased number of villagers preferred to send their children off to school, as compared to earlier days, which has reduced labor. Poor health outcomes due to illnesses, disability, and alcoholism have also reduced labor quantity.

#### *4.2.7 Social Capital: Internal and External Networks*

Social capital captures the notion that social bonds and norms among local groups are an important part of the basis for sustainable livelihoods. Aspects of social capital include horizontal and vertical relations of: trust; reciprocity and exchanges; common rules, norms, and sanctions; and connectedness, networks, and groups (Pretty & Ward, 2001). Both informal and formal associations are considered social capital assets, but it is informal rather than formal associations that are of most value to citizens in rural areas of developing countries (Krishna, 2002). Social capital aspects considered in the research included village cooperation and unity (relations of trust and connectedness), social networks and groups, and leadership effectiveness.

Gender lines strictly divided opinions about village cooperation and unity. When asked about cooperation among villagers, all but one female respondent said cooperation was not good in the village. Some women said villagers would cooperate only during times of festival:

“Earlier people were very cooperative, but now the people are not good. We never used to see quarrels among people, but now they quarrel for the simplest reasons. Rich people create problems. As the money increases, the conceit also increases” (A7).

“This is the worst village I’ve ever seen [referring to cooperation]! I moved to Byalal after marriage to a man from here, but if I would have known this village was this bad I would have never married this man” (FG1/A13).

Male interview respondents, on the other hand, unanimously reported that cooperation and village unity was good in the village. Similarly, when asked to list strengths of the village in QI, 67% of men listed “close-knit community” as a strength compared to only 11% of women.

Internal networks (horizontal connectedness) within the village included both formal and informal associations among villagers. Two types of formal groups were identified: SHG and *gajanana* (youth men’s association). The majority of interviewed women were members of one of the 15 SHG in the village. Most SHG met on a weekly or monthly basis. The SHG that participated in FG1 had organized a form of nonwage labor-sharing agreement in which, as a group, members will do free labor on another member’s farm in rotation, and it also provided its members with a means to save money weekly (**Plate 6**). Cooperation among its members, however, was disputable. When opportunities arose in the past, not all members agreed to participate. Village women missed opportunities without unanimous agreement (FG1 and A13). Nonetheless, SHG offered women the means to expand their income-diversifying options. Women applying as a group were more likely to qualify for loans than women applying as an individual. Informal networks identified in the village included trading of goods, exchange of information among farmers, money-lending, and common celebrations such as marriages, prayer, and funerals. Money-lending was also observed as an internal network. Some affluent villagers, as a livelihood strategy, lend money to others when their financial capital becomes scarce. Village lenders charge interest at rates lower than most financial institutions; however, if the money is necessary for medical expenses the lender

typically will not charge interest. Villagers lacked effectiveness in communication, and exchange of information within the village was observed to be lacking with significant need for improvement. Villagers only come together during times of festivals a few times each year to discuss issues, but most respondents were largely misinformed or completely unaware of village issues and activity. For example, 25% of surveyed men and women of QI were unaware of the existence of community groups within the village. In addition, several villagers received misinformation about why Byalal was not getting irrigation from nearby Alamatti Dam. Most believed that political reasons were to be blamed; but in truth, the reason was because it is biophysically impossible for Byalal to get irrigation because of its geographic location relative to the dam.

External networks (vertical connectedness) involving connections between external agencies (mostly in B. Bagewadi) and villagers were also identified. Several Byalal households utilized credit and savings systems created by microfinance companies such as the Grameen Bank in B. Bagewadi and the Agricultural Cooperative Society in the neighboring village of Kanakal. The accountant from the *panchayat* headquarters visits the village periodically and is a source of farm-related information and supplies seed at subsidized rates. Most farmers considered one of the local pesticide stores in B. Bagewadi, which provided information, tools, and technology to farmers, to be the primary source of external information on farm technology.

Less effective external networks included the watershed management program (WMP) and the farmer-extension program from UASD-Bijapur Station. Farmers perceived these organizations as ineffective. All respondents reported that no farm-extension workers

(from any organization) have ever come to the Byalal to give farm advice. One largeholder farmer woman described this in a seemingly acquiescent way:

“If crops fail, we are not upset because agriculture is the only thing we know how to do! Why be upset, when that is all we could do? I am not expecting to ever get help because we have never been given help by the college or any other organization. At this point, I would take the advice of anyone who would give it” (A2).

Although Byalal falls under the domain of a WMP, no one in the village was aware of any recent WMP activity in the village. Only a few respondents were vaguely familiar with a ‘mystery’ structure that had been built several years ago, but only one was able to clear up the mystery as to who built it, where it was located, and what it was for (see section 4.3.4). The only other WMP activity mentioned by villagers was a rainwater harvesting demonstration held in Maharashtra. Sixty Byalal villagers attended, but no one followed the WMP advice. When asked why, they said that conditions (irrigation and soil) in Maharashtra are not the same in Byalal and so WMP advice was neither applicable nor appropriate. One farmer who attended the event said, “Maharashtra has irrigation. If you have water, you can do whatever you want” (A2). Other villagers also criticized the WMP personnel for using the event as a platform to lecture villagers on destructive social habits such as alcoholism and smoking. The extension/training program at UASD-Bijapur Station offered an extensive number of training programs for farm and nonfarm skills and activities to villagers free of charge (**Appendix H**); however, very few villagers were aware of these opportunities. Rudset, a local NGO, also provides similar training. Those who attended UASD-Bijapur Station training events were responsible for transportation to and from campus; however, UASD-Bijapur Station provided room and board. Trainees from Byalal were highly critical of the UASD-Bijapur Station and Rudset training programs because they did little to help trainees apply for loans post-training. Indeed, not all respondents who had taken a training course from UASD-Bijapur Station took

on the activity in which they were trained because they were unable to get loans for start up. According to UASD-Bijapur Station, local group organizations such as the university research and extension programs, WMP, and NGOs have tested and proven technologies for improving productivity and sustainability in dryland farming with very competent individuals overseeing these programs. However, efforts to bring such technologies to villagers were undermined by a shortage in funding as well as the number of dedicated extension workers (those who are actually sent into villages to work one-on-one with farmers). Some extension workers, for example, did not return to villages after the initial visit to ensure proper adoption of technologies, to collect feedback from farm participants, or to offer a continuation of support.

There are three elected leadership positions in Byalal: one represents the general community, one represents the Scheduled Caste population, and one represents the Scheduled Tribe population. Leaders hold five-year terms, and at least one position must be occupied by a female. At the time of this research, women officially occupied all positions, but their husbands unofficially handled leadership tasks. Most respondents said that leadership, at present, was not strong in the village because the leaders were not effective in completing tasks such as village improvement or in keeping their campaign promises. For example, some respondents expressed dismay toward village leaders and their indolence regarding the unresolved issue of the broken transformer, which was exacerbating the energy crisis. The key informant (male) said,

“We have no strong leadership, because a strong leader would get things done. The transformer here in the village, for example, has been broken now for the last 6 months and still nothing has been done to get it fixed. We do not have strong leaders. If we did then things would get done, like fixing the broken transformer” (A6, KI).

Respondents also described the relationship between leaders as quarrelsome due to politics. One male interviewee said, “If the leader from one party tries to do something good to the village then the other party leader will oppose it just because he thinks that if the leader does something good then he will become popular” (A10). According to one respondent who was a former village leader, the biggest challenge of getting work done as leader was that task completion was usually dependent on the cooperation of multiple factions.

#### *4.2.8 Constraints on Human and Social Capital: Gender, Caste, and Age Divisions*

The researcher observed a number of additional constraints to levels of human and social capital in Byalal during fieldwork. Noteworthy constraints included gender inequality, caste discrimination, age division, alcoholism, and incidence of morbidity. These issues have shackled opportunities for Byalal to reach its true human capacity for development.

The women of Byalal played a prominent role in every aspect, yet they faced a number of challenges identified by the researcher that limited their access to resources. The legal age of marriage in India is 18; however, rural areas often ignore this law. Marriages of female children in Byalal were more common a generation ago, and most interviewed women 40+ were married before age 11 including one woman who was married as an infant. Women interviewed, who were younger than 40, married between the ages of 15 and 21. Upon marriage, the woman assumed primary responsibility of household work in addition to work in an income-earning job; thus, she was no longer able to attend school. Indeed, no female interviewees had completed their education beyond 9<sup>th</sup> standard. There were several young widows in the village; and the plight of widows of all ages remains significant. Both male and female villagers frequently subjected them to discrimination, and it was nearly impossible to remarry. One young widow shared the following:

“They [nonspecific] will talk bad about me and other widows. At the time of others’ marriages, people will not allow me to worship. They think it is a bad thing if I do this. Because of all these reasons, I feel very bad. I have been trying to remarry for two years, but no one has come forward” (A18).

When asked for the reason why others treat widows poorly, she simply explained, “It is traditional.” Widows received a monthly government pension of Rs 400.

Inequalities between sexes in Byalal were existent. One-third of interviewed women were the primary income earners of their household. These women had husbands who were no longer able to provide income because of disability, old age, alcoholism, or because their husbands had left. These women were particularly burdened by workload. In terms of ownership, women cannot own land; therefore, women farmers cultivated lands owned or leased by their husbands, and businesswomen work in stores owned by their husbands or fathers. Wages among agricultural laborers were also unequal: men received Rs 70 per day while women received Rs 30 per day. When asked for an explanation, one landowner (male) justified wage differences with the argument that work done by men such as plowing is more labor-intensive than work done by women such as weeding. When the researcher argued that the perception of weeding as “less labor-intensive” was debatable, the landowner rationalized his argument by suggesting that plowing requires more strength. Nonetheless, women laborers weeded fields with hand tools while bent over in the hot sun all day long during large portions of the year. Furthermore, the team discovered that at least one female laborer in the village participates in plowing yet she still does not receive equal pay as a man doing the same work. Another landowner explained the difference in wages as rooted in tradition. When asked if he thought that in the future women might be paid equally, he said, “In the future it may change. If women demand more, then we will have to pay them. But so far, they have not asked” (A16). The plowing female agricultural laborer was then asked if she

had ever thought of asking for equal pay, and she said that the thought had not occurred to her but that she may consider it.

Caste issues appeared to be a less constraining factor than gender issues to development in the village. There were several signs in the village that relations among castes have progressed beyond the formerly strict division traditional of Hindu society. Although the layout of the village remains segregated along caste lines (**Appendix F**), gatherings composed of mixed castes in all areas of the village occurred regularly throughout fieldwork including meetings within the school with village (unofficial) leaders and the research team, casual conversations held in multiple tea cafes, and in the fields and homes of farmers. Village leaders referred the team to villagers of mixed castes: one key informant belonged to a Scheduled Caste while the other key informant was a Brahmin. Cooperation among castes has reportedly improved over the last three decades according to respondents of both upper and lower castes. The Scheduled Caste key informant described the phenomenon:

“Earlier there were the untouchables, 15 to 20 years ago. But now we do not have the same problems. I am from a backward caste and all of my friends are from upper castes, and I spend most of my time with them. These friends will even come to my home and have food. At the time of getting a job or at the time of admission into college or school, castism (a reservation) is there for them. If a backward caste woman would open a tea café here, then upper caste people would also come to that tea shop” (A6, KI).

Throughout the fieldwork, the team observed that all castes regularly congregated in public and private places; however, some upper caste members are slower to overcome caste issues than others. Some members of upper castes will visit businesses but not homes of Scheduled Castes and Scheduled Tribes. The interviewed village Brahmin described cooperation between upper and lower castes as necessary: “We have to cooperate.

Sometimes we find it difficult to cooperate, but it will be solved amongst ourselves. Rarely do we take the issue to court. A few younger people will not cooperate at times” (A16, KI).

More respondents regarded differences between the younger and older as being considerably more divisive than differences between upper and lower castes. There was consensus among most elders that youngsters do not respect elders, which leads to problems in the village. “Earlier people trusted each other. Now, they do not. Earlier people were good, but now youngsters won’t respect elders,” described one male elder (FG3). Younger respondents did not refer on age differences of opinion.

Nearly every respondent had stories with implications for reduced human capital in the household through household illness, injury, or death. Illnesses and injuries were caused by disease, alcoholism, or work-related injury and have resulted in reduced labor quantity and destabilized household livelihoods. The following are a few examples from respondents which were typical occurrences in Byalal households: a woman with an alcoholic husband who could no longer work had lost her land to debt and now must migrate to secure household livelihoods; a father became ill and could no longer work had forced his daughter to become a *devadasi* for household income; and a woman injured her hand doing agricultural labor and could no longer work.

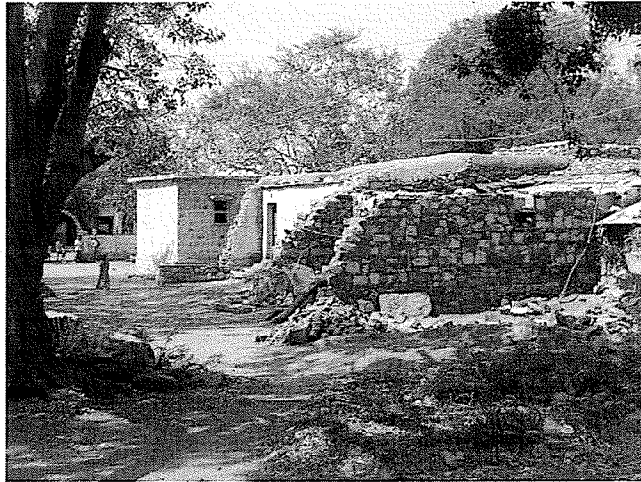
At a fundamental level, the constraints to human capital (gender inequality, discrimination against widows, poor education and skill levels, illiteracy, and alcoholism) affected both the quantity and quality of labor in Byalal. Women (and especially widows) were particularly suppressed from realizing their full social and economic potential by a heavy and imbalanced workload, early marriage and subsequent incomplete education, denial of rights to ownership and equal access to resources, and inequitable labor wages. These

findings implied that a rigid adherence to the historical traditions and cultural norms of India still persist today, although there was some evidence for improved relations among castes and improved access to health facilities. Evidence of social capital was moderate; however, the effectiveness of internal and external networks was questionable. Social relations between villagers and among village leaders were weak. A shared sentiment among villagers was that the local government has done little to reverse negative shocks to livelihoods, and residents seem locked in a state of poor economic opportunity and weak organizational power. Social cohesion among members within self-help groups also raised questions about the effectiveness of the self-help group as a tool of empowerment for women. Self-help groups were an effective means for saving money for women; however, disunity within the group occasionally posed barriers to diversification into new activities. External networks for improving livelihoods were largely ineffective or non-existent for villagers. Most critically, Byalal farmers have not received visits from external organizations for support; external training programs did not result in successful adoption of activity; financial organizations such as micro-finance schemes were available but the poorest were left out of opportunities to access credit; and access to information and technology for new and existing activities was impeded by weak institutions (manpower and funding).

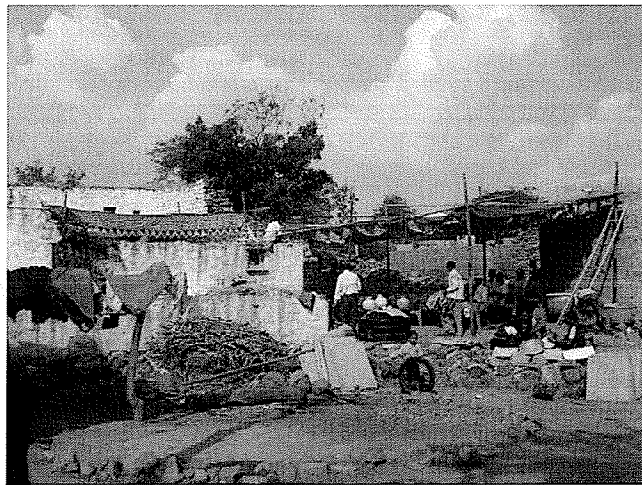
#### *4.2.9 Dynamics of Capital Assets: Accessibility and Substitution*

Although assets portrayed in this section appear static, it is worth mentioning that the availability of and access to assets in Byalal, in practice, is very dynamic and highly influenced by external conditions. For example, capital assets may require the access to or use of other assets. If circumstances deplete one capital asset, substitution or conversion to another asset can occur. To illustrate, natural capital assets typically converted into physical

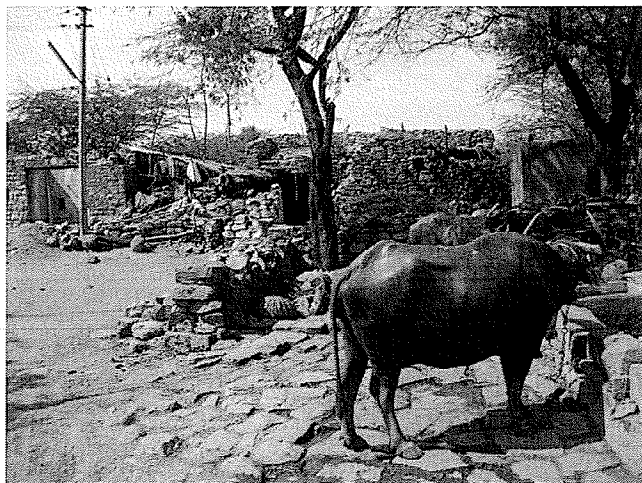
capital included leasing of livestock for organic manuring or plowing of fields. Farmers liquidated financial capital to invest in physical capital (such as equipment, machinery, and irrigation facilities); natural capital (such as land or livestock); or human capital (such as health and education). Likewise, natural capital assets converted by farmers into financial capital and included land (sold for Rs50K per acre), livestock, and trees for charcoal production business. Villagers also drew upon social capital during times when financial capital was in shortage through borrowing of money from more affluent households within the village.



**Plate 1.** Village communal and residential area.



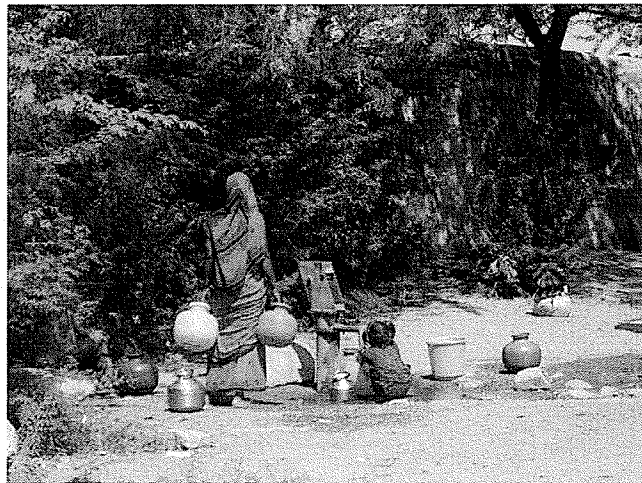
**Plate 2.** Village communal and residential area.



**Plate 3.** Village communal and residential area.



**Plate 4.** Commons property land for grazing.



**Plate 5.** Public water pumps for drinking water.



**Plate 6.** Self-help group of women farmers.

### 4.3 Agricultural Production Environment: Farm Systems, Practices, and Productivity

#### 4.3.1 Agroecology of the Region

Byalal lies on the tract of the Northern Dry Agro-Climatic Zone of the Deccan Plateau, which is one of the hottest and driest regions in peninsular India. The climate is characterized by hot summers and mild winters, and the rainfall is erratic and ranges from 400 to 500mm annually (Gajbhiye & Mandal, 2000). Droughts generally occur twice every five years, while severe droughts that persist for three to four years occur approximately once every 30 years. Only 17.3% of the net cultivable area is irrigated leaving 82.7% of the area dependent on monsoon rainfall (Bijapur District Official Website, 2009). The average annual rainfall specific to B. Bagewadi *taluka* from 1951-2000 was 666.5mm (Venkatesh, 2003); and areas considered drought-prone and susceptible to crop failure receive 750mm of rain or less per year (WB, 2001). The majority of rainfall occurs during the monsoon seasons beginning in June with heaviest amounts falling in September and October (Table 14). The rainfall pattern has changed in Central India. According to the Indian Institute of Tropical Meteorology, the amount of rain has not changed, but the rain now comes in shorter and more intense bursts, with fewer spells of light rain between as compared to decades earlier (Corbett, 2009).

**Table 14.** Seasonal rainfall statistics of B. Bagewadi *taluka* headquarters, 1951-2000. (Source: Adapted from Venkatesh, 2003: p. 9)

Rainfall (mm)				Number of Rainy Days			
Season	Fewest	Most	Normal	Season	Fewest	Most	Normal
SW Monsoon (June-Sept)	211.1	915.2	424.0	SW Monsoon (June-Sept)	14	40	25
NE Monsoon (Oct-Dec)	0.0	550.2	156.5	NE Monsoon (Oct-Dec)	0	19	8
Summer (Mar-May)	10.9	258.7	80.0	Summer (Mar-May)	1	13	5
Winter (Jan-Feb)	0.0	112.4	6.0	Winter (Jan-Feb)	0	4	0

In regards to groundwater conditions, B. Bagewadi has the largest portion of poor-yielding areas in the district, and the main parameters affecting water quality are salinity and hardness (Bijapur District Official Website, 2009). The dominant soil type of Byalal is rich and deep black soil. The water holding capacity for deep black soils is 200mm, and moderate amounts of soil erosion occur particularly during torrential and erratic monsoon rainfall.

#### *4.3.2 Farm Systems: Irrigated vs. Rain-fed Farms*

There are several disparities between Byalal farm systems with and without irrigation facilities, which have significant implications for livelihood strategies and outcomes of farm households (see section 4.4). Irrigated farm systems, either through bore wells or open wells, had higher crop diversity regardless of landholding size, and farmers were able to adopt a greater variety of agricultural practices including sustainable practices to improve productivity compared to dryland farmers (**Plate 7-10**). For example, one smallholder farmer with 4 acres and an open well grew a variety of subsistence and cash crops such as *jowar* (sorghum), *bajra* (pearl millet), maize, onion, chilis, *dal* (pulses), and banana. Likewise, an irrigated largeholder farmer with 7 acres had cropland filled with maize, onion, okra, lime trees, teak trees, sugarcane, banana trees, and coconut trees to name a few. This farmer also owned livestock and was able to adopt sustainable soil fertility measures by replacing chemical fertilizers with sheep manure for his lime orchard, a practice he attributed to good irrigation. He also practiced agroforestry. He intercropped his banana and coconut trees so that they reduced soil erosion as well as increased production. The following diagrams (Figure 4) illustrate the complexities and disparities in diversity and resource flows typical of irrigated and rain-fed Byalal farm systems. Figure 4a depicts an irrigated farm system of a largeholder farmer of 7 acres whereas figure 4b represents a rain-fed farm system of a

largeholder farmer of 20 acres. The resource flows of the irrigated farm system are numerous, and the system is more sustainable in the sense that the farmer was more self-sufficient, was able to make better use of internal resources, and was able to practice more sustainable agriculture in pest management, soil fertility, and soil conservation. In contrast, the resource flows of the rain-fed farm system are fewer, and the system is less sustainable because the farmer relies heavily on inputs from external resources.

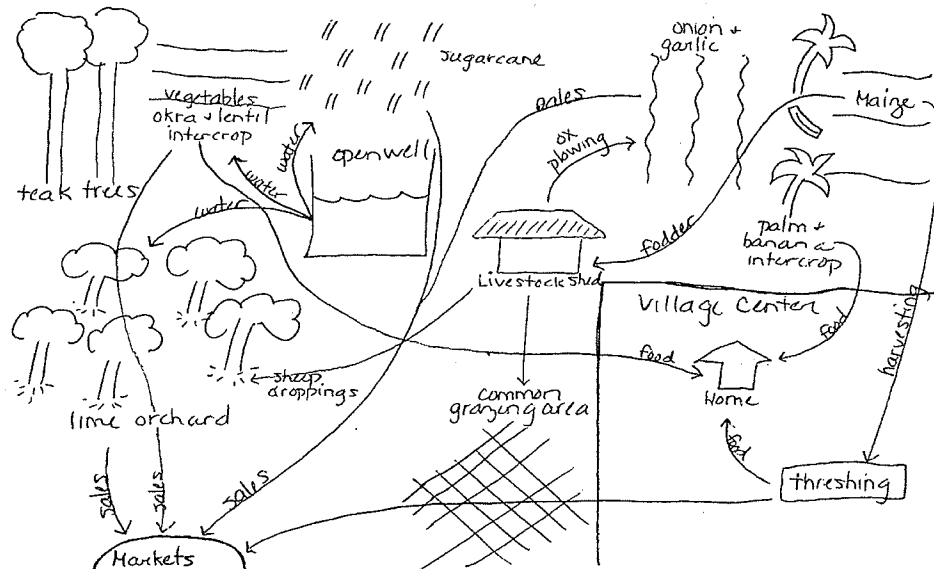


Figure 4a. RFM of an irrigated farm system of 7-acres. (Source: drawn by researcher)

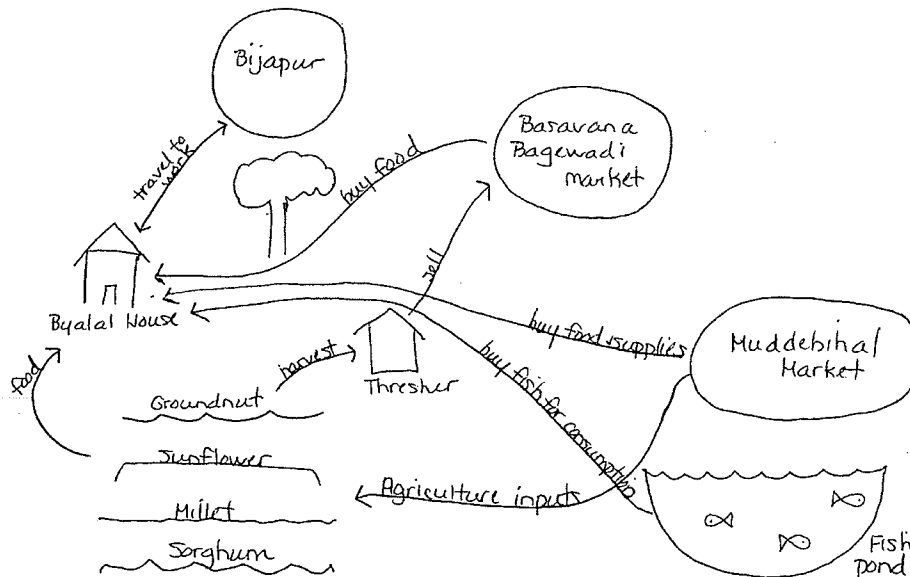


Figure 4b. RFM of a rain-fed farm system of 20-acre. (Source: originally drawn by farmer).

### *4.3.3 Defining Sustainability*

Villager awareness of linkages between agriculture practice and environmental impact was less than academics from UASD had predicted. Academics suggested that farmers were very aware of environmental degradation and were knowledgeable about sustainable agriculture. For example, many farmers found it difficult to identify practices that might hinder agricultural productivity and long-term environmental sustainability and often identified practices as helpful to productivity when they might arguably hinder productivity. Additionally, villagers were widely unfamiliar with the concept of ‘sustainability’. Respondents were asked to share their local definition of ‘sustainability’, but they were unable to do so. In order to hold conversations regarding sustainable agriculture as well as sustainability of prospective economic diversification activities (Chapter 5), it was necessary to modify the approach by providing respondents with the WCED (1987) definition of sustainability (i.e. meeting the needs of the present while not compromising the needs of future generations). Respondents were then given the example that sustainable agriculture practices can be used to describe alternatives to modern agricultural practices characterized as resource-degrading and with high external input. Even so, the majority of respondents still struggled to answer questions about potential current and future impacts of their present or prospective activities.

A few speculations can be made as to why villagers struggled to conceive of potential future implications by present actions. The more apparent explanations (low education, high illiteracy rates, and poor access to knowledge) may not be sufficient, particularly because imagining future outcomes can be difficult for anyone regardless of upbringing. One village-specific theory of explanation, drawn from observations, is that Byalal villagers may not

imagine future implications because they have to meet immediate livelihood challenges on a near daily basis and are thus more concerned with the present. Although researchers often perceive or foresee ecological degradation to be a problem, farmers may not mention such concerns unless they threaten immediate survival (Fujisaka 1989 cited in Norman 2002). A second observation and possible explanation is that villagers seemed to be strong believers in fatalism, the doctrine that fate predetermined all events and events are therefore unalterable, particularly in the areas of environmental, political, and social change (see section 5.4). For example, most respondents regarded changes in the environment such as increased rainfall variability and pest infestations as caused by *Devaru*. When asked why *Devaru* made these changes, one elder simply said, “It is our fate” (FG3). He was then asked if *Devaru*’s actions could be reversed, to which he replied, “Only a water facility will improve our situation.” Elder farmers were further probed by asking them if there was anything farmers can do themselves to improve the agricultural environment. One elder said, “We are doing everything right. God has to help us get water for irrigation.” Another said, “If it is our fate to have water, then we will have it” (A4). Fate played a role in social changes as well including health, financial, and political events. Inferred from this theory of explanation is a sense of absence, to some extent, of the belief that their own actions might have harmful impacts on the environment that could otherwise be mitigated through anthropogenic (not divine) intervention. Nonetheless, the fact that this was a challenge has important implications for the overall research outcomes as well as future diversification initiatives, discussed in Chapters 5 and 6.

