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Environmental Changes and their Impact on Agricultural Communities of Sindh: An Ecofeminist Perspective

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Abstract

Environmental degradation is one among the major issues threatening Pakistan. Pakistan is third most affected country by climate change after Haiti and Philippines. Along with climatic changes, human activities like ruthless urbanization, deforestation, desertification and massive development projects are also deteriorating the environment. Cyclones, drought, floods, heavy rainfall and extreme heat wave had badly affected the province of Sindh in past few years. The poor population of Sindh has been bearing the burden of natural calamities severely. Among poorest of the poor are women with multiplied miseries. Women in rural Sindh are closely associated with agriculture, playing an important role in national GDP. A woman selects, prepares, distributes and preserves food. Her role is important in farms as she is also involved in food selection, preparation, distribution and preservation. So agriculture degradation which is the result of environmental changes, has been negatively affecting the women. Women's vulnerability has been multiplied, as in many cases their livelihood is dependent on agriculture. The research article is an attempt to highlight the environmental issues from ecofeminist perspective—the idea that ecological destruction has its origin in patriarchy. Ecological destruction and gender inequality can be traced in our society where male are not only destroying ecosystem but also controlling the females..

Introduction

Pakistan's second most populated province, Sindh covers 140,915 square kilometer and forms the lower part of Indus Plain. The absolute location of Sindh is 23 to 35 degree, north latitude and 66-42 and 71degree east longitude. It is about 579 kms., in length from north to south and nearly 442 kms., in its extreme breadth.[1] Historically, great civilization of Indus valley had flourished in this fertile land, indicating that once, Indus valley was ecologically balanced and rich in natural resources.

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1 Government of Sindh, http://www.sindh.gov.pk/dpt/History%20of%20Sindh/ geogpaphical.htm

Since the beginning, river Indus has been the lifeline of Sindh's land. The total drainage area is estimated 372,000 square miles.[2] Most part of Sindh is either arid or semi-arid. The moisture index is negative as rainfall varies from 100 to 200 mm annually. The evaporation rate is about 100 to 2000 mm depending on climate.[3] The physiography of Sindh is diverse. Pithawala describes Sindh into six physiographic divisions: Western highlands, comprising of the Kirthar ranges and Sindh Kohistan section; lower Indus valley including eastern valley section, western part of the valley and deltaic region; and, desert province comprising the Pat and Thar.[4] Land of Sindh is generally flat and the only elevation is the Kirthar ranges with the height of 7000 feet above sea level. Other is rocky tract of the Kohistan. In the plain area slope is less than one foot per mile. In the western valley section, old alluvium and seasonal water channel flows from the Kirthar into the Manchar Lake.[5] Significant features of eastern valley part include aeolian soil with abandoned river channels. One prominent feature of Sindh is Indus delta, located at the Arabian Sea, roughly between Cape Monze and Rann of Kutch.[6] The deltaic area is spread on 312 km. sq.[7] It comprises of 17 major creeks. The map drawn by Ptolemy marks seven branches of Indus flowing into Arabian Sea, later, other maps demarcated Indus distributaries quite differently.[8] The eastern part of the province has rolling sand dunes. It is a desert area divided into Thar and the Pat.

Traditionally weather and climate of Sindh can be divided into *Sar* (upper Sindh), *Vicholo* (middle Sindh), and *Lar* (lower Sindh).[9] The diversity of topography also affects the weather and climate. The northern part of province is drier and hotter than southern part, having hot summer and mild winters, while, coastal strip experiences moderate temperature with warm summer and mild winters. Major part of Sindh

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2 A.K. Snelgrove, *Geohydrology of the Indus River, West Pakistan* (Hyderabad: Sindh University Press, 1967).

3 *Sindh: State of Environment & Development*, IUCN, 2004, Pakistan.

4 A.K. Snelgrove, *op.cit.*

5 *Ibid.*

6 Mushtaqur Rehman, *Land and Life in Sindh, Pakistan* (Lahore: Ferozsons, 1993).

7 *Indus Delta: An Environmental Assessment* (Karachi: Pakistan Fisher Folk Forum Publication, 2005).

8 Mushtaqur Rehman, *op.cit*., p.39.

9 *Ibid.*

lies in a zone of deficient rainfall, thus, heat and aridity are the dominant features of the province.[10]

The concept of ecofeminism emerged in 1970s. Francoise d' Eaubonne used the term in her book *Le feminism ou La mort*, where she explained the link between oppression of women and the oppression of nature.[11] In the following years, ecofeminism developed as an important school of environmental thought. Its basic theme is that 'ecological destruction has its origin in patriarchy'.[12] Ecofeminism comprehends women-nature connection. The ecofeminism challenges the dualism of man/ nature, emotion/reason, masculine\feminine, etc. In the postmodern industrial society, basically it is patriarchy and oppressive mode of thinking that has harmed both women and nature. With the advent of scientific revolution in Europe, the image of medieval cosmology, where earth has revered position – considered as living female – was undermined. The mechanistic thinking with rational behavior made it possible for man to master the nature and exploit its resources mercilessly. The attitude of dominating nature also supported males to control and dominate females.

Karren J. Warren writes that 'ecofeminism refers to a plurality of position. The positions are quite diverse as the feminism from which they gain their strength and meaning'.[13]

Victoria Davion in essay 'Is Ecofeminism Feminist' quotes Karren J. Warren's argument:

> women are identified with nature and the realm of the physical; men are identified with the "human" and the realm of mental. Whatever is identified with nature and the realm of the physical is inferior to ("below") whatever is identified with the "human" and the realm of the mental, thus, women are inferior to men.[14]

Another ecofeminist approach is presented by Vandana Shiva. She believes that:

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10 F.K. Khan, *A Geography of Pakistan: Environment, People and Economy* (Karachi. Oxford University Press, 1991).

