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Effect of organic food production and consumption on the affective and cognitive well-being of farmers: analysis using prism of NVivo, etic and emic approach

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Abstract
Extant research studies support has stressed the significance of nourishment on the physical health of humans. Some of the past academic literature has also hinted at an interconnect between food, thoughts, and action that becomes especially significant in the current era of Anthropocene. Organic farming production and consumption can not only enhance economic well-being but also promote social well-being along with subject well-being. Beyond the individual level, a community level facilitates fostering physical emotional physical and emotional ecosystems. However, several studies have inferred seemingly dubious claims about the impact of natural food intake on the mental well-being of an individual. In light of this impinging need, this first-of-its-kind study focused to search the impact of organic food consumption on the cognitive behaviour of individuals. Interview-based qualitative field research with 30 peasants' families was conducted in two phases in the model organic village of Manj Gaon of Uttarakhand. Results indicate that organic farming has positively impacted the mental well-being of the farmers, and apart from it, physical health, food security, and financial security are the fringe benefits for native organic farmers. However, there are many bottlenecks from the policy perspective such as non-availability of organic seeds, lack of marketplaces, lack of transportation infrastructure, and almost no facility of cold storage and warehouse, especially during the time of summer season. All these significantly hamper the adoption and sustenance of organic food production and consumption. Although many farmers exhibit the attributes of subjective well-being, as an outcome, it is rooted in the consumption of organic food, because better intake leads to a better thought process and eventually the results get reflected in the form of a better human being. To conclude, better thoughts, emotions, mind, and health of a human individual and society are strongly rooted in the adoption of chemical and pesticide-free food, i.e. organic.

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1 Introduction

The organic farming practice has the scope to furnish better livelihood moments and higher socio-economic benefits for small-scale growers. Organic farming is a metamorphosis and a strategy for the growth of peasants and worked as an economic deficit limiting in the Southeast Asian region. Progressive nations are like India, where sustainable agriculture is critical for rural development. Agricultural residues (wastes) such as wheat, sugarcane, maize, rice, wood, and cotton residues, could be used to produce board, binder-less board, and paper, or to convert these organic wastes to clean fuels and/or petrochemical substitutes via pyrolysis. Organic wastes may be also converted chemically by hydrolysis to sugars, which may be fermented to give bioethanol and further ethanol can be utilised in automotive sectors (Fahmy et al., 1982, 2017; Mobarak et al., 1982a, 1982b). Organic agriculture is an attitude to practice that positively impacts environmental control, animal well-being, premium food quality, physical fitness, optimum resource application, and egalitarian society, and it also utilizes the market for fulfilling the objectives and recompense for the internalization of externalities (Garg et al., 2021).

The practical importance of this research is to make sure that society as a whole should get mental and physical benefits through practicing and adopting sustainable organic farming production and consumption, and society is consuming chemicals collaterally with food, which is degrading the overall health of humans. In 2015, the United Nations embraced seventeen sustainable development goals (SDGs), aiming to vanish food shortages, malnutrition, and extreme penury by 2030, while simultaneously taking care of the environment including universal climate, this implies sustainable intensification of present farming areas across new inventions and alliance between numerous sectors (Calabi-Floody et al., 2018). United Nations Sustainable development Goals such as (Goal no. 1 no poverty), (Goal no. 3 Good health and well-being), (Goal no. 4Qualirt education), (Goal no.5 Gender equality), (Goal no. 11 sustainable cities and communities), (Goal no. 12 Responsible consumption and production), and (Goal no.13 Climate action) all are aligned with the current research aim and scope.

Sustainable intensification is major distress, majorly in the hills to raise food safety and sustenance of the farmers. Cultivate organic agriculture is seen to have possibilities that should be mulled to enhance the living standard of small peasants and lead to the future progress of nations in terms of financial security and better lifestyle including physical well-being. Noteworthy positive results were seen in longitudinal studies where high natural consumption was related to a diminishing occurrence of human infertility, imperfections in birth, allergic sensitization, middle ear infection, pre-eclampsia, metabolic syndrome, and high BMI (Vigar et al., 2019). But there is one more aspect to it, which is still needed to be discovered, i.e. cognitive well-being of a person due to organic food consumption; the conventional eating pattern still performs an eminent role in modern-day eating habits of the village communities, as it provides good nutrition compared to traditional food (Bisht, 2021). Farmers are consuming organic food from generation, and it is reflected in their positive attitude towards life. Also, organic farming's possibility of paving the way to back the trends in approval of dietary diversification from dietary simplification looks optimistic. Here farmers play an important role as primary adopters, growers, and consumers of organic produce. Working hard for hours farmers do not get the right price

and appreciation of their products, and these mentioned factors affect their interpersonal relationships and reason being, the economically weaker section and sustenance farming culture and no other source of earning a livelihood.

