



Climate Change's Impact on Pakistani Agriculture and Food Sector: Media Reporting and Its Analysis

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Abstract

Climate change is possibly the greatest challenge humankind has ever been faced. It has manifested in calamities of unpredictable frequency and intensity in different parts of the world. Pakistan is facing a multitude of impacts ensuing from the climate change phenomenon. This study provides a brief overview of Pakistani media reporting about climate change's impact on Pakistani agriculture and food sector and provides background information about agriculture and food security in Pakistan. The study was based on qualitative and quantitative content analysis. In this study editorials & articles of two newspapers (The Nation and The News) were examined from 2015-2019. The study result showed that The Nation newspaper gave more editorials & articles coverage rather than The News newspaper on research issues. The finding depicts that Pakistani management should adopt modern techniques of agriculture to minimize the effect of climate change on the food sector. Moreover, this study describes the prospects for the agriculture and food sector to adopt mitigation and recommend strategies to tackle the climate change that would arise.

Disciplinary: Climate Change, Agriculture and Food Production, Media & Communication.

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1 Introduction

Climate change is growing intimidation for our globe. Climate changes have caused many consequences on the agriculture sector and rural poor people in Pakistan. Climate changes have large impacts like an increase in variation in winter rainfall and monsoon patterns. Temperature

rise has caused a rise in Sea level and has caused overflows of rivers. Similarly, this phenomenon is deteriorating atmospheres, depression of Himalaya's glaciers, and augmented sternness of extreme weather events like cyclones, floods, and droughts (Javed & Khan, 2019). Production is being affected by several variables comprising rainfall pattern, temperature hike, water accessibility, variations in sowing and harvesting dates, and lands sustainability (Kakade, et al., 2013). The durations of Pakistani cropping dates have also clearly condensed in South Punjab and Baluchistan with the onward fluctuation in sowing and harvest time. It indicates that earnings from traditional ways are certainly not more enough to support many families. Climate changes are not about reducing gas emissions but also about human dignity and social reliability. It's about how we live and sustain ourselves; how we ensure that the poorest and vulnerable amongst us are protected and how we patent this responsibility that is upon us (Ghani, 2013). The consequences of climate changes are alarming; not only will be there more deadly floods, hurricanes, superstorms, drought, heat weaves but also there will be declining food stock, extreme water scarcity, agricultural decline, and loss of human life. It is strong evidence, flora and faunas take place every year in Pakistan (World Bank, 2018).

Today, climate changes have come to be one of the major challenges for Pakistan an agrarian base country. Pakistan falls among the top 8th states of the world that were highly at risk of environmental variation (Choudhry, 2016). Pakistani glaciers are expected to melt by 2035 which will have a terrible impact on freshwater flow. It is basically an agrarian-based economy; this sector contributes the 21% GDP of Pakistan, and it is extremely vulnerable due to climate changes. The agricultural sector is the backbone of Pakistan and has a maximum proportion of 4/5th irrigated cropland in the South Asian regions. Apart from its hazard to flood and famine, the state is also equally susceptible to internal and outdoor air pollution (Shakoor et al., 2011). According to Pakistani Agro climatic classification, its 2/3rd parts of the land is semi-arid to arid regions which are commonly categorized by the low inconsistent rainfall. In a few decades, circumstance has deteriorated; global warming phenomena become more obvious. Crop yieldings are projected to decline as an outcome that affects food production and livelihood (Naseer, 2013). Water scarceness and frequently flooded every year become a normal routine in Pakistan (Farouqi, et al., 2005).

In Pakistan, media plays a vibrant role in enlightening the public and management to protect and save natural resources of climatic disorder in the interest of future generations. Ecological sustainability on our earth would be achieved through caring for the atmosphere in a sensible consumption of natural resources. Similarly, rich, and poor countries have an equal stake in this stewardship of the globe. The real stability of our globe rests on the sustainability of earth environments. Therefore, the media's role is very critical in creating climate awareness and conveying a progressive behavior change in common masses in enlightening the environmental variations (Yadav & Rani, 2011). This study has a purpose to identify the media's role as a trendsetter, evaluate its coverages techniques, and check its reporting frequency in Pakistani media. These media reports help the public to know the climate change's effect on the agriculture

and food sector in Pakistan and its preventive actions. So, this research study will be a major milestone in this way.