#### *4.3.4 Agricultural Practices and Impacts on Productivity: Farmers' Perspective*

The traditional practice is rain-fed farming which includes growing of crops in both *kharif* (rainy seasons) and *rabi* (post-rainy seasons). Intensive subsistence farming, and to a lesser degree commercial farming, was practiced by Byalal farmers, and the range of crop diversity and agricultural practices were dependent on irrigation availability as previously described. Agricultural practices are categorized here under the following headings: pest management, soil fertility management, and soil and water conservation. In addition to the difficulty among farmers to identify current farm practices as sustainable or unsustainable, respondents were often not able to give a reason for why they participated in certain practices. For example, all farmers participated in intercropping but few were aware of its benefits as a sustainable pest management strategy. Likewise, some farmers grew legumes, but few were unaware of their nitrogen-fixing properties as a sustainable soil fertility management strategy. This lack of awareness is not surprising because many current agricultural practices have been passed down through oral tradition within the family or among neighbors whereby loss of knowledge of the underlying reasons took place. In addition to oral tradition, farm practices were also adopted or modified through recommendations by the local pesticide dealer. When interviewed, the pesticide dealer said that farmers only ask him for advice about pests, and he further revealed that he only gives advice relevant to the products he carries in his store. His products included mostly chemical pesticides and fertilizers; however, he also carried neem oil and manure as well (personal observation).

##### *Pest management*

All respondents were aware of the type of pests attacking their crops and participated in integrated pest management practices (IPM) including crop rotation, intercropping, frequent

weeding, pesticide use, planting a diversity of varieties each season, and planting modern varieties that are resistant to pests and disease. Two cited measures taken that improve productivity, from the farmers' perspective, were the application of pesticides and weeding frequently.

All farmers are dependent on chemical pesticides, a phenomenon observed by village elders that has increased within the last 10 years (**Plate 11**):

“Ten years ago, there were fewer pests and we wouldn't spray because the rains alone would keep them away. But now there are more pests and so we have to use pesticides. Earlier we did not have to use pesticides because we were planting local variety seed which used to take 6 months to grow. But for all the crops we have now [modern varieties], we have to use pesticides. If we don't, we will lose the crop to pests. Twenty years ago we were using only a little bit of chemical pesticides” (FG3).

All respondents were vaguely aware of potential health hazards associated with pesticide use. More specifically, they had heard about pesticides showing up in breast milk and had reacted by making pesticide application a male-only role. However, when asked what precautionary health measures farmers took when applying pesticides, no one took the appropriate actions to protect themselves:

“No one uses gloves or masks while spraying. They only cover their mouths and nose with cloth and then wash their hands with soap afterward. That is the only precaution taken. The pesticide shop owner advises farmers on precautions, and the village accountant does to, but still they never use this practice” (A16, KI).

Neem oil was extracted or purchased by only a few farmers as an organic pesticide, but they stressed that neem could only be used on lentils and is only effective as a means toward controlling but not preventing crop damage due to pests. Farmers not adopting neem use for IPM said that it was too difficult to extract or they were not knowledgeable on appropriate usage:

“I know that neem is helpful, as I have heard this on the radio; but it is very difficult to extract neem oil from the neem tree, and people are not interested to do this. It is

easier to buy pesticides. The pesticide store owner says that if we use neem oil the flower and the grains will fall down if we spray with neem oil. That is why people do not use neem oil” (A8).

### *Soil fertility management*

Farmers were aware that black soils in Byalal are generally fertile; thus, fertilizer inputs are relatively low. Nonetheless, intensive farming such as that in Byalal invariably removes nutrients which have to be replenished, and marginal and smallholder farmers cannot afford to allow fields to lay fallow for natural fertility replenishment. Fewer than 20% of surveyed farmers plant nitrogen-fixing chickpea (QIII); though, as mentioned earlier, most were unaware (or did not report knowledge) of the added natural benefit of improving fertility. Two cited measures to improve soil fertility, from the farmers’ perspective, were the application of manure and chemical fertilizer. One measure cited as a practice that might decrease productivity, from the farmers’ perspective, was the application of inorganic fertilizers without timely rainfall. This practice has occurred when rainfall was predicted but then failed to come. Some farmers cited considered the application of inorganic fertilizers, in general, as improving productivity whereas others considered it a hindering factor against productivity.

Soil fertility inputs of households differed according to socioeconomic and political factors such as wealth, access to and availability of inputs, availability of subsidized prices or loans from the GoK, and awareness of soil degradation. Wealthier households used inorganic fertilizers or a mix of both inorganic and organic fertilizers if they had access to livestock. Farmers who could neither afford nor rely on a regular supply of inorganic fertilizers relied more on manure for soil fertility. Supply of inorganic and organic fertilizers is indeed a limiting factor. According to some farmers, they were unable to purchase fertilizers last year

because the government refused to subsidize it due to a political dispute. Without fertilizer, farmers experienced reductions in both quality and quantity of output. There is also a livestock shortage in the village due to drought conditions, and farmers without livestock find that manure is difficult to obtain. A typical strategy is to hire pastoralists to graze herds overnight on crop fields.

Elders said that the use of inorganic fertilizers replaced or supplemented manure at least one decade ago, and they have observed a gradual decline in natural soil fertility:

“Earlier, we used to add only cow manure to the soil. But around 12 to 15 years ago, the use of chemical fertilizers replaced manure. The soil was more fertile in the earlier days compared to now. And now, it has become a situation that without the use of chemical fertilizers we cannot grow anything” (A16, KI).

When asked why farmers switched from cow manure to inorganic fertilizers, they said that they had heard that fertilizers would increase their productivity. Only a few farmers mentioned occurrence of a decline in naturally soil fertility over time. Of those persons, most still continue to use inorganic fertilizers because they now expect higher production. One farmer described this dependency:

“The soil is fertile at present, but the [prolonged] use of chemical fertilizers has spoiled the natural fertility. Chemical fertilizers are like a villain: Everyone wants to grown crops faster and with higher yields, but ultimately, the output we get does not have strength [in nutritional value]. Chemical fertilizers may earn us more money, but at the same time it also spoils the soil” (A6, KI).

Only one interviewee reported a return to cow manure from inorganic fertilizer:

“We have to increase the soil fertility and control soil erosion by putting up proper bunds, and we have to use more cow manure. If we use chemical fertilizer it will be helpful for only that one crop. But if we use sheep or cow manure, even if we don’t use manure for next year we can still get good crops [from that one application]. I use more cow manure now, and my use of chemical fertilizer is much less. At present, the soil fertility is good when using cow manure” (A10).

### *Soil conservation*

Soil conservation methods include conservation tillage (minimal or zero tillage), construction of physical structures such as bunds and terraces, use of mulches or cover crops to protect topsoil, and silt traps (Pretty, 1995). Many farmers did not perceive soil erosion as a local problem and took a minimalist approach for prevention even though there were several areas of evidence that erosion was occurring (personal observation of broken bunds, sloped croplands, and gullies). The two soil conservation measures adopted among farmers and cited as a means to improve productivity were constructing property bunding and leveling of cropland. All farmers had property bunds on the perimeters of their cropland to prevent soil erosion on their fields, although many reported that their bunds were broken and were in need of repair. Some farmers acknowledged that broken bunds left unrepaired and unleveled cropland are practices that may decrease productivity. According to UASD-Bijapur Station academics, property bunds are not as effective in preventing erosion as other types of bunding such as contour strip bunding. Byalal farmers were essentially unaware (or did not report knowledge) of conservation tillage benefits. They typically plow fields once or twice a year, and farmers that were more affluent rent tractors whereas others used ox and plow (**Plate 12**). In this way, farmers may be unknowingly increasing erosion through frequent tillage and removal of pebbles during seasonal land preparation. UASD-Bijapur Station academics contend that black soils only need tillage once every two or three years, and that pebbles and dryland cover crops such as cucumber can reduce erosion.

### *Water conservation*

Perhaps the most inflammable topic explored among farmers was that of water availability and conservation, and it was the agricultural practice most technologically underdeveloped.

Given that rainfall has become increasingly inadequate and unreliable over the past four decades, water conservation and harvesting could sustain crops through otherwise disastrous periods and could stabilize production. However, there were no water harvesting structures in the village as they are unaffordable to most farmers. Instead, farmers rely solely upon property bunds and leveled fields to prevent water run-off. Byalal falls under domain of a WMP, but as mentioned in section 4.2.7, no one was aware of WMP activity in Byalal in recent years. A few respondents were vaguely familiar with a ‘mystery’ structure built between 5 to 8 years ago. According to one key informant, the structure was a large bund with a check dam that was built at the edge of a wasteland area to prevent water and soil run-off and to recharge the groundwater level during monsoon seasons.

#### 4.3.5 Barriers to Adoption of Sustainable Agriculture Practices

Table 15 summarizes perceived barriers to and needs for adopting sustainable agricultural practices of interviewed respondents. Although perceptions differed in area of reasoning (economic, social, and environmental), many are interconnected revealing the complexities of challenges experienced by Byalal farmers.

**Table 15.** Interview respondents’ barriers/needs for adoption of sustainable farm practices. (Source: interviews)

Area of Benefit	Barrier/Need to Adoption	Area of Benefit	Barrier/Need to Adoption
General	<i>Social:</i> No interest in farming anymore/lack of motivation	IPM	<i>Economic:</i> Labor shortage
General	<i>Environmental &amp; Economic:</i> Crop failures due to water deficiency results in reduced profits- no money to invest in sustainable measures	IPM	<i>Economic:</i> Higher labor expense to remove extra weeds
General	<i>Social:</i> Younger generations not adopting same practices as their elders (i.e. bunds, intercropping)	Soil fertility management	<i>Economic:</i> Prices of inputs (fertilizer & manure) have increased
General	<i>Social:</i> Lack of information – do not know about sustainable practices	Soil fertility management	<i>Economic:</i> Organic fertilizer shortage (manure)/unavailability (vermi compost)
IPM	<i>Social:</i> Skeptic that sustainable practices can control pests; reduction of chemical pesticides would cause more crop disease	Soil/water conservation	<i>Social:</i> Landholding is too small for compartmental/ contour strip bunds; investments are too costly

All respondents blamed lack of money to invest in sustainable measures as the primary barrier to adoption (financial aid was also a need for adoption of sustainable measures). The researcher traced a lack of money back to environmental problems (reduced quantity and predictability of rainfall, drought), which resulted in crop failures such as reduced quantity and quality of output. This, in turn, led to lower profits from agriculture so that farmers were not able to afford costs associated with sustainable measures including cost of organic inputs, hiring additional laborers, and bund construction or repair. Farmers perceived that some measures, such as water harvesting, are simply unaffordable. Unstable price regimes (lowered profitability), increase in cost of inputs including manure, and supply shortage/unavailability of organic inputs were cited as economic-related barriers to adopting sustainable measures. Farmers frequently cited shortage of labor as a barrier to improving IPM practices among largeholder farmers, in particular. To reduce pesticide inputs, farmers needed additional labor to increase weeding. However, there were not enough laborers available to farmers at times when they were needed the most, and some farmers cannot afford an increased labor expense. Socially-rooted barriers were also cited by respondents including lack of information about sustainable practice, lack of interest in farming, and concern that sustainable measures might reduce productivity. Smallholders cited landholding size as a barrier to adopting appropriate soil and water conservation measures. According to smallholders, bunds take up precious cropland area that they could use for production.

Other reasons for non-adoption of resource-conserving technologies that were not mentioned by interview respondents but were drawn from personal observations and conversations from UAS academics include: general unawareness of soil degradation, general unawareness of linkages between agricultural practice and environmental impact,

improper use of agriculture loans (money was spent on social events such as marriage, children’s education, or home improvements rather than land improvement), lack of or unreliable information on new or improved technologies (re: main source of information is the pesticide dealer), and illiteracy.

Whereas interview respondents were not given specific barriers or needs to choose from, participants of QII were given a selection of options to choose from when asked what they would need in order to farm sustainably. The following options were given: access to reliable information; development of new skills; more encouragement/support; financial aid; stable market prices; and “other”. The “other” needs given by respondents were dependable power supply and an irrigation facility. Results were similar to those from interviews shown in Table 15; however, when presented with ‘development of new skills’ or ‘encouragement/support’ options, several farmers chose these as needs in order to farm sustainably which were not identified in interviews (Figure 5). Figure 5 is a depiction of results by landholding size.

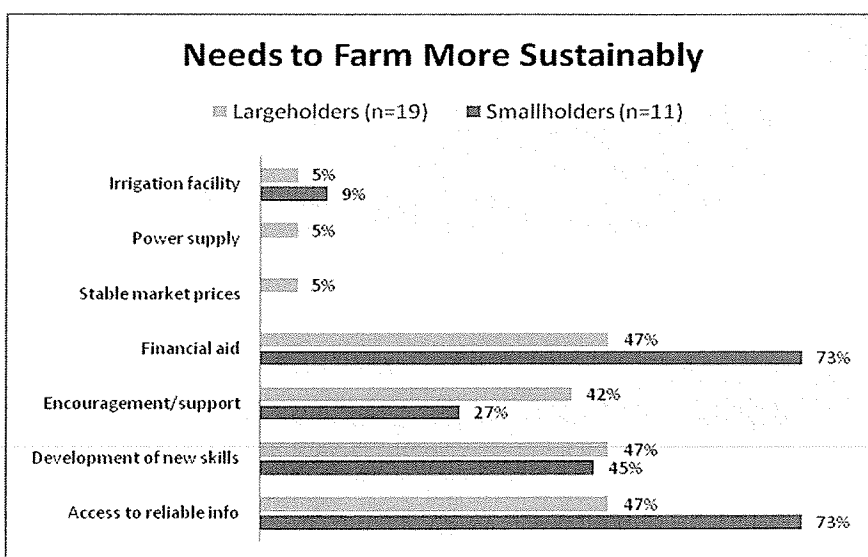


Figure 5. QII respondents’ needs/requirements to farm more sustainably. (Source: QII , n=30).

A strong majority of smallholders (73%) reported that they needed financial aid and/or access to reliable information to farm more sustainably. Nearly half (45%) of smallholders reported they needed development of new skills to farm more sustainably. Nearly half (47%) of largeholder farms reported that they needed financial aid, development of new skills, and/or access to reliable information to farm more sustainably whereas 42% needed encouragement/support. Interestingly, less than 10% of persons mentioned irrigation and power supply as a need to farm more sustainably.

#### *4.3.6 Current Local Challenges to Agricultural Productivity*

An extensive list of social, economic, and environmental challenges to agricultural productivity were identified upon reflection on the data. A decline in soil fertility, increase in soil erosion, rise in pest populations and occurrence of crop disease, and decline in quantity and quality of produce are local environmental changes observed over time which have contributed to the gradual overall decline in agricultural productivity. All farmer respondents attributed water deficiency, recurrent droughts, and increased rainfall variability as key limiting factors (**Plate 13**). Access to water is a major determinant of land productivity and stability of yields; thus, water is a crucial asset to livelihoods of those who work in agriculture. Irrigated land productivity is more than double that of rain-fed land (WB, 2008b), but most Byalal households do not have irrigation facilities. Yet, even farmers with irrigation facilities have experienced lowered productivity due to unpredictable and excessive power outages (**Plate 14**). Additionally, a general lack of awareness of links between agricultural practice and environmental degradation has contributed to poor natural resource management; but even respondents who were aware of lowered productivity due to environmental issues were unable to change their practices because of their inability to afford

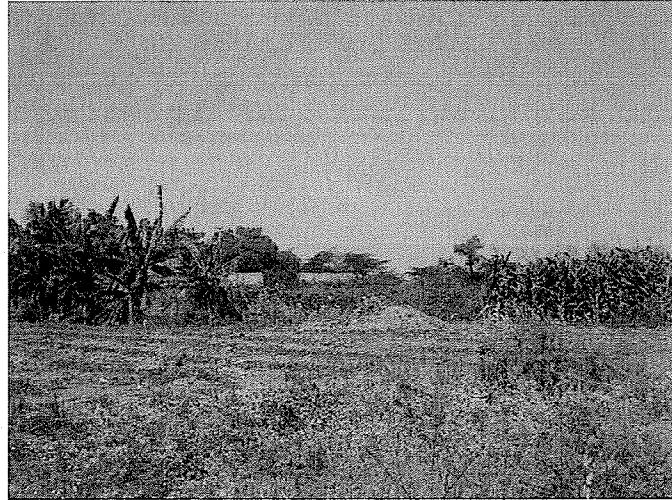
new investments and their limited access to information of region-appropriate sustainable agricultural practices.

In a downward cycle, crop failures in Byalal have led to reduced profits, and reduced profits in turn have led to an inability to invest in measures (including resource-conserving technologies) that might otherwise improve productivity in subsequent growing seasons. Depletion of financial capital through lowered productivity also resulted in the reduced ability to qualify for farm loans for future investments. When farmers severely deplete their financial capital and credit becomes inaccessible, livelihoods become destabilized and farmers are forced to adopt strategies that lead to further uncertainty (see section 4.4).

Low human capital was a limitation to agricultural productivity at a household level and village level, which led to insufficient quantity and quality of local labor; and deficient levels of social capital hindered the capacity of productivity because of weak networks for accessing reliable farm information and transfer of technology. Given that many farmers cited poor access to reliable knowledge as both a limiting factor to agricultural productivity and a necessity to farm more sustainably, improvements in social capital could have far-reaching benefits on building the capacities of Byalal farmers.

Macro factors have also played a role in limiting agricultural productivity. Unstable market prices for produce were a complaint among farmers. “Sunflower, safflower, and peanut – all the oil-producing crops – get good prices,” said one farmer (FG2). “But now that so many farmers are growing the same thing – these higher value crops – the output is high and now the price has fallen for these crops.” Input prices have doubled within a short period, while the harvest prices for cereal crops, especially sorghum and millet, have not increased by even 10% (Bantilan & Anupama, 2006). Farmers have little interest in growing cereal

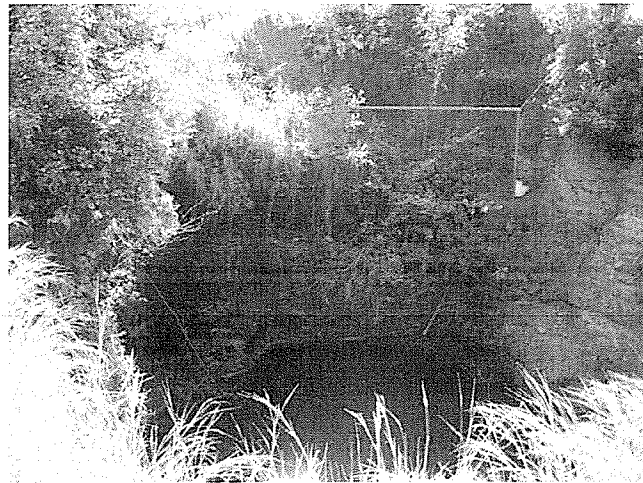
crops for this reason. Other macro factors affecting agricultural productivity pertained to political issues affecting irrigation plans, redevelopment of watersheds, and agricultural subsidies on inputs as previously described in section 4.2.5.



**Plate 7.** Irrigated farm depicting crop diversity.



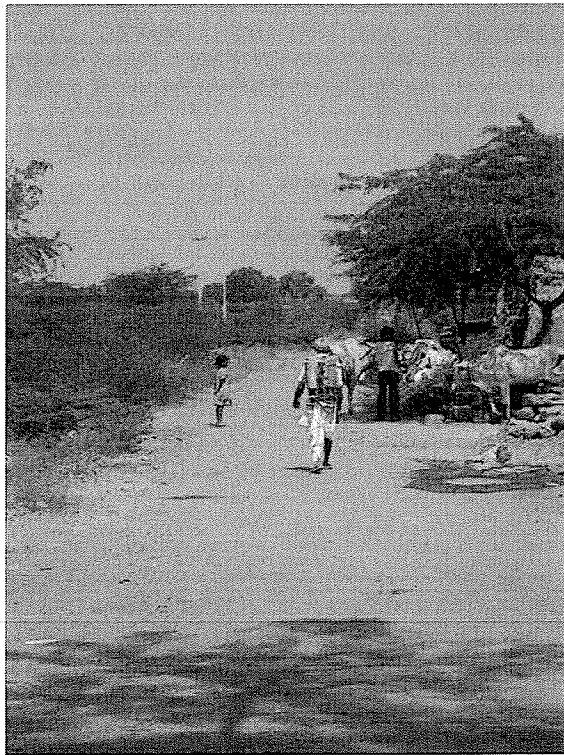
**Plate 8.** Recently sown sorghum crop on a rain-fed farm.



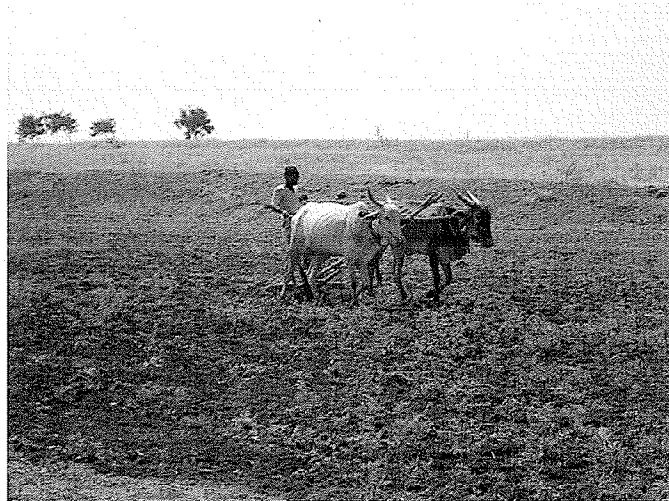
**Plate 9.** Open well irrigation



**Plate 10.** Borewell irrigation.



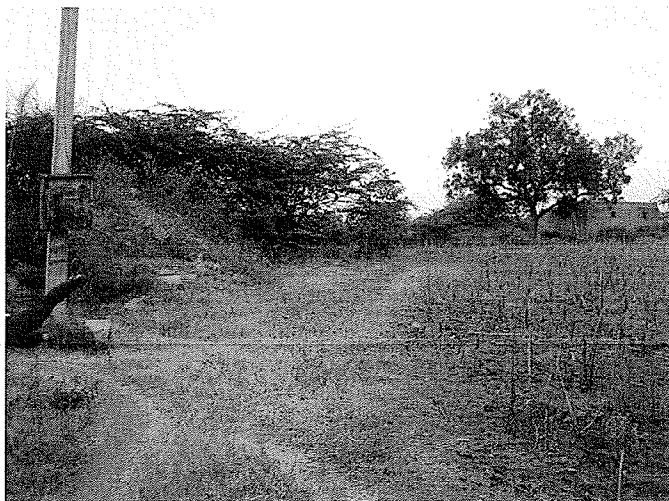
**Plate 11.** Male farmer going to his fields to apply pesticide.



**Plate 12.** Ox plow



**Plate 13.** Failed sorghum crop due to erratic rainfall.



**Plate 14.** Crop failure due to power shortage and broken transformer.

#### **4.4 Byalal Household Livelihood Strategies**

##### *4.4.1 Household Livelihood Stability: Who are the Poor?*

In agreement with the purpose of the research to explore prospective economic DA for poor and landless farmers as sustainable social and economic alternatives, it was first necessary to define who the “poor” were in the local context. Byalal is an impoverished and underdeveloped rural village, and no households were conspicuously wealthier than others. However, food security is no longer a primary concern. Thus, distinguishing the ‘poor’ from the ‘less poor’ using qualitative measures was an ambiguous process: there are many dynamics of poverty, the state of being ‘poor’ is relative and subjective, and the state of being ‘less poor’ is subject to change when confronted with vulnerabilities or shocks such as drought. Nonetheless, some subtle factors separated poor households from less poor households. ‘Poor’, in this study, specifically meant asset-poor and investment-poor as described by Reardon and Vosti (1995).

Respondents cited livelihood stability as a necessity for improving socioeconomic conditions for villagers in Byalal; and most respondents defined a ‘stable livelihood’ as one that receives sufficient and secure income through work availability and productivity. Based upon this needs assessment, the researcher distinguished ‘poor’ from ‘less poor’ by determining household livelihood stability of respondents based on their perceived and actual income stability and sources of income. A ‘poor’ household was one that had an insufficient and/or unstable income. Households considered ‘poor’ were greatly burdened by indebtedness and/or heavily dependent on migrant remittances for livelihood security. Under these criteria, a strong majority of Byalal households was poor.

During the process, two key findings surfaced which led to a change in respondent sampling for discussions on economic diversification. Using the above criteria, one key finding was that villagers from all socioeconomic classifications (not just farmers) were considered 'poor'. Thus, the original focus on farmers in the study was too exclusive of other groups who may also benefit from economic diversification initiatives. The second key finding regarded the livelihood stability of "landless" households. The concept of 'landless' was nebulous, as discussed in Chapter 4.2.3; but furthermore, a concentration on 'landless farmers' that was based on assumptions in the literature that landless persons are among the most vulnerable was not completely accurate for Byalal and perhaps not completely reflective of realities in other dryland agrarian villages as well. On the contrary, the research revealed a number of landless households including landless pastoralists (farm income) and landless laborers (nonfarm income) whose livelihoods were more stabilized than some landholding households were. When these two realities became apparent, the researcher modified and expanded the sample group of the study was to include poor farmers of all landholding sizes as well as those from the nonfarm sector.

Households with stabilized livelihoods shared some common characteristics. All stabilized households were income-diversified and none relied on income from migrant activity. Interestingly, all were from lower castes or Muslim. All but one had completed higher than 9<sup>th</sup> grade education. Stabilized household livelihoods were within two socioeconomic classifications: farm-diversified and farm/nonfarm-diversified. Stabilized farm-diversified livelihoods shared the following characteristics: largeholder farmers with land on one continuous tract (rather than on several land fragments); irrigation facility; integrated farm systems such as agro-pastoral and agro-silvo-pastoral integrated systems;

high crop-diversity including grains and vegetables; and adoption of resource-conserving farm technologies such as soil fertility management and soil/water conservation due to better access to resources and ability to make investments. Stabilized farm/nonfarm-diversified households included landowners of all landholding sizes and landless households, and all shared the following characteristics: all had at least three sources of income including income from at least one nonfarm business; none relied on income from general stores or tea cafes.

#### *4.4.2 Current Household Livelihood Strategies and Coping Mechanisms*

Five broad livelihood strategies to manage risk and cope with loss were identified among households in Byalal from both farm and nonfarm sectors to understand household economics and to acknowledge their achievements: intensification of existing productive activity; extensification of existing productive activity, diversification by adopting additional farm or nonfarm productive activities; migration to develop productive activity elsewhere, and departure from one productive activity for another. Village livelihood portfolios, in practice, included combinations and substitutions of strategies to improve livelihood stability.

Intensification, defined as increased physical or financial productivity of existing patterns of production including subsistence and cash crops and livestock, was a current measure taken by agriculturists and pastoralists in Byalal of all landholding sizes and the landless. All farmers had attempted to intensify production either through increasing inputs such as fertilizer, bunding, or by digging wells for irrigation. Extensification, the process of expanding existing production into land areas that were previously not used, was a particularly common livelihood strategy of the past that was typical for smallholder farmers without irrigation in which they expanded their production by renting portions of irrigated land from other landowners. Another example of expansion was found among

landless households that owned livestock (goat, sheep, or buffalo) in which they expanded herd size and grazed animals in common property lands (CPL). Extensification was most likely no longer a common strategy due to increased population constraints and declined CPL. A complete exit from the farm sector was a strategy found among only two respondents (one by choice, the other due to indebtedness that resulted in loss of land), although many others expressed their desire to quit.

Given the initially low agronomic potential and the limited technological support in Byalal, migration as an income-diversifying strategy was an important coping strategy especially of most poor households. Approximately 60% of the village working-age population participates in annual seasonal migration activity. Most migrants go to Goa and some go to Maharashtra in November for six months. Local “push” factors of migration included a weak village economy, poverty, drought, and lack of local work; and “pull” factors included higher job availability for unskilled workers and better labor wages. A key finding was that migrants and respondents from households dependent on migrant remittances expressed a strong desire to increase local income generation through diversification so that they would no longer have to migrate.

“Nobody likes to migrate, and migrants would prefer to stay here. If they could increase crop production somehow, then they could stay here. Migrant activity has a positive effect on the family in that it incurs income to support the family. But migration has a negative effect on the family, too. The father will be worried or sad, and so will the children” (FG3).