Past literature surveyed addressed the benefits of organic food consumption on physical well-being, but there is a gap in the study where enough evidence was not found on the benefits of organic food consumption on mental well-being, which positively impacts the household and societal relationships by practicing and consuming organic food (see Table 1). For example, many types of research claimed the plus point of organic food consumption on the health of the consumers, but there is less evidence found on the cognitive behaviour of a human being. Many types of research claimed the plus point of organic food consumption on the health of the consumers, but there is less evidence found on the cognitive behaviour of a human being. Researchers and author Jordi Júlvez, at Barcelona's Institute for Global Health, in Spain studied the levels of fluid intelligence, it is the capability to resolve reasoning problem, and the use of working memory, the finding suggests that eating organic food leads to better performance of the mind, in addition to that, when exposed to fine particulate matter (PM2.5), indoors were related to diminished working memory scores (Cockburn, 2021; Kashav et al., 2022; Melore, 2021).This study is mainly focusing on how organic food consumption can reduce family quarrels and helps to improve interpersonal relationships within the family. Studies in the past show that happiness is mainly linked with tranquillity, well-being, bliss, positive emotions, and contentment with the characteristic of life, and that food utilization can boost perceived subjective well-being. The causal effects of organic food on well-being were strongly linked to perceived physical health, pleasure, and emotional aspect (Apaolaza et al., 2018). So overall it can be said that the effect of organic food on cognitive behaviour does exist. In India, natural cultivation has been aided for a few decades (Eyhorn, 2007). The prime focus of the government initiative is to uplift peasants' livelihood and also to gain environmental benefits. The other dimension to it, the solution to distressing interpersonal relationships within and outside the family is not being addressed independently, but the focus is primarily on the physical health of the consumers. The projects focus on lowering the use of chemical inputs such NPK fertilisers, herbicides, insecticides, defoliants, genetically modified organisms (GMOs), and chemically treated seeds in future farming in order to target the abundant naturally available resources (International Trade Centre, 2007, 2011; Kumar et al., 2010; Zinatloo-Ajabshir et al., 2020). Next, through handsome and more vivid earnings as well as lesser input costs farmers get little monetary risks and are immune to other mishappenings because of a greater level of social awareness (Farnworth & Hutchings, 2009). Finally, the outcome is fewer family quarrels, as money is one of the main factors of bad interpersonal relationships as shown in Fig. 1. (Self Composition).

Further, the use of advanced technologies based on green chemistry and environmentally friendly solutions, such as nanotechnology, can have a positive impact on human life, agriculture, and the environment. For example, in agriculture, nanotechnology can be used to create more efficient and effective fertilizers, pesticides, and crop protection products. These products can be more targeted and precise, which can lead to decreased use of chemicals and reduced environmental pollution. Additionally, nanotechnology can be used to improve food safety by creating more effective food packaging that can help prevent contamination and extend shelf life (Fahmy et al., 2020; Rezayeenik et al., 2023). In terms of improving human life, green chemistry and environmentally friendly solutions can be used to design safer and more sustainable products, such as biodegradable plastics and non-toxic cleaning products. These products can help reduce exposure to harmful chemicals and improve overall health and well-being.

