



International Journal of Financial Management and Economics

P-ISSN: 2617-9210
E-ISSN: 2617-9229
IJFME 2023; 6(2): 142-147
www.theeconomicsjournal.com
Received: 12-09-2023
Accepted: 16-10-2023

Preety
Research Scholar,
Department of Economics
CRS University, Jind,
Haryana, India

Dr. Rakesh Sihmar
Assistant Professor,
Department of Economics
CRS University, Jind,
Haryana, India

Crop diversification in Haryana

Preety and Dr. Rakesh Sihmar

DOI: <https://doi.org/10.33545/26179210.2023.v6.i2.241>

Abstract

Because most rural residents depend on agriculture directly or indirectly for their living, agriculture is essential for the growth of an economy. Following the green revolution in 1966-1967, crop specialization in India was increased, with a focus on rice and wheat in particular while horticulture has been practiced. Analysis of the trend, pattern, and extent of agricultural diversification is attempted in the study Haryana. The researcher took into account factors including the size of the landholding, the type of crops grown there, and diversification in the study toward the very profitable crops. The analysis is based on secondary information gathered from numerous public sources. According to the report, Haryana farmers have diversified their agricultural practices to include fruits and vegetables.

Keywords: Agriculture, landholding, crop, diversification

Introduction

The term "diversification" has its roots in the word "diverse," which implies to travel or stretch away from a common point, according to Jha. The transition from agricultural to non-agricultural activities, such as dairy, poultry, animal husbandry, etc., is known as agriculture diversification. India's population is mostly dependent on the agricultural sector, yet this sector's contribution to the GDP is declining. Compared to other sectors, this one is still under a lot of employment pressure.

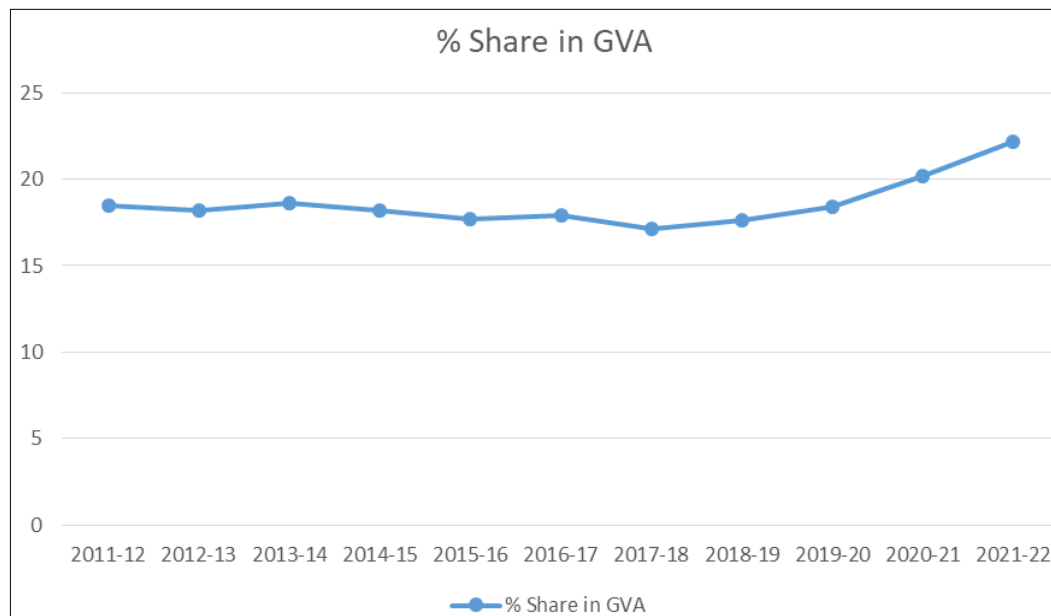
Table 1: Percent share of Gross Value Added (GVA) at Current Prices

Year	% Share in GVA
2011-12	18.5
2012-13	18.2
2013-14	18.6
2014-15	18.2
2015-16	17.7
2016-17	17.9
2017-18	17.1
2018-19	17.6
2019-20	18.4
2020-21	20.2
2021-22	22.2

Source: NSO, Ministry of Statistics and Programmed Implementation

Table 1 and figure 1.1 clearly shows that, almost stagnant growth in agriculture sector from 2011 to 2019 and it is lies from 17 percent to 18 percent. In 2020-21 there is significant increase in the GVA of the agriculture sector.

