



## INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, ECONOMICS AND MANAGEMENT

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## ASSESSING THE IMPACT OF POPULATION EXPLOSION ON GLOBAL ENVIRONMENT

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### ABSTRACT

Historically, the world population used to grow very slowly from about 2.5 million at the beginning of urbanization and it grew to some 50 million around the time of the black plague of the middle ages. It is only with the industrial, scientific and medical revolution and during the era of colonial expansion of the western powers that the number of the population risen as unmanageable thereby climbing to the dizzying heights. During the 20<sup>th</sup> century, the world's population increased almost fourfold, from 1.6 to 6 billion. Until very recently, there were fears that in the next century, if the explosion is not checked by wise leaders of the world, the world population would explode to some 12 billion leaving little room for wilderness areas to preserve wildlife and putting extreme pressure on food production, water and non-renewable resources. The increase of population increases the demand for more food, cars and energy. To satisfy their food requirement, they will have to clear forests in order to grow crops for food. Deforestation may result in destruction of homes of the most diverse wild-animals and plants again resulting in the extinction of many species, possibly including hundreds that are yet unidentified by scientists. It also adds to the problem of global warming, because trees naturally absorb carbon dioxide from the atmosphere. When there are trees, they take in carbon dioxide from the air and turn it into oxygen and release it back into the air again. When the trees are cut down, the carbon dioxide is released back into the air and helps trap heat near the earth and raises the temperature which may contribute in global warming. Therefore, the explosion of population should be checked in such a way the resources on the earth may be used sufficiently and economically preserving some non-renewable resource even for the future use.

### KEYWORDS

Carbon dioxide, deforestation, global warming, non-renewable resources, population explosion, wild animals and plants.

### INTRODUCTION

In these days, the number of world population is enormously increasing more than ever before. Most of poor countries overpopulated in such a way there could arise striking food shortage. Overpopulation is defined as the condition of having more people than can live on the earth in comfort, happiness and health and still leave the world a fit place for future generations. A population explosion occurs when there is a significant increase in numbers of people in a location in such a way it is difficult to supply necessary resources to maintain and sustain the existence of life of all living things including human being. Some effects include a pressure upon resources as there are more people (e.g. Food has to be distributed among more people), prices of goods will increase as the demand for the products increase (higher demand means higher prices, ecological disturbance will take place when more people go for more use of resources. According to some scientists, the greatest threat to the future may come from overpopulation.

During this century, the world's population has grown rapidly, doubling from 2 to 4 billion between 1925 and 1976, and reaching 5.3 billion by 1990 (Paul, 1993, p.22). Much of this growth occurred after World War II.

Some of the possible reasons for rapid growth of population after 1945 were peace, using fertilizers for mechanization farming, urbanization, industrialization, more income generation and medical facilities. In the 1950s and '60s, authors and policy makers who worried about rapid population growth noted that improved sanitation and health care in the postwar period helped more children survive infancy and enabled adults to live longer. It was common in nineteenth-century Europe for one-quarter of all infants to die before the age of 2.5 years, and one-half of adults by age 37.5. But a century later, one-fourth had not died until age 62.5, and one-half had not died until age 72.5 (Hauser, 1971, p. 107). Consequently, the rapid growth of the world's population over the past hundred years is believed as resulted from a difference between the rate of birth and the rate of death. As it may be known by all of us, in the past, infant and childhood deaths and short life spans used to limit population growth. In today's world, thanks to improved nutrition, sanitation and medical care, more babies survive their first few years of life. The combination of a continuing high birth rate and associated low death rate is creating a rapid population increase in many countries such as Asia, Latin America and Africa. The rapid explosion of human population around the world affects all people through its impacts on the economy and environment. The current growth rate of population is now a significant burden to human well-being.

Improved sanitation and health care in the postwar period helped more children survive infancy and enabled adults to live longer and fueled the explosion of population after the World War II. For instance, while the world's population increased annually by 20 million people during the 1940s, it increased by more than 50 million every year in the 1950s, 65 million a year in the 1960s (My T., 1975). In 1966, the United Nations estimated that world population would reach 7.5 billion by the end of the century (Philip M., 1971). These projections persuaded government officials around the world that rapid population growth was a serious problem and that steps should be taken to slow it down. In 1969, President Nixon announced that the U.S. government would "give population control and family planning a high priority," and called on other governments to take "prompt action" to slow population growth (Bonnie). And in 1974, the United Nations convened its first world population conference in Bucharest, Romania. At the time, government officials expected that population growth would lead to a series of problems: food shortages and hunger, conflict and war, environmental destruction, and the depletion of natural resources. Events in the mid-1970s initially seemed to confirm their worst fears.