2 Climate Change Effects on Pakistan

Today, Pakistan has been facing many challenges; and climate change is one of them. In a state that is climatic prone and keeps dynamic media; it's vigorous to find out the media's role on climate change and its impacts on the agriculture & food sector in Pakistan. It's relevant to discuss through a literature review that lots of studies have been done on climate change in the many developed countries in the world. But very limited scholarly research covers the discourse analysis in the developing countries in a media context. In Pakistan, only very few studies are available in the perspective of media reporting analysis on climate change's impact on Pakistan's agriculture and food sector. In this research study, two leading English newspapers The Nation and The News have been selected. This study tries to examine how Pakistani media sets the agenda and know about how much media coverage is given to the climate issue. In this study, the media has a purpose to guide the government in getting manageable economic development by confirming agriculture and food security.

2.1 Climate Change and Pakistan's Agriculture Sector

The agricultural sector is the largest source of income and employment for millions of Pakistani people. The country's main exports are reliant on farming both directly and indirectly (Ramay, & Saleem, M., 2012). It contributes 21% GDP, 45% labor force employment, and 60% export earnings (GOP, 2015). Pakistani agriculture is extremely affected by climate inconsistency, as temperature increases the duration of crop sowing and harvesting will be reduced. It might have the worst impact on food production and fodder yields (NCCP, 2012). Agriculture production will be provoked by growing temperature, fluctuating rainfall patterns, and extreme weather conditions (Viliani T. Fakava, 2012). Food production is being affected by a number of climate changes like, temperature slog, rainfall pattern, variations in seeding and reaping periods, water availability, water supply, and land suitability (Ziska, 2011). Agriculture performance is highly dependent upon these indicators, i.e., weather routine, wind speed and its direction, CO₂, solar emission, rainwater, soil humidity, and water vapors. Plant science says that CO₂ is a vital factor for the photosynthesis process and plant growth. A higher concentration of CO₂ in the atmosphere leads to a rise in temperature and few researchers have forecasted that agricultural production will increase in upcoming years. (Rosenzweig & Hillel, 1995). Pakistan is placed in arid to semi-arid regions. The food and crop production will decrease (FAO, 2008). Pakistan's cultivation areas have increased from almost 14.70 Mha in 1947 to 23.5 Mha in 2008. In Pakistan, two main agriculture seasons have fallen, (1) Kharif (June to October) and (2) Rabi (November to April}. Every year, from the entire available water; nearly 84% of water flows throughout the Kharif seasons, while merely 16% of water flows in Rabi time. Approximately, 81% of river drifts and monsoon rainfall rise from June to September. In Pakistan, Indus Basin tributaries distributed water to the farmer through watercourses based on Warabandi. The duration of the water supply is proportionate to the size of

farmer lands holding (Bandaragoda, 1998). Pakistan is placed in that areas where air hotness is estimated to be higher than the average global temperature that's why Pakistan is exceptionally liable to climate fluctuations (IPPC, 2007). The durations of Pakistani cropping dates have also clearly shortened in South Punjab and Baluchistan with the onward fluctuation in sowing time and earlier harvest. This indicates that earnings from traditional ways are certainly not more enough to support many families. Pakistan being an agricultural state severely depend upon water possessions. The climate of the rainfed area can be categorized into three sectors,

- i. Low rainwater zone gets below than 500 mm rain per year.
- ii. Medium rainfalls areas get 500 to 750 mm rainwater annually.
- iii. High rainfalls zone gets more than 750 mm rains per annum (World Bank, 2018).

2.2 Climate Changes and Food Security in Pakistan

FAO (2008) defines food security as "the state in which all people at all times having access to sufficient and nutritious food". Food security in Pakistan is very intense to climatic variations. Weather conditions and climatic catastrophe have a vast effect on the agriculture sector, food accessibility, food availability, food consumption, and food constancy structures. In Pakistan, fast-growing populations possess severe challenges for food security (Javed et al., 2020). Pakistan also faces food deficiencies due to water shortages. Approximately 47% of the inhabitants of Pakistan are facing food scarcity and malnourishment. Malnutrition is an outcome of food insecurity. Pakistan is fronting a severe calamity of malnourishment. In Pakistan, 15% of children under the age of five suffering from severe malnutrition, which is the maximum rate in South Asian regions. Likewise, 43% of children under the age of five years are constantly malnourished, it is a very critical rate. Alarmingly in Pakistan, the stunting rate is rising from 36% in 1994 to 42% in 2001 (Kirby, M. et al., 2017). It is estimated that in 2025, water shortfall will be reached at 32%, which might cause food deficiencies of 70 million tons. The latest estimate says that environmental change and siltation of core reservoirs will shrink water surface storing capacity up to 30% till 2025. The per capita water storage capacity in Pakistan is only 150 m³ and while comparatively 5000 m³ in Australia and the USA and 2200 m³ in China (Qureshi, A.S, 2011).