Corresponding Author:
Preety
Research Scholar,
Department of Economics
CRS University, Jind,
Haryana, India



Source: NSO, Ministry of Statistics and Programme Implementation

Fig 1: Clearly shows that, almost stagnant growth in agriculture sector from 2011 to 2019

Importance of crop diversification

Crop diversification is the introduction of new crops into agricultural production or a change in cropping patterns. 70 to 80 percent of farmers currently have land that is smaller than 2 hectares. These farmers need to diversify their crops with very lucrative ones like maize, legumes, etc. Under the "merapani-merivirasat" program, the Haryana government has also encouraged diversification by offering a per-acre incentive of Rs. 7000 for switching to a different crop. By lowering the risk related to the pricing of diverse farm goods, crop diversity fosters economic stability. Additionally, it lessens the likelihood of natural disasters including drought, pest disease, and unpredictable rainfall. A crop mixed cropping arrangement would be helpful in this situation. By switching from more water-dependent crops to less water-intensive ones like wheat and legume rice, it also aids in resource conservation.

Objectives of the study

1. To analyze the trend in the production of various crops in Haryana.
2. To check the magnitude of crop diversification in Haryana.

Literature Review

Anuja *et al.* (2021) ^[44] used District level data from several years to investigate the pattern of crop diversification in India. It was based on data from various years' worth of land use statistics. The Simpson index of diversification was employed in the study to gauge agricultural diversification levels. According to the study, there are significant geographical differences in the nutritional results of crop diversity. Additionally, the study discovered a link between diversity and under nutrition in the various study districts. Francaviglia (2021) ^[45], agriculture diversification increased food output and food security. The study made use of original data gathered in Italy. According to the study, management methods are crucial for promoting the intensive agriculture system.

Barman *et al.* (2022) ^[46] examined crop diversification as a way to achieve sustainable agriculture goals. It improves the biological cycles to minimize the input cost, maximize returns and decrease risk due to environmental and ecological elements. The study revealed that the intensification of crops increased the net returns and productivity of a farm. Crop diversification improves nutritional security, ensures food security, generation of employment, and moves toward sustainable agriculture.

Vernooy (2022) ^[47] identified crop diversification as a tool to mitigate climate change impacts on agriculture. It promotes the resilience of the household or community. The findings of the study revealed that there are positive outcomes because it increases yields, income, nutrition, and food security. The study noted that apart from all these impacts, crop diversification also improves the environment quality and moves toward a more sustainable future.

Rawat and Bala (2021) ^[48] determined the pattern of crop diversification in Haryana. The study found that rice and wheat were the major staple food crops of the state. The study also revealed that the area under rice was highest in the Karnal and Kaithal districts. Based on yield Gurugram is at the top. But the state has faced many difficulties due to excessive cultivation of rice such as water shortage and declining soil quality.

Ansari (2018) ^[49] examined the growth of horticulture crops in India over the years. The study found that in the 1980s there has no diversification but during the early 1990s it moves towards horticulture crops accompanied by the introduction of LPG policies in India. And now the economy started diversifying towards nonfood crops such as fruits and vegetables. Factors responsible for crop diversification identified by the study were the rate of return and productivity of the crops which was higher in the case of horticulture.

Mallick and Pattabayak (2017) ^[51] explored the relationship between crop diversification and sustainable agriculture. Herfindahl index was to be used in the study and secondary data was collected from 2007-08 to 2013-14 of various

crops. And the study found that area under coarse cereals has been declined from 2.10 to 1.76 percent and the area under fruits and vegetables has been increased continuously. According to the study, the crop diversification highest in Andhra Pradesh and followed by West Bengal, Bihar, Maharashtra, and Karnataka.