Widespread public recognition of population growth as a global social problem emerged slowly in the 1950s and '60s. It was assisted by the publication of two books with the same title: *The Population Bomb*. In 1954, T. O. Greissimer published a pamphlet with this title that was widely distributed by the Hugh Moore Fund, a private foundation started by the Dixie Cup Corporation. In it, Greissimer argued that "the population bomb threatens to create an explosion as disruptive and dangerous as an explosion of the atom bomb, and with as much influence on prospects for progress or disaster, war or peace (Ibid, p.40). Then in 1968, Paul Ehrlich published a book with the same title that borrowed some of Greissimer's ideas and extended them to explore the environmental consequences of population growth. These two books, and the work of private philanthropic groups like the Hugh Moore Fund, and the Population Council, a group organized in 1952 by John D. Rockefeller III, helped bring rapid population growth to the attention of policy makers and the public (Ibid, p.37).

The availability of sufficient food and sanitation facilities lowered death rates in countries around the world. As a result, people continued to have children at pre-1950 rates. Because people adjusted their behavior slowly to changed circumstances, healthier babies and longer lives contributed to world population grew rapidly. Policy makers concerned about population growth worried that it would result in a series of social, political, and environmental problems. First, they thought that the growing population had or would soon outstrip the amount of food available to eat, resulting in a Malthusian crisis: *too many people, too little food*. "The battle to feed all of humanity is over," Ehrlich argued. "Sometime around 1958, the stork passed the plow." He expected this to lead to widespread hunger and starvation. "In the 1970s," Ehrlich predicted in 1968, "the world will undergo famines hundreds of millions of people are going to starve to death. . . ." Ehrlich and others who supported this view were often called "Malthusians" because this argument relies on Robert Malthus's 1798 *Essay on Population*, which proposed that "the power of population is indefinitely greater than the power in the earth to produce subsistence [food] for man."

The growing gap between population and food supply would lead first to starvation, population control advocates expected. And the onset of starvation would lead to a second problem: war. As one population control group explained in a 1967 newspaper ad, "There can be no doubt that unless population is brought

under control at an early date, the resulting human misery and social tensions will inevitably lead to chaos and strife to revolutions and wars, the dimensions of which it would be hard to predict." During the 1960s, many U.S. government officials viewed social unrest, communist insurgency, and guerrilla warfare in poor countries as the likely political product of "overpopulation."

Third, the new Malthusians argued that a growing population would increase levels of pollution and waste, which would result in environmental degradation. As Ehrlich wrote, "The causal chain of [environmental] deterioration is easily followed to its source. Too many cars, too many factories, too much detergent, too much pesticide . . . inadequate sewage treatment plants, too little water, too much carbon dioxide all can be easily traced to *too many people*." But in 1990 he still maintained that "Global warming, acid rain, depletion of the ozone layer, and exhaustion of soils and ground water are all related to population size."

And fourth, the new Malthusians believed that the growing population would consume finite natural resources such as minerals and oil at an accelerated rate, resulting in raw material shortages and rising prices for the goods produced by industrial societies. As the Club of Earth argued in 1988, "Overpopulation and rapid population growth are intimately connected with . . . [the] rapid depletion of non-renewable resources. . . ." Because they expected rapid population growth to lead to starvation, war, environmental degradation, and the depletion of natural resources, private groups and government officials began advocating population control in the late 1960s and early 1970s. And they urged governments to adopt programs that would slow population growth. These included the creation of educational family planning programs, the distribution of contraceptives, and sometimes the provision of clinics that performed abortions and sterilizations, usually on a voluntary but sometimes on an involuntary basis. Population control advocates in government and the private sector believed that rapid population growth was such an urgent problem that drastic steps needed to be taken quickly. Some even advanced the concept of triage as a way to address the problem.

