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Reforming Farmland and Rangeland in Tharparkar: Suggested Implementations for Income Generation

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ABSTRACT

This paper is the analysis of farming and rangeland of rain-fed area of Tharparkar and it is desert area, but the concept is general and applicable for every part of the world's desert where agriculture is rain-fed dependant. It is disadvantaged area of Pakistan. Its' main source of income is livestock, people like agriculture, but agriculture is not sustainable source of income due to shortage of rainfall. There is need of awareness of reforming of farmland and rangeland; fencing is the best way for farmland reform. Only this practice can help the farmers supplying the fodder in drought conditions. Rangeland also should be conserved for the natural vegetation providing, fodder. Increase in livestock would lead Thar to agro-based industrial economy. We should get the lesson from the example of Denmark where previous condition was like Tharparkar.

JEL. Classification: Q12; Q15

Keywords: Farming, Rain Fed, Livestock, Farmland, Rangeland, Forecast, Reform, Natural-Vegetation, Sustainable, Organization

1. INTRODUCTION

Tharparkar is a desert region in the southern part of Sindh province in Pakistan. It mainly thrives on rains and it is saying that. Rains

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are blessing for Thar/desert else it is a fatal and daunting desert. Rains are the only source in the sand desert tract and it is rare, at intervals of 3-4 years and maximum rain fall is recorded up to 3 inches only, with the result that the local Tharies are always in the state of nomad tribes. Besides, uncertain fate, famine is inherited by Tharies¹. This aridzone district of Sindh remains one of the country's disadvantaged regions. Indicators of health, education and other determinants of well-being are invariable at the bottom of national scale, sporadic and scanty rain fall, dwindled water resources, transient and incoherent grazing, and reliance on exploitative economy even for mundance needs are the permanent features of Thari livelihood. Tharparkar supports a population of one million spread over 2350 villages pressed on 19,638 square Kilometers. Due to short span of monsoon and inconsistent rains, the agricultural activities are at the very substance level and at times they are at nadir. The dug well is the only source of drinking water in the area. The underground water is largely brackish with limited spots of sweet water. The depth of ground water wells ranges from 60 feet in the south-west to 300 feet in the north-east². At this time sweet water from Naukot to Mithi and Kunri to Chachro is supplied, from this the people who live in the village nearby the way of the pipe line and surroundings are taking benefit of water for the purpose of drinking for people and livestock.

Farmland is a legal and authorized land for farming and the property of owner but only rain fed agriculture is the harvest got by owner. When this land is left by any reason without sowing any thing then it gets covered by natural vegetation (grasses, herbs, shrubs and variety of trees) grows in this farmland. When this land is cultivated each and every vegetation is rooted out leaving the land clean for agriculture but due to lack of proper rain it fails. By this practice labour, seed, livestock labour, and precious time become wasted but still 95% people are interested to do agriculture (Primary data). Rangeland is the land, which is not allotted to some one for the purpose of cultivation.

When there is no cultivated crop at farmland at that time farmland and rangeland is the open meadow for livestock. No body refuses any body to leave their livestock in their farmland. Only prohibited thing is that nobody is allowed to cut any tree from their farmland. In such open meadows all the grasses and shrubs are not preserved for livestock in proper way, results the wastage of fodder. All these things motivate to researcher and planners to suggest the farmer for reform of farmland along with rangeland.

¹ Muammadi, Allah Wasayo, "Why and What is Thar Development Foundation" (*Chairman Thar Development Foundation care of Hyderabad X-Ray, Jail Road, Hyderabad*) leaflet. This organization does not exist now days.

² "Thardeep Rural Development Project (TRDP) an Introduction" *Head Office Mithi, Tharparkar: (Leaflet)*. It is an NGO working in Tharparkar District and it is researching on different aspect of income generating and prosperity of people.

For cultivated crops only rainy year is favourable, and in the rainy monsoonal year fully agricultural products are produced. Where as in other years famine and drought is there, and the importance of agriculture is declined almost in all over Thar. In drought, farming is worst of all the other income-generating sources, which are ritually done by the Tharies.

As we know that 81% of total families depend on farming (Herani, 2002, p.253), so, for the improvement of economy of Thar, complete regard should be given to the matter of agriculture. 'We must begin with the farmer; there will we lay a foundation for system and order because the peasant class and the agriculture class exceed other classes in the importance of their services' (Baha, 1922). The question of economic must commence with the farmer and therefore reach an end with the other classes, in as much as the number of farmers is greater than all the classes, many times greater. Therefore it is becoming that the economic problems be first active agent in the body politic. Agriculture is the backbone of the Pakistan's economy, because it contributes to the economy and social well being of the whole nation, through its influence on the gross domestic product, employment and foreign exchange earnings.

Farmers need more care for the alleviation of poverty. Agriculture is still the single sector in Pakistan's economy employing 42 per cent of the countries work force. More than two-thirds of the country's population lives in rural areas and the overwhelming majority of them are dependent, directly or indirectly, on agriculture for their livelihood (PSC, 2005). Government is taking lot of steps for the improvement of agriculture in Pakistan. Thar also needs attention of authorities.

The review of literature describes that some of the related studies are available for and referred in this paper.

In Tharparkar such type of studies are some what related to this study but not the same that which is why, this paper is carried out.

Main aim of the study is thus to see the growth in traditional ways of farming in Thar Desert rain dependent area. Focus of the study is specially to examine: (i) to know the trend of growth of performance of rain fed farming; (ii) to promote fencing of farmland and conservation; (iii) to find the new topics for researcher for further research, which is necessary for the development of Tharparkar.