To expand on this point, leaders from all four villages that were part of the village selection process at the outset of this study similarly and overwhelmingly verbalized their preference to diversify income in the village so that their villagers could stop migrating. In this way, migrants and their families consider migration undesirable but necessary; and there was a

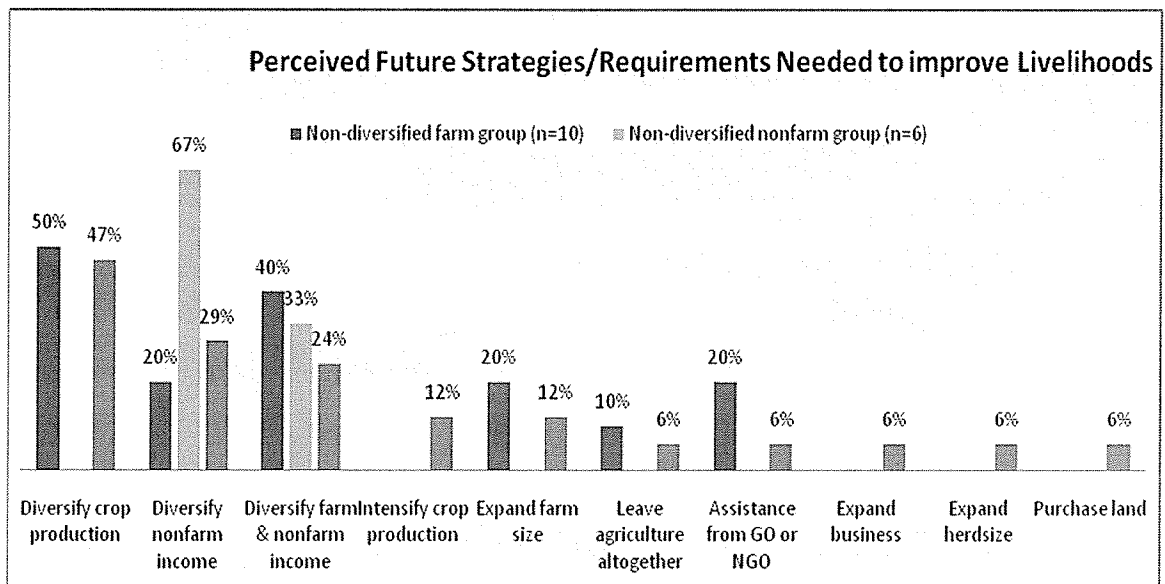
general interest in diversification through adoption of new production activities among migrants. Women migrants, in particular, if given the opportunity would prefer to stay in Byalal because the labor in Goa was arduous. The only stipulation cited by migrants was that the potential diversification activity must be at least as profitable in earnings as earnings made from migrant activity.

Nearly half (40%) of respondents' households had diversified their income by adopting another production activity, most of which were farm/nonfarm-diversified. All interviewed smallholder farmers (both with and without irrigation), largeholder farmers without irrigation, and landless households (including laborers, livestock owners, and business owners) had taken up diversification as a livelihood strategy to stabilize their household income. For example, several largeholder farmers without irrigation facilities had chosen to diversify their productive activity by working as laborers on the farms of others or by adopting some form of business. A common combination of strategies among landless households was to rent land for livestock husbandry, for charcoal production, and/or work as laborers on the farms of landholders. All persons working in business had a second or third income source, which usually included agricultural labor. Although only one respondent made a departure from agricultural activity, several additional farmers expressed their desire to do the same. Farm diversification, a strategy taken up by some farmers to adopt new crop and/or livestock production activity, was an activity that most farmers were interested in but were restricted due to poor resource endowments. More specifically, lack of irrigation, shortage of electricity, small landholding size, low financial capital, and poor access to credit were limiting factors to farm diversification. Greater diversification by largeholding farmers stemmed primarily from greater resource availability. Irrigated and rain-fed largeholder

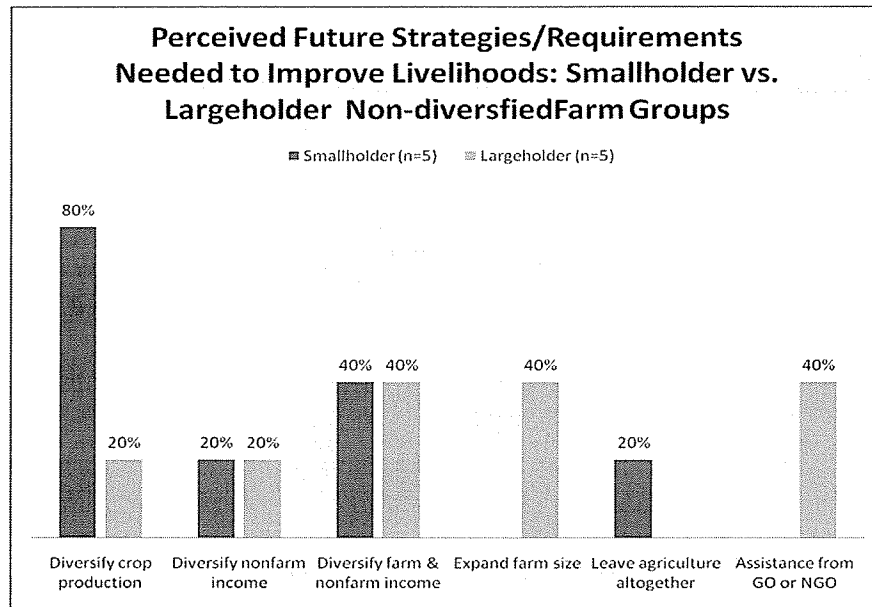
farmers with land plots on one continuous tract were able to diversify farm production; but only those with irrigation were crop-diversified with higher valued produce such as wheat, maize, sugarcane, and vegetables. Indeed, crop diversification as a promising means to reduce crop income risk and thereby increase livelihood stability appeared to work primarily for largeholder farmers (with land on one continuous tract rather than fragmented) with irrigation.

#### 4.4.3 Future Strategies and Coping Mechanisms to Stabilize Livelihoods

Respondents in QI were asked to identify strategies and/or requirements they perceived as necessary to improve household livelihood stability in order to assess local needs and potential future actions. Figure 6 presents results by socioeconomic classification. The results from the non-diversified farm group are further broken down by landholding size and are presented in the lower graph.



**Figure 6a and 6b.** Respondent needs and requirements to improve livelihood stability. (Top): Results are divided into socioeconomic classification. (Bottom): Results of non-diversified farm group are divided into landholding. (Source: QI, n=33).



Half (50%) of respondents in the non-diversified farm group perceived a need to diversify their crop production to improve their livelihoods while 40% perceived a need to diversify both farm and nonfarm income activity. Less cited needs among the non-diversified farm sector included diversifying only nonfarm income activity, expanding farm size, and external assistance from the government or NGOs (a perceived requirement for action). The majority of smallholder farmers (80%) said they wanted to diversify crop production to improve their livelihoods, and 40% wanted to diversify both farm and nonfarm income. However, given the land and water constraints, it would be difficult for smallholder farmers to diversify crop production. For successful crop diversification on small plots, farmers may need to have at least one of the following: irrigation, reliable information on feasible options for dryland agriculture, or expansion of cropland (an unlikely possibility due to low accessibility of financial and natural capital). Largeholder farmers cited the need to diversify farm and nonfarm income, expand farm size, or required to receive assistance from the government or NGOs.

Among those in the non-diversified nonfarm sector (in this survey all were laborers), two-thirds (67%) said they needed to diversify their nonfarm income to improve their livelihood. One-third said they needed to diversify both farm and nonfarm income. The most frequently cited needs among the income-diversified group included diversifying crop production (47%) and diversifying nonfarm income (29%). Less cited needs of this group included diversifying both farm and nonfarm income, intensifying crop production, and expanding farm size.

Interviews also reflected the interests of questionnaire respondents. The interviews revealed that most villagers (regardless of landholding status) were interested to diversify farm income with livestock husbandry and/or to diversify in the nonfarm sector as well (see Chapter 5).

#### **4.5 Evaluation of Livelihood Outcomes in Byalal**

To explore the local context and livelihoods of the poor, this section seeks to address the final component of the SL framework, evaluating livelihood outcomes. The evaluation of livelihood outcomes in this chapter will have implications for the economic diversification feasibility assessment in Chapter 5 and for recommendations for future initiatives presented in Chapter 6. No normative procedures are available for assessing sustainable livelihood outcomes because the concept of a 'sustainable livelihood' is largely abstract, dynamic, and idealistic. Therefore, the researcher took two approaches to evaluate Byalal livelihood outcomes. The first approach, presented in section 4.5.1, was rooted in the premise livelihood outcomes are the basis for assessing the sustainability of particular strategies. Given that rural livelihood strategies are often heavily reliant on the natural resource base, the consideration of the effects of current strategies and their future impacts on the environment can determine

outcomes (Scoones, 2005). Section 4.5.1 is thus a discussion of the implications of each current and potential strategy (identified in section 4.4) with regards to general feasibility given the local context and environmental impacts based upon comparable studies in the literature. The second approach, presented in section 4.5.2, offers a different view by exploring current livelihood outcomes at the broader village level. This assessment is based largely upon social, economic, and environmental changes that have occurred over the past 40 years in Byalal and how villagers have coped and adapted to change. Because sustainability of livelihood outcomes is largely abstract, section 4.5.2 first operationalizes the sustainable livelihood indicators outlined in Table 5 from the literature for the dryland agrarian village context of Byalal. Then, the researcher assessed indicators using qualitative criteria for a consideration of current livelihood outcomes.

#### *4.5.1 Sustainability Implications of Household Livelihood Strategies*

Results presented in section 4.4 revealed a mixture of current and desirable strategies perceived as necessary for improved livelihood stability. Most respondents mentioned the need to diversify farm and/or nonfarm income to improve household livelihoods, a large number of farm respondents identified the need to intensify current production with irrigation, and fewer respondents indicated the need to expand or quit current production. The results from a 2001 FAO study of eleven farming systems in South Asia suggested the following recommendations for household strategies for reducing poverty in rain-fed farming systems such as Byalal (in order of importance): diversification of farm income; intensification, diversification of nonfarm income, and exit from agriculture (each of equal importance); and finally, expanding farm size (Dixon & Gulliver, 2001). The research also concluded that little can be done to significantly reduce poverty within rain-fed mixed

farming systems without increasing the overall water security of its farms and that future emphasis must shift to sustainable agricultural practices for increased production.

Intensification in Byalal is associated with increased use of external inputs, emphasis on sowing modern varieties instead of local varieties, improved irrigation with borewells and open wells, and/or expanding herd size. Landowning agriculturists and pastoralists without irrigation expressed a strong desire to intensify existing production with irrigation facilities and cited that lack of irrigation is a major limiting factor to livelihood stability. Intensification has led to a number of environmental, social, and economic problems in Byalal such as increased pressure on the land, increased (and improper) use of chemical pesticides, decline in soil fertility, increased soil erosion, depletion of groundwater, financial losses from failed irrigation attempts, labor shortages (more laborers are needed for intensification), and heavy reliance on CPL for grazing. It thus begs attention to the fact that most Byalal farmers were unaware of environmental problems and perceived the need for further intensification (as well as farm diversification) via irrigation to improve livelihood stability and that the FAO 2001 study supported intensification as a poverty-reducing strategy for dryland regions. However, further intensification in Byalal would likely exacerbate these problems without improvements in natural resources management and adoption of resource-conserving technology. The accompaniment of improved environmental stewardship along with further intensification efforts would be essential for sustainable livelihood outcomes. However, in the absence of strong proactive policies and agro-ecological potential, it is uncertain whether sustainable intensification can raise productivity (Alexandratos, 2005), which raises doubts as to whether investments should be made in Byalal. Another concern is the issue of groundwater exploitation. The continued development of borewells for irrigation is a likely

cause for chronic poverty in the long run. Karnataka is among the Indian states with high levels of groundwater exploitation; and borewells, which are becoming the single largest source of irrigation in India, are responsible for most of the depletion (Shah, 1998). This implies the non-sustainable use of groundwater resources which have far-reaching consequences especially for dryland regions. Taking into account all of the above considerations, intensification efforts must include investments of technologies that are appropriate for dryland regions and that do not further deplete (and potentially regenerate) resources such as construction of appropriate bunds and water-harvesting structures. If intensification strategies are to be taken up by local farmers, then adoption of sustainable intensification strategies such as these are more likely to lead to sustainable livelihood outcomes.

Only a few respondents perceived extensification, a more common strategy of the past, as a potential need for livelihood stability. Agricultural extensification also faces a number of environmental problems. It has often involved the exploitation of marginal lands and CPL with resultant degradation and/or desertification. A study of 75 villages in seven arid Indian states found that common property areas declined by approximately thirty to fifty percent between the 1950s and 1982 (Jodha, 1992 as cited in Steinfeld *et al.* 1998). Indeed, there was significant evidence of both processes in Byalal from intensification and extensification strategies of the past and present.

Respondents who currently relied on farm income were income-diversified or cited an interest to diversify through adoption of farm DA – through crop diversification or livestock husbandry, in particular. Although the FAO study cited earlier suggested diversification of farm activity as the first recommendation for South Asian regions, studies

in India revealed that crop diversification may not be appropriate for all regions. Research has linked the ability to diversify crop production to resource endowment (i.e. more land, access to irrigation, access to credit to increase inputs for input-intensive crops), land quality, cropping year conditions (rainfall quantity and timing), and village disparities in peninsular India (Walker & Ryan, 1990 as cited in Bantilan & Anupama, 2006). Evidence seems to point to crop diversification as being more effective in reducing crop income risk in the higher and more rainfall-reliable villages than in the lower and more rainfall-variable villages (Bantilan & Anupama, 2006). Therefore, viability of crop diversification (especially for farmers without irrigation) as a sustainable livelihood strategy in the dryland region of Byalal is questionable, given that most farmers are resource-poor and rainfall is highly variable. However, there are a few crop DA with potential to increase farm income without further degradation of resources (see section 5.2). Promising strategies may include integrated farming (i.e. agroforestry and agro-silvo-pastoral systems especially on large farms), organic farming, planting cover crops such as cucumber, and rotating crops with nitrogen-fixing legumes such as chickpea or pigeon pea for small and large farms. Farm diversification through adoptions of new sustainable practices has been accompanied by local regeneration, often with the reversal of migration patterns as the demand for labor grows within communities (Pretty, 1995). Another option for farm diversification is the adoption of livestock husbandry, and a strong majority of villagers was interested to diversify farm income with livestock husbandry of goat, sheep, or buffalo. Although most poor households are unable to afford to own many animals, it is thought that if incomes rise in rural areas there will be investments in more livestock which will place greater pressure on CPL (Reardon &

Vosti, 1995) thereby challenging the long-term sustainability of livelihood outcomes from this activity.

Many respondents, particularly those already employed in the nonfarm sector, stated a general interest to diversify nonfarm income as well. Additionally, one respondent was exited from agriculture into the nonfarm sector, and a few more were interested to do the same. Development strategists are increasingly focusing their attention to the rural nonfarm economy for a variety of reasons. A number of studies have shown that nonfarm activities are protecting, and in some cases, improving rural livelihoods (Blaikie *et al.*, 2002 on Nepal; Bryceson, 2002 on Africa; Molle *et al.*, 2002 on Thailand; De Haan, 2002 on India). The engagement of farm households with the nonfarm market economy has permitted the non-market rural economy to survive (Blaikie *et al.*, 2002). In India, there is significant room for development of the rural nonfarm economy. One study in rural India has suggested that the nonfarm sector appears to have grown in step with overall population growth but that it did not increase in share of total employment during the 1990s (Kijima & Lanjouw, 2004). The research also revealed that poverty reduction policy-makers should continue to explore options for promoting the nonfarm sector. In addition to potentials for poverty reduction, diversification of income sources toward the rural nonfarm sector, as a strategy in the broader sense, can also have positive effects on the environment by reducing land constraints (Reardon & Vosti, 1995; WB, 2008b). Prospects of nonfarm diversification for rural poverty reduction are also promising. Empirical studies on nonfarm diversification in rural Africa have revealed that a positive feedback loop exists wherein those participating in the rural nonfarm economy enjoy faster income growth, thereby providing the resources to plow back into expanded nonfarm activity (Barret *et al.* 2001).

Economic diversification, in general, can contribute positively to livelihood sustainability because it reduces proneness to vulnerabilities including stress and shocks such as drought. A comparative study on rain-fed farm regions found the household-level impact of drought to be smaller in China and Thailand than in India. In India, farmers relied mainly on migration, sale of livestock, and borrowing for income security whereas farmers in China and Thailand relied mainly on diversification of farm and nonfarm income for income security (Pandey & Bhandari, 2009).

Migration was a major defensive coping strategy for Byalal households. This research considered migrant income a nonfarm source of income. Most NGOs and other institutions see seasonal migration as a negative phenomenon, largely because of its exploitative nature and its disruptive effect on family life and wider social relations (Turton, 2000). The literature is contentious on whether or not migration can reduce poverty (Deshingkar & Start, 2003). Permanent migration to urban centers, for example, can provide a pathway out of poverty for skilled and educated rural villagers; however, most of villagers in Byalal are unskilled and poorly educated. Migration of those villagers would not reduce poverty but displace it. Furthermore, according to the World Development Report on Agriculture for Development (WB, 2008), more than 80% of the decline in rural poverty is attributable to better conditions rather than to out-migration of the poor. In this way, migration has not been the main instrument for rural poverty reduction. Aside from the issues regarding local potential for poverty reduction, Byalal villagers perceived migration as undesirable but necessary, as migration has deep personal, social, and economic costs. Results from this research imply that interests in replacing income from migrant activity with income from a local activity are strong; thus, strategies for economic diversification in

Byalal, particularly among the migrant population, could at least provide an alternative to migration if not also a pathway out of poverty.

#### *4.5.2 Evaluation of Village-Level Sustainable Livelihood Outcomes*

A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets, while not undermining the natural resource base (Chambers & Conway, 1992). As suggested by Scoones (2005), a disaggregation of this definition into subcomponents was done to create the sustainable livelihood indicators that were used for assessment of livelihood outcomes. Three indicators were especially relevant and within the scope of the research: wellbeing and capability, livelihood adaptability (resilience), and environmental sustainability. Sections 4.2 and 4.4.1 respectively, explored wellbeing and capability, as measured by availability and access to capital assets and livelihood stability and security. At a village level, the research found wellbeing and capability level to be inadequate due to the low availability and poor access to capital assets.

##### *4.5.2.1 Livelihood adaptability*

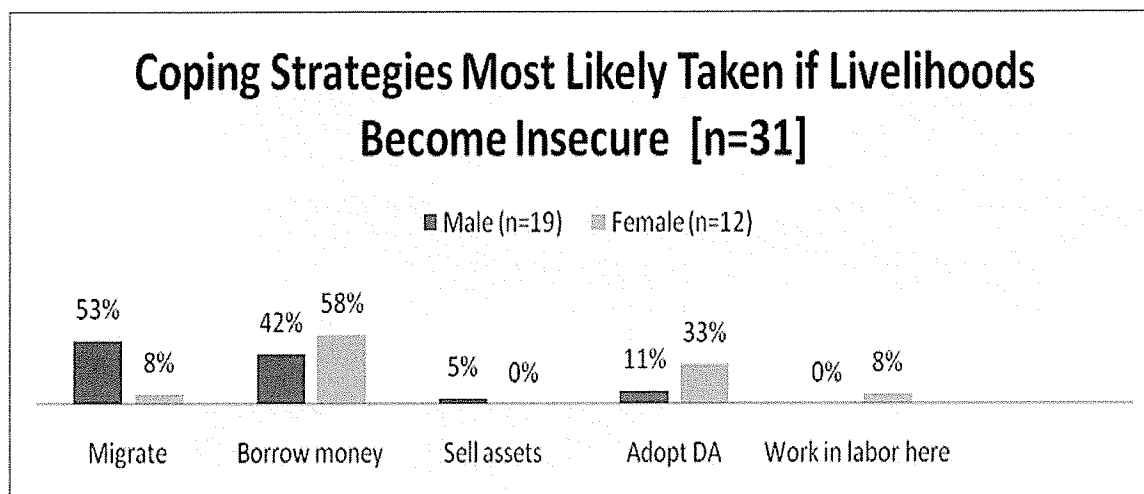
Livelihood adaptability among villagers was considered by exploring the capacity of villagers to be resilient when confronted with social, economic, and environmental risks. Resilience is concerned with the magnitude of disturbance that can be absorbed or buffered without undergoing fundamental changes, and it is a promising conceptual tool for evaluating the sustainability of livelihoods because it provides a way for analyzing how to maintain stability in the face of change (Berkes *et al.*, 2003). Those who are unable to cope (make temporary adjustments in the face of change) or adapt (make longer term shifts in livelihood strategies) are not resilient and thus inevitably vulnerable and unlikely to achieve sustainable livelihoods (Scoones, 2005). The criteria used were: What vulnerabilities (i.e. shocks,

stresses, and crises) influence livelihoods in Byalal? How do villagers cope or adapt with these vulnerabilities? What are the positive and negative social changes in the village over time passage?

The issues of highest concern, as articulated by the villagers, included events that destabilized household livelihoods and placed the village in an economic crisis thereby increasing vulnerability and threatening livelihood outcomes. Critical events included droughts, water deficiency, unpredictable rainfall, torrential rainfall during monsoons, and power shortage. These events contributed to crop failures and subsequent livelihood instability. The social and economic costs of droughts, in particular, were enormous. Byalal has experienced successive droughts during the last eight years resulting in crop failures, livelihood and food insecurity, loss of livestock and fodder, loss of work availability, higher rate of seasonal out-migration in search of work, and increased dependency on others for subsistence.

Changes in the external environment such as these can affect assets, strategies, or outcomes. The resultant changes in behavior are known as coping strategies (Mishra, 2007). In response to changes, the first reaction among villagers was to wait and see if the government would provide safety-net provisions, which are usually in the form of public works programs. During droughts, the government typically creates between 40 and 50 local labor jobs usually in construction to reduce the severity and extent of distress. However, in the past, there were rarely enough jobs available for everyone, and villagers unable to get local government-created jobs would need to migrate in search of work. When household livelihoods become unstable during times of crisis, villagers reported that they were most likely to adopt the following coping mechanisms (listed in order of most to least likely):

borrow money, migrate for work (long distance), work in nearby villages, diversify economic activity, or liquidate assets (Figure 7). Assets, in this context, included land, house, gold, or livestock. Villagers viewed selling of assets as a strategy of last resort. Women more frequently undertook diversification activities as a coping strategy, whereas men tended to migrate.



**Figure 7.** Coping strategies most likely taken to stabilize household livelihoods. (Source: QI, n=31)

Respondents were asked to share their ideas about alternative actions, within the village, that they could potentially take to better cope with crises without dependency on external institutions (i.e. the GoK or GoI), migration, or borrowing money. Most respondents struggled to come up with alternative coping mechanisms that did not involve reliance on external processes. For example, many respondents said that during crisis, villagers (and especially leaders) should improve cooperation and unity in order to convince the government to generate more local jobs, build water harvesting structures, or build irrigation facilities. Respondents also cited improved communication and unity as a way to improve transparency and efficiency in allocations of government financial assistance within the

village. Respondents who were able to come up with ideas that were not associated with dependence on external support cited the following potential internal coping measures:

- diversification into nonfarm activity for income alternatives when crops fail;
- villagers must unify to help each other out during drought;
- wealthier households must share food grains with the poor;
- grain reserves must be established when crops are strong to carry villagers through times when crops fail;
- each individual should have a sense of obligation toward the improvement of the village by improving their education and by working diligently.

These ideas have great potential for improving village resilience (and sustainability) during crisis; yet, the major coping strategies were dependence on the government or migration.

There are a few explanations that may elucidate why further coping mechanisms are not being taken. The role of risk perceptions is a likely influencing factor on the adoption of coping mechanisms. Poor Byalal villagers, as a vulnerable people, are understandably risk-averse, and they are accustomed to migrant activity as a standard strategy taken during crisis. Migration is a common strategy familiar to the majority of households in Byalal, and even though migration is undesirable, risk aversion and fear is relatively low compared to risks associated with unknown activity. A second possible explanation is related to the common theme in the proposed coping mechanisms of strengthened village cooperation and unity for collective action during crisis. Indeed, capability for self-organization amidst crisis is a characteristic of resilience. Self-organization calls for higher levels of social capital than what currently seems to exist in Byalal. At present, social cohesion among villagers is restrained because of inefficient internal networks, inadequate communication, and ineffective leadership. The researcher observed sufficiency and effectiveness in communication within the village to be in need of significant improvement. To illustrate, villagers mainly come together during festivals a few times each year to discuss issues, but many respondents

throughout the year remained largely misinformed or unaware of village issues and activity. Furthermore, current weak local leadership, as perceived by the majority of respondents, further impeded capacity for self-organization during crisis. Low social capital within Byalal is not inconsequential. A study of 69 villages in northern India by Krishna (2002) suggested that measures of social capital and effectiveness of new leaders must not be low in order for villages to have relatively higher economic development performance. Also, empirical data provides evidence that local groups, such as groups for natural resource improvements, can be facilitated for increasing farmers' knowledge and skills, their leadership capacity, and their motivations to act (Pretty & Ward, 2001). Thus, improved village resilience through a strengthening of social capital for social cohesion and internal and external networks may be vital not only to the success of potential strategies such as economic diversification initiatives but also total socioeconomic development and sustainability of livelihood outcomes.

Evaluation of long-term adaptability was facilitated by the identification of socioeconomic positive and negative changes observed over time. Table 16 presents socioeconomic changes conveyed by the villagers. Villagers identified more positive changes than negative changes. Positive socioeconomic changes in the village pertained to improved quality of and access to resources such as drinking water, food, healthcare, transportation, markets, and education. Other positive socioeconomic changes pertained to improved quality of life through higher labor wages, increased number of irrigation facilities, which enabled increased agricultural productivity and decreased rate of migration, and indirect poverty reduction due to land reform policies of the 1960s. Four out of six negative changes pertained to a gradual deterioration of social cohesion among villagers.

**Table 16.** Positive and negative socioeconomic changes over the past 40 years in Byalal.

Positive Socioeconomic Changes	Attributed Reason (if given)	Negative Socioeconomic Changes	Attributed Reason (if given)
Better access to drinking water	-	People are less cooperative; more selfish	Increased reliance on government for help
Better access to external markets and agencies	Improved transportation options (tom tom, bus)	Youth no longer respect the elders (according to elders)	-
Better access to healthcare	Construction of nearby clinic in Kanakal village	Increased frequency & severity of health problems	Change in diet – modern varieties are perceived as less nutritious than local varieties eaten earlier
Improved food security	-	Increased political stalemates hinder economic development	Changes brought about by land reform and the creation of elected leadership positions
Improved quality of housing	Better construction	Increased quarreling among villagers over minor problems	-
Improved schools	Addition of more classrooms & teachers	Increased cost of farm inputs & living expenses	-
Increased education levels among villagers	-	Reduced life expectancy	Change in diet – modern varieties are perceived as less nutritious than local varieties eaten earlier; reduction in breast-feeding because of pesticide poisoning
Increased labor wages	Increased cost of living		
Poverty reduction	Land reform policy (more people own land now than before)		
Increased agricultural productivity & lowered migration incidence	Increased number of borewells/open wells		

Respondents of all castes reported that in the past, villagers were more cooperative and quarreled less, and the political situation was better back then because disputes were quickly resolved resulting in social and economic development of the village. The village key informant theorized that this negative socioeconomic change has resulted from increased dependency on external support from the government:

“The rich should give food grains to the poor. People who have grown more and have stocks can give grains to others who have less. The rich should share grains during

drought. This type of cooperation was done earlier in the village, but now it is done to a lesser extent because of politics. Nowadays, everyone expects help from the government. Even for minor things, people now ask the government to do it instead of doing it themselves. For example, about 15 years ago one person from each household came forward to help construct the road from Kanakal to Byalal. Nowadays, something like this is not possible because people want everything to be done by the local *panchayat* or by the government. [He gives another example]: Earlier we had a big well for drinking water. It was like pure filtered drinking water. It was built 15 years ago. Villagers used to come together to clean it – men and women together. But now they want the *panchayat* to do this work. The *panchayat* did not do it, and so now nobody cares for it. That is why no one can drink from this well anymore” (A16, KI).

Prior to post-colonial India and extending back to the Mughal times up to 500 years ago, traditional village leaders were typically wealthy elders from upper castes, and they represented all castes and ethnic groups of that village for the primary objective of community peace. Although caste divisions were stronger in earlier days, respondents from all castes made references to local politics being more proactive and effective in resolving issues in earlier days under traditional leadership as compared to now under elected representatives. Current leaders, for example, were slow to access state and market agencies and incapable of resolving minor disputes. During modernization in India, economic development has become a top priority, and new forms of leadership have developed as a result. New leaders are relatively younger with much higher levels of formal education and are neither usually high-caste nor from the richest households (Krishna, 2002). Despite the more equitable dispersal of power and influence, weakness and ineffectiveness of new leaders may impede social progress and economic development objectives.

The research can draw inferences pertaining to village resiliency from reflections on positive and negative socioeconomic changes in Byalal. All positive changes involved improved endowment and access to resources of villagers largely because of external processes and institutions. This, in turn, has generated a negative feedback loop of intensified

reliance on external processes for continual support. To illustrate, because of recent action of the GoK to waive loans taken by smallholder farmers, many farmers stated that they expect the GoK to repeat this policy and are thus not worried about indebtedness. Farmers also now expect subsidized loans each time they apply. As a result, villagers have not fully realized their capability for self-organization and capacity for learning and adaptation within Byalal. Nonetheless, the positive socioeconomic changes insinuate that quality of life and livelihood security, in general, have improved compared to forty years ago.