Table 1 Comparison of work done in the past with present work

	Title/author	Scope	Past findings and results	Present findings and results
1	Eating organic food is linked to better cognitive development in children (Cockburn, 2021)	Further clinical assessment is required to provide more detailed information	The study is showing the positive impact on children's cognitive learning capacity	The current study showing impact of organic food consumption on all ages including physical well-being
2	Eat organic—feel good? The relationship between organic food consumption, health concern and subjective well-being	Emotional well-being can be studied in future	This research analysed the influence and the impact of organic food consumption on subjective experience well-being	The current study talks about the impact of organic food production on subjective and cognitive well-being
3	Neurobehavioural effects of long-term exposure to pesticides: results from the 4-year follow-up of the PHYTONER study (Baldi et al., 2011)	More studies are required to prove the effect of pesticides increase the chances of dementia	The study shows the exposure to pesticide and its negative effects on neurobehavioural changes	The current study shows the health benefits and positive neurobehavioural effects on farmers, which results in good mood, postadoption of organic farming
4	A systematic review of organic versus conventional food consumption: is there a measurable benefit on human health? (Vigar et al., 2019)	Future clinical research should focus on using long-term whole-diet substitution with certified organic interventions as this approach is more likely to determine whether or not true measurable health benefits exist	The study shows positive outcomes, where increased organic consumption was associated with reduced incidence of infertility, birth defects and lipid profiles	The current study provides an extension to the past studies for example—the current results show that apart from improvements in medical conditions, there are fewer family quarrels in the family and society after adopting organic farming production and consumption
5	Agri-food system dynamics of smallholder hill farming communities of Uttarakhand in north-western India: socio-economic and policy considerations for sustainable development (Bisht, 2020)	Agriculture value chain development must be assessed for sustainable employment and social well-being	A proper policy system must be prepared for the profitable agriculture and regenerative food system	The current study also focuses the challenges faced by the farmers in the value chain development
6	Organic farming and small-scale farmers: main opportunities and challenges (Jouzi et al., 2017)	Farmer's livelihood improvement is the prime factor to be considered	Lower yields in comparison with conventional systems, lack of training, certification and research needs of small holders	Respondents agreed that there is a lack of training for the farmers about organic farming practices and after conversion from conventional to organic farming farmers have improved their livelihood

Table 1 (continued)

	Title/author	Scope	Past findings and results	Present findings and results
7	The influence of label information on the snacks parents chooses for their children: individual differences in a choice-based conjoint test	Authentic labelling is a policy issue that needs to be catered by the proper policy check	There is a positive impact of attractive labelling on consumers perception which leads to better socio-economic development	Authentic labelling and certification leads to better sales output, but there is a need to improve the policy related to the organic product certification
8	Organic cotton cultivation—a pragmatic approach for resource poor and market—challenged farmers (Rajendran, 2004)	Government policy interventions are necessary to promote organic farming practices and extension trainings	The focus is laid down on the sustainable farming system, where India can achieve like other western countries not only in cotton but in other commodities as well	The role of government and suggestion are highlighted while showing the benefits of organic farming in socio-economic and environmental developments
9	Assessing the social and economic benefits of organic and fair trade tea production for small-scale farmers in Asia: a comparative case study of China and Sri Lanka (Qiao et al., 2016)	Fairtrade certification and marginal farmlands are the bottlenecks for the farmers to earn livelihood and depend on organic farming	Due to marginal land and lower economic income, it is not easy to depend on organic farming for sustainable livelihood	The study concludes that multi-cropping and high yield crops can help farmers to achieve sustainable livelihoods in rural areas and developing nations
10	Genetically modified and organic crops in developing countries: a review of options for food security (Azadi & Ho, 2010)	Knowledge and awareness should be the focus among consumers about genetically modified crops and organic farming	The study focuses on genetically modified crops and organic farming and their impact on food security with its advantages and disadvantages, but it concludes that government interference is essential for any such developments	Our results and findings are showing that food security can be achieved through the proper implementation, adoption, and after gaining sufficient knowledge of organic farming in any region