Hypothesis given bellows are tested in the light of above objectives: (i) it is hypothesised that traditional farming is not reliable for income generation; (ii) it is also hypothesised that reforming of farmland and rangeland will prove sustainable source of income generation. Two alternative hypotheses are also set: (i) farming is reliable source of income, if properly managed. (ii) Reforming of farmland and rangeland will not prove reliable source of income.

Structure of this paper is as follows. Section 2 shows methodology, Section 3 data analysis, section 4 provides related literature and some explanations, section 5 gives conclusion and finally section 6 is policy implications.

2. METHODOLOGY

Planners policy makers, investors, writers, researchers, donors, NGOs, businessman, and government faced difficulties due to accurate and latest data for rural development sector of the country. In order to fill this gap with reference of Tharparkar, we conducted an evaluation from grass root level. Data was collected to achieve the result for the purpose and scope of this study. For the collection of data, there are two types of references and source, primary and secondary. The methods for conducting inquiries, in order to collect primary data of farming can be of three types: Case Study Method, Statistical Method, and Sample Survey Method. This study is based upon the random samples survey method and collected data is tabulated in tables and analyzed for the defined purpose covering the period 1988-2000 and after that some general opinions were taken for the updation of this paper up to June 2005, it is described as below:

2.1 The Sample

The primary data, for Tharparkar, was compiled through questionnaires filled in by 1771 families from 30 villages of Thar District, which consists of 2350 villages with the population of 9, 14,291 and covered area 19,638 Sq. KM. The whole Thar is sandy with dunes, therefore, travelling for the purpose of collecting data, of any sort, is really very difficult. While selecting the villages for survey, the villages of typical nature were marked in order to get complete information about the whole District. In this connection it is worth mentioning here that in order to collect the data on the prescribed questionnaire, it was a compelling need to stay in each village for many days. In order to get the questionnaire, meetings with the persons in a chosen village was a difficult task. Therefore, cooperation of reputed personalities of the area was sought. The job was also difficult in the sense that the villagers hesitate to cooperate with strangers.

The purpose of personally collecting and getting the questionnaire filled in required explanation. The questionnaire was in English; therefore, farmers were called in-groups. The contents of the questionnaire were translated for them in Sindhi and "Dhatki" languages and their questions were answered. Thus it was possible to collect the questionnaire then and there. Since the basic idea for selecting the topics of this study was based on random sampling in which every person was included as a sample. In this way the opinion of labours of defined area could be determined as an alternate to an already completed count of population.

2.2 Secondary Source

The Secondary data was collected through different sources such as: Libraries, Newspapers, Magazines, Thesis, Census Reports, Addresses

delivered by Govt. officials, Press Releases, SAZDA, Thar Seminar. It was also collected by: websites of Government of Sindh and Thar, Grameen Bank of Bangladesh, Rural development studies, data collected by NGOs and Studies of foreign origin such as: similar studies of Denmark, Somalia Indian Gujarat and Indian Thar of Rajasthan. Non-availability of data, on the one hand, and the accuracy of available data, on the other hand, was the major problem in the collection of secondary/published data, on farming. The example of such a data under this head was: Improvement of live stock, Selection of fodder, New sources for fodder purpose, Search for markets, Knowledge of middle-men, Local catalyst bodies and their work, Number of villagers engaged in farming and other jobs, Total animal population.

2.3 Background Characteristics

The consolidated data about the sample characteristic of this random sample survey study are being given as in the Table of primary data. In giving the random sample characteristics, every attempt was made to give almost necessary information about the village farmers of the defined area out of which sampling was done. The method of measuring attitudes are quite different from survey research method to understand public opinion. In sharp distinction to the open end questions, adapted the poll questionnaire, which is mainly used in collecting the information of this type, where a single question with fixed response were provided to the respondents. Through the questionnaire the attitudes and background characteristics of village farmers could also be ascertained and suggestions prepared to solve the existing problems. The main headings of the Poll-questions in the questionnaire, with fixed responses were as under: View on the present state of agro-based industry, The types of existing farming, Live stock, Dairy products, Crops/Agriculture, Non-crop/Rangeland, Ownership of land and Agriculture, Choice of work, Remittance economy, Debt status. As far as the extent of data accuracy of this study is concerned, it has some limitations, due to the following reasons: In most cases, the interviewed persons are uneducated; therefore, they could not appreciate the importance of this study. Some times they were reluctant to share information for fear of taxation or they hesitated for want of financial assistance. Due to this reason the information provided by them may not be accurate. People do not maintain proper accounts of their income, better sustainable source of income comparatively, livestock and farming transactions, benefits of rangeland and reform of farmland. Therefore, the information relating to this is estimated. The income and debit status data under different heads could not be ascertained due to literacy and frequently change in their business. Therefore, the accuracy of data for the varying types of business done during the year may not be correct.