2.3 Land Resources

Pakistan has geographically 196 million acres areas, of which 77.1 million acres are fit for farming. An aggregate of 54.5 million acres (71%) of agricultural lands are now cultivated either through irrigation or rainfall. The left behind 22.6 million acres of land (29%) area is suitable for agriculture and turns into useful if water is made available for irrigation (Economic Review, 2002). Wheat is the 1st basic food and rice is the 2nd most fundamental foodstuff in Pakistan for the entire population. The Pakistani crops yield is also low as compared to other states like Egypt, the USA, and China (Saeed, M., et al, 2002).

3 Literature Review

Javed et al. (2020) describe that environmental variation is a worldwide phenomenon. It makes an influence on agricultural sectors and water sectors. Due to systematic consequences of the environment, Pakistan is regularly facing natural calamities. The study accomplishes in this way that newspaper plays a substantial and dynamic role in forming consciousness about environment change in Pakistan. Habib et al. (2015) in their research explored the impact of climate change on the agricultural sector and the living life of the population in developed countries and especially rainfed regions of Pakistan called Pothwar. Survey-based and interviews were conducted with selected 60 farmers from (Chakwal and Attock). The study found that the majority of respondents 83% argued that water is the main problem in the region. Shakoor et al., (2011) analyzed the issue of climate change in Pakistan. The researcher illustrates that issue of climate change has become more challenging for agriculture in Pakistan. Change in climate change is a serious threat for the crop sector due to changes in atmospheric temperature and heavy or very low rainfall. The researchers suggested that there is a need to introduce new farming techniques and irrigation methods that would be fruitful and appropriate to improve the farming and agriculture condition in the arid region. Iqbal et al. (2009) claimed that the Pakistani economy mostly relies on the agriculture sector. The major irrigation system of Pakistan is river water that considers more powerful for agriculture production. They argued that due to change in climate change, productive resources and water and land for food production are declining rapidly. Oxfam (2009) examined the effect of climate variation in Pakistani rural communities. The study was conducted to explore catastrophe regions of Pakistan including Badin, Khuzdar, and Ranjanpur. The results showed that in Badin Area, seawater has been interrupted and causing floods and soil has become salty that has caused difficulties for the farmer to grow crops. Veil (2012) studied climatic disaster management and media persons, by exploring the relationship between media persons and disaster management. The researcher recommended that strong inter-personal communication and exchange of frequent information among media organizations and disaster management can strengthen the relationship among both parties and this cooperation could be fruitful for the public.

Objectives of this study are

1. To know that how much media coverage is given to issues of climate change and its impact on the agricultural and food sector.
2. To assess how media adopted framing strategies on the climate issue in the light of gathered data.

4 Theoretical Framework

This study was conducted under the Agenda Setting & framing theory. Under the notion of "Framing", the researcher intends to explore the nature of framing Pakistani media on research issues in three ways positive, negative, or neutral.

5 Research Methodology

This research study was basically qualitative and quantitative in nature. The content analysis technique was used to evaluate the content of editorials and articles. Quality of content was checked through editorials and article words and their framing analysis was either positive, negative, or neutral. For content analysis, two national English dailies (The Nation and The News) were selected. Both these national newspapers are top popular, mainstream, large circulated, claims to be objective and balance regarding their coverage. This study was based on both quantitative and qualitative nature and was hypothesized that The Nation gave more space rather than The News about the issue of climate change Impact on Pakistan's Agriculture and Food Sector (H1) and Pakistani media framing is more positive toward government policies on the issue of climate change Impact on Pakistan's Agriculture and Food Sector (H2).

5.1 Measurements

The coding sheet was designed to measure the content of selected newspapers. The content was measured quantitatively (number and digit) as well as qualitatively (positive, negative, or neutral). The universe of the study was all editorials and articles published in selected newspapers that were related to research issues from 1 January 2015 to 31 December 2019. Editorials & articles are considered a unit of analysis in which words, sentences, or whole paragraphs were about research issues. The population was editorials and articles in which the words: climate changes effect on agriculture production and food security, inconsistency in the crop growth cycle, variations in seeding and harvesting dates, Food availability, Food accessibility & Food utilization, malnutrition, agriculture & Food management policies in Pakistan.

The issue studied in this research is

- Climate change impact on agriculture and food sector

5.2 Measurement of the Framing/Coding Sheet

All editorials and articles slant will be measured as three categories, positive, negative, or neutral based on the Frame given to those newspapers.