11 Rosemarie Putman Thong, *Feminist Thought: A More Comprehensive Introduction* (Colorodo: West View Press, 1998).

12 Andrew Haywood, *Political Ideologies: An introduction*, 4th ed. (London: Palgrave Macmillan, 1998).

13 J. Warren Karen (ed.), *Ecological Feminism* (London: Routledge, 1994), p.2.

14 Victoria Davion, 'Is ecofeminism feminist?', *Ecological Feminism* (London: Routledge, 1994).

> …ontology of man dominating women and nature generates maldevelopment because it makes the colonizing male the agent and model of development. Women, the Third World and nature become underdeveloped, first by definition and then, through the process of colonization, in reality.[15]

Vandana Shiva is well-known among the socialist ecofeminists. Warren explains that socialist feminism is anti-dualistic. Alison Jagger further elaborated that 'its goal is to abolish the social relation that constitutes human not only as worker and capitalists but also as women and men'.[16] Shiva strongly advocates Indian cosmology – person and nature are a duality in unity. They cannot be separated by one another. This is contrary to western view of nature. She blames western development model for marginalizing women, especially in the Third World. In postindustrial society the role of male labour becomes significant\dominant and nature and women are turned invisible. The introduction of dualism in society devalues and degenerates the nature's work, thus, leading to ecological crisis.[17] Shiva called the western type development maldevelopment, which 'actually breeds poverty in the areas that are "developed" and therefore is properly called "maldevelopment"'.[18] She writes:

> what goes by the name of development is a maldevelopment process, a source of violence to women and nature throughout the world. This violence does not arise from the misapplication of an otherwise benign and gender neutral model, but is rooted in the patriarchal assumption of homogeneity, domination and centralization that underlie dominant models of thought and development strategies.[19]

It is said that women are creatures of nature, men are creatures of culture. In the patriarchal world, intellect, materialism, rationalism and mechanical relationships are more valued as compared to intuition, spiritualism and emotionalism. The former are qualities of males and latter are considered weaknesses of females.

Haywood asserts:

> …patriarchy in this view establishes the supremacy of culture over nature…… Ecological destruction and gender

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15 Vandana Shiva, *Staying Alive: Women, Ecology and Survival in India* (London: Zed Books, 1998).

16 Rosemarie Putman Thong, *op.cit*., p.268.

17 Vandana Shiva, *op.cit*.

18 J. Warren Karen (ed.), *op.cit*.

19 Vandana Shiva, *op.cit.*, p.46.

> inequality are therefore part of the same process in which 'cultural' man rule over 'natural' women.[20]

Methodology

The research is based on, both primary and secondary data. The secondary data is collected from books, NGO's reports, government websites, newspaper articles and other international scientific reports. Primary data was collected by field survey. Field study was conducted in four districts of Sindh, namely, Karachi, Khairpur, Umerkot and Qamber Shahdadkot. The rationale of selecting different districts of province lies in their physiographic diversity and variety of crops cultivated there (Map 1).

The study population comprised women active in agriculture in various capacities, such as farming and livestock-raising. The method of selecting women respondents is judgmental. This method was adopted to incorporate different physiographic conditions of the land, crops diversity, relationship with land, age, marital status and ethnicity. The districts selected represent four different climates, landforms and irrigation sources, as is described in the following subsections:

1. *Karachi*: The largest city of Pakistan and capital of Sindh, it covers an area of 3530 sq. km.[21] Karachi is a megacity with a population of about 18 million.[22]

2. *District Khairpur*: It located in the upper Sindh, It is surrounded by Shikarpur and Sukkur in north, Sanghar and Benazirabad in South, Larkana and Nosheroferoz in west and on its eastern side lays India. The total area of Khairpur is 15,910 sq. km.[23] According to development statistics of Sindh, 2013, the projected population of district Khairpur in 2012 was 2,248,809.[24] About eighty per cent of the population is associated with agriculture. Dates are the dominant crop of Khairpur.

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20 Andrew Haywood, *Political Ideologies: An Introduction*, 4th ed. (London: Palgrave Macmillan, 2007), p.277.

21 http://www.kmc.gos.pk/Contents.aspx?id=14

22 Arif Hassan, *et.al.*, *Karachi: The Land Issues* (Karachi: Oxford University Press, 2015).

23 http://www.pbs.gov.pk/sites/default/files//tables/District%20at%20a%20glance%20Khairpur.pdf

24 http://sindhbos.gov.pk/wp-content/uploads/2014/09/Development-Statistics-2013-.pdf

3. *District Umerkot*: The total area of the district is 5608 sq. km. On the eastern and southern side of Umerkot is located Tharparkar. Sanghar and India lie on the north, and Badin on the south.

4. *District Qambar-Shahdadkot*: Situated in the north-west of Sindh, the total area of district is 5475 sq.km. (Hyderi and Pirzado 2010).[25] The projected population in 2012 was of 1424,918 (Sindh Bureau of Statistics, 2013).[26] The population mainly depends on agriculture. The physiography of district is diverse with plain agricultural lands and Kirthar mountains in the west. The *Hamal*, the *Drigh* and the *Langh* are prominent wetlands of the district.[27]

Map 1: Selected Districts of Sindh Representing Different Geographical Regions[28]

The data was analyzed through quantitative methods (frequency distribution, percentage) and inferences were drawn by putting together

25 Shammsheer al Hyderi and Anwar Pirzado, *Exploring SINDH* (Karachi. Information and Archives Department, Government of Sindh, 2010).

26 http://sindhbos.gov.pk/wp-content/uploads/2014/09/Development-Statistics-2013-.pdf

27 Shammsheer al Hyderi and Anwar Pirzado, *op.cit*.

28 http://www.sindh.gov.pk/images/map.JPG

qualitative and quantitative data and comparing the findings according to the objectives of the study.