Lava and Kuri (2016) ^[50] presented empirical indication from West Bengal to identify the relationship between crop diversification and food security. The study found that regions having a low level of crop diversification had an acute deficit of per capita availability of food production. It showed that regions with high per capita production observed high level of crop diversification.

Methodology

Secondary data from a variety of government sources, including the Ministry of Agriculture, statistics Abstract, the Horticulture Department of Haryana, the Agriculture Census of India, etc., were used in the study for analysis. A diversity index and a variety of analytical tools were used to analyze the data. The study uses the Simpson index to determine the degree of crop diversification. Herfindahl index is the source of Simpson index (D). One less than the

Herfindahl index is the Simpson index.

$$D = 1 - \sum_{i=1}^N (p_i)^2$$

Here, p represents a crop's proportional share of the gross cropped area, and D stands for the Simpson index.

The value of the index lies between zero and one. One means there is perfect diversification and zero means no diversification or crop specialization.

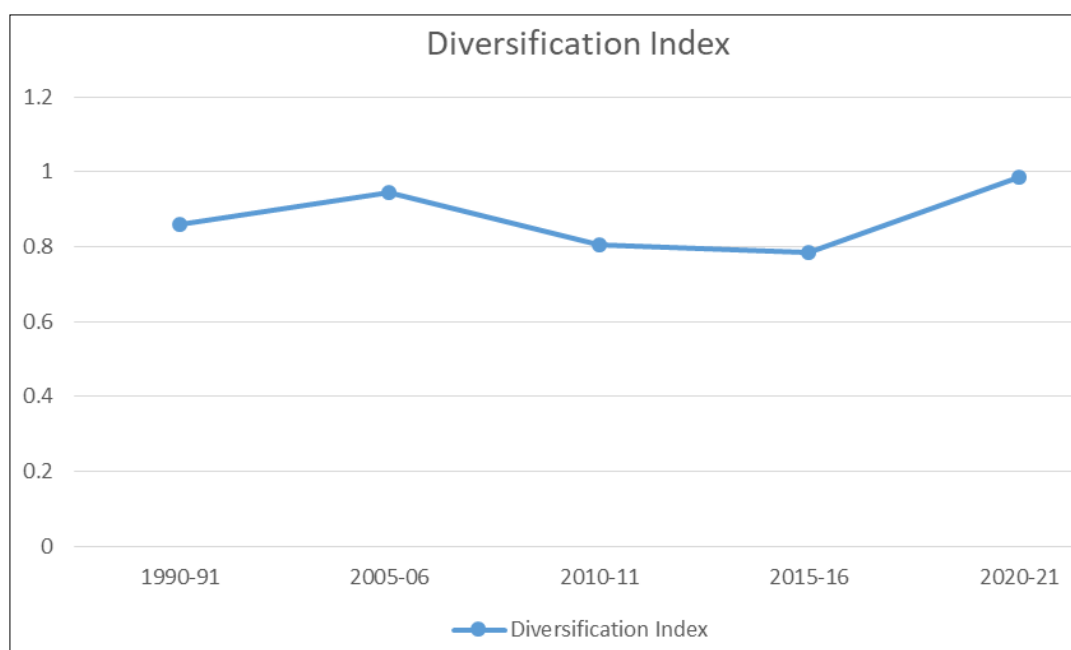
Result and Analysis

On the basis of secondary data on crop diversification the results are estimated through diversification index.