## STATEMENT OF THE PROBLEM

Now-a-days, the number of world population is increasing at an alarming and astonishing rate. According to some scientists, the greatest threat to the future may come from overpopulation. Overpopulation and rapid population growth are intimately connected with the rapid depletion of non-renewable resources. Some effects include a pressure upon resources as there are more people (e.g. Food has to be distributed among more people), prices of goods will increase as the demand for the products increase (higher demand means higher prices, ecological disturbance will take place when more people go for more use of resources. To mitigate food shortage, the simplest solution is to increase the area of cultivation land and plant it with the food crops. To this effect, they cleared forests and planted food crops. When forests are cut down, they released carbon dioxide gases into the air which highly contributed for global warming. In 1974, scientists discovered that man-made gases called chlorofluorocarbons (CFCs) that were used in aerosol sprays, solvents, and Styrofoam destroyed the ozone layer, which protects people and plants from the sun's damaging rays. They also observed that the increase of populations contributed to most of the atmospheric pollution resulting from CFC use. The same is true of global warming. During the mid-1980s, scientists discovered that the burning of fossil fuels and forests had increased the level of carbon dioxide in the atmosphere. They predicted that high carbon dioxide levels would trap heat in the atmosphere and make the planet warmer. Rapidly rising temperatures could create serious problems for people in different settings, scientists argue. Rising temperatures could melt polar ice and raise sea levels, inundating islands and low-lying coastal plains where millions live. A one-meter rise would flood deltas on the Nile, Po, Ganges, Mekong, and Mississippi Rivers, displacing millions of people and swamping the croplands now used to feed them. Higher sea levels could drown coral reefs, destroying the fish and ruining the livelihood of people who depend on reefs in the Caribbean and the Pacific. And warmer water could increase the strength of hurricanes and typhoons, causing greater damage for people living along their path in the Western Atlantic and Western Pacific. The insurance industry is particularly concerned about this prospect because windstorms caused \$46 billion in losses between 1987 and 1993.

Higher temperatures could also disrupt agriculture. While farmers in northern latitudes North America and northern Europe and Asia could benefit from higher temperatures, longer growing seasons, and higher levels of carbon dioxide (which plants use to grow), even modest increases could devastate farmers in tropical zones in Asia, Africa, and Latin America. Rice yields decline significantly if daytime temperatures exceed 95 degrees, and in many Asian countries, temperatures are already near this limit. One group of scientists predicted that cereal prices could increase between 25 and 150 percent by the year 2060, a development that would cause hunger and starvation for between 60 million and 350 million poor people, most of them in the tropics.

Because of increased number of people, they are highly involving in deforestation. They are using more cars in number. They are using more energy for cooking and heating. There are, for example, sound environmental and social reasons to reduce energy consumption and car use and slow deforestation. Because these activities also release vast quantities of carbon dioxide, efforts to curb the consumption of fossil fuels and wood might also reduce global warming. (The carbon dioxide released by these activities accounts for about half of all greenhouse gases.) The same is true for other activities that produce other greenhouse gases.

People are attempting to satisfy their food demand from different sources. To this effect they increased the number of cows to get meat, milk and milk byproducts. However, the increased number of cows contributed for deforestation and resulted in hunger on the part of human being because of global climate change effect. A reduction of world cow herds would reduce hunger and deforestation, and also curb emissions of methane, which makes up about 18 percent of all greenhouse gases. The ban on CFCs, scheduled to take effect at the turn of the century, will slow destruction of the ozone layer, about which there is no serious scientific dispute, and reduce its contribution (about 14 percent) to global climate change. And if nitrogen fertilizer use was curbed, the problems associated with groundwater pollution could be addressed and nitrous oxide levels in the atmosphere (about 6 percent of the total) could be reduced. However, in the case of nitrous oxide, fertilizer reductions could adversely affect global food supplies and contribute to hunger, which suggests that efforts to curb fertilizer use should be approached with great caution.

Because of explosion of population, the people around the world are using more energy from different sources like fire, petroleum or fuel. For example, to get energy from fire they have to cut down forests for firewood. These would result in releasing more carbon dioxide into the air which may be thought as a major source for global warming. When they want to get energy from fuel, they have to buy the petroleum from the countries endowed with it. This, in turn, hurts the economy of the countries buying fuel from fuel rich countries.

These and others related problems pushed the researcher to investigate the case based on Descriptive Research with the help of secondary data from published texts on globalization in order to arrive at possible solutions as the findings of the study.

## OBJECTIVE OF THE STUDY

The general objective of this study is to communicate the effects of problems of population explosion to the people of the world to generate awareness about the problems associated with the alarming increase of population and push everybody to contribute and heed towards slowing down the number of population all over the world at the earliest.

### SPECIFIC OBJECTIVES

- To show the impact of population explosion to the people of world
- To make the world leaders heed and take corrective actions towards the explosion of population.
- To generate awareness of the danger of population explosion to householders and make them limit the number of their children thoroughly understanding the impact of the problem and the devastation it causes if not mitigated.

### RESEARCH QUESTIONS

- Is population explosion mercy or curse to our planet at present? How?
- If it is curse, then how it can be checked?
- Who is more responsible for global warming, the advanced or underdeveloped countries? Why?

## SIGNIFICANCE OF THE STUDY

The number of world population is increasing at an alarming rate. If it continues at the same rate, it is becoming a real danger, worry and curse to the earth. As it is obvious to many of us, we are increasing the number of our children sometimes not knowing the consequences of it. Other times, we are increasing the number of them simply being shy of cultural products like children are wealth gifted from God and people should not involve themselves in checking of such blessings and they should bear as many children as possible. The importance of this study is to generate the awareness of the danger of population explosion and make every concerned body understand the problem and make the decision on the number of his/her children in such a way that the planet (earth) could provide them all necessary facilities of life. Because the increase of population if not supported by economy it is curse rather than mercy. It becomes mercy only when it is managed appropriately and commensurately with the available resources on the earth.