Environmental changes in Sindh

Sindh has experienced some catastrophic natural calamities in the past few decades. Whether it is dry spell creating severe drought, or erratic and heavy rainfall causing floods, Sindh has been exposed to disastrous climate change. Pakistan is among the worst affected countries by climate change. Rapid increase in population has multiplied the pressure on natural resources of Sindh. Indus River System Authority (IRSA) has confirmed per capita decrease in water. At the time of independence, per capita annual water availability was 5,600 cubic meters, which has been dangerously decreased to 1000 cubic meters, because of population increase and lack of proper management.[29] The situation is more alarming in Sindh as water availability is continuously reducing to a dangerous level. In 2002, water reduced to 1200 cubic meter per capita and even lesser in Sindh. The years from 1998 to 2002 were quite critical for agriculture. In 2002, at the time of Rabi season water was not available for sixty per cent of the cropped land. It worsened the drought condition in rural parts of Sindh.[30] People from drought hit areas moved to other cities, increasing the rate of internal migration. Not only rural population was affected by the lack of water but the situation is also always worse in urban slums where, majority does not have access to safe drinking water and adequate sanitation facilities. If this trend continues by 2020, there would be more pressure on agriculture and people related with cultivation.[31] The work of agricultural women has been increased manifolds, due to the shortage of water resources. She has to travel long distance to fetch water for drinking. At the time of acute shortage, she avoids bathing and washing clothes; thus forced to live an unhygienic and unhealthy life.[32]

Drought, another menace in Sindh, is not something new. In 1868-69, there was a famine in Thar and Parker areas. Lack of rainfall extended the drought period and the district was almost depopulated. Again, in 1898-1899, there was an extended dry spell and lack of

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29 'Pakistan becoming water stressed, concedes Irsa', *The Nation*, 14 September 2015.

30 IUCN, *op.cit*.

31 Mahbubul Haq Human Development Centre, *Human Development in South Asia 2010/2011: Food Security in South Asia* (Karachi: Oxford University Press, 2011).

32 Muhammad Ali Shaikh (ed.), *Report on Agriculture in Sindh: Issues and Options* (Karachi: SZABIST Centre for Information and Research, 2001).

rainfall. Sindh along with other parts of western India, was badly affected.[33] In recent decades, parts of eastern Sindh have suffered severely from 1998 to 2002, as the dry spell prevailed longer, thus resulting in worst drought. The recent drought of 2014 affected the areas of Mithi, Chhachhro, Dahli, Diplo, Islamkot and Nagar Parker, spreading on 19,638 square kilometer of area.[34]

Floods are common in the Indus basin because of heavy monsoon rainfall and melting of glaciers in the summer season in the northern part of country. The most terrific floods recorded in Sindh were of 1841, 1858, 1874, 1882, 1895, 1913, 1916, 1921, 1926 and 1929.[35] Jacobabad was damaged in 1874 by floods, as 80 towns and villages were swept away. In 1942, there was breach in the Begari and Jhali bunds, and, 3,000 sq. miles were inundated, near Sukkur, on the right side of Indus bank.[36] The super-flood of 2010, affected 17 districts of Sindh, destroying 879,978 houses and 1,043,500 hectares of cropped area. The agricultural community was mostly affected as seven million were uprooted.[37] Poor peasants and agricultural labor were the most affected and vulnerable groups. After the flood, many communities were unable to recover, and their losses pushed them to poverty or indebtedness.[38] The flood of 2011 damaged 2,184,951 acres of crop area. The very next year (2012), 11,894 villages were inundated and 245,459 acres of cropped area was affected. Similarly in 2013, flood water covered 246,590 acres of crop area and affected 3,068 villages.[39] In a way, flood has become an annual feature now in Sindh.

In 2009, Karachi experienced heavy rainfall; 26 people were dead and 150 were injured. This was one of the worst rains in the past thirty years.[40] With such frequent natural disasters, it is imperative for

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33 R.D. Choksey, *The Story of Sindh: An Economic and Social Survey (1843-1933)* (Karachi: Indus Publications, 2003).

34 National Disaster Management Authority, (2015) http://www.ndma.gov.pk/new/

35 A.K. Snelgrove, *op.cit.*

36 *Ibid.*

37 Kaiser Bengali, *Profiles of Land Tenure System in Pakistan* (Karachi: Pakistan Institute of Labour Education and Research, 2015).

38 Social Policy and Development Centre, *Gender and Social Vulnerability to Climate Change: A Study of Disaster Prone Areas in Sindh* (Karachi: SPDC, 2015).

39 National Disaster Management Authority (2015), *op.cit.*

40 Naseer Memon, *Disasters in South Asia: a Regional Perspective* (Karachi: Pakistan Institute of Labour Education and Research, 2012).

the policymakers to improve on the disaster preparedness and mitigation policies.

Objectives

The objectives of the research are to investigate:

i. What type of environmental changes are threat to the agriculture production and related activities;
ii. how women and their families have been affected by these changes; and
iii. comparing the four sample districts regarding the impact of environmental changes on agricultural women's livelihood, health and well-being of their family

Results

Biographical Profile

Table 1: Respondents by Age

Age (Years)	Frequency	Percentage
Up to 18	2	3.3
19-35	26	43
36-50	24	40
51-65	4	6.6
65_{+}	4	6.6

Nearly all age groups are represented in the field study. The largest group of respondents comprises of forty-three per cent people, mainly of nineteen to thirty-five years of age. The second large set is of age of thirty-six to fifty years. Eighty per cent of the respondents are adult and mature females.

Table 2: Respondents by Education

Education	Frequency	Percentage
Illiterate	41	68
Up to primary	13	22
Quran literate only	6	10

The educational level of respondents is quite poor with sixty-eight per cent of illiteracy. Only twenty-two per cent can read but cannot write properly.