#### *4.5.2.2 Environmental sustainability*

Most rural livelihoods are reliant on the natural resource base at least to an extent; therefore, environmental sustainability is an appropriate indicator for sustainable livelihoods. Environmental sustainability, as intended here, referred to the ability of a system to maintain productivity when subjected to disturbances, whether a 'stress' (a small, regular, predictable disturbance with a cumulative effect) or a 'shock' (a large, infrequent, unpredictable disturbance with immediate impact) (Scoones, 2005). This implies avoiding depletion of natural resources to levels that result in permanent decline of ecological products or services. The criterion used for evaluation was: What are the changes observed in the environment and natural resources base over the last four decades? Has there been a loss in natural capital over time? Have deforestation/desertification, soil degradation/erosion, and/or loss of biodiversity taken place over time? Viewpoints were drawn from village elders.

The following changes in the environment and natural resources base over the last forty years according to village elders are arranged in the following categories: climatic change; desertification; groundwater exploitation; pest and disease resistance in crops, and decline in agricultural productivity. Changes in climate included temperature change and

change in rainfall pattern. Although no respondents were familiar with the concepts of “climate change” or “global warming”, some mentioned that winters used to be colder and the summers are now hotter. Late monsoons and uneven distribution of rainfall at critical stages of crop growth have become common. Elders have noticed an increase in unpredictable rain patterns over the past four decades. Increased rainfall variability has meant that farmers can no longer predict the rains, which have led to reduced agricultural productivity and higher dependence on others for food.

“Soil fertility is generally good, but only with water. Now the quantity of rain has fallen, and it comes in an erratic and unpredictable manner. If we get sufficient water, land will also become fertile. Now the soil fertility is also reducing because of less water.” (FG3).

Some elders attributed change in rainfall to lack of forest cover or increase in population while others attributed environmental change to fate or *Devaru*.

Changes in the land over the past four decades were mentioned by all elders and included increased soil erosion, decline in natural soil fertility, and changes in landscape. The landscape has significantly changed over the last four decades. Vast areas of wastelands are scattered throughout the village. To describe changes, the village key informant said, “There are fewer trees now. Earlier we had lots of trees. While I would be walking to my land, I would feel as if I were entering a forest. But it is not so, now” (A16). Another said that three or four decades ago:

“...there were lots of trees along our fields, and we had lots of different types of trees like neem; but now there are only those spiky jolly trees which are of no use to farmers. We cannot grow them along our bunds because they cover the ground area with their roots and absorb all the water from the soil” (A19).

Based upon the above descriptions as observed by elders and in conjunction with personal observations of current or continual practices that involve natural resources, it appears that a

process of desertification has been taking place in Byalal over the course of at least the last four decades and is continuing to occur at present. The UN Convention to Combat Desertification (1994) defined desertification as land degradation in arid, semi-arid, and dry sub-humid areas resulting from multifaceted factors including climatic variations and human activities. Typical characteristics of desertification (all of which have been identified or observed in Byalal) include an increase in bare lands, loss of vegetation cover followed by soil degradation through erosion and compaction, invasion of unknown vegetation that is of no economic value, disappearance of useful plant species, reduction in productivity due to soil degradation, and decreased fodder for livestock and subsequent reductions in livestock (Macharia, 2004). Activities including agricultural intensification, overgrazing and heavy dependence on CPL, inadequate prevention of soil erosion, and deforestation for charcoal production are the likely culprits of desertification in Byalal.

Groundwater exploitation has also occurred, as was described in sections 4.2.2 and 4.5.1. Low rainfall and the increasing number of wells have affected groundwater levels; and farmers have to dig deeper for wells to reach the water table. Pest and disease resistance has also increased in crops over the last four decades, and the quantity and variety of pests are now greater than before. Before the 1990s, the elders said that farmers did not use chemical pesticides. There were fewer types of pests then, and the rains were usually enough to keep pests away. One elder said:

“Earlier there was very little problem with pests, but now there are lots of pests. For this, we have to use pesticides. If we do not spray with pesticide, then in one day the entire crop will be eaten by pests by the next morning. Earlier, for example, we used to grow sunflower and there were no pests for sunflower crops. At that time, we never used to spray anything. But now, even for the sunflower, we have to spray with pesticides” (FG3).

Agricultural productivity has also declined over the past several decades. Most farmers were unable to explain this change. However, one farmer attributed the decline in productivity to changes in seed varieties:

“Thirty or forty years ago, we used to grow more produce. Earlier, we used to grow local varieties of seed which took six months to grow. But now, we use hybrid varieties of seed which takes only three months to grow. Earlier we used to grow different crops and the cost of production was less. Back then, we had 90% profit from output and 10% costs for inputs. But now, it is 90% cost of inputs and 10% profit from output” (A16, KI).

In order for Byalal livelihoods to be sustainable, the local ecological system must be able to support the social and economic systems. However, clear signs of desertification and resource depletion in the village implies that neither social nor economic goals are currently being met as indicated by high levels of livelihood instability, reduced agricultural productivity, and heavy reliance on seasonal out-migration as an income supplement. Furthermore, because Byalal villagers, as a rural agrarian society, are heavily dependent on natural resources to support their livelihoods, persistent pressure on the land and the continuation of the desertification process without mitigation or reversal is not sustainable for future livelihoods. Of particular concern for both current and future livelihoods, is that although local changes in the environment have been observed by villagers themselves, there is a general lack of awareness of the linkage between human actions and environmental degradation and that those who were aware of linkages and had the motivation to make land improvements were constrained by the inability to afford the expense and/or did not qualify for loan approval. To reduce the depletion of the local natural resources base, stronger levels of social capital are necessary including an increase in local farm groups and a stronger presence and intensified capacity of local NGOs, extension and training program at UASD-Bijapur Station, and the local WMP is an essential requirement to increase awareness,

knowledge, and skills and also to provide technological and financial assistance. In addition to increasing capacity and outreach, these external organizations should also work more closely with local financial institutions such as banks and microfinance companies to assist villagers' in obtaining financial assistance so that villagers are able to adopt resource-conserving technologies and farm and nonfarm diversification activities.

#### *4.5.2.3 Concluding Remarks on Sustainable Livelihood Outcomes*

The objectives of livelihood outcomes from livelihood and coping strategies vary within and across the situations and long-term goals generally include increased income, increased wellbeing, reduced vulnerability, improved food security, and more sustainable use of natural resource base (Gordon *et al.*, 2001); however, the actual long-term goals of outcomes may differ from short-term objectives. In Byalal, villagers adopted household coping strategies to achieve short-term objectives of livelihood stability and security. If coping behavior is constantly necessary, as it was in Byalal, then the livelihood strategy becomes a survival strategy, leading to erosion of assets and destitution (Turton, 2000). Villagers were highly risk-prone to frequent natural and social vagaries. During droughts or other major crises, the coping mechanisms of most households were economic and included dependence on government safety net provisions for livelihood security, out-migration, and borrowing in-kind or -cash from villagers or financial institutions, with few options to act otherwise. After a consideration of current strategies and coping mechanisms and an evaluation of the sustainability criteria for village-level livelihood outcomes (i.e. wellbeing and capability, livelihood adaptability and resilience, and environmental sustainability), the findings implied that current livelihood outcomes of Byalal villagers, at the village-level, were not sustainable due to breakdowns within both natural and social systems. Their abilities, as a village, to self-

organize for collective action in times of crisis were further undermined by external institutional and political processes beyond their control. The literature also supports these findings. Economic principles, which explain household behavior, underpin most livelihood strategies in semi-arid rural India (Gordon *et al.*, 2001). When livelihood strategies change because of the external environment, especially when people have little control over such changes, unsustainable livelihood strategies and coping mechanisms continue because of tradition and habit (Perez & Cahn, 2000), or because there are limited options to change to more sustainable behavior.

#### **4.6 Summary**

The emergent picture of Byalal, as portrayed by the data, revealed complex and extensive challenges confronting rural livelihoods residing in a poor agrarian village in the marginal dryland region of South India. Shocks and stresses such as droughts, floods, erratic rainfall patterns, and electrical power shortages have resulted in loss of farm income due to crop failures and loss of labor wages or work opportunities for agricultural laborers. Due to the persistent nature of these problems, most livelihoods in Byalal were highly risk-prone and households from all socioeconomic classifications were in debt. When seeking out the “poor”, this research found that villagers from all socioeconomic classifications (not just farmers) regardless of landownership and size of landholding have insecure and unstable livelihoods. Households with a more secured livelihood were income-diversified, although not all income-diversified households had secured livelihoods. The majority (60%) of the working-age population relied on seasonal migrant labor on a regular and annual basis to secure household livelihoods, although migration is considered by the villagers as

undesirable but necessary. Consequently, the entire village economy becomes destabilized when the majority of its population leaves for six months. Given the local context, livelihood strategies and coping mechanisms, and the evaluation of sustainability indicators, this research found current livelihood outcomes in Byalal to be unsustainable.

A number of complex and interrelated factors played an influential role in livelihood outcomes. Analysis using the sustainable livelihood framework revealed poor asset endowment and limited access to all capital assets, and contextual factors further restricted villagers' options of livelihood strategies – sustainable and otherwise – thus keeping villagers trapped in a perpetual state of poverty. Limited access to all five capital assets limited livelihood options, including diversification opportunities, and also reduced the likelihood for sustainable livelihood outcomes because villagers were forced to implement less sustainable measures (i.e. agricultural intensification under severe resource constraints, deforestation for charcoal production, seasonal migration, keeping women and children at home instead of school for income generation, forcing family members into sex work or *devadasi* activity, etc.) to improve immediate welfare. Other contextual influencing processes on livelihood outcomes in Byalal included insecure government agriculture policies on subsidies, trade, irrigation, power supply, and prices of produce and agricultural inputs.

The study revealed a mixture of both traditional and modern farm practices among farmers and a general unfamiliarity with the concept of sustainability. The lack of uptake by farmers of more sustainable and diverse practices was strongly related to their limited knowledge of options, lack of direct observation of new practices, limited community engagement, insufficient funds for investment opportunities, and lack of margin in their livelihoods for taking risks to introduce innovations in their practices or to suffer crop failure.

A process of desertification has been taking place in Byalal, most likely due to the past and current strategies of heavy agricultural intensification, extensification, and deforestation.

Given the strong local interest by villagers (including migrants) to diversify income locally and the general uncertainty as to whether other livelihood strategies (i.e. sustainable intensification) are feasible in Byalal, economic farm and nonfarm diversification activities that do not further degrade the local natural resources base were found to offer the most potential pathway toward sustainable outcomes. A larger and more diverse nonfarm village economy, in particular, may improve total economic development within the village as well as reduce vulnerabilities to natural, social, and economic vagaries. Nonetheless, feasibility and sustainability implications of each prospective diversification activity, in a case-by-case analysis, would need to be explored in a further assessment for sustainable livelihood outcomes (see Chapter 5).

## **Chapter 5: Economic Diversification Livelihood Strategies**

### **5.1 Introduction**

This chapter provides a consideration of prospective economic diversification activities (DA) explored with poor villagers. Also considered is the feasibility and sustainability of top DA given the local context. The process of sharing and exploring prospective DA proceeded by first allowing participants to share and explore their interests, and then the researcher shared DA initiatives from the GoK and/or UASD (see Tables 3 and 4 for original lists). In this way, the initial list expanded to include additional interests of villagers. Then, using the social ecology framework described by Hill (2005) as described in Chapter 3, the study assessed the feasibility and sustainability implications of each DA. Using this framework, the components of the feasibility and sustainability assessment of each DA included the collection of local interest, needs for adoption of DA, barriers pre- and post-adoption of DA and how to overcome barriers, and the potential for environmental impact.

Two key challenges arose during the assessment. As described earlier, villagers had difficulties linking current or potential activities to current or future potential impacts – particularly the cause and effect relationship between human actions and impacts on the natural resources base. Hence, conversations regarding the potential of livelihood DA strategies for “sustainable” livelihood outcomes, for example, were challenging. The answers to the sixth question in the framework (What future environmental positive or negative impacts, if any, might this activity have?), therefore, were supplemented with information drawn from reflections on the data collected, conversations with experienced locals relevant to the activity discussed, conversations with UASD-Bijapur Station, and from supporting literature. The second key challenge pertained to the seemingly shortsightedness of answers

regarding the barriers to adoption and ways to overcome them (see section 5.4.4). The barriers to adoption were unanimously “lack of money” for both farm and nonfarm DA or “lack of irrigation” for farm DA; and it was difficult to encourage villagers to look beyond these undeniable barriers for a deeper exploration of potential future livelihood activities.

Hill’s assertion below provided useful observation in relation to this challenge:

“Money is more often used (often not consciously) as an excuse for inaction, rather than being a root cause of lack of engagement. It is not that money is unimportant, but rather that the focus should be on what it is perceived to be needed for. This permits attention to be placed on the full spectrum of tools (including money) that may be used to reach the desired goals.” (Hill, 2005:p.63).

As a way to deal with this challenge, questionnaire III participants received a selection of potential barriers to choose from in a closed-question format (in contrast to open-ended format of interviews). In this way, participants did not receive a “lack of money” option and were asked to be more specific by choosing from the options given (see **Appendix A**).

Section 5.2 offers a localized assessment of the feasibility and sustainability implications of each prospective farm DA in Byalal and then moves to an assessment of each prospective nonfarm DA in section 5.3. Then, section 5.4 situates the feasibility and sustainability of economic diversification, as a general strategy, into the broader context of rural India to more realistically assess the capacity of Byalal villagers to diversify. Capacity to diversify is indeed conditioned and constrained by a number of observed contextual factors both at the micro level and in the macro context of rural India.

## **5.2 Farm Diversification Activities**

### *5.2.1 Local Interests: Farm DA Ideas from and for Villagers*

Table 17 presents a comprehensive list of farm DA that were shared and explored during fieldwork. The DA are split between activities that were presented to the researcher by

interested participants (1-4) followed by activities presented by the researcher to participants for exploration (5-10) during semi-structured interviews and questionnaire III. Activities denoted with an asterisk are unique ideas from villagers not yet suggested by the GoK or UASD.

**Table 17.** Farm DA explored with women and men during interviews (n=20) and QIII (n=33).

FARM DA	AREA OF BENEFIT	INTERESTED FEMALES	INTERESTED MALES
<b>Participant Ideas/Interests</b>			
1. Livestock husbandry: Sheep/Goat-rearing	Production	A3, A5, A20 13 of 18 (QIII)	A1, A10, A15 5 of 15 (QIII)
2. Livestock husbandry: Dairy (Buffalo)	Production	A3, A20 13 of 18 (QIII)	A14, A19 4 of 15 (QIII)
3. Livestock husbandry: Poultry	Production	3 of 18 (QIII)	FG2
4. Fishery * (at nearby pond in Muddebihal)	Production		FG2
<b>UAS &amp;/or GoK Ideas</b>			
5. Vermi-composting	Environment	A5	FG2 1 of 15 (QIII)
6. Apiculture	Production	No interest	No interest
7. Sericulture	Production	1 of 18 (QIII)	No interest
8. Crop diversification: Dryland horticulture	Production	1 of 18 (QIII)	A19 (grapes) 1 of 15 (QIII)
9. Crop diversification: Agroforestry	Environment, Production	1 of 18 (QIII)	3 of 15 (QIII)
10. Organic production	Environment, Production	1 of 18 (QIII)	7 of 15 (QIII)

**Note: Key features of each female interviewee:** A2 [Age 48; Largeholding farmer; Non-diversified]; A3 [Age 40; Landless; Nonfarm/Nonfarm-diversified; Migrant]; A5 [Age 40; Largeholding farmer through land tenancy; Farm/Nonfarm-diversified; Migrant remittance-dependent]; A7 [Age 45; Largeholding farmer through land tenancy; Farm/Nonfarm-diversified; Migrant remittance-dependent]; A9 [Age 35; Landless; Farm/Nonfarm-diversified]; A12 [Age 25; Landless; Nonfarm/Nonfarm-diversified; Widow]; A13 [Age 35; Largeholding farmer-unirrigated; Farm/Nonfarm-diversified; Separated from husband/Single mother]; A17 [Age 49; Landless; Farm/Nonfarm-diversified]; A18 [Age 20; Landless; Farm/Nonfarm-diversified; Widow]; A20 [Age 24; Landless; Farm/Nonfarm-diversified; *Devadasi*]. **Key features of each male interviewee:** A1 [Age 70; Largeholding farmer; Non-diversified]; A4 [Age 38; Smallholder farmer; Farm/Nonfarm-diversified; Secure livelihood]; A6 [Age 42; Largeholding farmer-unirrigated; Farm/Nonfarm-diversified; Secure livelihood]; A8 [Age 41; Largeholding farmer-unirrigated; Farm/Nonfarm-diversified; Secure livelihood]; A10 [Age 25; Smallholder farmer; Farm/Nonfarm-diversified; Former migrant; Migrant remittance-dependent]; A11 [Age 50; Landless; Farm/Nonfarm-diversified]; A14 [Age 45; Landless; Farm/Nonfarm-diversified; Secure livelihood]; A15 [Age 45; Landless; Nonfarm/Nonfarm-diversified]; A16 [Age 51; Large landowner/renter; Nonfarm non-diversified]; A19 [Age 55; Largeholding farmer; Non-diversified]

Of these activities, villagers had adopted only livestock husbandry at the time of this research. Farm DA of highest interest among villagers of both genders were livestock husbandry of sheep or goats and buffalos (for dairy production). Results from QIII

additionally revealed a high interest in organic production by men. Of lesser interest among villagers were poultry farming, fishery, vermi-composting, agroforestry, dryland horticulture, and sericulture. No one expressed interest in adopting apiculture. Although fishery in the pond (a government-constructed reservoir stocked with fish) in the neighboring *taluka* of Muddebihal was mentioned as a prospective DA, it was deemed an unrealistic option for poor Byalal households. In fact, no one from the village was able to adopt fishery activity because of the steep expense one must pay to participate. The results indicated that the most favorable farm diversification activities (sheep/goat/buffalo husbandry) among villagers were locally familiar activities that they perceived posed the least risk.

#### *5.2.2 Feasibility Assessment and Sustainability Implications*

Table 18 presents the resources and supports perceived as necessary for the adoption of prospective farm DA. The potential barriers to adoption and/or future sustainability of farm DA, according to respondents, are also shown.

In general, the range of perceived needs for the adoption of farm DA included greater access to capital assets: natural capital (water and fodder to sustain new crops or higher populations of livestock), financial capital (ability to get financial assistance in the form of loans from other villagers or from financial institutions to purchase physical capital needed for new DA), physical capital (machinery or equipment for new DA), human capital (availability and affordability of additional labor), and social capital (external support for reliable information regarding new or improved technology; financial support; and internal support/permission from family or SHG).

**Table 18.** Needs and barriers to adoption and sustainability of farm DA. (Source: Interviews, n=20; QIII, n=33).

FARM DA	PERCEIVED NEEDS	PERCEIVED BARRIERS
<b>Participant Ideas/Interests</b>		
1. Livestock husbandry: Sheep/Goat-rearing	10 sheep @ Rs 25K; 1 laborer; Rs 50K (for 20 sheep); construct shed for Rs 6-8K or made out of jolly tree branches (free)	Incentive-related barriers: High maintenance work Net returns will not be sufficient Too risky/costly an investment Long-term/future risk: Medicine needed for seasonal illnesses in Nov-Dec. Doctors will not come to village to give treatment – transport to doctor is necessary
2. Livestock husbandry: Dairy (Buffalo)	2-3 buffalo; construction of shed; 5 buffalo @ Rs 15K each (local breed) or Rs 25-50K each (stronger breed); water for green fodder; extra help (when son finishes education); land	Resource constraint barriers: Lack of money Lack of water & green fodder Lack of information Incentive-related barriers Too risky/costly an investment Long-term/future risk: Marketing issues – low demand Maintenance costs
3. Livestock husbandry: Poultry	More information	Incentive-related barriers: Too risky/costly Resource constraint barriers: Need large landholding Lack of knowledge
4. Fishery *	10 lakh for 5yr contract to fish	<i>Incentive-related barriers: Too costly, no one can afford</i>
<b>UAS &amp;/or GoK Ideas</b>		
5. Vermi-composting	Rs 10K to start (for personal use); Rs 40K for small-scale business, or Rs 1 lakh for large-scale business loan from bank	Resource constraint barriers: Cannot get subsidized loan Cannot get loan approval Lack of knowledge Incentive-related barriers: Too costly
6. Apiculture	Market w/in village or a middle-man for pick-up	Resource constraint barriers: Lack of information Long-term/future risk: No market in village-marketing issues Too difficult to travel to Bagewadi market more than once per week Pesticides will kill bees Incentive-related barriers: Too low demand Too difficult/high maintenance work
7. Sericulture	None reported	None reported
8. Dryland horticulture	Family support (shares land w/ brothers); investment to begin = 1 lakh per acre	Incentive-related barriers: Family support Too costly/too timely for returns on investment
9. Agroforestry	None reported	Incentive-related barriers: Too risky an investment Net returns will not be sufficient/too timely Resource constraint barriers: Lack of information
10. Organic production	None reported	Incentive-related barriers: Too costly Resource constraint barriers: Lack of information

Perceived barriers to adoption were related to resource constraints in the all of the above and incentive-related barriers associated with risk perceptions and market demand (too risky or costly an investment, insufficient or too timely net returns, low market demand). Foreseeable threats to sustainable success included inability to pay maintenance costs (inputs, transport, and loan repayment), possible risk of incurred losses if animals die, and potential difficulties marketing the product. A more in-depth assessment of social, economic, and environmental implications of favored farm DA follows below.

#### *5.2.2.1 Livestock husbandry: Sheep/goat-rearing, dairy farming, and poultry farming*

Animal husbandry through sheep/goat-rearing or through dairy activity with buffalos was the most common DA of interest among villagers with and without land, and the GoK and UASD recommend both DA for the improvement of farmers' economic conditions. "If villagers would receive [financial] support, 75% of people here would do dairy farming or shepherding" (A4). Sheep/goat-rearing and dairy activity are perceived by most villagers as profitable and low-risk, and livelihood benefits are twofold: profit from the animal itself (meat, wool, dairy products) and profit from manure to improve soil fertility either on their land or by leasing livestock to others wishing to overnight livestock in barren fields.

Sheep/goat-rearing business is very profitable and inputs are relatively minimal. A woman who used to own sheep said that her ten sheep yielded two bags of wool for which they earned Rs 800 per annum. After some time, she sold her sheep at the local markets where she earned Rs 200/kg for meat. To start a remunerative business, villagers reported that they would need a loan for the purchase of ten to twenty sheep (Rs 25-50K), and an additional amount to construct a shelter (though most sheep owners had constructed a simple shed using thorny branches of the local jolly tree). If the household is short in human capital

it needs a hired laborer. Because several others in the village have already adopted this activity, those who are interested regard this activity as feasible and low-risk because they have access to information about how to raise livestock. The only foreseeable future threats to long-term success were maintenance issues of livestock due to seasonal illnesses of the herd. The major barriers to adoption were resource constraints (lack of money to purchase sheep or goats), and a long-term foreseeable barrier to sustaining or succeeding in a sheep/goat business was future risk of potential difficulties with seasonal illness of animals. If illness occurs, the owner must go to Bagewadi for medicine immediately before the illness spreads to the entire herd and before sheep die. Owners who did not look after the animals in a timely manner incurred losses due to illness.

Dairy activity with buffalos was also an activity of interest among villagers. Moreover, so many villagers were interested in dairy production that a campaign promise of a current village leader was to get each household a buffalo. So far, this promise was unfulfilled. Villagers perceive this DA as very profitable because there are many possible products they could market from dairy: milk, curd, and ghee. A man in the village who participates in dairy production reported that he earns Rs 20/L milk. Villagers, including the experienced dairy farmer, believe that each local breed of buffalo can yield between 7-10L daily, and stronger breeds can yield up to 20L daily. The experienced dairy farmer gave the following advice to others: "Though dairy activities are very profitable now, I am not earning any money for dairy because I purchased the cheap local variety of buffalo... my advice to others is they should purchase the better, more expensive buffalo variety" (FG2). To begin a remunerative dairy production business, villagers claimed that they needed financial support to purchase two to five buffalos. The local breed of buffalo cost Rs 15K each whereas the

stronger breed of buffalo cost Rs 25-50K each. Other cited needs included a shed, water for animals and fodder, and hired labor for those households with labor shortage. There was a discrepancy between villagers who perceived that green fodder (and thus higher water input) was necessary for higher yields of milk production and those who perceived that any fodder including agricultural waste would be sufficient for the same yield. As follows, a major foreseeable barrier was the shortage of fodder due to water deficiency. UASD-Bijapur Station researchers stated that drought-tolerant green fodder is a research focus; however, owners can use sorghum varieties as fodder for milk production. Although not mentioned by villagers as a barrier, the researcher inferred that interested villagers need advice regarding breed and fodder type for optimal productivity.

In the absence of financial constraints, livestock husbandry of goats, sheep, and buffalo is feasible and sustainable in the short-term as a means toward improving socioeconomic conditions of poor Byalal villagers given the high interest and familiarity among villagers, perceived present and future low risk, current profitability, strong current market demand, and relatively low input cost. However, the high number of interested villagers in livestock husbandry (in addition to the many others who have already adopted this activity) raises legitimate concerns about the long-term sustainability implications of livestock husbandry as a DA; yet, villagers are largely unconcerned or unaware of any foreseeable negative consequences. Potential concerns about long-term profitability, for example, may arise due to future market fluctuations in price and demand from overproduction. The current market demand for sheep is indeed strong, and villagers do not perceive that an expansion in this business would reduce demand in the future. Nonetheless, Byalal farmers have experienced a similar phenomenon before in crop production. When

Byalal farmers shifted from cereal production to a more profitable oilseed production, they noticed a decline in market price of sunflower, safflower, and groundnut produce due to a shift in supply and demand. A second concern pertains to the capacity of the natural resources base in Byalal to withstand even greater pressure on land exerted by increased livestock holdings. Livestock grazing affects natural resources in many ways. Most critical for Byalal is the availability of land and water to produce fodder, provide drinking water, and drain surplus wastes for livestock populations. Most poor Byalal households currently engage in small-scale livestock husbandry and are landless; thus, they heavily rely on CPLs for grazing. Respondents did not perceive land availability for grazing or increased land degradation as a foreseeable problem. For example, when the researcher asked landless persons if lack of land was an issue they stated that land is not necessary to own livestock because grazing areas are not scarce. Likewise, some respondents were presented with the following more specific hypothetical scenario: "If leaders would fulfill their promise, approximately 168 buffalo in addition to those already in the village would need to be sustained in the 1523-acre village. Many of those 168 buffalo would be owned by landless villagers and would be restricted to the 50 acres that are common grazing areas. What long-term impacts, if any, might that have on the environment?" Respondents to both questions asserted that increased livestock production would have a positive impact on the environment because of the increase in manure to improve soil quality and no negative impact on the environment. Nonetheless, as livestock holdings increase in Byalal, one can expect greater pressure on land and reduced availability of CPL. In a study of seven arid states in India, the researchers found that common property resource areas declined by 30 to 50% between 1950 and 1982, and that cattle holdings declined by 20% (Jodha, 1992 as cited in Steinfeld, 1998).

Population pressure has made CPL and wastelands increasingly unavailable; thus, at a certain point, the land will have reached its maximum capacity to sustain livestock at which point there will no longer be open areas for grazing or sufficient amounts of fodder. At present, recurrent droughts in the last eight years and reduced availability of fodder have already placed limitations on the holdings of livestock owners. At a broader level, the question needed to be addressed is: How can the process of desertification be mitigated (and preferably reversed) in the presence of a scale-up in herd size in a relatively small dryland village where many households are poor and landless?

Poultry farming, a farm DA recommended by the GoK and UASD (see Tables 3 and 4), was considered one of the least feasible farm DA among Byalal villagers. Most villagers (especially upper caste) are vegetarian; thus, raising poultry for subsistence was uncommon. Those who raised poultry were mostly landless households of lower castes that did so at a small scale mainly for subsistence, and some sold eggs for income to other villagers for Rs 2 each. Poultry owners complained that the biggest barriers to successfulness of poultry farming were predators (mainly cats killing the chickens and stealing eggs), other villagers stealing the chickens, and finding the eggs (chickens lay their eggs anywhere and often outside the pen). For these reasons, Byalal poultry owners regarded income from small-scale poultry production as insufficient as an income-alternative. Villagers that explored the feasibility of commercial (large-scale) poultry farming as a prospective DA cited the following barriers to adoption: incentive-related barriers (low interest, high-risk investment, too costly an initial investment) and resource constraints (the need for large landholding and lack of information). Because no one in the village participated in large-scale poultry farming, locals considered it an uncertain and high-risk investment. The only person (from a

neighboring village) they knew of who had tried a large-scale poultry business incurred tremendous losses. One Byalal respondent described that incident:

“No one has done this in Byalal, but I have talked with someone from Alakoppa village who has done this with about 500 birds. But he incurred losses of Rs 3-4 *lakh*. The reason was due to illness in the flock. Usually, one bird will become infected with fever, and then the rest of the birds also become infected immediately. The disease spreads very quickly. It is very risky to do this poultry business, and the initial investment is also very high” (A10).

Additionally, unlike sheep/goat-herding and dairy farming, commercial poultry farming requires a large-scale operation in order to be a worthwhile and profitable venture according to UASD-Bijapur Station academics. Large-scale poultry farming can thus only be done by large-holding landowners who have the financial means to build a sizable coop for the flock. Given that nearly half of landowning Byalal villagers are smallholders or landless and several large-holding landowners are marginal farmers who are not financially capable of making high capital investments, poultry farming is deemed a less feasible farm DA for Byalal villagers.