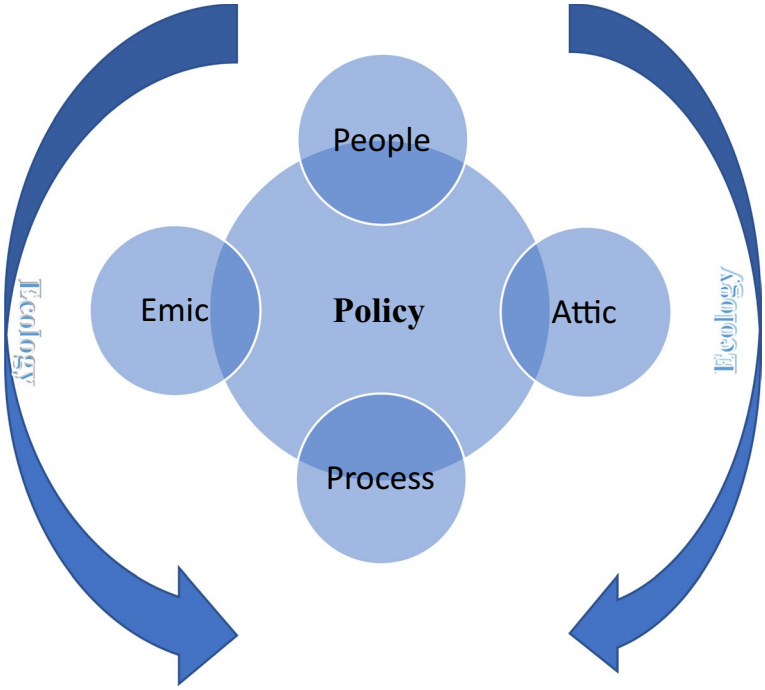

Fig. 1 (Self-composition) Agri-ecosystem in terms of emic and etic codes

Overall, the use of advanced technologies based on green chemistry and environmentally friendly solutions can help improve human life and agriculture, while also reducing the environmental pollution. However, it is important to note that these technologies also have potential risks and downsides and should be thoroughly evaluated before implementation (Kumar et al., 2012).

2 Literature review

2.1 Economic and social aspects of the study region

Same as other hill areas of India, farmers in Uttarakhand are doing sustenance farming and possess less than 1 hectare of agricultural land, and facing infrastructural issues and livelihood issues with poverty and economic problems. In one of the studies about organic cotton, peasants in India reveal that organic farming expands farmers' income from 10 to 20%. The majority of people who live in the hills of Uttarakhand are directly involved in farming. Even the populace living in close-by towns and cities has an association with farming or ruralness (Flick, 2018; Bisht, 2021).

Agriculture is the prime earning source and foundation for the livelihood of most of the population in the hill state of Uttarakhand. Agriculture land in the hill area is small and fragmented, and 80% of these farms are less than one hectare in size. Farmers in the study terrain, also in other agrarian countries, often face high financial debt due to hyped interest

rates on borrowings. In Uttarakhand state especially in plain regions debt funds are used to purchase farming inputs such as chemical insecticides and pesticides, which are banned in different parts of the world due to their toxicity (Rajendran, 2004). The draft order was published by the agriculture ministry that sought to outlaw 27 chemicals, including monocrotophos, due to the traditional agri-practices, consumption of these pesticides is very less in the hills as compared to plain regions, so there is an urgent need to curb the application of fertilizers in the plain regions of the state. So the research question arises that to whether pesticides have a major impact on the cognitive behavioural impact on human minds? And second research question arises whether organic food consumption can reduce family quarrels and improve interpersonal relationships?

Some studies found that chronic pesticide exposure can cause various neurobehavioural effects, including Alzheimer's disease and dementia. In a study of 614 French farm labourers, those who had more exposure to pesticides performed worse on a test of cognitive function than those who had less exposure (Baldi et al., 2011; Kim et al., 2019). There are several studies found related to the consumer purchase intentions, attitudes, and impact of organic food on human health (Magnusson et al., 2003; Lee & Yun, 2015; Lapple and Kelly, 2013; Yazdanpanah et al., 2015; Massey et al., 2018). But no study focused on the cognitive well-being through organic production and consumption.

So, there is a need to further explore and study the positive impact of organic food consumption and production on human health and relationships (see Table 2). Apart from it, for the improvement of the socio-economic conditions of the hills, further study can be done in the future, to promote Uttarakhand villages as eco-villages. The concept of organic villages should be emphasized for the economic well-being of the farmers (Sharma and Sarmah, 2019). Certain entrepreneurial opportunities exist in developing nations, where sugarcane bagasse can be used for paper and board manufacturing. Geographies where the agricultural residue is in excess, can adopt social entrepreneurship; for example, there are a plethora of opportunities in the plain region of Uttarakhand where sugarcane is the prime and cash crop for the farmers.