Table 2: Diversification Index

Years	Diversification Index
1990-91	0.858872457
2005-06	0.94339558
2010-11	0.804908824
2015-16	0.786086544
2020-21	0.9875901154

Source: Authors own calculation by using secondary data



Source: Authors own calculation by using secondary data

Fig 2: Show Diversification index trend line

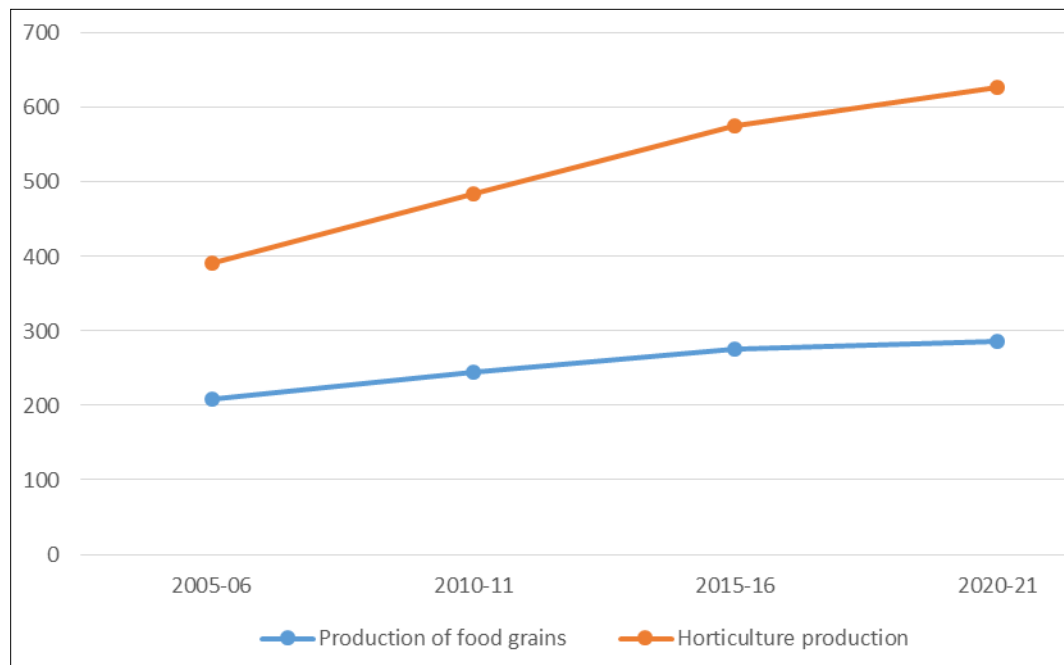
Diversification index trend line shows that, there is significant crop diversification exhibits by the state. The value of index clearly described that, diversification in the state increasing step by step like jerks.

Table and diagram described the picture of production of food grains and horticulture crops in India. Trend line shows the increasing tendency of horticulture production means that continuous increase in the diversified production in the state.

Table 3: Food Grains and Horticulture production in India

Year	Production of food grains	Horticulture production
2005-06	208.60	182.82
2010-11	244.50	240.53
2015-16	275.68	299.85
2020-21	285.98	340.88

Source: Department of Agriculture, Cooperation & Farmer's Welfare



Source: Department of Agriculture, Cooperation & Farmer's Welfare

Fig 3: Show diagram described the picture of production of food grains and horticulture crops

Conclusion

The primary cause for concern in Indian agriculture is the advancement of the sector and the variety of crops. As one of the leading States in terms of agricultural output, Haryana is important to India's agricultural industry. Economic reforms have caused a lot of changes in the agriculture sector in Haryana. The study looked at how the State's crop diversification has grown and discovered that horticultural crops in particular have shown an increase in advancement. Kurukshetra and Hisar, among the many districts of the State, experienced the greatest development in terms of land devoted to horticultural crops, while Charkhi Dadri, Jhajjar, and Palwal experienced little to no diversification. The Simpson Index value demonstrates that crop diversification has been happening and accelerating in the State from 2017 to 2022. The Haryana government should do more to encourage diversity in order to preserve natural resources for sustainable agriculture.