#### *5.2.2.2 Organic agriculture production*

Organic agriculture is a form of sustainable agriculture that is characterized by production without the use of synthetic fertilizers and pesticides (Pretty, 1995). Organic agriculture production was not listed in Table 3 as a recommendation by the GoK, and it is not truly a diversification measure in the sense that it does not serve as an income-alternative when crops fail. However, organic production is a current initiative of UASD and UASD-Bijapur Station (see Table 4) as an important measure for improvements of the natural resources base. Thus, organic production can indirectly be a potential measure for sustainable livelihood outcomes.

No farmers in Byalal participated in organic production; however, Table 16 portrayed a strong interest among male respondents. General barriers for non-adoption included incentive-related barriers (too costly) and resource constraints (perceived need for irrigation and lack of information). Additional barriers observed by the researcher also pertained to lack of incentive: some farmers were generally unaware of soil nutrient and erosion issues as being problematic or unsustainable and thus did not perceive a need or incentive to change production activity; and at present, there is no market incentive because the price of organically-grown produce (except pomegranate) in the local markets is equivalent to the price of inorganically-grown produce making profitability the same.

There were disagreements among academics at UASD and UASD-Bijapur Station as to whether or not irrigation is necessary for organic production. Some maintained that only areas with lots of rain or irrigation can successfully produce organic crops, while others asserted that organic production can be done anywhere including dryland regions. To further investigate the feasibility of organic agriculture in the Byalal area, the research team spoke with an organic farmer from a nearby village who had come to Byalal to visit his uncle. The young male farmer owned 12 acres of irrigated land and 30 acres of rain-fed land. Five years ago, the farmer noticed environmental changes on his cropland such as decline in soil fertility and cracking. At that time, he had read in a newspaper about the potential to increase productivity through organic farming, and then he learned how to grow organically at a WMP demonstration in Maharashtra. He has been growing organic crops for two years now and has noticed an improvement of the soil and an increase in productivity for all crops (both irrigated and rain-fed). The farmer stopped applying inorganic chemicals to his land five years ago. Alternatively, he uses a natural pesticide and fertilizer he called *jeevamurtha* (life

milk). The farmer willingly shared his special recipe with the research team. To prepare *jeevamurtha*, the farmer mixes together cow dung and urine, powdered pulses, black *jaggary* (sugarcane product), water, and fertile chemical-free soil. For a stronger pesticide, he said that he would also add chili, garlic, neem seed powder, and papaya leaf. Farmers must mix this mixture in the clockwise direction because microorganisms would die if stirred counter-clockwise. His organic rain-fed crops included wheat, sunflower, and chickpea; and his irrigated organic crops included pomegranate, onion, sunflower, and peanut.

The farmer, inspired by his success, wrote and published a book to share his experiences and techniques with other farmers. He said that he sells his book at an inexpensive rate of Rs 20; however, farmers have not shown interest in either purchasing the book or adopting organic production. At the time of fieldwork, he had only convinced 25 farmers to grow organically. He said that the biggest barrier to adoption for farmers was that they must allow their land to lay fallow for two years before organic production can begin. Most farmers cannot afford to forgo production for any amount of time. The only way that he was able to quit production temporarily was because he had a secondary income source to carry him over the time gap. He believed that another barrier was general risk averseness. He said he had initial doubts as well, but he took the risk and was glad he did it. Notwithstanding the acknowledged initial barriers and risks, the organic farmer offered the following incentives to prospective organic farmers: since switching to organic production, he has been saving money because the input costs are less and he has noticed a marked improvement in land quality.

Upon reflection, organic production may be feasible for Byalal farmers given the high interest, demonstrated success by nearby farmers, reduced cost of inputs, and its reduced

negative impacts on the environment and human health. However, awareness of benefits and incentives to change production activities were extremely low. Probably the biggest barrier to adoption of organic production is that it is only a realistic option for households with an alternative income source that is sufficient for livelihood subsistence for at least two years without income from crop production. Incentives and financial support would be imperative for feasibility and sustainability of diversification interventions, and organizations such as UASD-Bijapur Station, WMP, and NGOs must intensify efforts to transfer information and technology. Government and non-government organizations in Karnataka purchase organic produce at higher rates than market rates from its farmer members, and if local farmers were aware of the existence of such organizations then perhaps they would perceive organic production as a worthwhile investment. Local farmers can expect market incentives (i.e. higher price for organic produce), if the benefits of buying organic produce spread to consumers and demand increases. Farm households with livestock for manure production or vermi-composting technology (see below) would have a greater advantage in organic production than those who would depend on manure from others.

#### *5.2.2.3 Vermi-culture*

UASD-Bijapur Station researchers have produced and utilized three technologies of vermi-culture (vermi-compost, vermi-wash, and in-situ vermi-compost). Vermi-culture is the process in which worms, such as *Eudrilus eugeniae*, are used to break down organic matter into vermi-cast, or worm manure. Vermi-cast, referred to here as vermi-compost (VC), is an organic fertilizer that is five times richer than the livestock manure typically used by local farmers. VC activity has several far-reaching potential benefits: increased livelihood stability as a secondary income source (if produced at a large scale), improved natural resources base

through reduced dependency on chemical fertilizers, lowered cost of farm inputs, and increased social capital within the village when production is done in groups. In this way, adoption of VC has a high potential for sustainable livelihood outcomes; however, the feasibility within Byalal, must also be considered.

Only a few respondents expressed interest in adopting vermi-composting as a DA. Many respondents were unaware of VC technology, but approximately five villagers showed interest in the past and took a training course at UASD-Bijapur Station or Rudset (local NGO). None of the five villagers adopted VC activity after training, citing resource constraints (inability to obtain loans from banks and lack of information) as the major barriers to adoption. Indeed, they were highly critical of the training programs for not giving them advice or assistance on getting loans (see section 5.4.6). Similarly, a women's self-help group in Byalal received a loan to begin VC; however, when they realized the loan was unsubsidized they rejected the offer. Another barrier observed by the researcher was the absence of a local market for VC at present: local pesticide dealers in B. Bagewadi did not carry VC because there was no customer demand.

Input costs are relatively low, and needs for adoption of small-scale production include construction of one compost structure (Rs 10K), 2.5kg worms (Rs 250/kg), and agricultural waste. However, small amounts of land and water are also required which pose barriers to adoption for many in Byalal. For small-scale production, the minimal size of one composting structure is 20' x 4' x 2', and for large-scale production (as an income-alternative) multiple structures of this size must be built. Each structure must be watered every three to four days during hotter months or once per week during milder weather.

Threats to long-term success include predators (egrets, mongoose, and rodents) and contamination of earthworm stocks with flatworm.

Upon reflection, small-scale vermi-composting production is unlikely to function as an income-alternative for Byalal households although it would have positive benefits on household agricultural production and to reduce or eliminate costs of chemical fertilizer input. VC production in farm households that do not own livestock could also reap the benefits of having access to organic fertilizer. Larger-scale VC production would more likely serve as a sustainable income alternative; however, given the land and water constraints of most households, only the few largeholding households with irrigation may be able to adopt VC at large-scale. Nonetheless, individuals that do not fall into that category could still benefit from VC production through participation in groups, such as SHG. According to UASD-Bijapur Station, approximately 3500 women in SHG currently participate in VC production. Most members cultivate VC on a small-scale; however, their SHG will collectively sell VC in large quantities to UASD-Bijapur Station or other clients. SHG can earn between Rs 2.5/kg to Rs 3.5/kg. For VC production as an income alternative to be sustainable, an increase in market demand via increased farmer awareness and transfer-of-technology through extension work will be necessary.

#### *5.2.2.4 Crop diversification: Dryland horticulture and Agroforestry*

Respondents interested in crop diversification wanted irrigation facilities so that they can grow higher-value cash crops such as wheat, onion, garlic, and other vegetables; however, the outlook for these farmers to obtain irrigation is uncertain. Some farmers have been waiting for decades for irrigation; therefore, respondents were encouraged to explore other crop diversification measures to stabilize livelihoods throughout the study. Technologies

such as dryland horticulture and agroforestry with drought-tolerant species, for example, may be a more realistic option for crop diversification with the benefit of increased earnings from higher-valued crops without the need for heavy water input. The adoption of agroforestry by growing trees in wastelands or along bunds of farmlands can have multiple benefits as a measure of soil and moisture conservation as well as a source of fodder, timber, green manure, and fuel wood (GoK, 2007).

Although many farmers expressed an interest in crop diversification as a prospective DA, few cited an interest in dryland horticulture or agroforestry. Major barriers to adoption included incentive-related barriers (perceived high-risk, too costly an investment, long lag time for initial returns, lack of family support) and resource constraints (too small landholding size and lack of information). Farmers' risk-averseness toward horticulture production is justified. In 2003, pomegranate and grape crops were uprooted in the area because of viral and bacterial crop disease. At present, UASD-Bijapur Station has developed improved region-specific and resistant technologies in dryland horticulture for grape, lime, and pomegranate; however, it requires specialized techniques and there is insufficient technological extension available for the transfer of dryland horticulture technology to villages. One male farmer, who shared his large farm with his two brothers, was interested in grape cultivation but did not have support from his brothers. Another barrier to adoption, also seen in organic production, was the issue of lag time before returns on investment are seen.

He said:

“I would have to ask my brothers to start this business, and they would have to agree to do it. But they are not interested in investing such a huge amount of money; and also, we would have to wait two to three years before getting a profit. But my brothers want profit within 3-4 months! I have to obey my brothers' views because they are also looking after the farm” (A19).

Both dryland horticulture and agroforestry are perceived by villagers as feasible only for large landholding farmers. Fruit-producing bushes and trees take up more area of cropland than most smallholder farmers are willing to allow, and farmers believe that the root systems of trees may rob the soil of moisture content or that shade from trees may disrupt the productivity of ground crops.

Only two farmers in the village were observed to participate in these activities, and both were largeholders with irrigation. Both grew banana trees, and one grew lime, teak, and coconut. Teak trees take 25 years before they can be sold as timber. There were few other fruit-producing trees sparsely available throughout the village such as sapota and tamarind. UASD-Bijapur Station recommends tamarind as a profitable tree for marginal lands because of their shallow root systems. UASD-Bijapur Station has found that farmers are slow to adopt agroforestry measures, in general, because trees need care for at least two years before they bear fruit; and smallholder farmers adopting tamarind production are only planting them along property bunds (crop perimeter) rather than intercropped throughout cropland because of small plot sizes.

Dryland horticulture and agroforestry have the potential for sustainable livelihood outcomes, in general, because of potential far-reaching benefits in productivity and resource conservation. However, smallholder farmers in Byalal do not consider this a feasible option because of landholding size, and feasibility for largeholder farmers is uncertain without significant improvements in transfer of technologies of appropriate measures. In addition, the more appealing crop diversification activities among farmers appear to be those that improve welfare and livelihood sustainability in the short-term.

#### *5.2.2.5 Apiculture and Sericulture*

The GoK and UASD (Table 3 and 4) recommended apiculture and sericulture activity. Farmers can develop both in combination with field crops in most parts of Karnataka. Sericulture requires only a small portion of land whereas apiculture do not require any additional land (GoK, 2007). However, only one person reported interest in sericulture, and no one reported interest in apiculture activity. General barriers were incentive-related (lack of interest, low demand, perceived high maintenance) and resource constraints (lack of information). One male farmer said of apiculture, “I have seen those boxes alongside the roads near Bagewadi. I do not believe that honey will collect in those boxes” (A11). Another respondent cited barriers associated with resource constraints (labor shortage) and future risk (sustainability of bee colony):

“Because someone needs to be with the boxes 24 hours a day, this is impossible to do because I am alone. Also, there is another problem with beekeeping: if the bees are kept near a farm that uses pesticides on the plant, then there is a chance the bees will die. I have seen this happening. I have seen dead honeybees in fields known to have pesticides. Also, if I did beekeeping, then I would then have to grow sunflowers all the time” (A14).

Long-term and future risks included difficulties marketing the product because of low demand, foreseeable problems transporting the product, and potential poisoning (and loss) of bee colony to pesticides. To illustrate, one female farmer said:

“Beekeeping activity could be done here, but honey is very difficult to sell in Byalal because consumption is very low. People will get honey here from trees and use it. They do not purchase it. So it is only profitable outside the village. So, we would need to drive everyday to Bagewadi to sell it. If we could get someone to pick it up from us that would be better, but no one would drive out this far for just one seller. If it (going to Bagewadi) were just once a week or every 15 days, then we could do it” (A5).

These barriers raised legitimate concerns regarding the feasibility and sustainability of apiculture as a livelihood strategy. A further investigation into the feasibility of apiculture

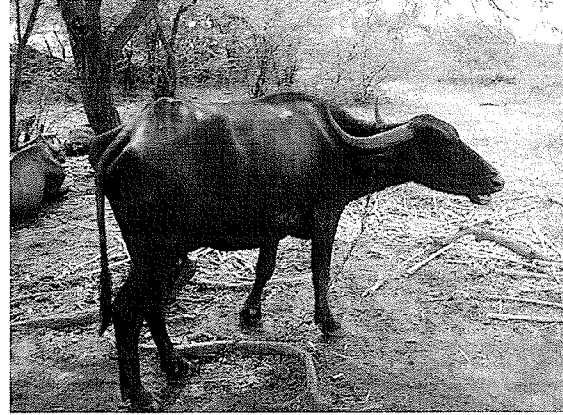
for villagers was facilitated through an informal conversation with one of the few roadside apiculturists located on the way to Byalal. The researcher had observed the beekeeper each day on the way to the village and took the opportunity to speak with him on two occasions to gather information to share with Byalal respondents and UASD-Bijapur Station. The apiculturist started his roadside business (located adjacent to a sunflower farm) two years ago with 25 boxes (Rs 51K total) with bees from the Punjab region of India. He has now expanded production with 100 boxes. To start production, he qualified for a subsidized loan of Rs 50K from the district cooperative bank. He said it was not difficult to get this loan, and all he had to do was show proof that he had completed 10<sup>th</sup> grade education. Thus far, his business has not only been successful, it has also been extremely profitable. One cycle of honey production occurs approximately every 20 days. He collects honey from the boxes and then sells it at Rs 120/kg (or Rs 100/kg wholesale). Each cycle yields approximately 3 quintals (300kg) of honey from which he earns at least Rs 30K per month. In addition to high profitability, apiculture has low maintenance costs. He does not own land and does not pay rent because he is located on public property. Transportation expenses were minimal and labor expense was the only major expense. He pays a laborer Rs 2K/month. Challenges to long-term sustainability included the requirement that 2 persons must stay with the boxes 24 hours a day which can be burdensome, health hazards associated with handling of bees, and potential risks and costs associated with maintaining the health of the bee colony. For example, if bees become sick spraying costs Rs 500/month. Pesticides do kill bees; therefore, the placement of bee colonies near pesticide-free sunflower crops is imperative.

Apiculture may be a more feasible and sustainable DA than Byalal villagers perceive. Furthermore, if they were aware of the high profitability, low maintenance risk and cost, and

seemingly strong market demand beyond the village, then perhaps more villagers would be willing to adopt apiculture as an income alternative. Apiculture can be adopted by anyone regardless of landholding and could be done in village wastelands, and it would produce labor jobs for villagers. One can also speculate that if a supply of honey increased in Byalal, then perhaps they would find that village demand does exist. Even in the absence of village demand, transportation costs to B. Bagewadi once a month would be feasible due to high profitability. Furthermore, an indirect potential benefit of apiculture adoption within Byalal is the possible incentive to reduce chemical pesticide use on sunflower. The only significant remaining barrier to adoption would be increased awareness and financial and technological support.



**Plate 15.** Farm diversification: sheep-rearing in Byalal



**Plate 16.** Farm diversification: dairy production with buffalos in Byalal



**Plate 17.** Farm diversification: vermi-composting at UASD-Bijapur Station



**Plate 18.** Farm diversification: dryland horticulture (lime) and agroforestry (teak) in Byalal



**Plate 19.** Farm diversification: apiculturist showing his bee colonies near B. Bagewadi

### 5.3 Nonfarm Diversification Activities

#### 5.3.1 Local Interests: Nonfarm DA Ideas from and for Villagers

Table 19 presents an inclusive list of nonfarm DA that were identified and discussed during fieldwork. The DA are split between activities that were presented to the researcher by interested participants (1-14) followed by activities presented by the researcher to participants for exploration (15-21) during semi-structured interviews and QIII. Villagers had several “original” interests (denoted by an asterisk) not suggested by the GoK or UASD. “Original” DA shared by respondents such as chili-grinding business (**Plate 20**), general store/tea café business (**Plate 21**), bangle-selling, retail-selling of fruits and vegetables, tom-tom transportation business, labor contracting business, and charcoal production were activities which have already been adopted by others in the village. Only a few DA such as mechanic work, teaching a computer course, beetle leaf/nut store business, mat-making, and *agarbatti* (incense-making) were original ideas not currently adopted in Byalal. Both genders came up with original DA ideas. Top interests among female respondents included candle-making, tailoring/embroidery, *roti*-making, business (un-specified), vegetable/fruit vending, and clothing production. Top interests among male respondents included tailoring/embroidery, *roti*-making, and candle-making. The results show higher diverseness and range of interests for prospective nonfarm DA as compared to farm DA.

**Table 19.** Nonfarm DA explored with women and men during interviews (n=20) and QIII (n=33).

NONFARM DA	AREA OF BENEFIT	INTERESTED FEMALES	INTERESTED MALES
<b>Participant Ideas/Interests</b>			
1. Tailoring/embroidery	Community, Family	A2, A18 5 of 18 (QIII)	FG2 1 of 15 (QIII)
2. General store/tea café *	Community, Family	A9 2 of 18 (QIII)	A10 1 of 15 (QIII)
3. Beetle leaf/nut store *	Community, Family	1 of 18 (QIII)	No interest
4. Agarbatti (Incense-making) *	Social support	A13, A20	No interest
5. Bangle-selling *	Social support	A5	No interest
6. Vegetable/Fruit vendor *	Community, Social support	A5, A9 1 of 18 (QIII)	No interest
7. Chili-grinding *	Community		A10
8. Mechanic *	Community		Son of A7 (migrant)
9. Labor contractor *	Community	1 of 18 (QIII)	1 of 15 (QIII)
10. Charcoal production *	Production		1 of 15 (QIII)
11. Tom-tom Transportation *	Community	1 of 18 (QIII)	No interest
12. Reed/mat-making *	Social support	1 of 18 (QIII)	No interest
13. Business (non-specified) *	Community, Family, or	4 of 18 (QIII)	1 of 15 (QIII)
14. Host computer course *	Community		A6
<b>UASD &amp;/or GoK Ideas</b>			
15. Roti-making	Community, Social support	A13 5 of 18 (QIII)	3 of 15 (QIII)
16. Candle-making	Social support	A13, A20 6 of 18 (QIII)	4 of 15 (QIII)
17. Toy/Doll-making	Family, Social support	1 of 18 (QIII)	No interest
18. Clothing production/textile design	Community, Family	3 of 18 (QIII)	No interest
19. Join SHG	Social support	1 of 18 (QIII)	NA
20. Host market days	Management	No interest	1 of 15 (QIII)
21. Host exhibition	Management	No interest	2 of 15 (QIII)

**Note: Key features of each female interviewee:** A2 [Age 48; Largeholding farmer; Non-diversified]; A3 [Age 40; Landless; Nonfarm/Nonfarm-diversified; Migrant]; A5 [Age 40; Largeholding farmer through land tenancy; Farm/Nonfarm-diversified; Migrant remittance-dependent]; A7 [Age 45; Largeholding farmer through land tenancy; Farm/Nonfarm-diversified; Migrant remittance-dependent]; A9 [Age 35; Landless; Farm/Nonfarm-diversified]; A12 [Age 25; Landless; Nonfarm/Nonfarm-diversified; Widow]; A13 [Age 35; Largeholding farmer-unirrigated; Farm/Nonfarm-diversified; Separated from husband/Single mother]; A17 [Age 49; Landless; Farm/Nonfarm-diversified]; A18 [Age 20; Landless; Farm/Nonfarm-diversified; Widow]; A20 [Age 24; Landless; Farm/Nonfarm-diversified; Devadasi]. **Key features of each male interviewee:** A1 [Age 70; Largeholding farmer; Non-diversified]; A4 [Age 38; Smallholder farmer; Farm/Nonfarm-diversified; Secure livelihood]; A6 [Age 42; Largeholding farmer-unirrigated; Farm/Nonfarm-diversified; Secure livelihood]; A8 [Age 41; Largeholding farmer-unirrigated; Farm/Nonfarm-diversified; Secure livelihood]; A10 [Age 25; Smallholder farmer; Farm/Nonfarm-diversified; Former migrant; Migrant remittance-dependent]; A11 [Age 50; Landless; Farm/Nonfarm-diversified]; A14 [Age 45; Landless; Farm/Nonfarm-diversified; Secure livelihood]; A15 [Age 45; Landless; Nonfarm/Nonfarm-diversified]; A16 [Age 51; Large landowner/renter; Nonfarm non-diversified]; A19 [Age 55; Largeholding farmer; Non-diversified]

### *5.3.2 Feasibility Assessment and Sustainability Implications*

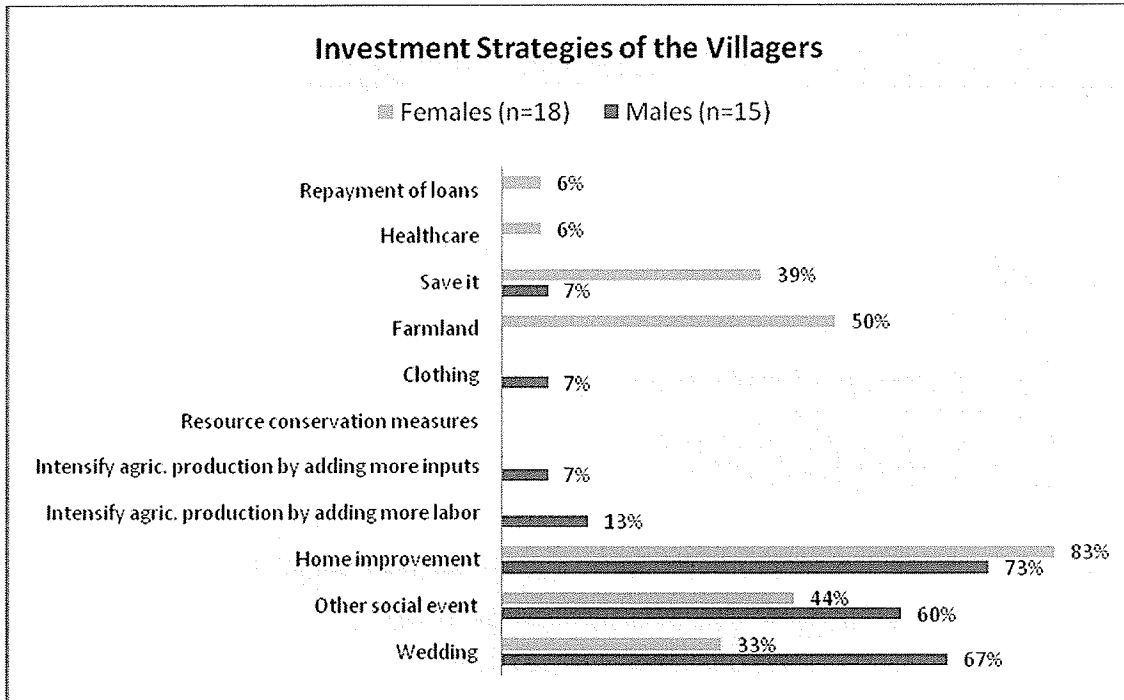
Table 20 presents resources and supports perceived as necessary for adoption of prospective nonfarm DA for and potential barriers to adoption and/or future sustainability of nonfarm DA according to respondents. Only the nonfarm DA of strongest interest and where respondents cited needs and barriers were included in this table.

In general, the perceived needs for and barriers to adoption of nonfarm DA were similar to those described for farm DA. Needs included increased socioeconomic capital assets: financial capital (ability to get financial assistance in the form of loans from other villagers or from financial institutions to increase physical capital needed for new DA or human capital through education/skills), physical capital (supplies, machinery, or equipment for new DA), human capital (increased information, education, skills, labor availability), and social capital (external support and internal support/permission from family). Perceived barriers to adoption included resource constraints (lack of money and information, poor infrastructure of roads and electricity, and poor access to credit) and incentive-related barriers (low market demand, high competitiveness, high risk, no family support). Long-term foreseeable barriers were future market concerns of transporting goods or services to markets outside Byalal and ability to cope with potential maintenance and operation costs. Presented below is a more in-depth collective assessment of social, economic, and environmental implications of top nonfarm DA.

**Table 20.** Perceived needs and barriers to adoption and long-term sustainability of nonfarm DA. (Source: Interviews, n=20 and QIII, n=33).

NONFARM DA	PERCEIVED NEEDS	PERCEIVED BARRIERS
<b>Participant Ideas/Interests</b>		
1. Tailoring/embroidery	Rs 3-5K for sewing machine; 2- mo training program-Kanakal or training from college/ business; family permission	Resource constraint barriers: Cannot get loan/afford machinery Do not have paperwork for loan qualification Incentive-related barriers: No family support Long-term/future risks: Marketing issues - too competitive Maintenance costs, difficulties to repair
2. General store/tea café *	Rs 20-30K to start; additional money to stock supplies; Rs 10K (tea café only); variety of dishes to compete with others	Resource constraint barriers: No money, illiterate Incentive-related barriers: Too risky an investment due to competitiveness Long-term/future risks: Problems maintaining adequate stock (cost) Marketing issues dealing with competition Villagers expect to pay with 'credit' or they will not come; and then fail to pay
3. Agarbatti (Incense-making)*	Training & SHG support; initial money to start; support from husband; transport to Bagewadi	Incentive-related barriers: No SHG cooperation No husband support-too high risk No village market Long-term/future risks: Marketing difficulties in transportation to Bagewadi
4. Bangle-selling *	Money to start; permission from husband	Incentive-related barriers: No permission from husband-can't do 2 jobs
5. Vegetable/Fruit vendor *	Permission from husband; initial investment of Rs 400-500; transport to Bagewadi to purchase produce	Incentive-related barriers: No permission from husband- can't do 2 jobs No village market- cost of produce is too high Insufficient net returns Goods are perishable (incurred losses)
6. Chili-grinding *	Money/loan for chili grinder	Resource constraint barriers:Power shortage Long-term/future risks: Maintenance costs/operation costs (bills)
7. Mechanic *		Incentive-related barriers/resource constraints: Low market demand in village so it is necessary to travel to village cluster – but roads are in too poor condition (poor infrastructure)
8. Computer class*	Market in village	Incentive-related barrier: No local market
<b>UASD &amp;/or GoK Ideas</b>		
9. Roti-making	Training & SHG support; marketing advice	Incentive-related barrier: No SHG support No market in village-everyone makes their own Long/term/future risks: Transport issues
10. Candle-making	Training (supplies given at training) & SHG support; Rs 15K to start; marketing skills	Incentive-related barrier: No SHG/family support No market in village- no one buys them in store

Consistent with the assessment of farm DA, sustainable livelihood outcomes of each nonfarm DA should also be considered through an evaluation of future impacts on the environment. However, environmental impacts caused by most of the nonfarm DA presented in Table 19 are minimal. In fact, it is conventionally thought that diversification into the nonfarm sector may have a positive impact on the environment due to a shifting of the workforce away from jobs that depend on natural capital. To illustrate, many landless households in Byalal participated (or desired to participate) in charcoal production, an extractive and unsustainable livelihood strategy that is reliant upon natural capital, which has resulted (at least in part) in the depletion of forest cover to the extent to which the surrounding natural landscape has been altered (**Plate 22**). The growth of nonfarm DA that does not impact natural capital might reduce the need of those households to carry out such extractive practices in the local environment for survival. All other nonfarm DA presented on Table 19 do not heavily rely on natural capital inputs to sustain business which implies minimal or no negative impacts on the local natural resources base. It has also been suggested in the literature that agriculturists who diversify into nonfarm activities could even use cash from nonfarm activity to invest in resource-conserving farm technology to improve productivity as a positive impact on the environment. Small and poor farmers tend to invest more in resource conservation measures when they have cash available from nonfarm work (Clay *et al.*, 1995). However, these investments may not be a priority of households. To assess the potential for this outcome, the researcher asked respondents the following question: “With the extra money from your current or potential diversification activities, what would you do with this additional income?” Figure 8 presents the results.



**Figure 8.** Potential investment strategies of poor households in Byalal from income generated by prospective DA. (Source: QIII, n=33)

As depicted in Figure 8, no one reported an interest in investing their additional income into resource conservation measures. The majority of women and men surveyed reported that they would most likely spend their additional income on home improvements or weddings. The results implied that, at least in the near future, resource-conserving technologies would not be a foremost priority among farm households.