3. DATA ANALYSES

Facts collected and recompiled

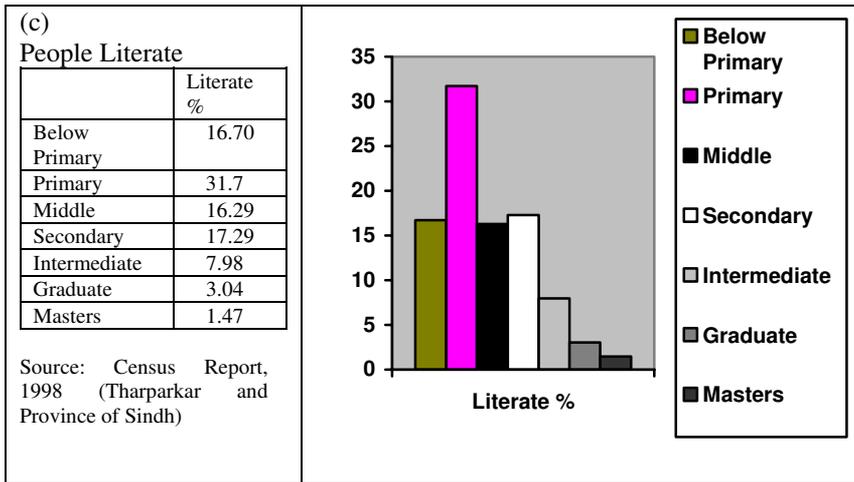
Table-1. Regarding Demography		TABLE-2.Regarding Livestock Status		
HEADINGS	THARPARKAR	HEADINGS	THARPARKER	
Total Area	19,638 Sq. K.M	Livestock	3,656,933	Growth rate (1986-1996)
Number of villages	2,350			112.4%
Number of Dehs	166	Cows	048513	88.20 %
Tapas	18	Buffaloes	0039842	20.96 %
Total Population	914,291.	Goats	1970852	148.00 %
Men	499,859	Sheep	898542	67.56 %
Women	414,432	Horses	008132	271.00 %
Population with Age above 10 years	581,435	Camels	103057	686.00 %
Population with age above 65 years	34,140	Donkeys	150834	751.70 %
Density of Population	46.6 per /Sq. K.M			
Population Growth Rate Per Annum.	3.13 %			

Source: National Census Report, 1998, Provincial and Tharparkar (Secondary Data Researched, Tabulated and Reframed)

Source: National Census Report, 1998, Provincial and Tharparkar

TABLE-3 Regarding Crops and Minerals Production (a)		Literacy Status (B)		
Crops	Bajra (millet), Jowar, Cluster bean, Mung, Moth, Sesame	Literacy Rate	%	
Minerals	Coal, Granite, China Clay	Both	18.32	
		Men	28.33	
		Women	6.91	

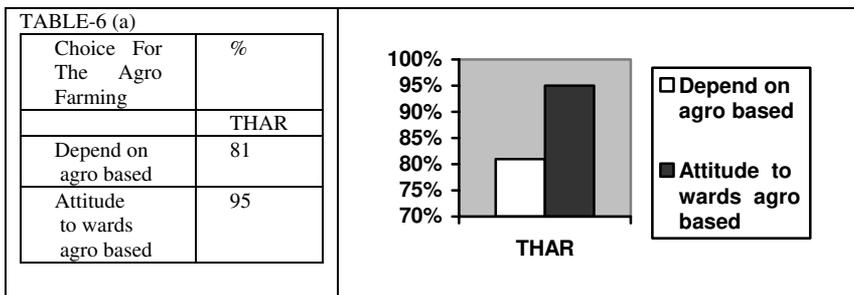
Source: Census report, 1998, Provincial and Tharparkar

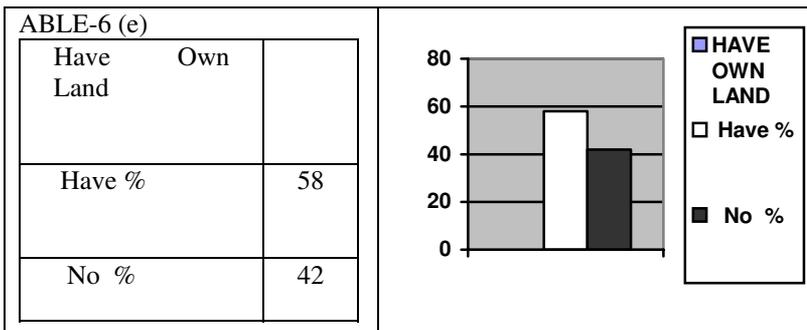
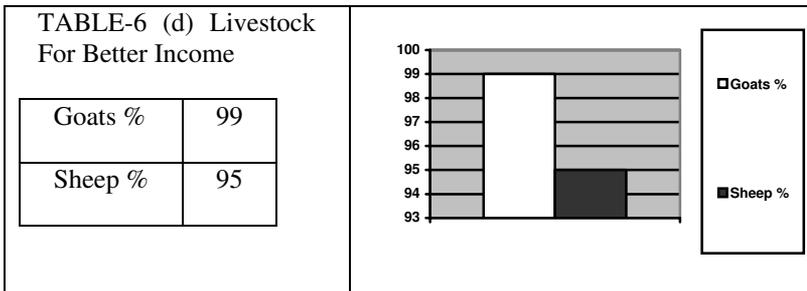
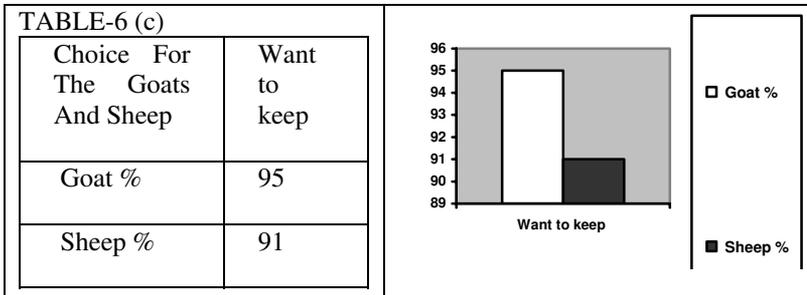
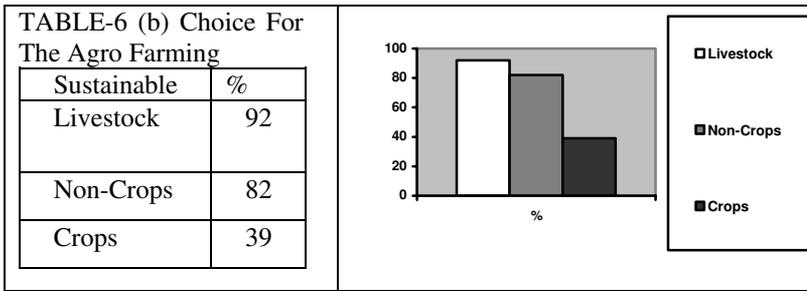