References

1. Joshi PK, Joshi PS, BIRTHAL PS. Diversification and its impact on smallholders: Evidence from a study on vegetable production. *Agric Econ Res Rev*. 2006;19(2):219-236.
2. Kalaiselvi V. Patterns of crop diversification in the Indian scenario. *Analysis Biol Res*. 2012;3(4):1914-1918.
3. BIRTHAL PS, Joshi PK, Roy D, Thorat A. Diversification in Indian agriculture toward high-value crops: The role of small farmers. *J Agric Econ Rev Can d'agroeconomie*. 2013;61(1):61-91.
4. Mehra S. Instability in Indian agriculture in the context of the new technology. *Int Food Policy Res Inst*; c1981. Bhalla GS, Singh G. Recent developments in Indian agriculture: A state-level analysis. *Econ Polit Weekly*. 1997;32(13):1-17.
5. BIRTHAL PS, Joshi PK, Roy D, Thorat A. Diversification in Indian agriculture towards high-value crops. *Int Food Policy Res Inst*; c2007. p. 1-40.
6. Munshi K. Social learning in a heterogeneous population: Technology diffusion in the Indian Green Revolution. *J Dev Econ*. 2004;73(1):185-213.
7. Bhalla GS, Singh G. Economic liberalization and Indian agriculture: A state wide analysis. *Econ Polit Weekly*; c2009. p. 34-44.
8. Murgai R, Ali M, Byerlee D. Productivity growth and sustainability in post-Green Revolution agriculture: The case of the Indian and Pakistan Punjab's. *World Bank Res Observer*. 2001;16(2):199-218.
9. Singh S. Crisis and diversification in Punjab agriculture: Role of state and agribusiness. *Econ Polit Weekly*. 2004;39(52):5583-5590.
10. Pandey VK, Sharma KC. Crop diversification and self-sufficiency in food grains. *Indian J Agric Econ*. 1996;51(4):1-644.
11. Satyasai KJS, Viswanathan KU. Diversification of Indian agriculture and food security. *Indian J Agric Econ*. 1996;51(4):1-674.
12. Singh S. Contract farming for agricultural diversification in the Indian Punjab: A study of performance and problems. *Indian J Agric Econ*. 2000;55(3):1-283.
13. Go I. State of Indian agriculture. Ministry of Agriculture and Farmer's Welfare, Government of India; c2016. <http://agricoop.nic.in/otherreports/state-indian-agriculture-2017>.
14. Chand R. Doubling farmer's income: Rationale, strategy, prospects, and action plan. Policy Paper, No.1, NITI Aayog, GOI; c2017. GOI, The Economic Survey 2017-18. https://niti.gov.in/writereaddata/files/document_publication/doubling%20farmers%20income.pdf
15. Ministry of Finance, Government of India; c2018. <http://mofapp.nic.in:8080/economicsurvey>. UN, #Envision 2030 Goal 2: Zero Hunger, United Nations, New York, USA; c2015. <https://www.un.org/development/desa/disabilities/envision2030-goal2.html>.