5.3 Positive Stance

An editorial and articles are considered positive if the frame was found as.

- If these selective newspapers positively highlight and suggest the solution of upcoming climate changes and create awareness to the general masses.

5.4 Negative Stance

An editorial and articles are considered negative if the frame was found:

- If these selective newspapers do not suggest any solution and its framing stance toward the issue in this way, that government are not showing serious attitude and its approaches are not good enough for tackling climate changes.

5.5 Neutral Stance

An editorial and article fall into the category of neutral if the frame was found as:

- If the editorial & article shown neither positive nor negative interplay will be coded as neutral interplay.

6 Analytical Results

Table 1 and Figure 1 present numerical descriptions of both newspapers (The Nation and The News) editorials and articles. The result shows the editorials and articles publication is more focused in The Nation rather than daily The News.

Table 1: Overall total editorial & article publication of The Nation and The News on research issues during 2015-2019.

News Paper	Total Editorials Publication	Total Articles Publication
The Nation	7	23
The News	4	14
Grand Total	11	37

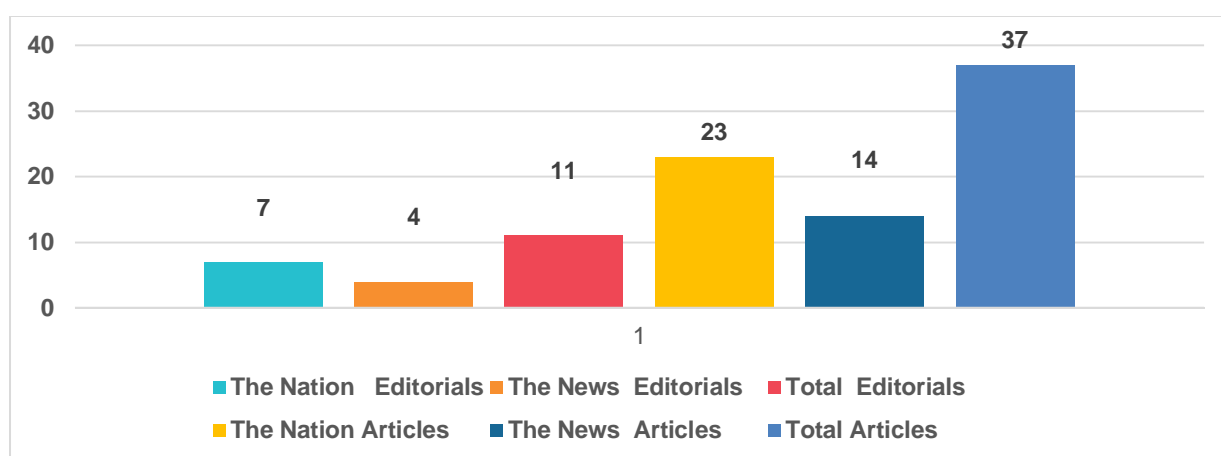


Figure 1: Overall total editorial & article publication of The Nation and The News on research issues during 2015-2019.

Table 2: Comparison of editorial treatment of The Nation and The News on research issue during 2015-2019.

News Paper	Total Editorials	Positive		Negative		Neutral	
		No's.	%	No's.	%	No's.	%
The Nation	7	4	57%	1	14%	2	29%
The News	4	2	50%	2	50%	0	0%
Grand Total	11	6	55%	3	27%	2	18%

According to the results, Daily the Nation published total of 7(100%) editorials while The News published 4(100%) editorials during a research period of 5 years. The result shows that Daily the Nation published 4(57%) editorials as positive whereas, The News published 2(50%) editorials as a positive stance on research issues. The above table depicts that The Nation published 1(14%) editorial while The News published 2(50%) editorials as a negative stance on the research issue. The result illustrates that The Nation published as 2(29%) editorial as neutral stance and The News did not publish any editorials as the neutral slant. The result found that both newspapers written a total of 11(100%) editorials under research issues in which 6(55%) editorials were written as a positive stance, while 3(27%) editorial slants were negative, and 2(18%) editorials written as

neutral. The result indicates that overall editorials treatment of both newspapers on research issue of Climate change Impact on Pakistan’s Agriculture and Food Sectors positive for overcoming the issues.