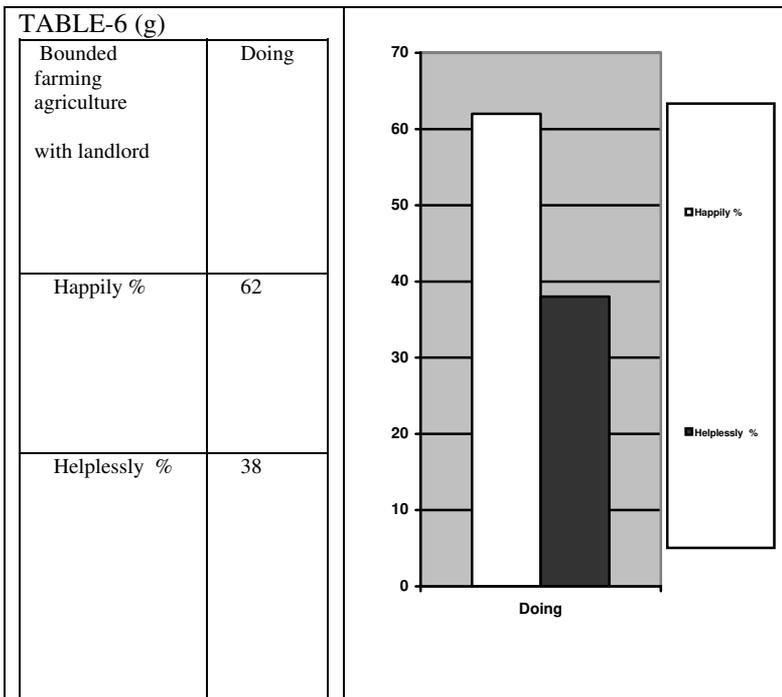
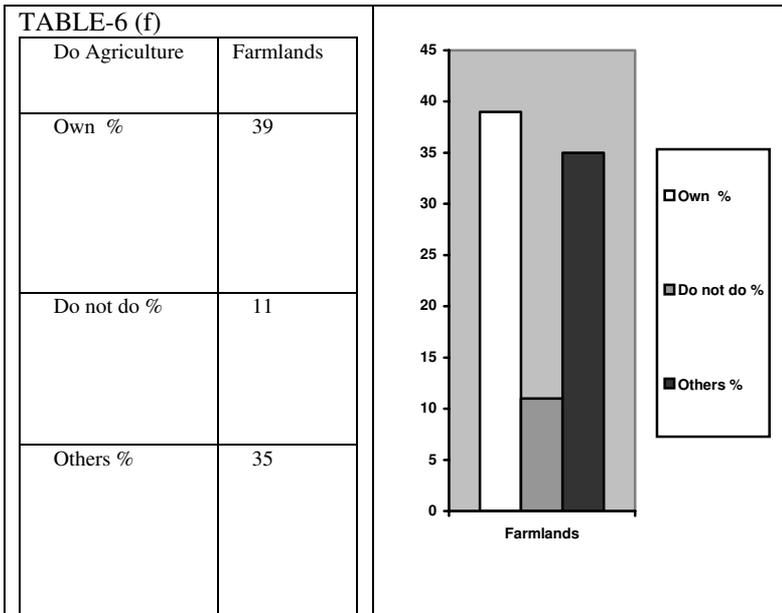
PRIMARY DATA ABOUT AGRO-BASED INDUSTRY AND SOCIAL SERVICES (1988-2002) COMPILED FROM QUESTIONNAIRE.