## METHODOLOGY OF THE STUDY

The present study is based on Descriptive Research with the investigation of secondary data. The secondary data are collected from the published sources on globalization.

## SCOPE OF THE STUDY

The study is entirely focused on consequences of the explosion of population based on Descriptive research with the assistance of secondary data from the texts written on globalization. The study is about the impact of explosion of population on environment all over the world.

## FINDINGS OF THE STUDY

1. Overpopulation is resulting in a striking food shortage because more farm land is being used for urbanization and industrialization in larger quantity in order to accommodate the exploding large number of population. Thus, the greatest threat to the future may come from overpopulation (*too many people, too little food*).
2. Much of the growth of population occurred after World War II due to peace, using fertilizers for mechanization farming, urbanization, industrialization, more income generation and medical facilities (improved sanitation and health care).
3. To maintain the life of people on the earth, the scientists and other concerned bodies should focus on innovations and increase productivity in many folds from the available smaller farm land employing advanced technologies as to feed more people.
4. A growing population would increase the levels of pollution and waste, which would result in environmental degradation. Too many cars, too many factories, too much detergent, too much pesticide, inadequate sewage treatment plants, too little water, too much carbon dioxide all can be easily traced to *too many people*.
5. The growing population would consume finite natural resources such as minerals and oil at an accelerated rate, resulting in raw material shortages and rising prices for the goods produced by industrial societies. Moreover, unbalanced utilization of resources may ultimately lead to the depletion of natural resources.
6. The number of population, thus, should be checked as increasing of population is believed as to leading to the destruction of population thereby creating acute shortage of resources necessary for existence of life.
7. To minimize global warming, every person in the world has to plant one seedling every year personally initiating the Motto "one seedling for one person". Then, the plants absorb the carbon dioxide thereby releasing oxygen and global warming can be checked.
8. Rich countries are more disturbing the environment though industrialization and deforestation. They have to fund the projects of poor countries in order to plant trees to maintain the environmental balance.

## CONCLUSION

Now-a-days, the number of world population is significantly increasing. The increase of population has been followed by food shortage. To produce more food crops, they involved themselves in deforestation and planting more food crops. To that effect, they cleared or cut-down more trees from the forest. The cut-down of trees contributed to releasing more carbon-dioxide into the air. That, in turn, contributed to global warming. To curb these all problems resulting from the expansion of population, it should be checked as more increase may mean danger to population itself. Finally, for what is happening all over the world, the advanced countries should take more responsibility as they are more disturbing environment in which human being can live through industrialization and technological advancement.

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**ECONOMIC VIABILITY OF MICRO-FINANCE FOR DAIRY ENTERPRISE****SURESH, K.****RESEARCH SCHOLAR****DEPARTMENT OF AGRICULTURAL ECONOMICS****GANDHI KRISHI VIGNANA KENDRA****UNIVERSITY OF AGRICULTURAL SCIENCES****BANGALORE****MUNDINAMANI, S.M.****PROFESSOR & HEAD****DEPARTMENT OF AGRICULTURAL ECONOMICS****COLLEGE OF AGRICULTURE****UNIVERSITY OF AGRICULTURAL SCIENCES****DHARWAD****ABSTRACT**

*The dairy farming in India as traditionally practiced under mixed farming mode along with crop farming has been supplementary to the major occupation of crop farming. Provision of micro finance to undertake dairy enterprise is a key tool to generate employment and earn income by rural women dairy entrepreneurs in rural India. The present study attempted to analyse the economic viability of micro-finance for dairy enterprise in the North Karnataka region of India. The data needed for the study was collected from the respondents by personal interview method using pre-tested schedule prepared for the purpose in the year 2008. The data collected was subjected to tabular and financial feasibility analysis. The study revealed that the total cost per buffalo per annum was found to be Rs. 9,937.21 in Haveri district and Rs. 10,306.17 in Bellary district of North Karnataka region. The net returns were found to be Rs. 3,945.48 and Rs. 4,959.02 per annum in Haveri and Bellary districts, respectively. The net present value was found positive and benefit cost ratio more than unity. The internal rate of return was higher than bank rate. Hence, the study concluded that Dairy is feasible enterprise and very much suitable for rural women to practice and empower them economically and socially. So the financial institutions and NGOs should come forward to extend financial support and guidance for rural women through Self Help Groups to take up dairy enterprise as an income generating activity.*

**KEYWORDS**

Dairy, Feasible, Micro finance, Net return, Rural Women, Total cost.