Table 3: Comparison of articles treatment of The Nation and The News on research issue during 2015-2019

News Paper	Total Articles	Positive		Negative		Neutral	
		No's.	%	No's.	%	No's.	%
The Nation	23	14	61%	9	39%	0	%
The News	14	8	57%	6	43%	0	%
Total	37	22	59%	15	41%	0	0%

According to the results, Daily the Nation published a total of 23 (100%) articles while The News published 14(100%) articles during a research period of 5 years. The result shows that Daily the Nation published 14(61%) articles as positive whereas, The News published 8(57%) articles as a positive stance on the research issue. The above table depicts that The Nation published 9(39%) articles while The News published 6(43%) articles as negative stances on the research issue. The result illustrates that The Nation and The News did not publish any articles as the neutral slant. The result found that both newspapers wrote a total of 37(100%) articles on under research issues in which 22(59%) editorials were written as a positive stance, while 15(41%) articles slant were negative.

7 Discussion

7.1 Adaptation Strategies for Agriculture Sector

- Agricultural crops and soil management systems must be upgraded.
- There is a substantial quantity of agricultural foods is wasted in Pakistan, mostly due to lack of proper infrastructure, lack of storage capacity, processing facilities, and poor transportation facilities. Thus, this should be among the main concern to deal with the growing food demand (Arslan, A., 2011).
- Develop new crops varieties which highly yield, resilient to warmness, drought lenient, less liable to insects and pests.
- Introduce new irrigation systems and new crop farming techniques (Shakoor et al, 2011).
- Use biotechnology to develop more carbon receptive crops.

7.2 Strategies for Improving Food Security in Pakistan

- To encounter the decline irrigation water availability, launch some short-term strategies i.e., induction of public awareness campaigns, the promulgation of highly effective irrigation system, changes in cropping pattern, identify probable surface water storage sites and dams.
- Long-term schemes might be comprising, regulatory framework formulation on groundwater, the building of large dams, increasing crop yields, and enhancement of drought and floods forecasting mechanism.
- Mass media communication can play a substantial role in assisting the public in enhancing their knowledge about the issue, its causes, and its implications. Media must deliver practical information to the public to act comprises of water-saving, changing farming techniques to advance crop yields, or learning different skills to increase their income.

8 Conclusion

This research has presented a content analysis on climate change impact on Pakistan's Agriculture and Food Sector in two leading English newspapers (The Nation and The News) from 1 January 2015 to 31 December 2019. Being quantitative and qualitative content analysis based, the researchers have evaluated all editorials and articles of daily the Nation and The News. It is found that both newspapers published a total of 11 editorials and 37 articles on research issues. It was found that daily The Nation published 7(100%) editorials related to research issues, in which 4(57%) editorials were showing a positive stance, 1(14%) editorial was negative, and 2(29%) editorials were written on neutral stance. Similarly, in an 8-year total number of 4(100%) editorials are published in The News, out of these 2(50%) editorials were positive, 2(50%) editorials were written as negative stance regarding the issue. It was found that daily The Nation published 23(100%) articles regarding the issue, out of which 14(61%) articles were written as a positive approach, 9(39%) articles were negative on the research issue. Similarly, in an 8-year total number of 14(100%) articles are published in The News, out of these 8(57%) articles were positive, 6(43%) articles published as negative stance regarding the issue. The total result shows that Daily the Nation published more editorial and articles as compared to The News. Overall, the study found that the Pakistani media framing strategies in Climate change Impact on Pakistan's Agriculture and Food Sector were very positive toward the solution. Hence, two hypotheses were developed and tested. The data strongly supported the prediction of both hypotheses.

Due to environmental changes, Pakistan is facing compounded threats of low agricultural productivity, and the agricultural sector is a large source of livelihood; half of the population depends upon it. The Government would take an extraordinary toll on the betterment of agricultural sectors in Pakistan. To address these climate challenges, there is a need to formulate strategies and adaptation actions for climate risk management through federal and provincial management. Pakistan must adopt modern agriculture techniques, which have tried to minimize the impacts of environmental changes and weather inconsistency through irrigation. Use the substitution of the labour force with energy-demanding practice and plant breeding for heat and water stress torrent crops. Similarly, it is much needed to strengthen the resilience of rural peoples and support them to cope with the supplementary threats of food security. Management needs to do more and very faster, especially, need to step up efforts to switch from using fossil fuels and to clean renewable energy. Government must work and collaborate with the finance department to get money out of fossil fuels and use it for climate solutions, like restoration of forests, and to use clean technology to cut carbon emissions on a large scale. Climate change policy needs to be framed by taking into consideration agriculture, water, and food security. It should be done in consultative methods in which all the relevant stakeholders are taken on board. Through media collaborations, the government and the public must come together to act for tackling the worst impacts of climate change for building a safer future for all humankind.

9 Availability of Data and Material

Data can be made available by contacting the corresponding author.

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