Table 3: Family Type

Type	Frequency	Percentage
Joint	48	80
Nuclear	12	20

Joint family system still prevails in Sindh. Eighty per cent of respondents' families live with elderly and other relatives.

Table 4: Household Size

Size	Frequency	Percentage
1-4	11	18
5-8	30	50
9-12	11	18
13 and above	8	13

As mentioned above, joint family system is a salient feature of the agrarian society in Sindh. Eighty-one percent respondent's household size indicates they are living collectively as a part of large household.

Basic Facilities

Table 5: Type of Residence

Type	Frequency	Percentage
Pucca	25	42
Katcha	29	48
Hut	6	10
Total	**60**	**100**

Only forty-two per cent respondents are fortunate to live in concrete houses. Forty-eight per cent are living in mud houses and ten per cent respondent's residence is vulnerable to natural calamities as it is either made up of wood planks or straw mats.

Table 6: Facilities at Home

Facility	Yes (%)	No (%)
Electricity	7	5
Piped water	2	10
Sewage disposal	0.4	12
Washrooms	8	4.5
Natural gas	0.2	12
Separate kitchen	7.7	5.6

T.V./Cable	5	7
Separate animal den	8	5

Facilities at home can ease the workload of women. Natural gas and water supply at home is not common in respondents' households. Less than five per cent of respondent have these facilities at home. Electricity is enjoyed by only seven per cent responding households. Separate kitchen and separate barn are common with only eight per cent households.

Table 7: Decision Making Pattern

Decision	Male (Percentage)	Female (Percentage)	Both (Percentage)
Buying/purchasing property	9.2	1.2	1.4
Socializing	8.1	2.5	1.7
Children's education	9	1.4	1.2
Matchmaking	8	1	3.4
Grocery/shopping	7	2	3.4
Savings	3	3.4	1.7
Female Job	8	00	0.2
Voting decision	8	2	1.2
Crop selection	7.4	1	2

The above data indicates male dominance at home. More than eight per cent males at home made decisions, whether its matter of land, crop selection or casting vote. Savings is the only area where females are trusted to reserve money for future.

Table 8: Political Participation

Activity	Yes (Percentage)	No (Percentage)
Casting vote	83	17
Attending political meetings/rallies	15	85

Majority of the respondents (83 per cent), regularly cast their vote in general and local elections. Only seventeen per cent refrain themselves from electoral process because either they do not possess CNICs, or, they are below the age of eighteen. Female participation in other political

activities is very little. Only fifteen per cent respondent had attended political gatherings/ rallies or demonstration. Eighty-five per cent prefer to stay at home.

Table 9: Land Ownership Pattern

Pattern	Frequency	Percentage
Women as landowner	9	15
Family as owner	6	10
Sharecropping	25	42
Agriculture labor	20	33
Total	**60**	**100**

Female land ownership is just fifteen per cent. Majority of the respondents, work in share-cropping system. Thirty-three per cent are agriculture labour. Only ten per cent work on their own family land.

Figure A: Land Ownership Pattern

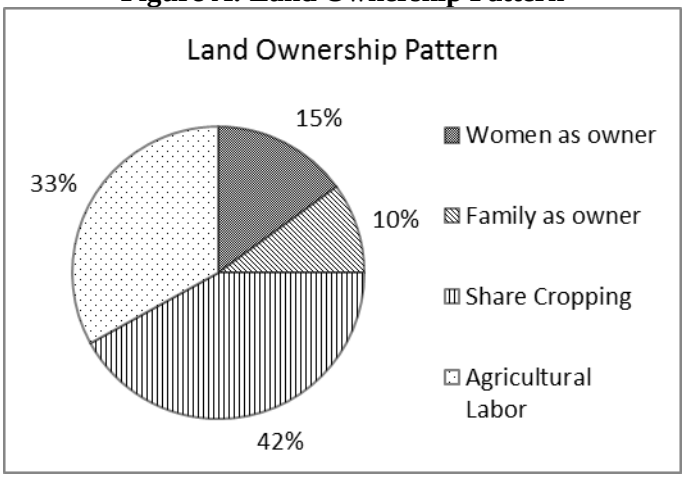


Table 10: Women Health

Health Condition	Frequency	Percentage
Excellent	—	—
Good	36	60
Poor	20	33
Worst	4	6.6
Total	**60**	**100**

Sixty per cent of respondents are satisfied with their health conditions. Only thirty three per cent admit about their poor health and seven per cent have severe health issues.

Table 11: Class Status

Status	Frequency	Percentage
Very Poor	15	25
Poor	24	40
Middle Class	13	22
Rich	8	13
Very Rich	—	—
Total	**60**	**100**

About sixty-five per cent respondents admit they belong to poor or very poor class. Twenty two per cent claimed to be in middle class and only thirteen per cent consider themselves as rich.

Table 12: Productive Activities of Women in Agriculture

Activity	Percentage
Ploughing	7.3
Sowing	8
Watering	6.2
Weeding	7
Harvesting	9
Spraying pesticides	2
Cotton picking	5
Vegetable collection	11
Grain storage	4
Herding	13
Dung collection	8
Using manure	7
Selling agricultural products in market	3
Handicrafts	8
Other work	2

The above data indicates that work of females has reduced on the farms. Herding is the only activity where thirteen per cent of respondents take care of their animals. It is followed by vegetable collection as eleven per cent only. Rest of the women's activities, amount to less than ten

percent. Spraying pesticides and selling agriculture products is the least popular work among the respondents.