**INTRODUCTION**

Micro finance is a broad term that includes deposits, loans, payment services and insurances to poor. The concept of micro finance and micro credit are used interchangeably. But micro credit does not include savings; hence micro finance is more appropriate term (Manimekalai, 2004). The concept is understood as providing poor families with very small loans to help them engage in productive activities or grow their tiny businesses. A success indicator of micro finance lies in a 'credit-plus' approach, where the focus has not only been on providing credit, but to integrate it with other development activities. Today micro finance is very much in the agenda of public policy and it has been increasingly used as a vehicle for reaching the otherwise unreachable poor in the country.

The dairy farming in India as traditionally practiced under mixed farming mode along with crop farming has been supplementary to the major occupation of crop farming. The traditional system of cattle keeping served the purposes of requirement of cattle and buffalo males for farm work, utilization of crop byproducts which otherwise shall go waste, utilization of surplus family labour, meeting the family requirement of milk and milk products and through sale of animals. Keeping of a few dairy animals also served as an insurance against crop failure.

The dairying has been considered as a potential means of alleviating large scale unemployment, especially in rural areas (Alagumani and Anjugam, 2000). Women play a key role in animal, farm and home management (Savitha, 2004). Successful dairy husbandry enterprise not only improves the socio-economic status of rural women, but also assures a sustained and assured means of income to supplement their income from the main enterprise (Rais *et al.*, 2007). To improve the socio-economic conditions of rural women, the Community Based Tank Management Consultancy Project (CBTMCP), UAS, Dharwad has extended micro finance to poorest among the poor women entrepreneurs in selected tank commands of Haveri and Bellary districts through Tank Users Group (TUGs) on pilot basis. The assessment of impact of micro finance on empowerment of rural women in terms of income and employment may help to extend similar financial assistance for poor women entrepreneurs in other areas. Hence the present study is undertaken with the objective to analyse the feasibility of investment on dairy enterprise through micro finance.

**REVIEW OF LITERATURE**

Misra and Pandey (1986) analysed the dairy financing scheme for small and marginal farmers and agricultural labourers under IRDP in Basthi district of UP. Researcher found that the net present value of investment was positive, Benefit Cost ratio was more than unity and pay back period fell within the prescribed period of loan repayment. Hence the scheme was economically feasible.

Shanmugan (1991) evaluated capital investment in dairy farming and reported that the NPV and B: C ratio in case of crossbreed cow's project was Rs. 55,576.70 and 1.24 respectively. The NPV and B: C ratio in case of graded buffalo's project was found to be Rs. 17,842.85 and 1.09 respectively.

Singh *et al.* (1995) conducted a study on Watershed approach for improving the socio-economic status of tribal area. The study reported that the watershed management programme had not only increased the crop yield, but also allowed for the development of fodder resources in the area. Per capita income has gone up from Rs. 598 to Rs. 1739, and the average Benefit-Cost Ratio (1.76:1) indicated the economic feasibility of the watershed management programme for improving the socioeconomic status of farmers residing in the tribal areas.

Pawar (1996) conducted a study on economic analysis of dairying in assured rainfall zone of Maharashtra. It was found that the Benefit Cost Ratio was comparatively with 2.03 in small followed by 1.92 and 1.83 in landless and large farm dairy units respectively. Net Present Value was high as Rs. 274.57 in large farm followed by Rs. 21486 and Rs. 11413 in small farm and landless dairy unit respectively. Pay back period was least (1.99 years) in small farm whereas prolonged to 2.10 and 2.21 years in landless and large farm units respectively. The Internal Rate of Return was highest at 45 per cent in small farm followed by 42 per cent and 39 per cent in landless and large farm dairy units respectively.

Sharma and Singh (1996) in their study on economic evaluation of Hill Cattle Development Programme in Himachal Pradesh found that the Benefit Cost Ratio was 12.4 at 11 per cent, 10.72 at 12.5 per cent and 9.4 per cent at 14 per cent interest rate and Net Present Worth of the programme was Rs. 29.06 million at 11 per cent, Rs. 20.87 million at 12.5 per cent and 15.15 million at 14 per cent discount rate. The Internal Rate of Return was found to be very high (40.6%). It could be inferred from the study that programme is economically viable. Thus, the cattle improvement programmes which have high returns to investment, as evinced by this study, should be introduced on extensive scale to increase milk production and ameliorate the socio-economic conditions of the rural poor living in these areas.