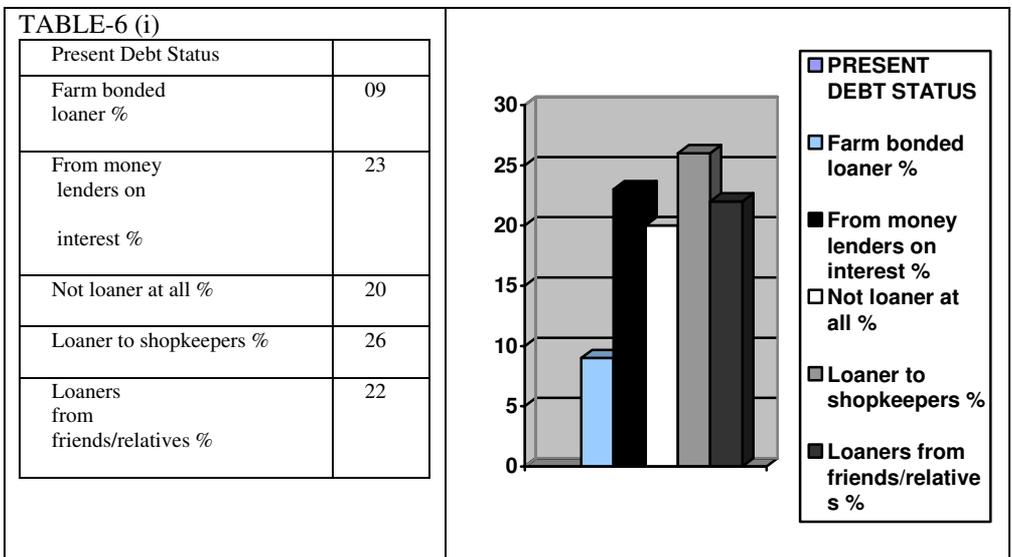
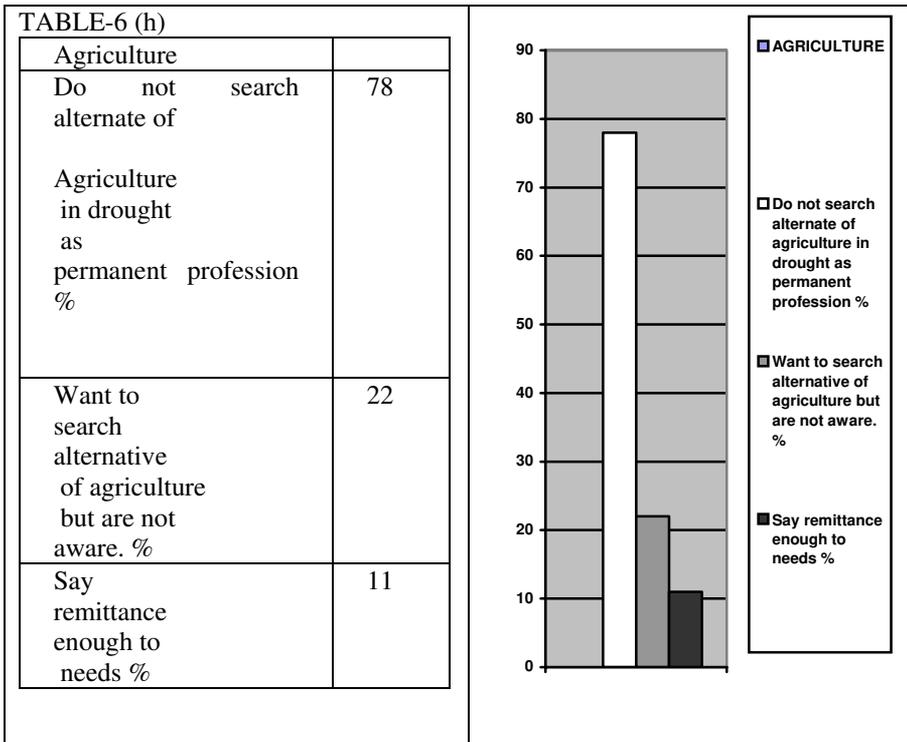
Table-4 Regarding Agro-Based Industry		Table-5. Regarding Social Services	
HEADINGS	THARPARKAR	HEADINGS	THARPARKAR
Crops	Not sustainable source	Roads	Improved but not enough
Non-crops	Range land is second level sustainable for livestock	Electricity	Improved but not enough
Livestock	First level sustainable source	Education	improved
Dairy products-	In future may be sustainable source	Employment	improved
Mills	At present not in practice	Remittance economy	Improved but not enough
		Animals population ratio	Fluctuate due to droughts
		Housing facilities	improved
		Water	Increased tube-wells but not enough

Source: Primary Data, Questionnaire Compiled.









4. SOME FACTORS AND EXPLANZATION

To achieve the purpose to the study, we have to discuss some important factors for the conclusions and policy implementations. So, following are the important factors to be discussed.

4.1 Methods of Reforming of Farmland

Those who have got farmland should follow suggestions that: some parts of it should be fenced and left for natural vegetation. Those who are not able to fence the farmland by thorny plants or in any way then at least they should not root out the plants, which are naturally grown. Each farmer should collect the seeds of Devi, Kandi, Ber, and put these into the rows of the boarder line of the farmland. After 3-4 years naturally these plants will grow fencing the farmland. These are the plants, which will give dual benefits: the fodder, and fencing.

4.2 Benefits to be Expected from the Fenced Farmland

In this farmland tooh (a fruit of creepers wild plant) grow naturally. If they are collected from out side the farmland in the season of monsoon and at the same time when season is over at that time should be collected from fenced farmland. Its seed is sold at charming rates at market. It itself is a good fodder and as a fodder it is sold in market too. On the other hand better quality of seed of small vegetable melon should be collected and dispersed only once in the farm and especially in fenced area then it automatically will grow in much quantity and soil will preserve seed in natural way for following years. There are some qualities of it, which can be preserved with out cold storage for few months. This commodity is also demanded in the cities. This commodity is income generating and should be encouraged. Wild watermelon also remains for few months without cold storage. If seeds are collected and dispersed in fenced farmland then it also gives good production and is good source of income. It is also a source of seed sellable in the market and in the shape of fodder. At the same time the meha is also a vegetable that is also naturally grown in such type of land. The harvest of it is also a source of vegetable and sellable and is also good source of fodder. The Ber a fruit is source of fruit and leaves are source of fodder³.

According to Halepoto⁴, Sinn; a grass can be planted in the season of monsoon. If one Sinn is rooted out and then each stick of it along with it's' root is separated and the root portion is put into soil at the time when

³ Interview of Balu, Pirbhu, Kmoon and Villagers of Chelhar, Taluka Chachro, Tharparkar. In-group opinion was taken, it was done for the up dating of this papers.

⁴ Interview of Halaypoto, PM, Banh Beli an NGO, working in Tharparkar. He has good experience of development and also belongs to Tharparkar that is why his opinion has a worth.

soil is moisturized by rain. After few years this stick converts into a big bunch of it and is sustainable source of fodder. The plant in form of shrubs and trees are source of fodder. They grow and remain alive for many years without rainfall, if it is not fallen regularly. These are the source of fodder in drought too. The grasses, which are grown in monsoonal rain and get dried up, are enough fodder for whole year till next monsoon. If it is harvested and collected then it can be sold in market in the drought years. In conclusion we find out that the fenced farmland is very much beneficial, if some positive measures of proper protection are made with the help of livestock owners who help in protection.

4.3 Harvesting Fodder

The naturally grown grasses should be harvested and collected for the next required time. Those who have not livestock should sell this grass to earn income. Those who have livestock should feed their livestock, whenever there is shortage of fodder in the rangeland. After that the fodder in the fenced farmland should be harvested for hard days because of fencing this fodder is available whole year and can be harvested easily at any time⁵.