16. Niti Aayog. The SDG India Index 2019-20, GOI; c2019. <https://niti.gov.in/sdg-india-index-dashboard-2019-20>. International Institute for Population Sciences (IIPS) and ICF, National Family Health Survey (NFHS-4), 2015-16, IIPS, Mumbai; c2017. <http://rchiips.org/nfhs/NFHS-4Report.shtml>.
17. Radhakrishna R, Panda M. Macroeconomics of poverty reduction: India case study, Indira Gandhi Institute of Development Research, Mumbai; c2006. <http://oii.igidr.ac.in:8080/xmlui/handle/2275/180>.
18. Bobojonov I. Crop diversification in support of sustainable agriculture in Khorezm. In cotton, water, salts and soums economic and ecological restructuring in Khorezm, Uzbekistan (Martius C, *et al.*), Springer, Dordrecht, The Netherlands; c2012. p. 219-233. https://link.springer.com/chapter/10.1007/978-94-007-1963-7_14.
19. Pingali PL, Rosegrant MW. Agricultural commercialization and diversification: Processes and policies. Food Policy. 1995;20(3):644-651. [https://doi.org/10.1016/0306-9192\(95\)00012-4](https://doi.org/10.1016/0306-9192(95)00012-4).
20. Guvele CA. Gains from crop diversification in the Sudan Gezira scheme. Agric Syst. 2001;70:319-333. [https://doi.org/10.1016/S0308-521X\(01\)00030-0](https://doi.org/10.1016/S0308-521X(01)00030-0).
21. Ryan JG, Spencer DC. Future challenges and opportunities for agricultural R & D in the semi-arid tropics. International Crops Research Institute for the Semi-Arid Tropics, Patancheru; c2001. <http://www.icrisat.org/PDF/Outlook%20rep%20Future%20Challenges%20in%20SAT-594.pdf>.
22. Joshi PK, Tewari L, BIRTHAL PS. Diversification and its impact on smallholders: Evidence from a study on vegetable production. Agric Econ Res Rev. 2006;19(2):219-236. <https://ageconsearch.umn.edu/record/57759>.
23. Van den Berg MM, Hengsdijk H, Wolf J, Ittersum MKV, Guanhua W, Roetter RP. The impact of increasing farm size and mechanization on rural income and rice production in Zhejiang province, China. Agric Syst. 2007;94:841-850. <https://doi.org/10.1016/j.agsy.2006.11.010>.
24. Kahan D. Managing risk in farming. In farm management extension guide 3, food and agriculture organization of the United Nations, Rome, Italy; c2008. p. 29-87. (fao.org). 3-ManagingRiskInternLores.pdf.
25. Sharma HR. Crop diversification in Himachal Pradesh patterns, determinants and challenges. Indian J Agric Econ. 2011;66(1):97-114. <https://ageconsearch.umn.edu/record/204738/files.1-H%20R%20Sharma.pdf>.
26. Feliciano D. A review on the contribution of crop diversification to Sustainable Development Goal-1 No poverty in different world regions. Sustain Dev. 2019;27(4):795-808. <https://doi.org/10.1002/sd.1923>.
27. Anuja AR, Kumar A, Saroj S, Singh KN. The impact of crop diversification towards high-value crops on economic welfare of agricultural households in eastern India. Curr Sci. 2020;118(10):1575-1582. <https://doi.org/10.18520/cs/v118/i10/1575-1582>.
28. Pandey S, Bhandari H, Ding S, Prapertchob P, Sharan R, Naik D, *et al.* Coping with drought in rice farming in Asia: Insights from a cross-country comparative study. Agric Econ. 2007;37:213-224. DOI: 10.1111/j.1574-0862.2007.00246.
29. Lin BB. Resilience in agriculture through crop diversification: Adaptive management for environmental change. Bio Science. 2011;61(3):183-193. <https://academic.oup.com/bioscience/article/61/3/183/238071>.
30. Barghouti S, Kane S, Sorby K, Ali M. Agricultural diversification for the door: Guidelines for practitioners agriculture and rural development discussion paper 1. World Bank, Washington DC, USA; c2004. <https://agris.fao.org/agris-search/search.do?recordID=GB2013203761>.
31. BIRTHAL PS, Roy D, Negi DS. Assessing the impact of crop diversification on farm poverty in India. World Dev. 2015;72:70-92. <https://doi.org/10.1016/j.worlddev.2015.02.015>.
32. Thapa G, Kumar A, Joshi PK. Agricultural diversification in Nepal: status, determinants, and its impact on rural poverty. Discussion Paper No. 01634, International Food Policy Research Institute (IFPRI)-South-Asia, Office, New Delhi; c2017. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2972291.
33. McCord PF, Cox M, Schmitt-Harsh M, Evans T. Crop diversification as a small holder livelihood strategy within semi-arid agricultural systems near Mount Kenya. Land Use Policy. 2015;42:738-750. <https://doi.org/10.1016/j.landusepol.2014.10.012>.
34. Jones AD, Shrivinas A, Bezner-Kerr R. Farm production diversity is associated with greater household dietary diversity in Malawi: Findings from nationally representative data. Food Policy. 2014;46:1-12. <https://doi.org/10.1016/j.foodpol.2014.02.001>.
35. Njeru EM. Crop diversification: a potential strategy to mitigate food insecurity by smallholders in sub-Saharan Africa. J Agric Food Syst Community Dev. 2013;3(4):63-69. <https://doi.org/10.5304/jafscd.2013.034.006>.
36. Davis KF. Assessing the sustainability of post-Green Revolution cereals in India. Proc Natl Acad Sci USA. 2019;116(50):25034-25041. DOI: 10.1073/pnas.1910935116.
37. Ecker O, Mabiso A, Kennedy A, Diao X. Making agriculture pro-nutrition: Opportunities in Tanzania. IFPRI Discussion Papers, 1124, International Food Policy Research Institute, Washington DC; c2011. <https://www.ifpri.org/publication/making-agriculture-pro-nutrition>.
38. Makate C, Wang R, Makate M, Mango N. Crop diversification and livelihoods of smallholder farmers in Zimbabwe: Adaptive management for environmental change. Springer Plus. 2016;5(1):1135. <https://springerplus.springeropen.com/articles/10.1186/s40064-016-2802-429>.
39. Census, Provisional Population Totals Paper 1 of 2011 (India & States/UTs); c2011. https://censusindia.gov.in/2011-prov-results/census2011_ppt_paper1.html.
40. Li D, Zhang L, Tang X, Zhou W, Li J, Zhou C, *et al.* Bivariate distribution of shear strength parameters using copulas and its impact on geotechnical system reliability. Comput Geotech. 2015;68:184-195. <https://doi.org/10.1016/j.compgeo.2015.04.002>.
41. Fan L, Qian Z. Probabilistic modelling of flood events using the entropy copula. Adv Water Resource.