Aside from the considerations of local environmental impacts, additional implications for sustainable livelihood outcomes through nonfarm DA can be considered from the local economic viewpoints of profitability and market demand. Tailoring, general store/tea café business, tom-tom transportation business, and chili grinding required comparatively higher capital costs for equipment or supplies than other nonfarm DA in Table 19; however, most of these activities (with the exception of operating a general store/tea café business and tom-tom transportation business) were remunerative for currently participating households. Operating

a general store/tea café business was not remunerative according to owners for a number of reasons. Competition was high among the five locations in Byalal, customers often requested to make payments by “credit” and often never paid their debt, and store maintenance was sometimes difficult. Owners complained that if they did not give customers “credit” then they would simply go to a different general store in Byalal, and owners would lose customer loyalty. Based upon the already high competition among store owners and low profitability, the opening of additional stores would be a less sustainable livelihood strategy for villagers unless they offered a different or more extensive supply of goods. Tom-tom transportation business owners were also not able to maintain stabilized livelihoods because there were too many drivers and not enough business especially during November through June when most villagers migrate to Goa. As a result, drivers also migrate for work at that time. There were three tailoring businesses in Byalal. Two of the three tailors interviewed were income-diversified with secured livelihoods. However, they expressed concerns about future competition in the village if others would also adopt tailoring. There was only one chili-grinding machine in the village. The owner (also one of the tailors) said that he does chili-grinding in the evenings when farmers have returned from work. He always has customers; however, the power shortage has resulted in reduced productivity. Nonetheless, this activity would likely be a sustainable livelihood option, given the low competition, high profitability, and strong demand. Other nonfarm DA listed in Table 19 had lower capital costs but may be less remunerative than tailoring or chili-grinding if adopted as a small-scale business. Similar to farm DA such as poultry, VC, apiculture, and sericulture, these “other” nonfarm DA are unlikely to yield profits that would suffice as an income-alternative for the Byalal households unless they are adopted on a full-time basis and/or as a large-scale business either

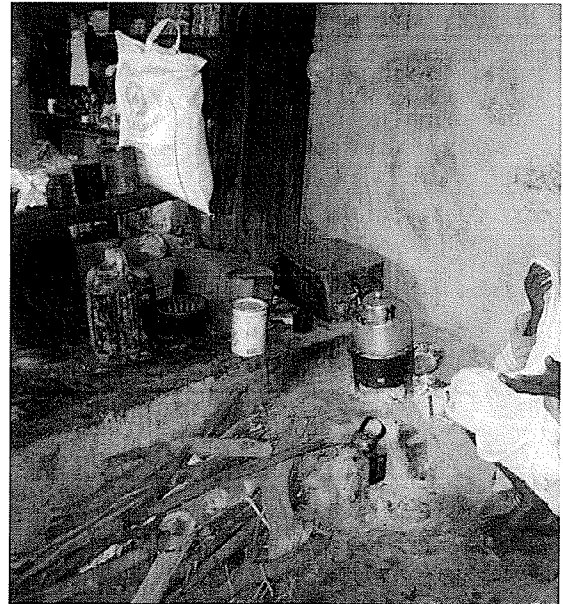
individually or in a group. Although there was less interest in hosting market days and exhibitions, this may be an activity with far-reaching benefits if a *hobli* (cluster of villages) was to participate. For example, exhibitions could be set up as a farmer-to-farmer and agency-to-farm extension groups to share innovative ideas, provide support to one another, and transfer information and technology. If villagers from surrounding villages were to attend a farm exhibition event, the nonfarm sector in Byalal would likely benefit from profits through vending of goods and services. In this way, levels of social capital are increased. A platform for hosting exhibitions already exists in the Byalal through the young men's organization, *Gajanana*. This group organizes an annual festival in September that involves recreational events such as sports competitions, singing, games, and a *rangoli* (drawings created with colored powder) competition. The festival awards cash prizes and is open to men and women from several villages for participation. However, given that there were no innovative farmers within Byalal, farmer-to-farmer exchange of information may be futile without a flow of external and reliable information. Agency-to-farmer exhibitions may be best for remote villages such as Byalal and surrounding villages; but given the shortcomings (i.e. manpower and funding) of external groups such as farm NGOs and university extension programs, it is unlikely that agency-to-farmer exhibitions can take place without significant measure to address those shortcomings.

Markets play an important role in determining opportunities for improved livelihood strategies that the poor can generate. Potential marketing problems of goods and services were a barrier cited by respondents for farm and nonfarm DA. UASD academics have observed this barrier in villages in the district of Dharwad. They said that although the university training program supplies trainees with necessary supplies and teaches marketing

skills for a business within the village, the major barrier to sustainability of the adopted DA was that women were not pro-active enough in their marketing strategies. The women want UASD (or other training organizations) to market products for them. This implies a lack of confidence, incentive, or motivation to sell. Another economic barrier to adoption and long-term sustainability (for both prospective farm and nonfarm DA) pertained to the presence (or absence) of local market demand. Ideal DA for villagers were activities with low competition and high demand for potential goods and services. Villagers maintained that there was an insufficient market demand for successful and sustainable business in *roti*-making, candle-making, incense-making, or apiculture business, which posed a significant barrier for the adoption of DA. For example, all Byalal households eat *roti*, an Indian bread made from *jowar* (sorghum), at every meal. However, villagers argued that because women made *roti* daily and often gave them away to neighbors free of charge, there was no market for *roti* because no one would purchase them. Admittedly, issues regarding a market economy were points of contention between the researcher and respondents. From a capitalist point of view, the researcher argued that there could potentially be a market for *roti* based on the laws of supply and demand. *Roti* preparation is time-consuming and done frequently, and *roti* is high in demand because it is an essential staple in all households (**Plate 23**). However, village respondents, from a transitioning economy where bartering terms of trade are still a major form of economic exchange of goods and services, have a different viewpoint. Respondents asserted just as confidently that a *roti*-selling business could not be successful because no one would actually pay for *roti*. This line of reasoning has important implications for future diversification initiatives. Diversification initiatives may involve development of a stronger capitalist market economy than is currently present, thus posing barriers in and of itself.



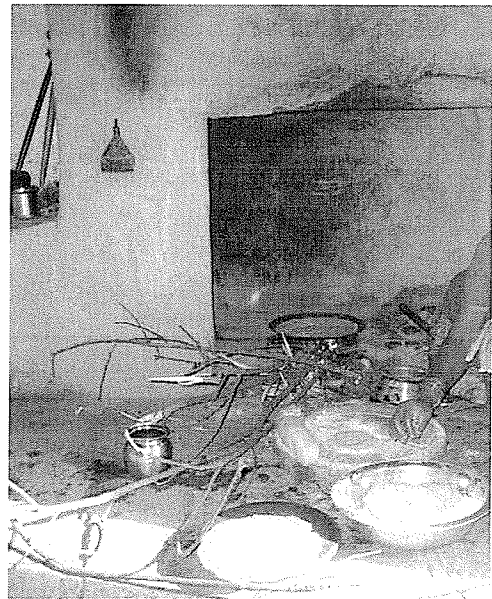
**Plate 20.** Nonfarm diversification: Chili-grinding machine in Byalal



**Plate 21.** Nonfarm diversification: Inside a general store/tea café business in Byalal



**Plate 22.** Nonfarm diversification: Charcoal production business in Byalal



**Plate 23.** Nonfarm diversification: *roti* preparation in Byalal

#### **5.4 Diversification in the Broader Context of Rural India: Additional Considerations**

The poor's strong interest or incentive to diversify does not always match by their capacity (Reardon & Vosti, 1995). In addition to the constraints posed by the asset poverty experienced by Byalal villagers (as described in Chapter 4) there were a number of additional factors that condition the options for livelihood strategies such as economic diversification. This section situates economic diversification, as a general strategy, within the broader context of rural India for a further consideration of the realistic capacity of Byalal villagers to diversify economic activity for improved livelihoods. An identification of all influences on diversification was beyond the scope of this research; therefore, this section is not all encompassing. Additionally, many influences already mentioned throughout Chapters 4 and 5 will not be repeated here. Therefore, this section identifies the major influential factors on economic diversification in a linkage analysis from the research findings in Chapters 4 and 5, personal observations from the field, and supporting literature.

##### *5.4.1 A Hierarchical and Patriarchal Society: Inequality Revisited*

A hierarchical, patriarchal, and ancient caste system plays a major role in society and politics (Menon-Sen & Kumar, 2001). This system propagates discrimination and gender inequality, and women (especially of lower castes) are particularly disadvantaged because the system cultivates the suppression, inferiority, and objectification of women. Women of rural India still have not achieved equal access to make social and economic advancements as men (UNDP, 2007b; KHDR, 2006). This imbalance traps women in a reinforcing cycle of inequality that prevents them from advancing in status; and therefore, rural India remains hindered from realizing its true capacity in development. In a study on the gender-caste system in India, the proportion of women involved in decision-making power seems to

increase in higher castes (Deshpande, A., 2002), and within scheduled castes, a woman's participation in decision-making is not ubiquitous (Table 21).

**Table 21.** Some indicators of women's autonomy among scheduled castes, India, 1998–99. (Source: Modified table from NFHS-II, p. 67 printed in Deshpande, A. 2002).

Percentage not involved in any decision-making	9.1
Percentage involved in decision-making on what to cook	86.2
Percentage involved in decision-making on own healthcare	49.7
Percentage involved in decision-making on staying with her parents/siblings	47.4
Percentage who do NOT need permission to go to the market	31.3
Percentage who do NOT need permission to visit friends/relatives	23.7
Percentage with access to money	56

This has important implications for development strategies in Byalal, where half the population belongs to scheduled castes and scheduled tribes. The study revealed that a recurrent barrier to economic diversification among women was lack of permission from her husband. However, women were less able to adopt diversification strategies because they had low education or skills (often because they married at a young age and were then expected to quit school to maintain the household), and women did not have the right to adopt income-diversifying strategies without the consent of their husbands. Yet, the study also revealed that women (if given the option) were more likely to uptake diversification activities as a potential coping mechanism than men – a notion also supported by academics at UASD. If women are not granted permission to uptake diversification strategies or are restricted due to insufficient education or skills, then the extent to which village economic stability can take place through future diversification initiatives is uncertain. Although a major rationale for SHG for women is to curtail this phenomenon through empowerment via group decision-making, the study also revealed that SHG themselves were a barrier to adoption of DA among women because of a lack of consensus among its members. Some members were more risk averse than others; but without a unanimous vote, new activities are not adopted. In addition, the

potential for Byalal widows to diversify income for socioeconomic improvement is doubtful, given the traditional customs that make it difficult for widows to live a normal life. The study revealed their hesitation and doubt when asked about potential DA. Widowhood, indeed, poses a major barrier to diversification for women. In addition, caste divisions in Byalal, though reportedly improved over time, may also pose potential barriers for future diversification efforts. In the short term and local level, gender inequity and discrimination must be considered from the outset of the development of local diversification initiatives; but looking into the future and at a broader level, the question must be asked: If an undesirable issue such as gender inequality is intricately woven into society as a long-standing and culturally accepted norm, as is the case in India, is it possible to make a transformation in the mindset among people for social and economic change that moves against that norm? Women must be granted equal rights to men and that includes the ability and incentive to complete their education and to freely make decisions in every way.

#### *5.4.2 A Traditional Society: The Questionable Role of Fate in Hinduism*

Many traditional aspects woven into the society of Byalal influence livelihoods on a daily basis, many of which stem from the deeply embedded roots of Indian history and religion. Hinduism was the dominant religion in Byalal. Although Hinduism advocates the notion of free will rather than a pure version of fatalism, the average Hindu believes in fate to a certain extent (The Hindu Website, accessed 2009). Karma is the Hindu belief in a universal principle of cause and effect; and in some schools of thought, karma is also dependent on the will of a god who acts in a fair way. In Byalal, for example, focus was often given to Shiva (The Destroyer). Thus, Hinduism recognizes the importance of both free will and fate in the life of humans: man is responsible for his actions, but the real doer is actually the omniscient,

omnipotent, and omnipresent God who allows nothing to happen without his knowledge or consent (The Hindu Website, accessed 2009). Along these same lines, auspiciousness and its role is another tradition observed in the Byalal Hindu society. Auspiciousness (and inauspiciousness) is the degree to which events, times, and relationships are conducive to the wellbeing of an individual or of the society (Flood, 1996). Hindus often consult astrologists at decision-making times to determine the most auspicious (fortunate or prosperous) moment for planning events such as marriage and purchase of gold.

Indirect references to auspiciousness and fatalism, the doctrine emphasizing the subjugation of all events or actions to fate or inevitable predetermination, were a recurrent theme in the answers of respondents as depicted in section 4.3.3. Perhaps related to one's fate was the rigid belief held by farm elders that their sons were expected, or destined, to take over the farms of their fathers. Although the research found generational differences in opinion on decision-making and livelihood strategies, not assessed was the extent to which these differences were influenced by fatalism. Traditions with religious connotations were observed to be an essential component in the daily lives of Byalal villagers and in the broader context of Karnataka; therefore, Hinduism was more than a religion. It was a way of life. It was their culture, and culture is a contextual component that is likely to strongly influence how the poor are able to interact with the institutions that affect their livelihoods. Through this realization, two key findings emerged. First, it became obvious that, particularly in rural India, the "social" aspects of cultural and religious norms and traditions are inseparable from the "economic" and the "environmental" aspects. Secondly, because Hinduism played a central role in decision-making, it will likely influence future decisions and interactions with institutions regarding diversification strategies and livelihood outcomes. Accordingly, the

sustainability of livelihood outcomes from a dominantly economic plan for prospective diversification activities may be uncertain if social factors are not given equal attention. This finding underscores the importance of a systems-approach for development that is inclusive of the social, environmental, and economic local context.

#### *5.4.3 Alcoholism*

Government statistics show that 21% of adult men (and 2% of women) consume alcohol; however, more than half of all drinkers fall into the criteria for hazardous drinking (Prasad, 2009). Of particular concern is the amount of alcohol drunk in India that is unrecorded because it is illicit home brew. Illegal production is known to occur quite extensively throughout the country (Benegal *et al.*, 2000). Imbibing of such concoctions like arrack can result in death, disability, or hospitalization. In 2000, the prevalence of alcohol dependence in Karnataka was an estimated 3.79% (Benegal *et al.*, 2000). A study conducted in Karnataka suggested that India's poor are drinking more than they earn resulting in a deadly spiral of alcohol and debt (Prasad, 2009).

Alcoholism was found to have high social and economic costs within the household and for the entire village. Alcohol abuse in Byalal, especially among the male population, occurred so frequently that villagers forewarned the research team that data collection should cease by 6pm each day because at that time the men returned from work and began to drink. There were a few cases found where alcoholism had resulted in the reduced quantity of labor within households in Byalal, and one household had lost their land because of their inability to repay their debt due to excessive alcohol purchase. Women and children bore the indirect costs of male alcohol abuse. Males who became ill because of the accumulated effects of heavy drinking, the women and children with little choice but to uptake more work, including

migrant activity, for livelihood security. The long-term sustainability of diversification strategies will most likely be constrained by continued alcohol abuse in Byalal further perpetuating the labor imbalance, which leaves women with the brunt of the work.

#### *5.4.4 Economic Behaviors in Decision-making*

This study revealed themes of shortsightedness, risk aversion, and complacency regarding household decision-making for current and prospective diversification strategies. Shortsightedness was common among most respondents. During brainstorming sessions for the feasibility of farm and nonfarm diversification strategies, for example, villagers were often incapable or unwilling to exploring future possibilities because they could not look beyond the initial needs of irrigation or money for adoption of new strategies. In this way, villagers felt that they had limited options to take alternative measures without external interventions and support. Another example of the influence of myopic behaviors in decision-making frequently observed pertained to immediacy: villagers typically only took actions if benefits or returns on investments could be reaped in the short-term. Some farm DA, such as organic farming, dryland horticulture, and agroforestry, were not adopted in part due to the initial long lag time before incurring profits. Horticulture and agroforestry, although more profitable, was unappealing because farmers must wait several years before crops reach maturity for production. Apiculture activity was also less appealing among Byalal villagers because profits are only incurred once a month whereas activities such as the more appealing activity of dairy production, although less profitable, incurs daily income and immediate production. The needs and interests articulated by Byalal villagers were strongly biased towards short-run productivity.

The research also observed the role of risk perceptions in influencing decisions regarding the adoption of diversification strategies. As described and explored in section 4.3.3, most villagers did not perceive or foresee ecological degradation to be problematic. In this way, the role of risk perceptions directly affected the adoption of sustainable technologies because there was no perceived immediate threat and there was no incentive to do so. In addition to lack of perceived risk, risk aversion was also observed as a recurrent barrier to adoption of farm and nonfarm DA. For example, farmers perceived some farm activities such as livestock husbandry, agroforestry, and apiculture as too risky either as an initial investment or in the future. Perceived future risks in several nonfarm DA such as *agarbatti*-making, chili-grinding, tailoring/embroidery, and *roti*-making were cited frequently as a barrier to adoption. No innovators were identified in either the farm or nonfarm sectors in Byalal. Indeed, there was a lack of margin in Byalal livelihoods for taking risks to introduce innovations in their practices or to suffer crop failure.

A number of villagers that expressed a general indifference toward prospective diversification strategies were seemingly complacent or acquiescent in their present state of impoverishment. To exemplify this sentiment, one male farmer when asked to share his DA ideas said, "I am happy with the way it is. I am happy with my earnings. I want to stay in debt forever. I do not want to take the risks [in diversification strategies] to increase my income" (A19). Villagers who had successfully diversified their household income provided some insight into this attitude. "In terms of future prospects for others in this village to diversify...well, people here are illiterate and they do not know what they can do or how they can do it. People don't want to do extra work either" (A4). Another said, "People are illiterate and do not think in these lines in this village" (A6, KI).

A fundamental understanding of economic decision-making behaviors may help initiatives for diversification by ensuring an environment that not only gives locals more options to choose from but also helps them to make decisions more wisely by addressing perceived risks and barriers. In addition, some villagers may simply not want to change their ways or take part in implemented diversification initiatives.

#### *5.4.5 Issues of Access: External Institutional and Organizational Processes*

People everywhere confront difficulties in decision-making; however, the poor are often asked to do it more often and in tougher circumstances. The choices of the poor are sometimes viewed as a result of some inherent failing rather than because their environments offer fewer opportunities such as access to various resources (Mullainathan, 2009). The single most commonly reported obstacle to investment and entrepreneurship is inadequate access to capital; however, demand constraints may also be a factor underlying restricted access to credit (Davis, 2003). Thus, it is recognized that villagers of Byalal make decisions based on limited options and within an environment where external processes are inadequate, inefficient, or further constrain access to a number of assets that allow capacity to diversify income. Indeed, the research supports the notion that influential external processes, many of which are largely beyond the control of the villagers themselves, limit the local capacity to diversify. For example, it has already been described how the inadequacy of government departments has resulted in the poor quality of infrastructure, especially road conditions and electrification, which constrains local options for farm and nonfarm diversification activities. Other constraints pertained to issues of access to credit, information, and technology, which necessitate a stronger presence and enhanced capacities of external organizations.

Access to credit was a dominant constraint for poor households in Byalal. Although there has been an increase in the number of rural microfinance institutions over the last ten years as a means to extend credit services to underserved areas, those in Byalal who were previously unable to undertake higher-return farm and nonfarm activities were unable to qualify for credit to invest in more productive activities as depicted in section 4.2.3. To qualify for credit, the applicant must prove the completion of 10<sup>th</sup> grade education, and if applicable, provide legal papers of land ownership. Additionally, the applicant had to convince the loan extension officer of their ability to pay back loans. According to farm respondents who had previously applied for loans, convincing criteria included landholding size, irrigation facilities, and production of high-profit cash crops. Given that most farm households in Byalal lacked irrigation, produced low-profit cereal crops, and that many households were smallholders or landless, many households were deemed ineligible for credit thereby trapping the poorest in a vulnerable state with low-return and high-risk livelihood strategies.

Limited access to reliable information on new technologies was another prominent barrier to diversification. As previously discussed, extension programs from local institutions such as the WMP, UASD-Bijapur Station, and NGOs lacked the capacity to scale up diversification initiatives because of insufficient numbers of workers and funding which perhaps explains why Byalal villagers have not been visited by external farm extension agencies. Furthermore, these institutions also were limited in their abilities to disseminate careful assessments of successful interventions. For example, academics at UASD-Bijapur Station described the problem that farm extension workers from local institutions will often go once into the village to disseminate information regarding new technologies but then do

not return to the village for a follow up to ensure proper adoption of technologies or to receive feedback from village practitioners. They have found that farmers often adopt measures but carry them out incorrectly or modify them in ways they see fit. In other words, transfer of technology from these institutions takes only a top-down and short-term approach. However, it is well established that when the knowledge and engagement of local people is sought and given value during planning and implementation, then they are more likely to continue activities after project completion (Pretty, 1995). In this way, a bidirectional feedback mechanism implemented into extension and training programs can increase the capacities of the extension program and improve prospects for sustainable diversification initiatives for villagers.

Villagers who had participated in training for vermi-composting also challenged effectiveness of training programs available at UASD-Bijapur Station and Rudset, a local NGO. Respondents who had taken training courses from these institutions did not adopt measures because they were unable to receive loans for capital costs. After training, participants were given a certificate of completion by the training program and were advised to take the certificate to financial institutions when applying for loans. Even after providing the certificate, financial institutions rejected participants for loans. They expressed frustration and confusion by the rejection. According to Rudset, the most common reasons for loan rejections from financial institutions were the inability to provide proof of education and excessive money request. The research revealed evidence of both: many villagers were unable to meet the education stipulation and villagers requested loans in the past for amounts that were excessive. Nonetheless, future diversification initiatives should include the closing of the gap between the training program and financial institutions to increase uptake of

diversification measures through an increased communication and collaboration among institutions.

#### *5.4.6 Issues of Access: The Macro-political Context*

Investigations into the expansive realm of macro-political processes that influence rural livelihoods were beyond the scope of this research; however, government policies (or the lack thereof) have profound impacts at every level and cannot be ignored. Access, control, and use of assets are influenced by political processes and therefore influence livelihood options and outcomes down to the household and individual level. A recent comparative assessment on poverty reduction policies in China, India, and Brazil found that India ranks poorly in its pro-poor growth and pro-poor social policies due to inequalities between the rich and poor, despite its reductions in poverty during the country's reform period (Ravallion, 2009). The study suggested that a major problem for India is its extensive capture of policies by non-poor groups, and that the government can learn from the progressive social policies of Brazil and the macroeconomic growth policies of China. This inequality has widened the gap between the rich and poor and the urban and rural, which hinders total reductions in poverty; therefore, a more inter-regional balance of investments is necessary to reach the most vulnerable.

Government policy choices by the Indian government over the last two decades have in fact increased the vulnerabilities of small and marginal farmers (Patnaik, 2009). Worsening matters, the interests of this group of farmers tend to be poorly represented, as policies are biased toward those of the landed elite (WB, 2008). Farmers in marginal production environments, such as the rain-dependent dryland regions, are perhaps the most vulnerable and neglected. To illustrate, the current overemphasis on wheat has led to a shift

away from growing drought-tolerant millet and sorghum, which is more appropriate for dryland and drought-prone areas. Fickle price regime policies of produce result in such shifts in crops grown. In Byalal, only farmers with irrigation were able to produce higher-valued wheat, while farmers with rain-fed fields - with their lower-valued millet and sorghum crops - were left to struggle with lower incomes and their dreams to some day also construct groundwater irrigation to grow higher-valued crops. Many had significant debts from failed attempts to do so. Policies have also largely neglected investments for research and technology on dryland agriculture to increase agricultural productivity (Patnaik, 2009). Furthermore, the governments of Karnataka and Andhra Pradesh must move forward to find ways to settle the long-lasting dispute on the lift irrigation system and more seriously investigate the availability of water for irrigation in dryland regions. Additionally, there is a need for more effective planning for sustainable watershed management programs in drought-prone rural areas. Impact assessments of watershed development in India have suggested several positive trends: increased productivity, reduced vulnerability during droughts, recharging of the water table, improved fodder production for livestock, improved access to drinking water, increased local job opportunities, and diversification of the village economy (Turton, 2000). Since the 1990s, the Indian government and NGOs have spent \$500 million annually into the redevelopment of watersheds in these areas; however, these efforts have fallen short of their goals due to an overemphasis on technical aspects while neglecting the importance of understanding the complex social dynamics of agrarian villages (Corbett, 2009). The presence of a stronger and more effective watershed development program would likely have far-reaching benefits in Byalal and the surrounding villages.

Policies are also needed to stimulate the rural nonfarm economy and promote nonfarm diversification that includes well-targeted interventions for the marginalized subpopulations. Evidence from past studies in African and Latin American countries suggests that promotion of farm/nonfarm linkages, especially those focused on commercialization of smallholders, has enormous potential to create employment and to further diversify income (Kimenye, 1995). A study conducted in India on rural nonfarm employment suggested that policy-makers seeking to maximize the impact of an expanding nonfarm sector on rural poverty should concentrate their efforts on removing the barriers of entry of the poor into the non-farm sector which involves improving education in rural areas (Lanjouw & Shariff, 2002). The poor conditions of roads also affect the efficiency of markets. Policy-makers urgently need to address this issue.

India's policies on trade liberalization also affect villagers. India is among the world's leading agricultural producers; yet, its trade flows are relatively small compared with those of other main players on the world agricultural markets. During the reforms of the 1990s, India liberalized its trade policies; however, India's involvement in world agricultural trade has declined since the mid-1960s. The reason is not so much because of failures in agricultural production but rather that agricultural policies since the onset of the green revolution have been focused on considerations of food security and self-sufficiency through deliberate pursuit of import-substitution endeavors (Nayyar & Sen, 1994). The potential benefits to India for a greater move toward trade liberalization are nebulous. While the potential gains from full trade liberalization as a share of GDP are larger for developing countries than for developed countries, the estimated impacts of a potential Doha agreement suggest that gains are smaller for developing countries, in part

because negotiations currently place heavier emphasis on eliminating export subsidies and on cutting domestic subsidies than on reducing tariffs in both developed and developing countries (WB, 2008). Although reductions in both are important, reductions in tariffs are expected to have a greater impact on poverty reduction in developing countries than the removal of subsidies. Therefore, a shift of focus regarding trade barrier reductions in the next Doha agenda from subsidies to tariffs may lead to greater gains for India.

#### *5.4.7 Climate Change and Seasonality*

Increased rainfall variability and successive droughts that result in crop failures are phenomena that destabilize the household and village economy. Successive droughts may also obstruct the successfulness of prospective farm and nonfarm diversification activities; thus, the rationale for the implementation of economic diversification as a “drought-proofing” strategy seems somewhat paradoxical. Droughts will have a direct impact on crop and livestock diversification. Without resource-conserving technologies such as water harvesting, construction of appropriate bunds to prevent soil erosion during torrential monsoon rainfalls, and technologies for predicting rainfall, these activities may not be sustainable solutions, as natural resources will continue to be depleted. Droughts will have an indirect impact on prospective nonfarm DA because of the occurrence of higher incidence of seasonal out-migration during droughts. When most of the villagers leave town for extended periods, the local economy becomes severely destabilized and food security becomes an issue for all. Indeed, the sustainability of the nonfarm sector is uncertain at present because it is contingent upon a substantial portion of the village population to be present year-round for

survival. In this way, the health and stability of the local nonfarm sector directly affects the health and stability of the local farm sector.

All agrarian households in Byalal confront seasonality as an inherent feature of their livelihoods, which explains patterns of income-diversifying strategies and seasonal changes in occupation. A study measuring livelihood security in India showed how the seasonal calendar explained the timing of migrant labor in a rural community and was deemed important for determining the need for external assistance to rural households (Lindenberg, 2002). Households that pursue income-earning opportunities often do so in a seasonal cycle which is not synchronized with the farm's own seasons (Ellis, 2000). As a result, farm households interested in new income-diversifying activity may take up such opportunities only during off-season months so that less remunerative production does not overlap with production that is more remunerative. On the other hand, nonfarm households including agricultural laborers and seasonal migrants may benefit from diversification since they are bound less by seasonality than farm households.

### **5.5 Summary**

An exploration of the feasibility of prospective farm and nonfarm diversification activities was undertaken with villagers in an assessment for future diversification initiatives for rural dryland regions of northern Karnataka. In this assessment, the villagers' interests, needs, and barriers to adoption and long-term sustainability of alternative income-generating DA were collected to evaluate the potential of each for sustainable rural livelihood outcomes. The results revealed a wide range of interests in potential farm and nonfarm DA originating from UASD, GoK, and from villagers themselves. Among all DA explored, livestock husbandry through sheep/goat rearing or through dairy production was of highest interest and was

considered the most feasible, from the villager perspective, because of its commonality in Byalal. To a lesser extent, male farmers expressed a general interest in organic production. However, the research found that in addition to those activities, vermi-compost production; organic production; dryland horticulture and agroforestry; and apiculture might also be feasible and sustainable diversification activities for Byalal villagers. Of those activities, only a few Byalal farmers with irrigated farm systems had adopted dryland horticulture and agroforestry.

Nonfarm diversification activities of top interest among all respondents included tailor/embroidery business, chili-grinding business, candle-making business, and *roti*-making business. To a lesser extent, respondents expressed an interest in a general store/tea café business. However, the research found that all nonfarm business (excluding general store/tea café and charcoal production) might also be feasible and sustainable options for some households, providing that the nonfarm activity does not rely on natural capital inputs due to the conditions of the local natural resources base.