Figure B: Productive Activities of Women in Agriculture

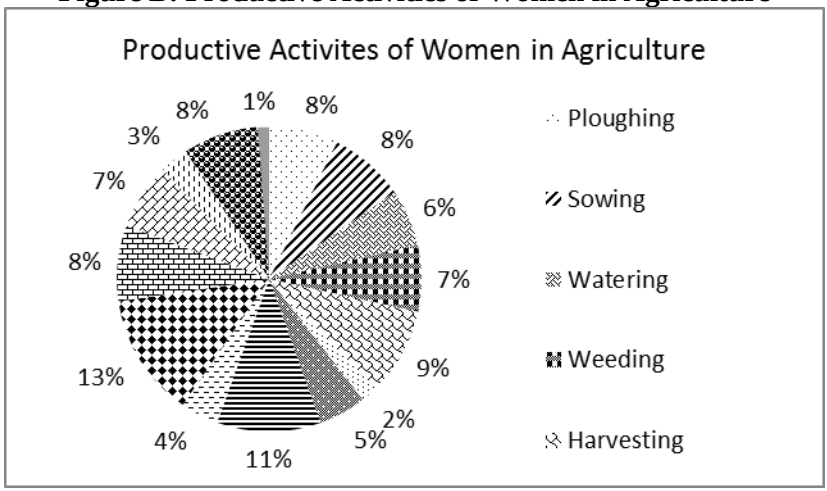


Table 13: Environmental Changes Experienced in Past Decades

Environment	Frequency	Percentage
Changed	48	80
Not changed	12	20
Total	**60**	**100**

Eighty per cent of the respondents confirmed that they have experienced environmental changes in past few decades. Only twenty per cent believe that no such change occurred.

Figure C: Environmental Changes in Past Decades

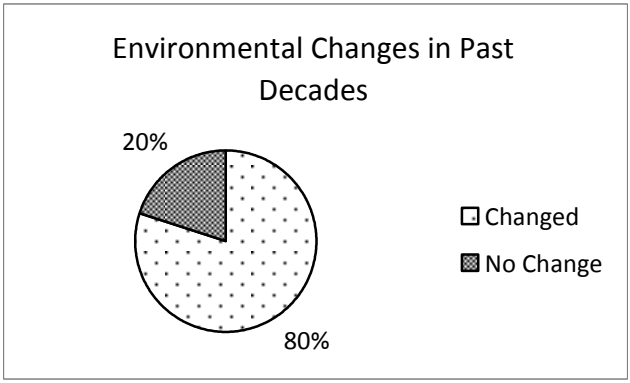


Table 14: Negative Impact on Livelihood

Impact	Frequency	Percentage
Yes	45	75
No	15	25

The changing environments in past decades have brought negative implications for the respondent household. Seventy five per cent confirmed it while twenty five per cent denied any negative impact on their livelihood.

Figure D: Negative Impact on Livelihood

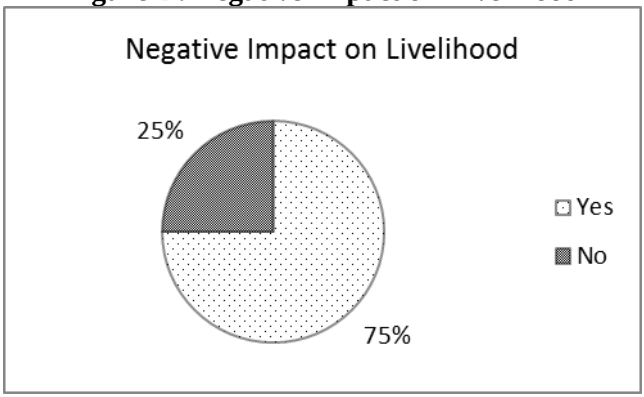


Table 15: Respondent's Perception on Causes of Environmental Changes

Perception	Frequency	Percentage
Nature	36	60
Humans	22	37
Both	2	3
Total	**60**	**100**

Majority of respondents (sixty per cent) blamed nature for causing damage to environment. Thirty seven per cent thought humans are responsible for destroying the ecosystems and only three per cent believe that it is man-nature interaction which has caused environmental degradation.

Figure E: Perception on Causes of Environmental Changes

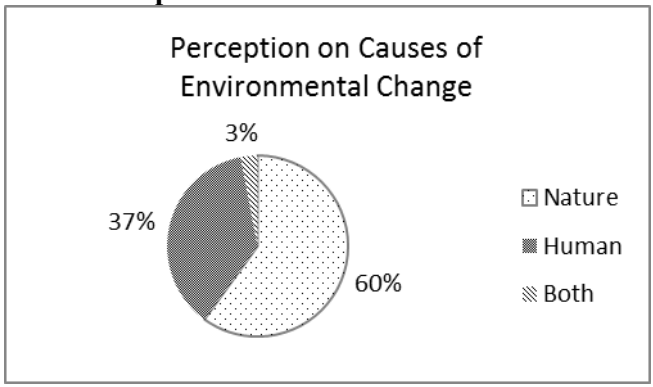


Table 16: Change in the Availability of Forest Products

Change	Frequency	Percentage
Now less available	51	85
More available now	3	5
No change	6	10
Total	**60**	**100**

The availability of forest products has reduced drastically as eighty-five per cent respondents confirmed there has been less fuel wood and fodder available now. Ten per cent response was of no change and only five per cent agreed that there is an increase in fodder and wood availability.