Bijai *et al.* (1997) conducted a study on economic feasibility of dairy financing under IRDP for weaker section in Azamgarh district (U.P.). In their study all borrower households were stratified into two strata viz landless labourers and marginal farmers. The analysis was done separately for defaulter and non-defaulter households. The findings of the study revealed that the average net return per buffalo per annum was found to be Rs. 1084 for defaulters and Rs. 976 for non-defaulter groups of landless labour. In case of marginal farmers, net return was Rs. 1150 and Rs. 879 for non defaulter and defaulter group respectively. Net Present Value was positive in all cases. Benefit Cost Ratio was also more than one and pay back period was favorable situation for non-defaulters of both categories where repayment was scheduled for three years.

Sanjay and Gill (2006) conducted a study on economic viability of important agriculture based enterprises for women in Punjab. The study was conducted with a total sample of 100 women entrepreneurs for the year 2004-05. The study has revealed that the net returns to dairy women entrepreneurs were Rs. 4878 per cow and Rs. 7498 per buffalo per annum. Total profits per entrepreneur shot sharply when the cost of the fodder and family labour was not included.

## DATA AND METHODOLOGY

The data needed for the study was collected from the respondents by personal interview method using pre-tested schedule prepared for the purpose in the year 2008. Majority of the respondents have not maintained records of expenditure and income relating to the dairy enterprise they have taken up. Hence, data collected was based on the memory of the respondents. At the time of interview, personal bias of the sample rural women was minimized by convincing them about the genuineness of the purpose for which the data were collected. The data collected from the beneficiaries pertaining to the socio-economic status, establishing cost and maintenance cost incurred in management of dairy enterprise during the project period. Similarly, the data on income and employment generated through dairy enterprise and constraints faced while managing dairy enterprise was collected.

## FINANCIAL FEASIBILITY ANALYSIS

Financial feasibility analysis was carried out to evaluate the feasibility of investment in dairy enterprise. The discounted cash flow technique which has advantage of reducing the cash flows to a single point of time was used to facilitate comparison (Pawar, 1996).

The discounting procedure estimates the present value of an amount either received or paid out in the future. The discount factor permits the determination of the present value and has applications in evaluation of many agricultural projects. In case of dairy enterprise majority of the dairy owners were maintaining the milch animals for six years on the business point of view in their dairy unit. Then these animals were either culled out or disposed off in the market. Therefore, investment in the dairy unit was considered for six years.

Following four conventionally used project evaluation techniques were used in the study to evaluate the feasibility of investment on dairy enterprise.

1. Net Present Value/worth (NPV)
2. Benefit-Cost Ratio (B: C Ratio)
3. Internal Rate of Return (IRR) and
4. Pay Back Period (PBP)

### NET PRESENT VALUE

This indicates the present value of expected or realized returns of a project over a period of time when discounted at the opportunity cost of capital. The opportunity cost of capital in this study was 8.5 per cent bank rate of interest per annum. It was worked out as follows:

$$NPV = \sum_{i=1}^n Y_i (1+r)^{-i} - I$$

Where,

$Y_i$  = the net cash inflows in the year  $n$

$r$  = the discount factor

$I$  = Initial investment

$i$  = years of life period 1, 2, . . . . .  $n$ .

The project passes the feasibility test if the NPV is positive.

### BENEFIT COST RATIO

The Benefit Cost Ratio was calculated by the sum of the present values of six years divided by the initial investment in the dairy unit. If the ratio would be greater than unity, it indicated that the financial position of the business would be feasible.

$$B: C \text{ ratio} = \frac{\text{Discounted net cash flows}}{\text{Initial investment}}$$

$$= \frac{\sum_{i=1}^n Y_i (1+r)^{-i}}{I}$$

Where,

$Y_i$  = the net cash inflows in the year  $n$

$I$  = Initial investment

### INTERNAL RATE OF RETURN (IRR)

The rate at which the net present value of project is equal to zero is Internal Rate of Return (IRR) to the project. The net cash inflows were discounted to determine the present worth following the interpolation technique.

The method of interpolation followed is as under:

$$IRR = \text{Lower discount rate} + \frac{\text{Difference between the two discount rates}}{\text{Absolute difference between present worth of cash flows stream at the two discount rates}}$$

Present worth of cash flows at lower discount rate

Absolute difference between present worth of cash flows stream at the two discount rates

The project is considered to be feasible if the IRR is higher than the prevailing interest rate.