2.2 Observed positive effects of organic food intake on the social and personal behaviour of farmers within and outside the family

Interviewed an 85-year-old man who is having proper eyesight and no other physical ailments also women farmers who are more than 60 years of age do not look that age.

The prime agenda of the study is to find out the cognitive-behavioural changes through organic farming food consumption. So, farmers agreed to the fact that after the adoption of organic farming and consumption, interpersonal relationships with and within the family have improved also as a society; farmers behave amicably with each other. There are many factors associated with family quarrels, and financial and food security are one of those which helped the farmers to overcome family quarrels, the biological study further needed to be done on the chemical changes occurring in the mind due to the intake of natural food intake, where most of the farmers are accepted that their mood is fresh and happy the reason could be the hormone called dopamine and this could be this needs to be further researched that whether organic food consumptions lead to the creation of hormones called dopamine. We can study various social welfare for groups, where community upliftment is a procedure in which locals gather to take the combined decision and brainstorm solutions to personal and societal issues. Social well-being (socio-economic, cultural, and ecosystem) often evolves from such

Table 2 Emic and etic coding is done based on video data collected

Farmer	Emic code	Etic codes	Deep thematic metaphor codes
(*Group 1*)			
There are positive impacts of consuming organic food	Feeling better and more energetic after consuming organic food	*Physical well-being*, no eyeglasses, no eyesight problem	*Physically balanced*
Non-chemical inputs are better than chemical inputs	Organic inputs are non-hazardous to the environment and economically feasible to procure	Easily procured, safe for the ecology	Environment friendly
Organic farming practice is safe for the health	The organic farming practice has no negative effects on the health of the growers	No cancer patients, safe for the skin	Safe for the humans
There are differences between organic and non-organic food, and there are differentiating factors such as taste and nutrition	Organic food is more nutritious compared to non-organic food	Balanced nutrition, taste and freshness, no preservatives	Nutritious
Organic food consumption also provided better immunity at the times of Covid-19 pandemic	At the time of the Covid-19 pandemic, relatives and friends came to the villages, because in cities they felt the threat to their lives	Continuous consumption of organic food leads to better immunity	Good immunity
(*Group-2*)			
There is a positive cognitive effect on the behaviour after consuming organic food	Farmer/villagers feel fresh and happy after consuming organic food s	*Mental well-being,* better thought process, elicit good behaviour	*Positive attitude*
There are fewer family quarrels in the family	Farmers feel that they are not violent in the family and behave well within the family due to organic food consumption	Good serotonin levels are due to organic food consumption and a pollution-free environment	Happy mood
Better interpersonal behaviour within the society	Farmers are amicable within the society as well, no land dispute	99% village is consuming organic food, which leads to better interpersonal relations in the neighbourhoods	Social well being
(*Group-3*)			
Adoption of organic farming leads to food security in the family, and now farmers have 2–4 types of food variety on their plates	Organic farming helped the farmers to enjoy the food of good quality and quantity	*Socio-economic aspect,* socially and personal and economic benefits	*Better quality of life*
Organic farming also helped in the higher education of children	Farmers are sending their kids to nearby cities for higher studies	Economic prosperity, economic security, economic opportunity	Better financial status

Table 2 (continued)

Farmer	Emic code	Etic codes	Deep thematic metaphor codes
Local export opportunities are generated by supplying organic produce to the embassy	Selling organic produce directly to the embassy of Japan without any mediator	Further connections can be made with other embassy to sell organic produce, the new source of income	Further embassy tie-ups
(*Group-4*)			
There is a lack of warehouse facility cold storage	There is no support from the government in the hills, and there is a need for warehouse and cold storage, because of perishable items	*Lack of (govt.) resources to the farmers,* perishable items get rotten due to no storage facility,	*Lack of policy initiatives*
Lack of transportation	No transport is provided by the government to supply produce from farm to market	Farmers are using their vehicles for the transport of organic produce	Lack of transport
Lack of seeds	Unavailability of organic seeds in the whole region	In Uttarakhand state no organic sees dealer/distributor is available	Lack of organic seeds
Market place	No separate marketplace for the organic produce also the proximity is a huge problem	The marketplace is very far from the hills, and not enough	Lack of marketplace
Marketing and awareness	People are still unaware of organic food; there is a dearth of marketing and promotion	Consumers are unaware of the organic products and their benefits	Lack of marketing and promotion

types of collaborative actions that are applied at a grassroots level (Qiao et al., 2016; Rajani et al., 2022).