Figure F: Change in the Availability of Forest Products

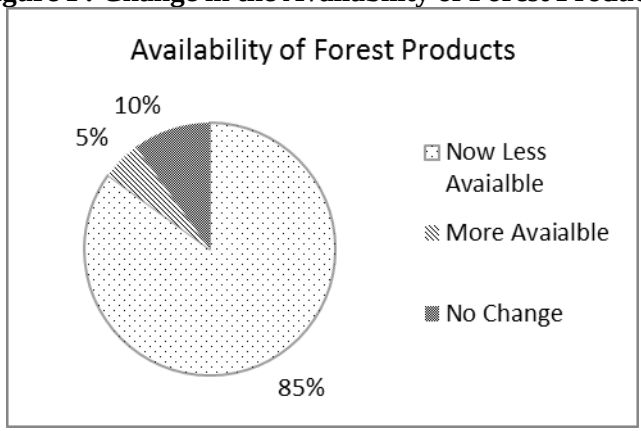


Table 17: Linkage between Economic Condition and Environmental Change

Impact	Karachi %	Khairpur %	Umerkot %	Qambar-Shahdadkot %	Total %
Decrease in cultivable land / crop	35	43	44	17	34
Salinization of ground water	19.5	14.2	NIL	17	16
Drought / Less rainfall	33	28.5	50	22	33
Decrease in irrigation water	10	14	6	22	12
Use of Pesticides	2.4	NIL	NIL	22	05
Total	**100**	**100**	**100**	**100**	**100**

Decrease in land and crop is the most significant change which has caused negative impact on the livelihood of the respondents. In Karachi and Khairpur, respondents consider it as the major issue followed by less rainfall and drought condition. Respondents from Umerkot blamed drought for affecting their livelihood.

Figure G: Linkage between Economic Condition and Environmental Change

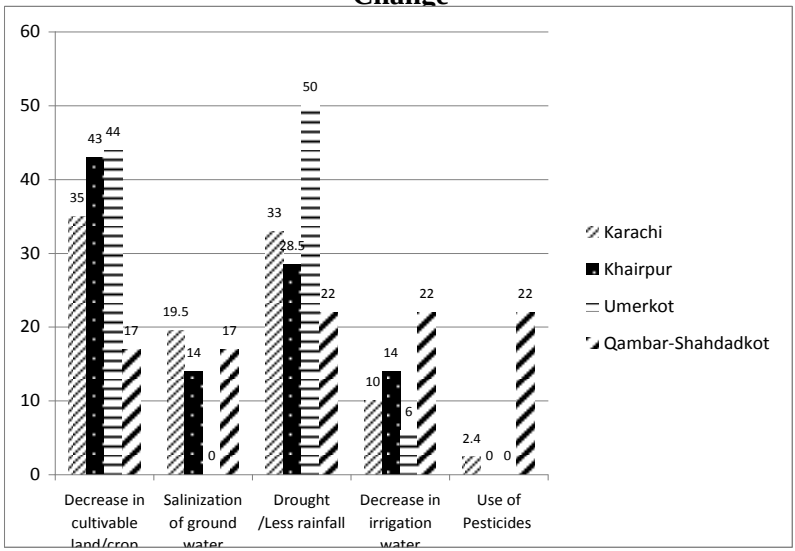


Table 18: Impact of Environmental Changes

Disaster	Karachi %	Khairpur %	Umerkot %	Qambar-Shahdadkot %	Total %
Floods	Nil	Nil	35	25	8
Heavy Rainfall	29	40	40	30	31
Deforestation	20.3	20	10	10	18
Air/Aquatic pollution	Nil	10	Nil	5	1
Harmful Pesticides	2	NIL	NIL	10	2.6
Drought	25	20	Nil	15	20.2
Rise in temperature	22.3	10	15	5	19

Majority of the respondents confirmed that heavy rainfall has caused much damage to their crop and houses. Twenty per cent respondents in all four areas described prolonged drought condition as menace, affecting their livelihood. Removing forest cover is another challenge seen by eighteen per cent of respondents.

Figure H: Impact of Environmental Changes

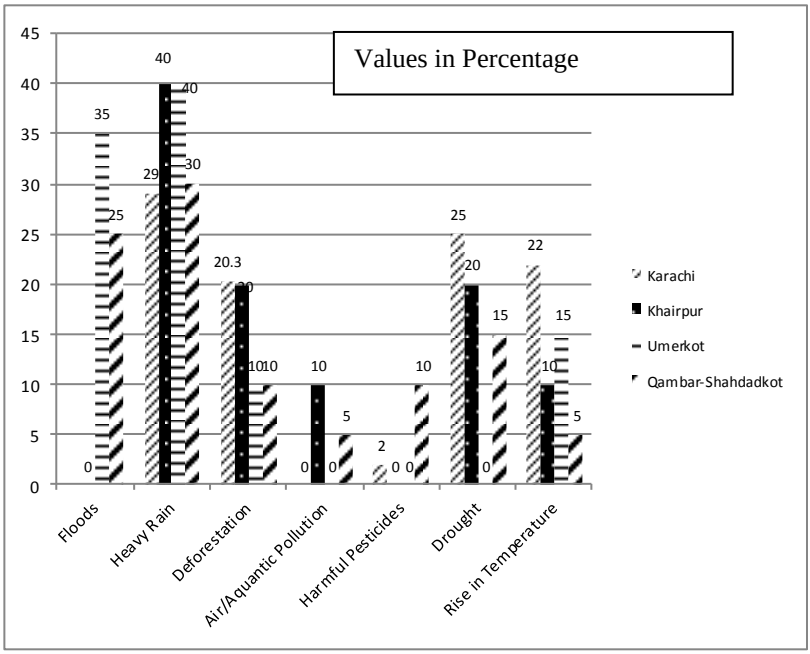
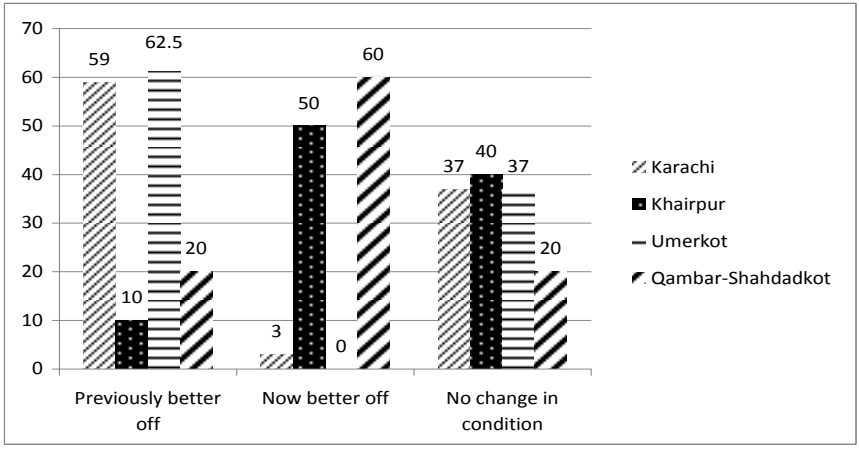