#### PAY BACK PERIOD (PBP)

Pay back period represents the length of time required for the stream of cash proceeds produced by the investment to be equal to the original cash outlay. i.e. the time required for the project to pay for itself.

$$\text{Pay back period} = \frac{\text{Initial investment}}{\text{Annual average returns}}$$

## RESULTS AND DISCUSSION

### COST AND RETURNS PER BUFFALO IN THE STUDY AREA

Most of the sample beneficiaries were poor and mainly depends on agriculture and wage earning for their livelihood. In the project they were provided with a buffalo as dairy unit to enhance their income level. The average cost incurred and returns realized per buffalo by the beneficiaries was computed and presented in Table 1 Portrays that the total cost over entire four years in Haveri district and it was found to be highest (Rs.12086.98) in first year of starting of dairy unit. Cost in second year was found to be lowest Rs.9038.19. The average total cost was worked out to be Rs. 9937.21 (Misra and Pandey, 1986; Singh, 1999). In variable cost labour cost constituted highest and average labour cost it was worked out to be Rs. 4889.50 followed by dry fodder cost Rs. 1339.75 and concentrate cost Rs. 654.30 respectively.

The milk production was found to be 1456 litres in first year of the project and on an average during last four years was 1008.06 litres. The gross return and net return found highest in first year of being Rs. 18162.00 and Rs. 6075.02 respectively. On an average the gross return and net return during last four years were Rs. 13882.79 and Rs.3945.58 respectively.

**TABLE 1: COSTS AND RETURNS PER BUFFALO ON SAMPLE DAIRY ENTERPRISE IN TANK COMMAND OF HAVERI DISTRICT**

Sl. No.	Particulars	Unit	I Year	II Year	III Year	IV Year	Average
1	Variable cost						
	a) Dry fodder	Rs.	1424.75	1557.25	1490.50	886.50	1339.75
	b) Green fodder	Rs.	253.50	179.50	247.50	262.00	235.63
	c) Concentrates	Rs.	1022.40	414.20	510.59	670.00	654.30
	d) Labour	Rs.	6042.92	3971.66	3979.54	5563.88	4889.50
	e) Miscellaneous	Rs.	229.21	248.68	267.82	217.17	240.72
	f) Interest on working capital	Rs.	807.55	573.42	584.64	737.84	675.86
	Total variable cost	Rs.	9780.33	6944.71	7080.58	8337.38	8035.75
2	Fixed cost						
	a) Depreciation on fixed capital	Rs.	1140.60	1026.54	923.89	412.32	875.84
	b) Interest on fixed capital	Rs.	1166.05	1066.94	976.25	893.27	1025.63
	Total fixed cost (a+b)	Rs.	2306.65	2093.48	1900.13	1305.59	1901.46
3	Total cost (1+2)	Rs.	12086.98	9038.19	8980.72	9642.97	9937.21
4	Total returns						
	a) Milk production	litres	1456.00	713.00	825.25	1038.00	1008.06
	b) Value of milk	Rs.	17472.00	8556.00	9903.00	12456.00	12096.75
	c) Sale of FYM and calf	Rs.	690.00	2910.00	1990.00	1554.17	1786.04
5	Gross return (b+c)	Rs.	18162.00	11466.00	11893.00	14010.17	13882.79
6	Net return (5-3)	Rs.	6075.02	2427.81	2912.28	4367.20	3945.58

The detailed costs incurred and returns obtained in maintaining a buffalo for three years after providing micro finance under CBTMCP in Bellary district is presented in Table 2 the total cost was found to be highest in first year (Rs. 13985.57) and lowest during second year being Rs.7874.40. On an average total cost during last three years was Rs. 8597.21. In total variable cost labour cost constituted highest being and average labour cost was 6158.92 followed by dry fodder cost Rs. 800.33. The concentrate cost was highest in first year, Rs. 921.6 and on average was found to be Rs.617.7. The milk production was found to be 1583 litres in first year and on an average was 1136.93 litres. The gross return as well as net return during last three years was Rs. 15265.19 and Rs. 4959.02 respectively (Sanjay and Gill, 2006; Bharadwaj *et al.*, 2006;). It is interesting to observe that the gross return and net return was found to be highest in third year being Rs.17683.33 and Rs. 8624.80 respectively (Singh *et al.*, 2006;). In Bellary district the total cost was also found to be highest in the first year (Table 2). This is mainly due to high investment on dry fodder, green fodder and concentrates. Cost was lowest during second year because second year was mostly reported to be dry period and hence beneficiaries were not interested to invest much on concentrates and labour. Therefore, labour cost for milking of animals and selling of milk was automatically reduced. The higher cost was associated with more use of concentrates and relatively better management of animals. Among the variable cost the cost on labour was highest because of dairy involves operations from roughage collection to transportation of milk for sale. The other reason was in Bellary district wage rate was high.