- 2016;97:233-240.
<https://doi.org/10.1016/j.advwatres.2016.09.016>.
42. Mazdiyasi O. Increasing probability of mortality during Indian heat waves. *Sci Adv.* 2017;3:15.
DOI: 10.1126/sciadv.1700066.
 43. Nguyen-Huy T, Deo RC, An-Vo D, Mushtaq S, Khan S. Copula-statistical precipitation forecasting model in Australia's agro-ecological zones. *Agric Water Manage.* 2017;191:153-172.
 44. Manjula R, Anuja K, Alcain FJ. SIRT1 and SIRT2 activity control in neurodegenerative diseases. *Frontiers in Pharmacology.* 2021 Jan 12;11:585821.
 45. Ferreri AJ, Calimeri T, Lopedote P, Francaviglia I, Daverio R, Iacona C, *et al.* MYD88 L265P mutation and interleukin-10 detection in cerebrospinal fluid are highly specific discriminating markers in patients with primary central nervous system lymphoma: Results from a prospective study. *British Journal of Haematology.* 2021 May;193(3):497-505.
 46. Barman B, Sung BH, Krystofiak E, Ping J, Ramirez M, Millis B, *et al.* VAP-A and its binding partner CERT drive biogenesis of RNA-containing extracellular vesicles at ER membrane contact sites. *Developmental Cell.* 2022 Apr 25;57(8):974-94.
 47. Vernooij R. Does crop diversification lead to climate-related resilience? Improving the theory through insights on practice. *Agro ecology and Sustainable Food Systems.* 2022 Jul 3;46(6):877-901.
 48. Getman RR, Green DN, Bala K, Mall U, Rawat N, Appasamy S, *et al.* Machine learning (ML) for tracking fashion trends: Documenting the frequency of the baseball cap on social media and the runway. *Clothing and Textiles Research Journal.* 2021 Oct;39(4):281-96.
 49. Ansari H. *The infidel within: Muslims in Britain since 1800.* Oxford University Press; c2018 Aug 1.
 50. Kuri M. Science communication of hazards with scientific uncertainty: In the cases of volcanic activity. *Journal of Disaster Research.* 2016 Aug 1;11(4):707-19.
 51. Pattanayak U, Mallick M. Agricultural production and economic growth in India: An econometric analysis. *Asian Journal of Multidisciplinary Studies.* 2017 Mar;5(3):62-6.