Feasibility of prospective activities, from the villager perspective, pertained to economic principles and included profitability, marketability, and low-riskiness. In turn, these characteristics were also barriers to adoption of prospective activities. Ecological degradation and sustainability of the natural resources base was not a perceived barrier to adoption or long-term livelihood sustainability for any prospective DA. Instead, the research found that lack of uptake of new activities or technologies by farmers was strongly related to their limited knowledge of options; limited reliable information regarding new technologies; inefficient processes of internal and external village engagement and support; insufficient savings and inaccessibility to credit for investments in new opportunities; concerns about

local market demand; poor infrastructure; land constraints to uptake large-scale production; and lack of margin in their livelihoods for taking risks to introduce new activities.

This research supports the notion that the local capacity to diversify is limited by micro- and macro- level influential processes, many of which are largely beyond the control of the villagers themselves. Although macro-level processes were beyond the scope of the research, a number of influences were identified which will likely condition or constrain future diversification initiatives. For example, traditional and cultural norms (i.e. gender inequality, discrimination against lower castes and widows, male alcoholism, and the role of fate in Hinduism and decision-making), institutional and organizational processes (i.e. limited capacities and effectiveness), and shocks, stresses, and trends (i.e. climate change and seasonality) may likely influence outcomes from diversification strategies in Byalal. Traditional and cultural norms may pose the toughest challenges for future diversification interventions, given their strong historical roots in rural India.

## **Chapter 6: Research Conclusions and Recommendations for Future Economic Diversification Interventions**

### **6.1 Introduction**

India is one of the world's largest and fastest-emerging economies; and as the population and pressure on natural resources intensifies in the coming years, the challenge remains to develop poverty reduction plans that promote sustainable livelihoods for present and future generations. Mahatma Gandhi once famously said, "India is not Calcutta and Bombay. India lives in her seven hundred thousand villages." Certainly then, India stands to benefit from poverty reduction in its rural villages, where the majority of its people reside. Economic diversification is recognized by the government and other institutions as a poverty reduction strategy for improving socioeconomic conditions of poor farmers and for stabilizing agrarian village economies. It does so by promoting households to engage in alternative choices in the farm and nonfarm labor market to obtain income sourced from diversified sources. However, economic diversification strategies must also incorporate goals for long-term social and environmental wellbeing.

The purpose of the research was to explore top-down ideas for prospective economic diversification activities from the bottom-up as sustainable livelihood alternatives with poor farmers in the context of the rural, dryland village of Byalal. The research purpose was addressed using the following objectives: to explore the local context and livelihoods of poor and landless farmers; to understand the characteristics of the local agricultural production environment; to identify farming activities, that from the farmers' perspective, may help or hinder agricultural productivity and long-term sustainability; to share and explore prospective diversification activities with farmers; and to consider the feasibility and sustainability of

favorable diversification activities discussed, given the local context. Since the Indian government has traditionally devoted more resources into areas with favorable production environments as opposed to marginal production environments (Fan *et. al*, 2000), the researcher intentionally sought a remote study site in the rural dryland region of South India where some of the harshest ecological, economic, social, and political challenges in the country confront people.

The following section in this chapter presents the conclusions from the research and includes expertise drawn from the literature. Based on the conclusions, the chapter then reveals a number of recommendations for future economic diversification interventions appropriate for Byalal and other villages in the dryland region. The chapter ends with concluding remarks about economic diversification for sustainable livelihood outcomes and on the sustainable livelihoods framework including its strengths, weaknesses, and usefulness as an analytical tool.

## **6.2 Research Conclusions**

The research broadly concludes that economic diversification – especially into the nonfarm sector – into activities that do not heavily rely on local natural capital may offer the best prospects for poverty reduction and sustainable livelihood outcomes for villagers, given the local agro-ecological potential and socioeconomic context. The future prospects for diversification are optimal as there was a strong interest by locals (including seasonal migrants) to diversify income-generating activity locally for household livelihood security.

There was also evidence that some diversified households in Byalal have a more secured livelihood than un-diversified households. Furthermore, there are external supporting institutions in the area which (if strengthened) have the expertise in region-appropriate skills

and technologies in order to facilitate diversification interventions. However, the local interest to diversify does not match the local capacity. Therefore, there is a clear need for the support of external institutions to strengthen the local capacity to diversify by removing barriers to entry for poor households and providing long-term support. The following section organizes more specific conclusions by each research objective.

#### *6.2.1 The local context and livelihoods of the poor*

The majority of households depended on agriculture alone for income, but several households participated in the nonfarm economy as well. The research found that villagers from all socioeconomic classifications (not just farmers) were found to have unstable or insecure livelihoods; therefore, the original focus of the research on “poor and landless farmers” for diversification interventions was concluded to be too exclusive of other groups in the village who may also benefit from future initiatives. Along these same lines, landlessness was not necessarily synonymous with poverty. Indeed, income diversification and access to irrigation appeared more strongly associated with sustainable livelihood outcomes and household livelihood security than landownership status or landholding size. Therefore, rather than narrowly focus on only farm households or landless households, future economic diversification interventions in Byalal and the surrounding dryland region should include poor households from all socioeconomic classifications (especially rain-dependent farm households regardless of landholding).

This research also contends that such diversification has already taken place in Byalal to some extent at the individual and household level. Barrett and colleagues (2001) state that diversification in poor countries is the norm and that few people collect all their income from just one source or hold all their wealth in the form of any single asset. Nonetheless, there is

an interest by many more Byalal households to diversify income but were constrained for various reasons. Therefore, there is a clear need for external institutions to strengthen the local capacity to diversify by removing barriers to entry for poor households and providing long-term support. More specifically, to create an environment conducive for successful and sustainable diversification to take place needs community engagement facilitated by collaboration between external institutions and villagers. Such an environment would incorporate the social and economic goals of villagers; ecological goals to improve the natural resources base; targeted improvements in access to capital assets; a platform for participatory exchange of knowledge, interests, concerns, and technologies; and risk management to reduce risk associated with the adoption of new farm and nonfarm activities and technologies.

Chapters 4 and 5 portray many complex social, economic, and environmental challenges confronting villagers living in poor agrarian villages in the marginal dryland region of South India such as Byalal. Given these challenges, the research concludes that current livelihood outcomes, at a village-level, are not sustainable due to breakdowns within both natural and social systems as assessed through the sustainability indicators of the study. From a reflection on the data, the research further concludes that a number of village-specific ways can disrupt this perpetual poverty trap. Human capital could be improved in the village if women (regardless of marital status or caste) were allowed equal social and economic opportunities as men including access to a full education, rights of ownership to land or other entitlements, equal wages, and equal participation in decision-making processes. Villagers must also permit children to complete their education as a measure of investment for the future. Studies have shown how initiatives to build social capital would increase

socioeconomic development performance (Krishna, 2002). For example, there is a clear need to improve social relations among village leaders to strengthen the resilience of Byalal during difficult times. The local government (according to villagers) has done little to reverse negative shocks to livelihoods, and residents seem to be locked in a state of poor economic opportunity and weak organizational power. Leaders must move beyond political self-interest toward collective action especially during major crises such as drought, and they need to take measures to increase communication and cohesion among villagers and within internal networks such as self-help groups. Furthermore, there is a need for a greater civil society presence in Byalal to improve the responsiveness and accountability of local democracy. Most critically, external organizations in the area must scale-up their efforts in order to extend support to remote villages such as Byalal. Some barriers to adoption by farmers of more sustainable and diverse practices included limited knowledge of options and lack of direct observation of new practices. Therefore, strengthened farm extension agency-to-farmer networks and farmer-to-farmer networks may provide opportunities for Byalal farmers to overcome such barriers by providing a platform for co-learning, transfer of technology, and research to take place. Also needed are mechanisms of feedback and accountability to improve the effectiveness of local institutions. It is critical that extension workers are willing and capable of transferring appropriate skills and technology and that they are dedicated to extending aid over time as necessary. In addition, local training programs must work together more closely with financial institutions to help trainees receive loans to begin new activities or practices. Rural micro-financial institutions need to find ways to ensure the inclusion of the poorest subpopulations in opportunities to access credit so that they too can participate more fully in the economy because the poorest do not qualify for loans, as they are unable to

meet requirements of financial institutions. Significant room remains for improving the efficiency of public (government-managed) resources. Road improvements, power distribution, and strengthened watershed management programs should be a top priority for the government to stabilize the overall economy. Roads and transport, for instance, clearly influence access to markets. Indeed, these shortcomings lower the productivity of current farm and nonfarm activities and undermine efforts of future diversification strategies without improvements. Unfortunately, there is little that can be done at the village-level (or with collective action from multiple villages) because of the macro-political nature of the issues. Investments in physical capital such as bunds, check dams and the re-vegetation of common lands are relatively easy to achieve; however, as Turton (2000) suggests, the returns to physical investments will rapidly decline if appropriate investments in social and human capital are not also made to develop sustainable and equitable institutions to manage these assets.

#### *6.2.2 The local agricultural production environment*

The research identified a number of challenges in the agricultural production environment (i.e. declines of the natural resources base, agro-climatic changes, socio-political and economic factors), which have resulted in lowered agricultural productivity of Byalal farms and have a number of implications for future diversification initiatives. The research findings and observations revealed that desertification is taking place, with some changes identified by elders as taking place over the past four decades. This research also found that the heavy reliance on unsustainable intensification practices of farmers further exacerbates the pressure on the land. It is thus concluded that if measures are not taken to mitigate and/or reverse the desertification process, future livelihoods dependent on the resources base will certainly be

affected. If diversification activities are to be sustainable livelihood alternatives, it is imperative that future interventions incorporate resource-conservation technologies into existing and prospective farm activities.

Significant differences existed between irrigated and rain-fed farm systems in Byalal. Because irrigated farm systems (as compared to rain-fed farm systems) were more equipped to adopt integrated farm systems and sustainable practices to improve productivity, farmers with irrigation may benefit more from farm diversification initiatives. Irrigated land productivity is more than double that of rain-fed land (WB, 2008b). Farmers of rain-fed farm systems regardless of landholding size faced tougher challenges. Without access to irrigation, smallholder and landless farm tenants may benefit more from nonfarm than farm diversification activities; and largeholding farmers may benefit more from new or improved technologies for dryland agriculture, technology that enables them to more accurately predict rainfall, resource-conservation technologies such as rainwater harvesting structures, and nonfarm diversification initiatives.

### *6.2.3 Farm practices and long-term sustainability*

Of primary concern for both current and future livelihoods is the general unawareness (or denial) of the causal relationship between human actions and environmental outcomes. The sustainability of livelihood outcomes from future diversification interventions will depend on whether or not villagers take into consideration the effects of their strategies and future impacts on the environment (Scoones, 2005). The characteristics of the agricultural production environment mentioned in the previous section signify a need for a platform and social network for the exchange and transfer of information on environmental issues and conservation technologies. The following region-specific measures to increase productivity

and conserve natural resources may be the most feasible measures for Byalal farmers: proper bunds, rainwater harvesting structures, green manuring, agroforestry, planting cover crops, mulching, and reducing frequency of tillage.

#### *6.2.4 Prospective diversification activities*

As compared to other livelihood strategies (i.e. agricultural intensification, migration, etc.), this research found diversification to offer the best prospects for sustainable livelihood outcomes for villagers in Byalal, given the local context. The findings indicate that capacity of agriculture to provide sustainable livelihood opportunities in Byalal is questionable; and out-migration is not possible for everyone and urban centers cannot (or should not, for economic and social reasons) be assumed capable of providing adequate livelihood opportunities for all those unable to make a living in agriculture (Davis, 2003). For these reasons, an emphasis on diversifying into the nonfarm economy may have better prospects for improved livelihoods in Byalal. Empirical research in the literature substantiates positive outcomes from diversification in rural areas of developing countries. Diversification reduces the risk of livelihood failures particularly in the presence of market failures and uncertainties (Allison & Ellis, 2001). A study conducted in all states in India on rural livelihood diversification revealed an inverse relation between poverty and rural livelihood diversification (Mehta, 2009). The study also revealed that Karnataka, as compared to all other states, was one of the least diversified. Another study found that nonfarm activity was the primary trigger for moving out of poverty from 1995-2005 for villagers from four Indian states (Narayan, *et.al*, 2009).

The research also revealed that men and women cope with household livelihood insecurity differently. Women preferred to diversify income for livelihood security whereas

men tend to migrate. However, the research also showed that availability of time and access to resources are potential barriers to diversification for women. Findings of a project in India confirmed that Indian women do not always have economic autonomy within her household, which prevents women from benefiting from income-generating opportunities (Crow, 1992). Daily time allocation and seasonality were also found to be inhibiting factors of women's abilities to engage in income-diversifying activities, a finding substantiated by Lindenberg's 2002 study in India and Von Braun and Wiegand-Jahn's 1991 study in Rwanda. Women already carry a "double burden" workload of productive and reproductive activities. Their husband's illness, disability, or alcoholism especially burdened the women who were the primary head of their household. Questions thus arise as to "who" can adopt new income-earning activities in the household and "how" the household member will work it into their already busy schedules. Some farmer women in Byalal, for example, mentioned that they may only find time to uptake diversification activities during the off-season months of April and May. In this sense, time was a capital asset (that is absent from the sustainable livelihood framework) as well as an influence on the feasibility of diversification.

Male respondents showed higher interest in farm diversification activities whereas female respondents showed interest in both farm and nonfarm diversification activities. Among all farm and nonfarm diversification activities explored, livestock husbandry through sheep/goat-rearing or through dairy production was of highest interest among all respondents including landless households. To a lesser extent, male farmers expressed a general interest in organic production. Nonfarm diversification activities of top interest all respondents included candle-making business, tailor/embroidery business, and *roti*-making business. To a lesser extent, respondents expressed an interest in a general store/tea café business. Villagers

demonstrated an interest in various options recommended by the University of Agricultural Sciences-Dharwad and Government of Karnataka, but the research also revealed that villagers had already contemplated diversification. Many respondents thus shared original ideas during the research.

#### *6.2.5 The feasibility and sustainability of favorable diversification activities*

Because of agro-ecological constraints, the research concludes that farm and especially nonfarm diversification activities that do not rely on natural capital inputs or further degrade the local natural resources base would be the most feasible and sustainable options for Byalal. Farm diversification through the adoption of new sustainable practices has been accompanied by local regeneration, often with the reversal migration patterns (Pretty, 1995). Empirical studies on nonfarm diversification in rural Africa have revealed that nonfarm activity is typically positively correlated with income and wealth (in the form of land and livestock) and thus seems to offer a pathway out of poverty - if nonfarm opportunities can be seized by the rural poor (Barret *et al.* 2001; see also Blaikie *et al.*, 2002 on Nepal; Bryceson, 2002 on Africa; Molle *et al.*, 2002 on Thailand; De Haan, 2002 on India).

The most feasible and sustainable farm and nonfarm prospective diversification activities according to the village respondents (i.e. sheep/goat-herding, dairy production, and tailor business) were found to share the following perceived characteristics: profitability because of local demand, short timeframe for returns from investments, low competition, and familiarity and observed success in Byalal or surrounding villages (perceived low risk). Although respondents expressed interest in other diversification activities as well, respondents perceived several activities as less (or not) feasible if activities did not share such characteristics, which were perceived as criteria necessary for adoption. Risk perception, in

particular, was a foremost barrier to adoption of a number of diversification activities that might otherwise be considered plausible. To illustrate, the research findings also found that other activities such as vermi-compost production; organic production; dryland horticulture and agroforestry; apiculture; and all nonfarm business (excluding general store/tea café and charcoal production) may be feasible and sustainable options for some households although respondents considered many of these to be high-risk with uncertain outcomes. These activities have minimal or no negative local environmental impacts and some even have positive impacts on the local environment; and there is a potential for positive social and economic outcomes. However, because neither Byalal nor areas nearby had adopted any of these activities (except dryland horticulture and agroforestry), the villagers considered them too risky for adoption and thus not feasible. Based on these findings, the research concludes a need for risk reduction measures in future diversification interventions that provide safety nets that lower the risk perception among villagers and encourage the adoption of new activities.

Along these same lines, other barriers to adoption of diversification activities by villagers included limited knowledge of options; insufficient savings and inaccessibility to credit for investments in new opportunities; lack of margin in their livelihoods for taking risks to introduce new activities; uncertainties in local market demand; poor infrastructure; and land constraints barring the uptake of production. This research also identified gender-specific barriers among women. In India, rural non-farm employment since 1990 has expanded more rapidly for men, and recently there has been some overall decline in female participation (Coppard, 2001). Barriers to diversify among women included denial of family support (i.e. permission from the husband/father) and lack of group cooperation with self-

help groups. Although non-government organizations throughout India have paid specific attention to providing opportunities to the poor to diversify their livelihoods through the formation of self help groups for women (Turton, 2000), this research revealed how self-help groups can act as a barrier to adoption of diversification activities for some women when groups must vote unanimously on decisions. The findings imply that an investigation of local economic decision-making behaviors within social groups (including households) may identify knowledge gaps regarding specific livelihood goals and power relations within the group. Furthermore, there is a clear need for the support of external institutions to strengthen the local capacity to diversify by removing barriers to entry for poor households.

Villagers did not perceive ecological degradation and sustainability of the natural resources base as a barrier to the adoption of diversification activities. However, the high number of villagers interested in adopting livestock husbandry (in addition to the many others who have already adopted this activity) raises concerns about the prospects for sustainable livelihood outcomes from livestock husbandry activity. Given the agro-ecological constraints, if all villagers wishing to adopt livestock husbandry in Byalal do so, they will most likely surpass the land capacity to sustain large populations of livestock. In arid grazing systems, the potential for increasing productivity is extremely limited, and livestock resources are best managed by allowing for variability of climate and other agro-ecological conditions (Behnke *et al*, 1993). Where infrastructure and crop encroachment interfere with resources availability, ecological systems are often disrupted, overgrazing and desertification occurs, and the livelihoods of agrarian villages are threatened (Steinfeld, 1998). Future initiatives must consider the sustainability of livelihoods at the broader village-level (while also trying to support individual goals at the household-level). While not promoting social

engineering of the village, there is the need for institutional incentives (from governments, non-government organizations, markets, etc.) that may help shift diversification advantages to practices less reliant on livestock husbandry.

This research also recognizes that goals for environmental sustainability and economic diversification may collide. For example, the reversal of land desertification may clash with new production that requires inputs of land or water. Indeed, a number of farm diversification activities (i.e. dryland horticulture, agroforestry, vermi-composting, and livestock husbandry) would require additional land, water, or both from an area where land degradation and declining groundwater levels are taking place. Furthermore, achieving gains in environmental regeneration can actually work against the livelihood strategies of certain groups. For instance, restricting access to common property lands to improve grassland productivity may deny the poor access to a valuable resource (Turton, 2000).

A contemplation of availability of land highlights the importance of another feasibility consideration: scale of production. Two challenges arise from the issue of scale of production for future economic diversification initiatives, given that diversification activities are to become income-alternatives for farm households when crops fail. First, prospective activities such as poultry farming, apiculture, vermi-composting, dryland horticulture, and specialty businesses such as candle/*agarbatti*-making, toy/doll/mat-making, and bangle-selling adopted for small-scale production may not provide sufficient incomes as an alternative. Selling of bangles, for example, was found to supplement household income but did not substitute for crop income when crops failed. Secondly, the ability to adopt large-scale production of farm diversification activities is typically contingent upon land availability and/or landholding size. Smallholder farmers may not adopt horticulture or

agroforestry because of their small areas for production; and landless households may be left out of opportunities that require land. Smallholder and landless households, however, could participate in activities such as apiculture, vermi-composting, doll/toy/mat-making business, candle/incense-making business, or bangle-selling at a large-scale if adopted for group production (i.e. self-help groups).

Most prospective farm and nonfarm diversification activities (i.e. tailoring/embroidery, mechanic work, teaching computer courses, clothing production/textile designing, apiculture, sericulture, dryland horticulture, vermi-composting, and organic production) require skills, financial and technical support, and information from external farm extension and training programs and financial institutions. The research concludes that external institutions need to provide the skills and training necessary for adoption of new diversification activities. Training programs should incorporate a feedback mechanism to receive input from and ensure correct training of trainees.

Based on a reflection of the data, the research identified the following influences on diversification in Byalal, given the broader context of rural India: patriarchy and gender inequality, discrimination against widows and lower castes (to a lesser extent), alcoholism, weak external institutions such as social networks and macro-political processes, climate change, and seasonality in rural livelihoods. Influences of a traditional and cultural nature of daily life such as the role of Hinduism, generational differences of opinion on livelihood goals and household decision-making, and the barter system in a transitioning economy are potential conditioning factors on diversification strategies and successful livelihood outcomes. The research concludes that patriarchy and traditionalism may likely pose the toughest challenges for future economic strategies because of the strong cultural and

historical roots in society. As Turton (2000) suggests, in countries such as India, rigid socio-cultural relations at village level may work against the poor.

### **6.3 Recommendations for Future Diversification Initiatives in the Region**

This section offers recommendations for future economic diversification initiatives for Byalal and the surrounding dryland region stemming from the conclusions of this research.

-Promoting a community-based rural development plan that is driven by joint collaborations of supporting institutions (government organizations, non-government organizations, the University of Agricultural Sciences-Dharwad, financial institutions, and other donor organizations) and the villagers will be critical. At a broader level, local institutions will need to scale-up their efforts in order to build human and social capital in the area, expand access to financial credit and savings schemes, and promote productive investments and resource-conserving technologies in order to create an environment conducive for diversification interventions to take place. At a local level, villagers will need financial support, sufficient education and training of skills and improved environmental stewardship, and encouragement throughout diversification.

-Future strategies for improving livelihoods through economic diversification in dryland regions should include all villagers rather than focus on landless and poor farmers. This research found households from all socioeconomic classifications (especially those without irrigation) to have unstable or insecure livelihoods and may also benefit from economic diversification initiatives. Initiatives must seek out especially the poorly educated, the unskilled, and women (including widows). Although there is a stronger desire among households to intensify agricultural production or diversify farm activities, smallholder farm

households of rain-fed farm systems and landless households may benefit more from nonfarm diversification activities, and largeholder farmers of rain-fed and irrigated farm systems may benefit from farm and nonfarm diversification activities. Seeking out households wishing to exit completely from agriculture is recommended for nonfarm diversification initiatives.

-Opportunities to strengthen human and social capital and enhancement of technical skills include the following: the creation of local farmer-to-farmer networks; an up-scaling of research-to-farm extension programs and villager training programs to open channels for information and technology; and the incorporation of mechanisms for feedback and accountability into the existing extension programs to ensure that villagers are trained correctly, and if not, to find out what they are doing differently and why. Indeed, a stronger appreciation for the inputs of villagers would enhance program effectiveness because villagers often have a better sense of what works and what does not work for them, which strategists and researchers will need to take into account. Another opportunity to build social capital is to include risk management for diversification activities for individuals and groups. Risk aversion is high among villagers given their lack of margin to uptake new activities; therefore, diversification interventions should create an environment that lowers vulnerabilities and risk perceptions through in-depth risk assessments of each prospective activity and with the provision of safety nets. Direct support to self-help groups or other formal groups in Byalal may provide the initial 'push' of encouragement to adopt new economic opportunities.

-Farm extension programs and training programs of local institutions must work together with local financial institutions such as banks and microfinance companies to bridge the gap

for poor villagers who have completed training but are unable to get loans for initiation so that they are not left out of opportunities.

-Education is critical since the better-paid local jobs require formal schooling, usually to completion of secondary school or beyond, and the association of education with rural nonfarm business success is often reported (Davis, 2003). Byalal villagers are well informed about the limitations on accessing credit due to insufficient education, and illiteracy played a strong role in the general unawareness of reliable information and new technologies. There is an imperative and fundamental need for villagers, especially women and children, to complete their education for improved overall wellbeing. Interventions that include awareness of the importance of education and/or incentives to enhance education may improve the likelihood for sustainable livelihood outcomes in the present and future.

-Given the concerns regarding scale of production, local market demand for production, and poor infrastructure for market transport (roads) and business productivity (power shortage), future diversification initiatives should consider the implementation at a *hobli*-level (cluster of villages) rather than a single village to create a larger market. Adoption of diversification activities among groups such as self-help groups may also provide a means for those without land or other resources to participate in large-scale production of activities. The use of wasteland areas in the village for large-scale production would be another option for vermiculture, apiculture/sericulture, and nonfarm diversification activities; however, expansion into these areas used for grazing may lead to poor outcomes for pastoralists.

-Because of the vulnerabilities and frequency of livelihood insecurity among farmers and their households is high, farm and nonfarm activities are likely to be attractive only if

activities simultaneously improve short-run welfare. Where possible, soil and water conservation and other measures to achieve sustainable development should benefit the farmer in the same year for higher adoption rates. These measures include rainwater harvesting structures, appropriate and effective bunds, minimum tillage, mulching, and planting ground cover crops. Farm activities such as organic production, horticulture, and agroforestry may take years for farmers to incur income and are thus perceived as unfeasible. Interventions may find ways or incentives that bridge households over that time period without income.

-There is also a need for future interventions to support policies and programs to facilitate and stimulate rural nonfarm employment. Watershed management programs, in particular, have been demonstrated in a number of areas in several developing countries to lead toward substantial improvements in rural livelihoods although the links between productivity gains by programs and livelihoods is complex and poorly understood (Turton, 2000).

-Future interventions will need a strong point-of-entry plan. First, although migrants expressed an interest to diversify income so they could quit migration, many have migrated for most of their adult life. Villagers thus deemed migration activity familiar and low-risk, albeit strenuous and undesirable. Therefore, the first stages of planning should include copious amounts of time for community engagement through preliminary participatory meetings to find ways that will encourage the participation of migrants in village diversification. Secondly, time of entry is of the essence. Because participation of the migrant population is key during all stages of development, interventions should begin during the off-season months of April and May when migrants are in the village and have time to participate in discussions.

-Interventions must look for ways to support the goals at the individual, household, or group level while simultaneously supporting village-level objectives for short- and long-term sustainability in a way that falls well short of promoting social engineering of the village. Institutional incentives (from governments, non-government organizations, markets, etc.) may help shift diversification advantages toward practices less reliant on natural capital.

#### **6.4 Concluding Remarks on the Research and the Sustainable Livelihoods Framework**

The characteristics of the marginal dryland areas of rural India present tough challenges ahead for diversification initiatives. However, the research supports the notion that diversification is feasible and it may indeed be the only pathway out of poverty for Byalal villagers. Consequently, there needs to be greater recognition by the Indian government and donor organizations that investments in research and development must reach areas of both low and high potential to shrink the gap between the rich and poor, if the country is to meet its goals for poverty reduction and increased agricultural productivity. Overall, the study rejects the widely-held stereotype that the poor are unmotivated or that they are responsible for their state of poverty (Cozzarelli *et al.*, 2002) and endorses the need for a scaling-up of institutions to support poor people's initiatives. Perhaps most critically, such institutions must find ways to increase the asset accumulation of the poor. Numerous poverty reduction studies in the literature reflect this notion. Higher aggregate asset scores of households in West Bengal and Andhra Pradesh were statistically significant correlates of subsequent escape from poverty (Narayam, 2009). As such, initiatives to boost asset accumulation will enable the poor to expand their livelihood options and outcomes.

The sustainable livelihoods framework, as an exploratory and analytical tool, was used in this research to consider the realities of the rural poor from a holistic perspective. Upon a reflection of the research process with regards to the framework, the researcher considers the framework quite useful but particularly demanding. The advantages of the sustainable livelihoods framework were many. Though exhaustive, the framework attempts to encompass all constituents that compose rural livelihoods. In this way, the framework encourages its users to be mindful of elements otherwise deemed insignificant or accidentally overlooked. The framework facilitated the realization and prioritization of problems; the identification of local and external institutional and contextual processes that influence resource allocation; and the recognition of possible courses of action. The inclusion of social norms and customs in the framework, given the strong influences of religion and culture in rural India, was particularly salient for the research outcomes and could affect future interventions. Although this research focused mainly on micro-level linkages of livelihoods, the framework also allowed for macro-level linkages as well. The sustainable livelihoods framework posed a number of challenges. First, the approach is extremely detailed and time-demanding. Indeed, some consider that the approach is over-ambitious and offers insufficient practical guidance on the way forward, and it is difficult for practitioners and communities to become familiar with it in a short time period (Carney, 1999). Although the research did not attempt to incorporate all elements of the framework during the investigation, a substantial amount of data was nonetheless collected which resulted in a considerable amount of time spent analyzing and synthesizing the findings. If the framework is to be used to its fullest potential, the practitioner must have an ample amount of time and resources. Secondly, there

is insufficient literature describing how to translate concept into practice. Assessing capital assets and livelihood outcomes was especially challenging.

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# APPENDIX A

## APPROVAL CERTIFICATE

14 October 2008

**TO:** Brenda K. Wilson (Advisor T. Henley)  
Principal Investigator

**FROM:** Wayne Taylor, Chair  
Joint-Faculty Research Ethics Board (JFREB)

**Re:** Protocol #J2008:130  
"Economic Diversification & Socio-environmental Sustainability for Poor Farmers in India"

Please be advised that your above-referenced protocol has received human ethics approval by the **Joint-Faculty Research Ethics Board**, which is organized and operates according to the Tri-Council Policy Statement. This approval is valid for one year only.