**TABLE 2: COSTS AND RETURNS PER BUFFALO ON SAMPLE DAIRY ENTERPRISE IN TANK COMMAND OF BELLARY DISTRICT**

Sl. No.	Particulars	Unit	I Year	II Year	III Year	Average
1	Variable cost					
	a) Dry fodder	Rs.	786.00	795.00	820	800.33
	b) Green fodder	Rs.	236.00	195.56	246.67	226.07
	c) Concentrates	Rs.	921.6	487.5	444	617.7
	d) Labour	Rs.	8926.75	3995	5555	6158.92
	e) Miscellaneous	Rs.	116.43	155.71	80	117.38
	f) Interest on working capital	Rs.	985.67	419.94	624.81	676.81
	Total variable cost	Rs.	11972.45	6048.71	7770.48	8597.21
2	Fixed cost					
	a) Depreciation on fixed capital	Rs.	1088.18	979.36	513.67	860.40
	b) Interest on fixed capital		924.95	846.33	774.39	848.56
	Total fixed cost (a+b)		2013.12	1825.69	1288.06	1708.96
3	Total cost (1+2)	Rs.	13985.57	7874.40	9058.53	10306.17
4	Total returns					
	a) Milk production	litres	1583	781.11	1046.67	1136.93
	b) Value of milk	Rs.	15830	7122.22	10466.67	10761.67
	c) Sale of FYM and calf	Rs.	1180	3980.00	7216.67	4125.56
5	Gross return (a+b)	Rs.	17010	11102.22	17683.33	15265.19
6	Net return (5-3)	Rs.	3024.43	3227.83	8624.80	4959.02



**FEASIBILITY OF INVESTMENT ON DAIRY ENTERPRISE**

To evaluate the feasibility of investment on dairy enterprise the criteria such as Net Present Value, Benefit Cost Ratio, Internal Rate of Return and Pay Back Period were employed and results are presented in Table 3

**TABLE 3: FEASIBILITY OF INVESTMENT IN DAIRY ENTERPRISE**

Sl. No.	Particular	Study area	
		Haveri	Bellary
1	Net Present Value	10833.90	6881.38
2	Benefit Cost Ratio	1.80	1.63
3	Payback period (Years)	3.93	3.68
4	Internal Rate Return (%)	42.44	45.19

**NET PRESENT VALUE (NPV)**

Net present value of an investment is the difference between the present value of series of inflows (returns) and outflows over the entire economic life of the dairy animal. Table 4 indicates that the Net Present Value found was Rs. 10833.90 for the beneficiaries of Haveri district, whereas, in Bellary district the Net Present Value was Rs. 6881.38 for the beneficiaries.

**BENEFIT COST RATIO (BCR)**

This criterion indicates the rate of return per rupee of investment made in dairy enterprise. Table 3 indicates that the Benefit Cost ratio was found to be 1.80 for the beneficiaries of Haveri district, whereas it was 1.63 for the beneficiaries of Bellary district

**INTERNAL RATE OF RETURN (IRR)**

This criterion measures the rate of return that can be realized by investment in dairy enterprise, and hence IRR is considered better than other criterion of evaluation. The value of IRR generally depends on the magnitude of returns realized in each year over the economic life of animal (Singh *et al.* 2006; Pawar, 1996). It could be noted from the Table 3 that, the IRR was highest at 45.19 per cent (Shanmugan, 1991) for the beneficiaries of Bellary district, whereas it was 42.44 per cent for the beneficiaries of Haveri district.

**PAY BACK PERIOD (PBP)**

It is the period required to recover the initial investment made on dairy enterprise. It could be observed from the Table 4 that the payback period was 3.93 for the beneficiaries of Haveri district and 3.68 years for the beneficiaries of Bellary district.

Thus, all the four criteria of feasibility analysis revealed that investment on dairy enterprise is a feasible proposition (Misra and Pandey ,1986; Bajai *et al.*1997; Pawar,1996).

**CONCLUSION**

The dairy farming in India is traditionally practiced under mixed farming mode along with crop farming has been supplementary to the major occupation of crop farming. Women play a key role in animal, farm and home management. Successful dairy husbandry enterprise not only improves the socio-economic status of rural women, but also assures a sustained and assured means of income to supplement their income from the main enterprise. Micro finance for dairy enterprise is considered to be an important approach to eradicate poverty in rural areas. Dairy is feasible enterprise and very much suitable for rural women to practice and empower them economically and socially. In the study area after provision of micro finance the herd size of rural women beneficiaries increased and it enabled them to get additional income and additional livestock assets. The feasibility analysis showed that dairy enterprise through microfinance is more returns to women entrepreneurs. The Internal Rate of Return was high compare to the rate of interest charged by the commercial banks indicating the worthiness of project. So the financial institutions and NGOs should come forward to extend financial support and guidance for rural women through Self Help Groups to take up dairy enterprise as an income generating activity. The government and department of animal husbandry need to encourage to take up dairy enterprise in rural areas by providing all the facilities and training to dairy women entrepreneurs especially to poor vulnerable sections of society so that it will supplement the income and ensures the overall growth of the family and society.

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