4.4 Protection of Harvested Fodder

All the grasses when collected in the traditional ways become wasted due to rainfall. The iron sheets, which are used in the cities to make the huts, should be sold at cheapest rates by government or any catalyst body. This technique will be useful for protection of fodder on the one hand and on the other hand people will make huts for themselves and livestock too. By this way protection of plants can be encouraged up to 80 percent⁶. Cutting of trees and shrubs will reduce helping the environment department.

4.5 Safety Nets for Cutting Trees and Shrubs

There are so many reasons of cutting trees but out of them some main are: fuel, fodder, straw for huts and protection of collected fodder, timber, for huts and ploughing purpose. If iron or cemented sheets, gas cylinders and timber are provided at cheapest rates will be the reason of reduction of cutting trees. When these trees will be ready for the fodder, in the result the livestock will increase, this increase of livestock will bring prosperity. In this way a new agro-based will merge in the area leading the

⁵ Interview of Narso and neighbor, Jhanbrisar, Taluka Chachro, Tharparkar. They are farmers and doing agricultural and livestock farming.

⁶ Interview of Riachand and villagers of Darar, Taluka Mithi, Tharparkar. They are farmers and keeping positive thinking, opinions have a worth.

area to industrial economy. It will remain in small scale at the beginning and after some time medium size industry will merge. Example of it is Denmark and Scandinavian countries.

4.6 Way of Providing Safety Nets for Trees

However for the supply of safety nets, there are two possibilities, one gas cylinders should be donated by any NGO or environment department, because they want to plant trees and this is the way of helping the project. After that the prices of refilling of gas cylinders should be received at the cheapest rate, which are comparatively low than the prices of fuel wood. Government should pay the subsidy in these rates. Those who are not paying bills should be given chances of loaning. It means let these charges remain in arrears and these arrears should be treated as loan, payable in the next possible time. Other possibility is that the coal of Thar is being explored, part of it should be converted into the gas and this gas should be provided to the people at cheapest rates.

The Iron /cemented sheets for huts and protection of fodder from rainwater should be given with the help of catalyst bodies / local organizations. These should be distributed according to the number of family members. Each family member should have one hut and one store for the collection of fodder; keeping in view that those who live in the villages and do agriculture should be given double numbers of sheets for the protection of fodder. The prices of these items should be low and given, as loan, one time only to make huts, which will be enough for coming few years.

Following articles also should be given

- (i). Iron guarders or wood,
- (ii) Other wood, which is utilized for purpose of support of ceiling as a substitute of angle of iron.
- (iii). Wood, which is used for the purpose of ploughing. Following the method will encourage the growth of natural plants increasing the meadows⁷.

4.7 Collection and Preservation of Naturally Grown Fruits and Vegetables

Kandi and Khabri both are trees of Thar, which give the fruits even rain does not fall. The fruit of Kandi is singri (pod) and is used as a fodder, vegetable and fruit too. When it is ripened at that time it can be picked up and used as fresh vegetable. It also can be preserved easily after boiling and drying it in sun light. It can be utilized till two years without cold storage. If advertised then it can be introduced to cities too, to generate the income.

⁷ Interview of villagers of Sokhroo, Taluka Chachro, Tharparkar. In group opinions were taken as a general for the confirmation of already data of thesis of PhD Herani

Fruit of khabri is very delicious and as fresh fruit it can be sold in markets of the cities of the country and needs cold storage.

Melon is also cut and dried up for preservation till two years and also can be sold in markets of cities. It is used as fresh and dry vegetable too. These are used till two years with out any cold storage. These vegetables are very delicious and they can be introduced in cities.

In some years there are chances that crops fail due to lack of proper rainfall but vegetable melons are ready for harvest and they are mostly grown in low rainfall too. In the fenced farm, they may grow easily, and can remain fresh and alive for longer without spoiling⁸.

4.8 Protection of Seeds of Watermelon and Tooh

The seed of wild watermelon can be collected easily at the same time they can provide the fodder. This is also easily preserved in the fenced farmland, which does not require too much hard labour too. This seed is income generating and can be sold in the market at charming rates. Seed of tooh can be collected by traditional ways. The seed is also sold at charming rates, if it is available in much quantity then the seed may be achieved otherwise it is used as a fodder.

4.9 Harvesting of Rainwater for Hard Days in Farmland

The fenced farmland is not flat everywhere in Thar, but it is sloppy due to dunes.. The rain water gets collected and starts to flow to the downward direction. If some cemented pond or any other thing is available there, to store water, then it will be collected over there. Such type of harvest is example of storage of water in tankas in most areas of Thar. Indigenous skilled man applies this technique and at this time some active NGOs are encouraging it. If 10-20 tankas are made at the farmland then enough water will be stored at the farmland. This water will be used whole year for the labour who will work at the farmland, it saves time and at the same time it will be utilized for drinking of goats etc (Samoon). If only one acre land is fenced and round about 100 mutkas (pitcher) are buried in the land and vegetable, melon or watermelon are sown in the surrounded areas of mutkas filled with water of rain. Then 1000 plants can be protected easily with low fall of rain and the fruit of this plant can be harvested in the year in which rain is not sufficient for the agricultural traditional crops. These fruits can give much support along with fodder saved for livestock. By doing this a family can survive easily getting rid of loans. Such type of agriculture is in practice in province of Balochistan for the crops of vegetables⁹.

⁸.Interview of Partab, Islamkot, Tharparkar. He is belonging to practical farming family in a typical village. Being a educated and having experience of job and farming, he has worthy knowledge. His opinions are applicable for consideration.