Any significant changes of the protocol and/or informed consent form should be reported to the Human Ethics Secretariat in advance of implementation of such changes.

**Please note:**

- if you have funds pending human ethics approval, the auditor requires that you submit a copy of this Approval Certificate to Kathryn Bartmanovich, Research Grants & Contract Services (fax 261-0325), including the Sponsor name, before your account can be opened.
- if you have received multi-year funding for this research, responsibility lies with you to apply for and obtain Renewal Approval at the expiry of the initial one-year approval; otherwise the account will be locked.

**The Research Ethics Board requests a final report for your study (available at: [http://umanitoba.ca/research/ors/ethics/ors\\_ethics\\_human\\_REB\\_forms\\_guidelines.html](http://umanitoba.ca/research/ors/ethics/ors_ethics_human_REB_forms_guidelines.html)) in order to be in compliance with Tri-Council Guidelines.**

## APPENDIX B

### VERBAL SCRIPT TRANSLATED FOR ORAL CONSENT & CONSENT FORMS

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**Research Project Title:** “Economic Diversification and Prospects for Sustainable Rural Livelihoods in a Dryland Agrarian Village: A Case Study in Bijapur District, Karnataka, India”.

**Researcher:** Brenda Wilson, Natural Resources Institute, University of Manitoba

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My name is Brenda Wilson, and I am a student at the University of Manitoba who is working in collaboration with the University of Agricultural Sciences in Dharwad. I am conducting research in Karnataka, and you are being asked to participate in the study. I will read you a description of the study to give you a basic idea about what the research is about. Please feel free to ask questions to the researcher. This consent form may contain words that you do not understand. Please ask the researcher to explain any words or information that you do not clearly understand.

The purpose of this research is to explore the social, economic, and environmental local realities of farmers in this village, to understand the linkages of the environment to the current agrarian crisis, and to discuss prospective economic diversification activities as environmentally and socially sustainable alternatives. This research will allow us to investigate possible activities that may improve the economic conditions among farmers. To help us do so, we wish to interview farmers in the village and other knowledgeable people to help us understand the local context.

In this study, we will ask you to participate in an individual interview session where we will be asking a number of questions about the village, your livelihood strategies, and the local environment with emphasis on sustainable agricultural practices. The meeting will take place in the language of your choice. Notes will be taken during the interview, and a tape recorder will be used to record the interview. The interview will last for approximately an hour. You can stop participating at any time. The information gained from the interview will be entered into a computer for analysis. All information you provide will be treated as confidential, and you will not be identified by name in any report or publication resulting from this study. I am not in any way affiliated with a government or non-government organization; therefore, there will be no benefit or cost to you.

In agreeing to participate in this study by giving your verbal consent, this indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the researcher from her legal and professional responsibilities. You are free to withdraw from the study at any time without consequence.

You are free to ask any questions that you may have about the study and your rights as a research participant. If any questions come up during or after the study, you may contact me, Brenda Wilson, the principle investigator, at 974 047 3058. Additionally, you may contact Dr. Salimath at the University of Agricultural Sciences Dharwad at 08362745903. This research has been approved by the University of Manitoba Joint Faculty Research

Ethics Board. If you have any concerns or complaints about this project you may contact any of the above-named persons or the Human Ethics Secretariat at (204) 474-7122 or e-mail [margaret\\_bowman@umanitoba.ca](mailto:margaret_bowman@umanitoba.ca).

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***Statement of Consent***

I \_\_\_\_\_ have been read this consent form. I have had the opportunity to discuss this research study with the investigator. I have had my questions answered by him/her in language I understand. The risks and benefits have been explained to me. I understand that I will be given a copy of this consent form after signing it. I understand that my participation in this study is voluntary and that I may choose to withdraw at any time. I freely agree to participate in this research study.

If the interview is audio-taped I still agree to participate: **Yes – No** (please circle appropriate answer).

I understand that information regarding my personal identity will be kept confidential, but that confidentiality is not guaranteed. I authorize the inspection of any of my records that relate to this study the University of Manitoba Research Ethics Board for quality assurance purposes.

By agreeing to this consent form, I am not waiving any of my legal rights as a participant in this study, nor releasing the investigators or the sponsor from their legal and professional responsibilities.

I, the undersigned, have witnessed the consent process for the participant named above and observed that all pages of the consent form were read to the participant and believe that the participant has understood and has knowingly given her consent.

Name of the witness: \_\_\_\_\_

Signature of the witness: \_\_\_\_\_

I, the undersigned, have fully explained the relevant details of this research study to the participant and believe that the participant has understood and has knowingly given consent.

Printed Name: \_\_\_\_\_ Date \_\_\_\_\_

Signature: \_\_\_\_\_

Role in the study: \_\_\_\_\_ *[i.e. study staff who explained informed consent form.]*

Translation required?  Yes  No If yes, indicate language \_\_\_\_\_

## APPENDIX C

### Questionnaire I: Livelihood Security and Strategies (All villagers)

No.	QUESTIONS	CODING CATEGORIES / RATING SCALE	SKIP
1	Are your sources of income stable?	YES.....1 NO.....2	→ Skip to #3 → Also do Q.III
2	What strategy are you <i>most likely</i> to participate in when your income becomes insecure?	Migrate for employment..... 1 Borrow money..... 2 Sell assets.....3 Adopt a new income-generating activity.....4 Other: _____ 5	
3	What would you need in order to improve your livelihood? (Allow participant to come up with answers, but if they are unable to then read them the options).  CIRCLE ALL THAT APPLY.	Diversify crop production.....A Diversify non-farm income.....B Diversify farm & non-farm income.....C Intensify crop production.....D Expand farm size.....E Leave agriculture altogether.....F Assistance from GO or NGO.....G Specify: _____ Assistance from the UAS.....H Specify: _____ Other: _____ _____	
4	How will you know when you have made significant progress in achieving livelihood security? (Indicators)		
5	What are the strengths of this village?  CIRCLE ALL THAT APPLY.	Strong village leaders.....A Strong community groups.....B Community is close-knit.....C Good access to resources.....D Many innovators in village.....E Easy access to markets.....F Good soil condition for agricultural productivity.....G No strengths.....H Other: _____ _____	
6	How would you describe the effectiveness of community groups in this village?	Very effective.....1 Somewhat effective.....2 Ineffective.....3 There are no groups.....4	
7	What type of activities, at the village level, can be taken to better cope with "crisis" – [drought, electricity shortage, rainfall variability, lack of irrigation, etc.]		

## APPENDIX C continued

### Questionnaire II: Environment and Natural Resources of the Village

No.	QUESTIONS	CODING CATEGORIES / RATING SCALE	SKIP
1	How has your agricultural productivity changed in the last 30 years?	It has increased.....1 It has remained the same.....2 It has decreased.....3	3
2	For what reasons do you attribute this increase/decrease in productivity?		
3	To what extent do you think environmental issues (such as soil infertility, pest-resistance, soil erosion, climate change, etc.) have affected agricultural productivity in the last 30 years?	Strongly extensive.....1 Likely.....2 Somewhat.....3 Minimal.....4 No linkage.....5 Need more information.....6	
4	Do you participate in sustainable agricultural practices for pest control?	YES.....1 NO.....2	
5	Do you participate in sustainable agricultural practices to maintain soil fertility?	YES.....1 NO.....2	
6	Do you take measures to conserve soil from erosion?	YES.....1 NO.....2	
7	Do you take measures to conserve water?	YES.....1 NO.....2	
8	What stops you from farming sustainably?		
9	What do you need to enable you to farm sustainably?  CIRCLE ALL THAT APPLY.	Access to reliable information....A Development of new skills.....B More encouragement/support....C Financial aid.....D Stable market prices.....E Other: _____ _____	
10	Which of the following sustainable agriculture practices would you consider most feasible?  CIRCLE ALL THAT APPLY.	Rainwater harvesting.....A Crop rotation using legumes....B Intercropping.....C Minimizing use of chemicals....D Construction of bunds/terraces to prevent run-off & soil erosion.....E Zero-tillage.....F Vermi-Composting.....G Agro-forestry.....H	

## APPENDIX C continued

### Questionnaire III: Farm and Nonfarm Diversification Activities

No.	QUESTIONS	CODING CATEGORIES / RATING SCALE	SKIP
1	What are your current main sources of income?	FARM.....1 NON-FARM.....2 BOTH.....3  <b>Farm (Crops &amp; Livestock):</b>  Sorghum (jowar).....A Millet (bajra).....B Cotton.....C Groundnut.....D Wheat.....E Sunflower.....F Poultry.....G Goats.....H Other: _____  <b>Non-Farm (Extractive &amp; Commerce):</b>  Farm labor in village.....K Seasonal migration.....L Trucking.....M Construction.....N Art/Craft.....O Tailoring/Stitching.....P Business.....Q Other: _____	
2	What diversification activities would you consider in order to stabilize &/or improve your income? These can be farm or non-farm activities.	_____ A _____ B _____ C _____ D _____ E	
3	Of the following farm diversification activities, which ones would you most likely consider adopting? Please feel free to mention activities not listed here.  CIRCLE ALL THAT APPLY.	Organic production.....A Agro-forestry.....B Poultry-farming.....C Dairy farming.....D Sericulture.....E Bee-keeping/honey.....F Vermi-composting.....G Dryland horticulture.....H Other: _____ I	
4	Of the following non-farm diversification activities, which ones would you most likely consider adopting? Please feel free to mention activities not listed here.  CIRCLE ALL THAT APPLY.	Candle-making.....A Doll-making.....B Toy-making.....C Self-help groups.....D Pasta/Roti-making.....E Clothing production.....F Textile design.....G Host exhibitions.....H Host market days.....I Open business (ex: tea café)...J Other: _____	

<p>5</p>	<p>Of the above circled activities in Questions 3 &amp; 4, what would be the barriers to adoption for you?</p> <p>Diversification Activity: Reason(s): _____</p> <p>Diversification Activity: Reason(s): _____</p> <p>Diversification Activity: Reason(s): _____</p> <p>Diversification Activity: Reason(s): _____</p>	<p><b>Possible reasons:</b></p> <p><i>Incentive-related-</i>  Net returns will not be sufficient.....A  Too risky an investment.....B  Too costly an investment.....C  Price/yield variability.....D  Too low a demand.....E</p> <p><i>Long-term/future risk-</i>  Insecure land tenure.....F  Political/policy instability.....G</p> <p><i>Resources constraints-</i>  Lack of knowledge.....H  Physical environment constraints (soil, rainfall, pest, disease, temperature).....I  Infrastructure is too poor.....J</p>
<p>6</p>	<p>With the extra money from your current/potential diversification activities, what would you do with this additional income?</p> <p>CIRCLE ALL THAT APPLY.</p>	<p>Use it for wedding.....A  Use it for other social events.....B  Use it for house improvements.....C  Use it to intensify agriculture by adding laborers.....D  Use it to intensify agriculture by adding more inputs (fertilizer).....E  Use it to intensify agriculture by adding both labor and inputs.....F  Invest in resource conservation measures (bunds, terraces, water harvesting, etc.).....G  Other: _____</p>

## APPENDIX D

### SEMI-STRUCTURED INTERVIEW SCHEDULE FOR POOR VILLAGERS

#### A. Introductory Questions/Collect Demographic Information

- How many years have you worked as a farmer?
- Does farming go back several generations within your family?
- How long have you lived in this particular village?
- What do you think are the advantages to being a farmer?
- Do you feel a sense of connection to your village and land/sense of pride for what you do as a farmer? Explain.
- What is your perspective of the current agrarian situation?

#### B. Environment/Agricultural Practices/Sustainable Agriculture [*Only for landholding farmers/farm tenants*]

- What are your current challenges in agricultural productivity? (Probe: erosion, water, pest/disease resistance, infertility, salinity, etc.)
- What measures do you take to increase your farm productivity? (Probe: crop intensification, fertility, pest management, water/soil conservation, etc.)
  - -sustainable practices for pest management?
  - -sustainable practices for soil fertility?
  - -sustainable practices for soil conservation?
  - -sustainable practices for water conservation?
- What practices might you participate in that might decrease your productivity?
- What stops you from farming more sustainably?
- What do you need to enable you to farm sustainably?
- How has the environment (land, soils, rainfall, vegetation, agricultural productivity, crop diseases/pests, etc. changed in the past \_\_ years? (Probe: Has productivity increased or decreased? Etc.)
- How have agricultural practices changed in the past \_\_ years? (Probe: Traditional activities vs. modern technologies)

#### C. Social Perspectives & Livelihood Strategies

- [*Only for landless farmers/laborers*]: Did you ever own land? If yes, why do you no longer own it?
- What measures do you take to secure your household livelihood? (Probe: All sources of income & strategies: Migration, borrow money, sell assets, etc.)
- Do you consider your income to be stable or unstable? If unstable, what kinds of support do you need that might help stabilize your income? (Probe for specifics: If they say 'money', ask them for specifics on what it is perceived it is needed for).
- How will you know when you have made significant progress in achieving livelihood security? [Indicators]

#### D. Diversification Activity [*Only for those with reported unstable incomes & migrants*]

- Have you tried to diversify your economic activity (through adopting new farm & non-farm activities or technologies) to stabilize your income to improve your livelihood? If **yes**, list activities & discuss outcomes. If **no**, would you consider diversifying your income-generating activity? (Probe: Why/Why not?)
- What income-diversifying activities have you thought of doing next to secure your livelihood that might interest you? (For each DA, discuss the following):
  - A. What might you need to actually do this?
  - B. What are potential barriers to adoption? Looking beyond those initial barriers, what barriers might get in the way of your long-term success in this? What measures could you take to overcome these barriers?
  - C. Can you think of any long-term environmental impacts that this activity might have on future generations?
- Now, let's explore the following farm and non-farm DA, and then discuss the sustainability implications (use same questions A-C above). [2 farm & 2 nonfarm, if time permits].
  - vermi-composting (or other)
  - dairy farming (or other)
  - incense-making (or other)
  - roti-making (or other)
- Do the characteristics of the village offer opportunities for diversification? (Probes: self-help groups, strong community leaders, access to market, sense of community closeness for collective action, good infrastructure, pro-active people, etc.)

***Only for diversified villagers:***

- Tell me about this activity. (Probe: Duration, income, successes/failures, etc.)
- How did you find out about this activity and start it up?
- What are the major challenges in doing this activity?
- Would you recommend this activity to someone *outside this village*, if they would ask your opinion?
- What characteristics of this village, if any, offer opportunity for others to diversify? (Probe: village leadership, village cooperation/communication, group support, market access, etc.)

**E. Sustainability Questions [Coping & Adaptability: Resilience]**

- How would you describe the cooperation and communication within this village?
- How effective are the village leaders?
- What +/- changes have taken place in this village over the last \_\_\_yrs?
- The major challenges for this area include drought, electricity shortage, rainfall variability, migration-dependence, & lack of irrigation. At a village level, what type of actions OTHER THAN MIGRATION can be taken to better cope with these challenges?

## APPENDIX E

### SCHEDULE FOR FOCUS GROUP DISCUSSIONS: WOMEN/MEN FARMERS

**Group Activity:** Draw daily, weekly, & seasonal calendar describing elements of daily lives, including all farm/non-farm activities.

*WOMEN ONLY:* What decisions are you able to make regarding farm activity?

What are the major challenges for this village, and how might the village cope with these crises?

*(Section I allows farmers the opportunity to brainstorm for their own DA ideas, but if they are having problems coming up with ideas, then the researcher will proceed to Section II in which diversification activities will be given for discussion. Section I will be asked again following those discussions to provide the farmers again with the chance to brainstorm for ideas before ending the focus group.)*

**I.** What activities (farm and non-farm) could help you secure your household livelihood?

- Brainstorm for list of ideas.
- Explore the feasibility of each:
  - a. What might you need to actually do this?
  - b. What barriers might get in the way and what might you need to overcome these barriers?

**II.** Explore Diversification Activity #1: \_\_\_\_\_ (FARM ACTIVITY)

- Introduce activity.
- Explore the feasibility of each:
  - a. What might you need to actually do this?
  - b. What barriers might get in the way and what might you need to overcome these barriers?

Explore Diversification Activity #2: \_\_\_\_\_ (NONFARM ACTIVITY)

- Introduce activity.
- Explore the feasibility of each:
  - a. What might you need to actually do this?
  - b. What barriers might get in the way and what might you need to overcome these barriers?

*...And so on, as time permits.*

## **APPENDIX E continued**

### **SCHEDULE FOR FOCUS GROUP DISCUSSIONS: VILLAGE ELDERS**

#### **A. Environmental Changes over Time:**

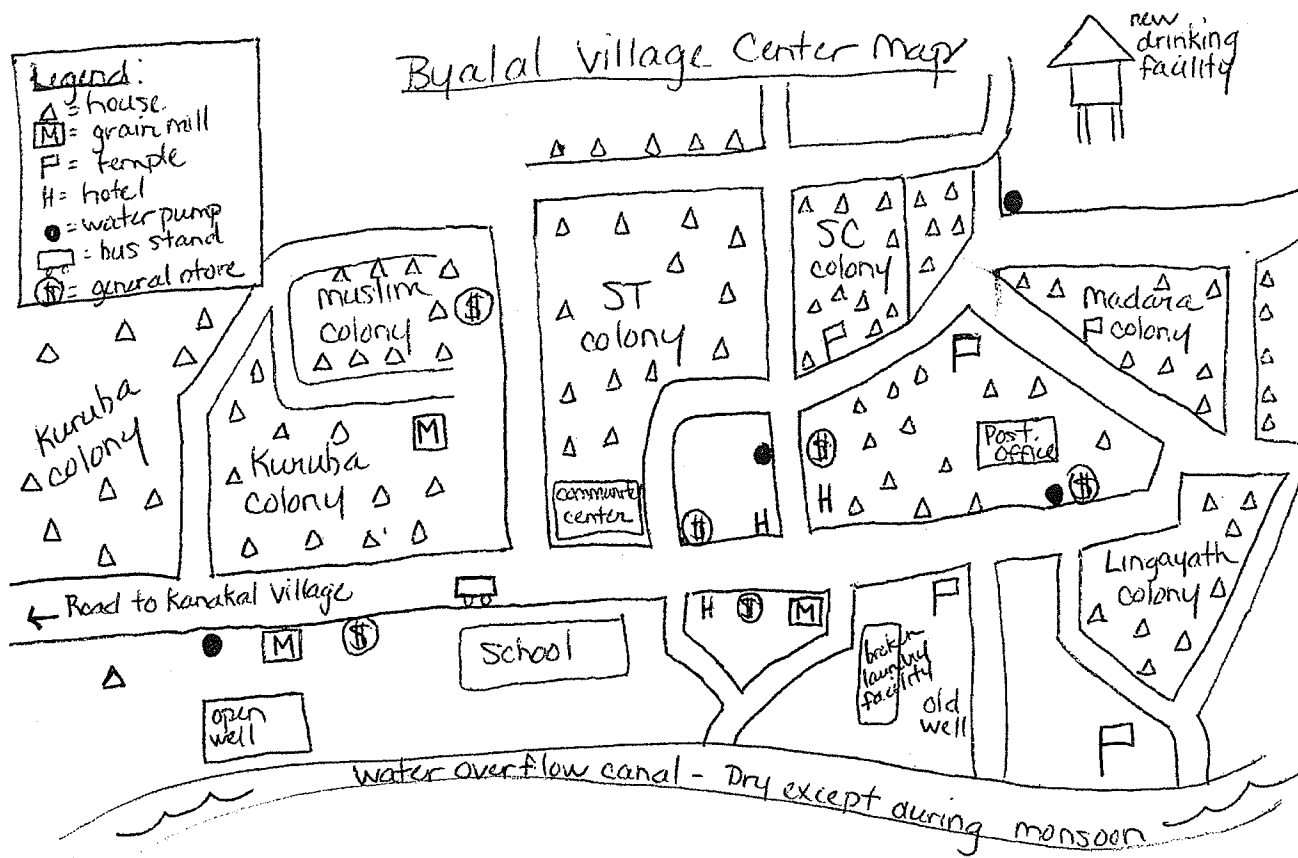
- How has the environment (land, soils, rainfall, vegetation, agricultural productivity, crop diseases/pests, etc. changed in the past 30 years? To what, do you attribute these changes?
- How do the current farm activities/practices of this village impact natural resources/environment?
- How have agricultural practices changed in the past 30-40 years? (ex. Traditional activities vs. modern technologies including heavy inputs of chemical fertilizers, etc.)

#### **B. Social Changes over Time:**

- How has the quality of life changed in this village over the past 30-40yr? (Probes: health, happiness, income, food security, education, etc.)
- What impact, if any, does migration have on the family?

# APPENDIX F

## BYALAL VILLAGE CENTER MAP



## APPENDIX G

### INDIVIDUAL RESPONDENT INFORMATION

	CHARACTERISTICS	FEMALES	MALES	TOTAL
	Total No.	40	47	87
	% Population (using Census 2001 data)	7.5% of female population	8.8% of male population	8.1% of total pop.
Age Group	<40	22	18	40
	>40	18	29	47
Marital Status	Single	2	5	7
	Married	23	42	65
	Separated	2	0	2
	Widow	11	0	11
	<i>Devadasi</i>	2	NA	2
Caste	Upper Castes	16	11	27
	Other Backward Castes	5	9	14
	Scheduled Tribes (ST)	6	7	13 (16% of ST pop.)
	Scheduled Castes (SC)	12	17	29 (6.3% of SC pop.)
	Muslim	1	2	3
Education Level Completed	Less than 4th	32	32	64
	4 <sup>th</sup> -9 <sup>th</sup>	7	6	13
	10 <sup>th</sup> -12 <sup>th</sup>	0	5	5
	Secondary Educ.	0	2	2
	Post-Secondary Educ.	0	2	2
<b>Household Income Classification:</b>				
Farm [Non- diversified]	Smallholder Farmer (<5ac)	3	11	14
	Largeholder Farmer (5+ac)	9	15	24
Nonfarm [Non- diversified]	Laborer	10	3	13
	Business	0	0	0
	Cash/Share Tenancy	0	1	1
	Other	0	0	0
Diversified	Farm	0	0	0
	Nonfarm	3	1	4
	Farm/nonfarm	15	16	31

Notes:

1. Diversified=persons with more than 1 income (agriculture, non-agriculture, or both)
2. Non-diversified=persons with only 1 income source (agriculture OR non-agriculture)
3. Rural Poor Household Income Strategies (Reardon & Vosti (1995):
  - Agriculture/Farm = crops, livestock
  - Non-Agriculture/Nonfarm = extractive, commerce [usually labor-intensive & includes small commerce, portage, *farm labor*, and *unskilled labor for construction, long-haul, or seasonal migration*].

## APPENDIX G continued

### RESPONDENT INFORMATION BY METHOD

<b>METHOD</b>	<b>HOUSEHOLD INCOME CLASSIFICATION</b>	<b>FEMALES</b>	<b>MALES</b>	<b>TOTAL</b>
<b>QI</b> [n=33]	FARM (Smallholder)	1	4	5
	FARM (Largeholder)	0	5	5
	NONFARM (Laborer)	4	2	6
	NONFARM (Business)	0	0	0
	NONFARM (Other)	0	0	0
	DIVERSIFIED	7	10	17
<b>QII</b> [n=30]	FARM (Smallholder – Diversification not-specified)	5	6	11
	FARM (Largeholder – Diversification not-specified)	10	9	19
<b>QIII</b> [n=31]	FARM (Smallholder)	0	2	2
	FARM (Largeholder)	0	3	3
	NONFARM (Laborer)	14	2	16
	NONFARM (Business)	0	0	0
	NONFARM (Other)	0	0	0
	DIVERSIFIED	4	8	12
<b>Semi-structured Interviews</b> [n=20]	FARM (Smallholder)	0	0	0
	FARM (Largeholder)	1	2	3
	NONFARM (Laborer)	0	0	0
	NONFARM (Business)	0	0	0
	NONFARM (Other-Cash/Share tenancy)	0	1	1
	DIVERSIFIED	9	7	16

## APPENDIX H

### UASD-BIJAPUR STATION CAMPUS TRAINING PROGRAMS AND SCHEDULE

<b>a. Crop production</b>				
SL. No	Date	Topic	No. of participants	Organizer/ Sponsoring Agency
1.	30.05.07	Crop production technology in greengram and bajra	20	KVK, Bijapur
2.	01.06.07	Crop production technology for cotton	25	KVK, Bijapur
3.	11.07.07	Genotypes, seed treatment and cultivation of sunflower	30	KVK, Bijapur
4.	23.07.07	Cultivation of green manure crops	16	KVK, Bijapur
5.	03.12.07	Raised bed cultivation in groundnut	35	KVK, Bijapur
6.	04.12.07	Improved production technology in sugarcane	30	KVK, Bijapur
7.	10.12.07	Groundnut crop production technology	15	KVK, Bijapur
8.	09.12.07	Improved production technology in Groundnut	12	KVK, Bijapur
9.	06.12.07	Improved production technology in sugarcane	20	KVK, Bijapur
10.	02.08.07	Improved production technology in Sunflower	20	KVK, Bijapur
11.	8.11.07	Improved production technology in Chickpea	20	KVK, Bijapur
<b>b. Horticulture</b>				
1	23.06.07	Improved production technology in pomegranate	15	KVK, Bijapur
2	04.07.07	Production technology for onion	10	KVK, Bijapur
3	09.07.07	Improved production technology in Pomegranate	12	KVK, Bijapur
4	06-07-07	Improved production technology for banana	23	KVK, Bijapur
5	12-08-07	Production technology for flower crops	06	KVK, Bijapur
6	26.10.07	Production technology for onion	20	KVK, Bijapur
7	09.10.07	Honge cultivation	50	KVK, Bijapur
8	21.10.07	Improved production technology in Pomegranate	10	KVK, Bijapur
9	24.10.07	Improved production technology in onion	08	KVK, Bijapur
10	02.11.07	Management of grape after fore pruning	12	KVK, Bijapur
11	25.06.07	Production technology in Banana	25	KVK, Bijapur
12	04.06.07	Production technology in grapes	20	KVK, Bijapur
13	05.06.07	Production technology in Pomegranate	18	KVK, Bijapur
<b>c Plant protection</b>				
1.	15-07-07	IPM in cotton and pigeon pea	14	KVK, Bijapur
2.	18-10-07	IPM in chickpea and pigeon pea	15	KVK, Bijapur
3.	12-12-07	IDM in pomegranate	25	KVK, Bijapur
4.	08-01-07	IPM and IDM in grape	30	KVK, Bijapur
5.	21-02-08			
6.	04-03-08	IDM in summer groundnut		
<b>d. Home science</b>				
1.	23.07.07	Tie and Dye	11	KVK, Bijapur
2.	21.08.07	Masala Preparation	08	KVK, Bijapur
3.	26.09.07	Pickle making	06	KVK, Bijapur
4.	25.01.08	Creative activities for children	22	KVK, Bijapur
5.	15.02.08	Jam and Pickle making	29	KVK, Bijapur

## APPENDIX H continued

### UASD-BIJAPUR STATION CAMPUS TRAINING PROGRAMS AND SCHEDULE

Details of vocational trainings				
<b>A. Vermiculture</b>				
1.	21to23.08.07	Production of vermicompost and biofertilizers.	39	KVK, Bijapur
2.	18to20.08.07	Production Vermicompost and biofertilizers.	32	KVK, Bijapur
3.	29to31.10.07	Production of vermicompost and biofertilizers.	42	KVK, Bijapur
4.	7to9.02.07	Production of vermicompost and biofertilizers.	39	KVK, Bijapur
5.	27to29.02.08	Production of vermicompost and biofertilizers.	30	KVK, Bijapur
6.	27to29.03.08	Production of vermicompost and biofertilizers.	38	KVK, Bijapur
<b>B. Home Science</b>				
1.	19-7-07	Agarbatti making	20	KVK, Bijapur
2.	31-07-07	Paper bag making	20	KVK, Bijapur
3.	05-09-07	Candle making	17	KVK, Bijapur
4.	07-09-07	Paper bag making	23	KVK, Bijapur
5.	22-10-07	Agarbatti making	23	KVK, Bijapur
6.	28-10-07	Paper bag making	14	KVK, Bijapur
<b>C. Apiculture</b>				
1.	10.08.07	Apiary	15	KVK, Bijapur
<b>D. Sericulture</b>				
1.	15.08.07	Sericulture	20	KVK, Sericulture Dept.
2.	21.10.07	Sericulture	20	KVK,

#### DETAILS OF OFF CAMPUS TRAININGS:

SL. No	Date	Place	Topic	No. of participants	Organizing Agency
<b>a. Crop Production</b>					
1.	06.06.07	Hebbalhatti	Production technology for Greengram	30	KVK Bijapur
2.	10.06.07	Utnal	Intercropping system in cereals+ Pulses	25	KVK Bijapur
3.	18.06.07	Yarnal	Variety and IPM in Redgarm	50	KVK Bijapur
4.	28.06.07	Masuti	Production technology for Onion	30	KVK Bijapur
5.	07.07.07	Athraga	Hy. in cotton and IPM	42	KVK Bijapur
6.	17.07.07	Yarnal	Wide row spacing and management of viral disease	30	KVK Bijapur