Table 19: Changes in Economic & Social Condition of Household in Past few Decades

Condition	Karachi %	Khairpur %	Umerkot %	Qambar-Shahdadkot	Total (no.)	Total %
Previously better off	59	10	62.5	20	27	45
Now better off	3	50	Nil	60	12	20
No change in condition	37	40	37.5	20	21	35

The social and economic condition of the respondents has been downgraded in past few decades. Forty-five per cent confirmed they were better off in previous years and poverty in their communities has now increased. It is pertinent to mention that fifty per cent respondents in Khairpur and sixty per cent in Qamber Shahdadkot claimed about their improved economic and social conditions. The reason is simple they are not entirely dependent on agriculture and some of their family members have switched to alternative jobs.

Figure I: Changes in Economic & Social Condition of Household in past few Decades



Discussion

The basic concepts are derived from the theories of (a) socialist ecofeminism explained by Warren, Jagger, Plumwood, etc. in general: and, (b) Shiva's idea of maldevelopment where male labour became dominant and nature and women became subordinate, in particular,. These concepts are incorporated in the questionnaire designed for field

survey. These concepts defined both the dependent and independent variables.

The backdrop of the study is provided with the introduction of dualism in society along with the advancement and mechanization of agriculture, as a result of which male labour became dominant and controlling, turning females and nature into its dependents. Traditional methods of agriculture involved women in almost every stage except few. There are still certain agricultural activities confined to male labours and female refrain to engage in such work. For instance, ploughing is not done by females for two obvious reasons. Firstly, it requires strong arms and lot of stamina, secondly, some superstitions which are not pronounced very clearly but operate at the back of the mind. These superstitions are mainly related with the concept of impurity of women through which a female body goes during menstruation in particular. Various South Asian religions believe in such notions of impurity, and social and cultural significance of this notion is that it is believed to be causing negative effects on land‘s fertility.

Another example is of spraying pesticides. Only two per cent of the respondents carried out this activity. It is duty of male workers to spray pesticides and use medicines as in their opinion it is technical and rational work which women cannot handle properly. In the agrarian society, man generally behave in a patronizing manner towards women, therefore, male of any age would engage in certain activities (ploughing, spraying pesticides, marketing, selling agricultural products, etc.) but women in no part of life would be encouraged to do such work. On smaller scale, especially for growing vegetables she used simple tools for land preparation and later sows seed. On the other hand, there are certain activities exclusively performed by women in Sindh. Cotton picking is one of these. Clearing weeds, vegetable collection, and preparation of dung cakes are done by women in almost all parts of the province. Women have been involved in raising livestock as traditionally she is given ownership of the animal in her individual name. Encouraged by this practice women take care of their animal, enjoy its benefits like selling milk and its products, selling its babies and finally to sell the animal in the market. This right of ownership and taking benefits is not infringed upon even if men help in grazing and taking care of animal.

When it comes to the female relationship with land, it is not surprising that female owners are less than twenty per cent in the study. Mostly, land is possessed by males. If she is agriculture labour, then usually her male family member receives her payment. In case of bounded/agriculture labour, men, women and children, all are offered by family to the person offering advance money—a practice which turns

virtually these people into slaves. Women did not have hold of money paid in lieu of their labour as even in daily contract system mostly male member of the family gets the money. Thus all such factors are responsible for turning women weaker in a system where they get least control of their life. Women's relationship with land is not acknowledged rather denied; therefore, she cannot be blamed for destroying the environment.

The research attempts to highlight the women's status and role in agricultural communities of Sindh. The above data reveals the vulnerability of women working in agriculture sector. Nearly all the respondents have confirmed that environmental changes have affected their lives somehow or other. It is not only women, but their entire family's well-being is threatened because of the deteriorating socio-economic conditions due to the decline in agricultural productivity.

The respondents of the survey comprised all ages, with the largest group ranging from nineteen to thirty-five years of age. Sixty-eight per cent of women were illiterate, twenty-two percent had up to primary level education, and only ten per cent could recite the Holy Quran. Majority of respondents live in a joint family where male family members are major decision- makers. Whether it's a matter of property purchasing, socializing, child's education, grocery shopping or casting vote, women have very restricted liberty to act upon themselves. Savings is the only area where male members trust women to take care of their money. Paradoxically, she is not allowed to spend money on her own, but bears responsibility to save it. To some extent, political activity is noticed in the study area. Eighty three per cent respondents have cast vote in previous elections. It's the male family member, who told them to vote for men's favorite candidate and women were quite influenced by these men. However, females abstain themselves from other political activities, for instance, attending political rallies, meeting and processions. In their opinion it is not decent to go out and participate in such activities. One can easily assume that these females have had little political awareness, and were drawn to polling stations by their male family member, to vote for the one who made promises to bring change in their lives by providing basic necessities.

Women as agriculture labor, have not been empowered enough to make decisions by themselves. They are totally dependent on male family members, either it can be father, husband, brother, or son; thus proving the patriarchal values in society. In some cases, where husband has died, the female had taken the status of head of the household. Even then she could gain authority to make decision only with the consent of her sons.

It is interesting to note that crop selection is decided both by males and females in few cases, where women are not working as labor, but either they own land or work on their family land. Land ownership status is another aspect of the study. Only 15 per cent of women have land of their own; 10 per cent are working on their family farms and, majority of the females are engaged in share-cropping pattern of cultivation. The 33 per cent respondents, who are grouped in agriculture labor, are working in fields on daily wages, earning Rs. 100 or less.