4.10 Positive Approach of People

When people of Thar will practice this type of harvesting of water and fencing of farmland then they will achieve encouragement and awareness of the use of their valuable farmlands. The fenced farmland should be named farm or garden. This wording also will encourage the farmers. They will themselves think that they are owners of the farm/ garden and they are now landlord. The younger generation when will think that their parents have got few acre fenced land and has got much benefit of it then they will try to fence more land. This practice will increase with new ideas of young's improving the farming. In this way the prosperity will merge into farmers.

4.11 Farming of Honey-Bee

At this time the honey, which is utilized in cities, is farm made. Honeybee cages are available in the farms of some areas of Pakistan where farms of honey are available at the rate of 2-3 thousand per cage¹⁰. These honeybee cages should be introduced at Thar in the fenced farmland. These cages can be important for producing natural honey too, because of natural flavours availability in the areas of Thar in different seasons. Different types of vegetation are available in different areas. The honey of Thar is included in the list of good quality. At the Same time honeybee has a vast areas of rangeland to roam over there. The collected honey should be checked and after verification it should be sold in cities' market. The standard should be checked according to tests of honey, which are available. At this time in some areas of Thar, in some years bees of Thar prepare the honey naturally.

4.12 Formation of Village Organization

We find from every rural development programme that local/indigenous/Village organization is must; with out it awareness is impossible or very slow. For example in Somalia local organizations promised to do every thing themselves like; healthcare facilities, roads, schools and so many other things and getting developed. In this sub-continent there was practice of panchayat (local organization) system. At present it also exists there but in weakened shape.

At this time city government is the nearly same type of practice, but depends on public funds. Grameen Bank of Bangladesh organized local organization for the development and encouraged them by micro

⁹ Interview of Akhtari, Farukh. Hub Choki, Blochistan, Dr. in Civil Hospital. In Blochistan rain fed area, pitcher agricultural is in practice

¹⁰ Interview of honey seller at Karachi and some people of Kohat (NWFP) who do bee farming practically.

financing. It becomes successful in improving the economy of poor¹¹. It is going to be replicate at this time in all over world.

At present time there is need of introducing some new and additional tool of net working. Using this system micro financing and micro-sharing/depositing, just like shares of companies should be introduced. At present these organization can be more successful, using this networking for more benefits and it will prove helpful for Tharies. If these organizations are organized to convince and motivate then labour work can be taken by local villager concerning with their problems. In this way Thar can develop and help in the income generation comparatively sooner than expected. In this concern Lenin gave a formula for the development that: Development of soviet socialism = Soviet + Electricity and Nehru gave equation for India that Socialism = Local organization + Electricity (Mithal). And for the development of Thar we are giving equation as under:

Development of Thar = Local organization + Live stock+ Networking system

Some quotations in favour of such type of organizations are also given in religious teachings also as mentioned bellow: "In brief, from among the wise men in every village a board should be organized and the affairs of that village be under the control of that board" (Baha, 1912).

"Under their advice a place must be appointed, and they must assemble together in that place and hold fast to the rope of consultation, and decide upon and execute that which is conductive to the people's security, affluence, welfare and tranquillity" (Baha'u'llah, p.178) regarding such laws as have not been expressly revealed in the book. Of them whatever they deem advisable and proper that must they enforce" (Baha'u'llah, p.182). "Solution begins with the village, and when the village is reconstructed, and then the cities will be also" (Baha p. 45).

So this is the importance of Local organization, for Thar and if there is strong system of it then development is assured.

Organization of Para and village should be made. Decision should be taken with the consultation of the committee members. They should be given training and awareness about reform of farmland, fencing the land and increase the livestock. The owners of livestock should be made aware that their little care can help the increase of vegetation producing more forage and their little sacrifice labour will result in the availability of fodder for coming years in abundance, follow the Grameen Bank example of Organization¹².

¹¹ Website about Grameen] [Bank] [Family] [Micro credit] [Newsletter] [Feedback] January-2001 the Virtual Library on Micro credit (website). This bank is worldwide popular in microfinance. It was started by proff. Muhammad Yunus. Mostly in lot of countries microfinance is replication of it, this also gives the traing to indigenous and exotic leaders for rural developmebnt following its working .

¹² ibid

4.13 Cultivation of Indigenous and Exotic Shrubs and Tree

Indigenous trees and shrubs, like: Neem, Kandi, Ber, Devi, Combhat, Khabri, Gangheti, Khip, AK, Sinn etc. should be selected and their seed be collected and dispersed in fenced farmland and in the rows of fencing and in the rangeland near their farmland. Some exotic plants, like: talhi (sheshum) ekar, babble and others, which are available, should be introduced in the same way as indigenous. This type of practice will result in the growth of natural vegetation lastly livestock automatically will increase¹³.

4.14 Emergence of Industrial Economy

When fodder will be available in abundance at easiest approach then livestock automatically increase because of natural interest of Tharies. When the livestock will increase, naturally the levels of income of Tharies automatically increase. The increase of income encourages widening their business and as a result small-scale industry will merge at the beginning in Thar. For example, milk plant, cheese preparing plant, butter plant, meat processing and preserving plant etc. After that some heavier industry will merge in the area. It will lead the area into industrial economy. Example of it is Denmark and a Scandinavian country is before us. In these areas they were facing drought but at this time they are industrially developed. They encouraged agro-based industry in the beginning¹⁴. Arbab Ghulam Rahim C.M Sindh has also announced in the month of December, 2006, that in every district cattle farm will be opened, this is the step of forward movement and it will improve in future.

4.15 Use of Under Ground Water/Water Aquifer

The under ground water aquifers are abundant in Thar at the depth level of 350 to 700 feet (Shaikh, 1992). Ground water, which is available at the level of approach of small tube wells and hand pump, be pulled out. The use of these be checked and utilized at some extent what ever is possible in different areas of Thar, like in areas of "Vat" the ground water is 4-30 feet deep. It can be easily pulled out with hand pumps. At the some extent people use it for little fodder and gardens of fruits, vegetables and crops. It can be good support to farmers but people are not aware about it. Some tube wells

¹³ Ethno forestry in Rajasthan, India: (website). It belongs to Indian research and is detailed study of plantation and conservation at rain fed area of Indian Thar.