Health condition of females presents the bleak side of their lives. Not a single woman was found with sound health. Six per cent of respondents had severe health issues. It is surprising, when the researcher inquired about their health, majority (60%) responded with satisfactory answer. In their opinion, few diseases were unimportant for them as far as they could manage work. Apparently, all these women seem malnourished and vulnerable; they have compromised with their meager food resources. It is because of their class status. Majority of the females (65%) belong to either poor or very poor families. Fifty-eight per cent lives in *katcha* house and huts. Even those who live in *pucca* houses do not have access to piped water, sewage system, natural gas and in some cases electricity, too. As part of rural culture, livestock rearing cannot be neglected. Separate animal pen were also present adjacent to the houses. With the decline in cultivation practices, especially in urban periphery of Karachi district, agriculture activity of women has been declined. The largest group consists of women rearing livestock. Ploughing, cotton picking, grain storage, and selling agricultural products in markets have been reduced to less than ten per cent.

This research was to investigate the environmental challenges responsible for decline in the agriculture activities. Majority of respondents (80%) replied that, in the past few decades, there has been a drastic change in environment. Seventy-five per cent confirmed the negative impact on livelihood. Sixty per cent believes that nature is causing changes, while, 37 per cent assumes that not only nature but human activities are also responsible for damaging the environment. This trend indicates that majority of the respondents are naïve and only few have broader understanding of their surroundings. Eighty-five per cent females confirmed that there has been tremendous decline in forest products. They used to collect fuel-wood and grasses, but now there is a marked difference in availability of such products. Accelerated deforestation is the reason. Their workload and time duration for wood collection has been multiplied but their earnings have decreased.

The research investigated the linkage between economic conditions and environmental changes district wise. In Karachi district,

35 per cent respondents believe there is a tremendous decline in cultivable land area and crops. Thirty three per cent linked it with the lesser rainfall and prolonged period of drought. All such phenomenon is associated with rise in temperature as a result of global warming. Ten percent agreed that there is decrease in irrigation water. Previously, underground water was easily available, but now condition has gone from bad to worse. Not only ground water has reduced, but salinization is another persistent menace. About 20 per cent respondents have been directly affected by the poor quality of water.

In the case of district Khairpur, 43 per cent respondents confirmed the decrease in cultivable land and crops. Only 15 per cent had been affected by water salinization. Drought and rainfall has also affected some parts, but in recent past, floods and heavy rainfall has destroyed the yield. Only 14 per cent complained the decrease in irrigation water.

In Umerkot district, nearly half of the respondents complained their land has turned barren because of non-availability of water. Only 6 per cent consider it's because of decline in irrigation water. Forty four per cent blames drought for causing unfavorable conditions for cultivation.

For the respondents of Qambar Shahdadkot, sufficient water availability is the main concern. Forty four per cent were worried as there is mark decline in irrigation water and rainfall is also erratic. Seventeen per cent complained that salinization of ground water has increased the problems.

As far as impact of such changes are concerned, farmer in Karachi district consider heavy rainfall as a major threat. It is due to their poor living conditions as most communities lives in either *katcha* or hut homes. Twenty five per cent thought drought is affecting their land.

Lack of water and salinization has turned soil infertile and crops cannot be grown. Due to prolonged drought, vegetation is not grown and they have to buy fodder from market to feed the cattle. Women are mostly affected as they used to collect fuel-wood from surrounding areas. As vegetation cover is removed, the availability of fuel-wood and fodder has declined to dangerous level. Now women have to cover long distance from their farms to gather fuel-wood. This put more pressure on female farmer as they have no work left to do while male family member move to urban centers for other jobs. Therefore agricultural activities in the rural part of Karachi are almost declined. Twenty two per cent respondent complained severe hot weather. It is due to rise in temperature and changing wind pattern specially when sea breeze is cut

off by winds coming from eastern part of province. With severe heat and no water, cattle rearing also became most difficult work for women.

In case of Khairpur, majority of the respondents get affected by heavy rainfall. Twenty per cent blame deforestation for lesser forest products and, and equal number of women consider drought has its negative impact by decreasing the cultivable land. Respondents in Umerkot, like other areas, blame deforestation for accelerating the negative impact on environment.

In Qmabar Shahdadkot, majority of the respondents consider erratic and heavy rainfall as a major threat to their crops. According to 25 per cent respondents, flood is the biggest disaster they have experienced. In 2010 flood, not only their crops were damaged but their settlements were also wrecked. Only 5 per cent complained for higher temperature in past few years.

Conclusion

The results of the research established the following:

i. Drought, heavy rainfall, floods and deforestation are the major threats affecting the land and work of the women.
ii. With the decline in agricultural activities, the well-being of women is further worsened as in the patriarchal system they are dominated by men thus have no powers to improve their socio-economic conditions. Similarly, the entities dominating the women also ruthlessly exploit the natural resources, creating more problems for poor women.
iii. While comparing the three different districts of Sindh, it is concluded that the rural areas of Karachi, where urban periphery cultivation is rapidly declining, are worst affected. It is because these communities are deliberately left out in development process, and badly neglected by the policymakers.

Recommendations:

The study recommends the concerned authorities and organizations the following:

i. To improve the infrastructure of the poor communities, with provision of basic facilities it is likely to reduce the workload of women at home.
ii. Majority of the agriculture labour is illiterate. It is suggested that primary education should be mandatory especially the girls' drop-out has to be checked.

iii. Improved health conditions are desperately needed in all study areas. The public hospitals are overcrowded. There is urgent need to have more public hospitals with female doctors.

iv. Empowering the agricultural labour is very important. Their exploitation can be ended by paying them decent wages.

The entire set of above recommendations is linked with good governance at the state level and recognizing women equally at the societal level.