¹⁴ Denmark (Website). This is the study, which is given in details in thesis of PhD. It shows that Denmark was suffering from droughts due to rain fed agriculture and they encouraged livestock rearing by conserving and reforming, the farmland and rangeland.

are introduced in Thar and they are working properly fulfilling the requirement of the villages. One tube well in taluka Chachro is very deep and water is pushed up by natural pressure of under ground water, which is proof that water is available but needs attention of authorities.

4.16 Infrastructure Facilities

The roads, electricity, healthcare facilities and animal husbandry facilities should be improved. Due to this farmer can buy and sell their produce easily at suitable rate. The communication will help them keep in touch with daily market rates and is very important factor of developed of all kind. This will bring social change, which is need of the hour. There is an amazing and rapid change in telecommunication due to introduction of V. phone in the year 2006, with the help of it those villages are also facilitated where still no transport is available.

5 CONCLUSION

After detailed study of this paper we have achieved following findings:

- i. Thar at this time is disadvantaged district of Sindh province. It is evident that there are wide gaps in the coverage of key pro-poor services such as primary education, prevention of health care, village electrification, skill promoting, livestock farming encouragement, micro finance, proper use of rangeland for fodder of livestock; which is reliable source of income.
- ii. Presently in the government of President Parvez Mushraf, the network of roads has improved. Work on the scheme of water supply is completed up to Chachro and Mithi, Khushali Bank is introduced.
- iii. There is need of change of crops to non-crops where ever it depends fully on rain. Non-crops need less care no investment and labour work.
- iv. "Muhrano" and "Vat" are suitable for rearing livestock due to abundance of trees as a fodder.
- v. In "Vat" area water is at low depth can be pulled out easily. Fencing and reforming some acres of farmland can save the natural vegetation for fodder and it also may prove honey farm at some level.
- vi. Pitcher irrigation may be able to prove better results in fenced farms.
- vii. There are so many natural herbs, which are used in medicine; they are grown naturally like Kunder, *Leptadnia spartium* (khip) and pilo. Kunder is used for making (Medicine) qushta of mercury; Khip is used for eczema, *Salvadora oleoides* (pilo), for constipation etc. After research in the field of these medicinally used herbs can be conserved this may increase income.
- viii. For the purpose of fodder indigenous plants like Khejdi (*Prosopis juliflora*), ber (*Zizyphus rotundifolia*) and (*Prosopis juliflora*) Devi can be

planted. Some other exotic plants like, eucalyptus and Cactus can be planted. Climate is suitable for cactus plants that don't need much water and is expensive in cities used for purpose of home garden.

ix. For the improvement of livestock better and more productive races are required.

x. Local leadership can organize Tharies, to conserve rangeland and non-crops and livestock properly.

xi. Promotion of livestock will lead Thar to develop other agro based industries.

xii. NGOs work is better than the government employs' work.

xiii. Hypothesis I and II are accepted by graphical and theoretical analysis.

6. POLICY SUGGESTIONS AND IMPLICATIONS

6.1 Proposed immediate measures

i. For the eliminating of poverty of Thar reforms of farmland is must, being a prime instrument for the development of livestock farming and agro-based industries.

ii. Awareness should be created to use duly fenced farmlands for the purpose of fodder for livestock.

iii. Micro-financing system be introduced for safety nets of cutting trees and shrubs and for further introduction of livestock.

iv. Bringing up live stock (animals within species; race, lineage; sort and kind) by producing fissile material, by introducing short-term loans, on experimental basis following the new technique of MLM (multi level marketing) system on guarantee of local organization.

v. Indigenous and exotic plants and grasses should be planted for conservation of farmland and rangeland.

vi. People be trained to understand the benefits of fenced farmland and un-sowed natural vegetation and modified farming types.

vii. Activities of NGOs should be encouraged.

viii. Local organizations at the level of par (neighbour) and village level be formed for boosting the program of development.

6.2 Medium and long term measures

i. Awards for best performance constantly should be encouraged for local leadership.

ii. Kandi (propos ginerasia) and ber (Acura psedotomentosa) Devi planting should be encouraged.

iii. Tube wells and hand pumps should be installed. Existing tube wells be checked, and dams/small water reservoirs/ tankas should be constructed to improve storage/ conservation of water and harvest of rainwater.

- iv. Under ground water aquifers should be used by constructing more tube wells.
- v. Possibilities for the supply of water, through pipes to nearby villages be extended and main line too.
- vi. For income generating infra- structure schemes like: roads, water development facilities, electricity, healthcare both for human and husbandry, as well as tree plantation for commercial purpose should be under taken by the authorities
- vii. Market for livestock should be searched and conserved by opening livestock sell market at Mithi and Umerkot.
- viii. Further research on livestock, its fodder, growth in rangeland and fenced farmlands should be carried out.
- ix. Agro-livestock industry should be promoted with the good intention to boost their export preserving the meat and dairy products
- x. Milk plant, meat plant, wool and fur utilizing factories should be established.
- xi. China clay, granite grazing and coal utilization industries should be established.
- xii. Coal should be explored and some part of it should be converted into the gas and should be supplied at the cheapest rates for the sack of conservation of plants.
- xiii. Implications of LBOD scheme, Renni Canal scheme and Thar Canal scheme should be confirmed as soon as possible and new ways of harvesting of rain water should be searched.
- xiv. Local government including the village organizations to cut the connection cost comparatively should handle work of water tube wells.

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