2.3 Recognized positive effects of organic agriculture on the livelihood of farmers

The interviewed organic peasants consider dissimilar positive impacts of natural agriculture, such as better physical and mental condition, better food safety and a better lifestyle as well as lesser farming expenses, lacking financial dependence of farmer families on mediators and money brokers, and not facilitated to organic seeds. Peasants are significantly accredited by organic farming activities, through diversifying their income sources. Past researches and field surveys in progressive nations of Asia, Latin America, and Africa have manifested that farmers get good yields after a couple of years and good earnings after the conversion period (Bacon, 2005; Bolwig et al., 2009; Tovar et al., 2005; Valkila, 2009). Selling organic produce to the organic market outlets is more likely to see higher returns on their investments; formal markets provide more earnings than supplying to informal markets which may increase farmers' livelihood (Kansara et al., 2022; Kurgat et al., 2018; Bernard 2017). "Women organic farmer Rita Ramola said that organic farming has improved the livelihood of the farmers in the village gradually, in conventional farming the return on investment was very less".

2.4 Improved physical fitness conditions of peasants and their family members

Farmers admitted that positive health results and impacted because of organic farming. The interviewed women agreed that in the past chemical pesticides have been sprayed on the crops by male farmers, but there were always the chances of collateral damage resulting in the health of all family members being directly impacted due to its application; presently after the conversion to organic farming there is a development in overall well-being including mental well-being as bad smell causes bad mood and organic fertilizers do not elicit fetid smell. As per the farmers, this evolved into reduced medical expenditure with positive social effects by diminishing effects on health and monetary load within the family. The French Agency for Food Safety (AFSSA) claims that organic foods include a higher proportion of dry components, minerals like iron and magnesium, and micronutrients that are antioxidants. Additionally, organic dairy products have lower nitrate concentrations and higher polyunsaturated fatty acids than regular organic dairy products (Lairon, 2010; Bangwal et al., 2022). Furthermore, a recent meta-analysis study found that conventional and organic diets have notable nutritional differences. Organic foods have higher antioxidant concentrations and lower levels of pesticide residues and dangerous heavy metals like cadmium (Barański et al., 2014; Baker et al., 2002; Średnicka-Tober et al., 2016). Despite the substantial health and nutritional benefits of organic farming, customers are hesitant to purchase organic goods, it essentially requires public and governmental support. While focused on group discussion farmers accepted that there were very few (Covid-19) cases in the village, it is believed that it is all due to organic food consumption. Moreover, small *Panicum miliaceum*, a variety of Barahnaja cultivation, has the scope to fight under nutrition and starvation in the Covid-19 pandemic epicentres (Kumar and Kansara, 2018; Muthamilarasan & Prasad, 2020).

2.5 Improved food security

Many farmers agreed that non-chemical input-based farming helped for the improvement of the food safety condition of their families in different ways, by intercropping, multi-cropping cash cropping, inaugurating new vivid crops, and better yields. Food safety is increased through agricultural practises like crop rotation, multi-cropping, and food crop cultivation in the fields used for cash crops. Farmers said, "This mixed farming technique has many advantages and is really helpful; at least we are producing our own food crops. A number of incidents in India showed how switching to organic cultivation improved food security and reduced debt" (Azadi & Ho, 2010; Panneerselvam et al., 2011). Farmers say that back when we only grew conventional crops, we would crumble if the year was not successful. Now if rice fails, at least we can get legumes and vegetables. Consequently, new cropping patterns helped farmers grow more different food crops.

"Our farming method is currently being diversified. We are including ladyfinger and pigeon pea and Japanese rice in the same field." Prominent farmer Bhagchand Ramola.

Furthermore, added that there are improved consumption crop yields due to innovative agriculture applications and further enhanced food safety for women farmers and their families. The farmers added "We also use liquid and organic manure in our vegetable field, I feel that it gives good results in cereals and fruits." These features are significantly related to women farmers, as they are mainly in charge of the organizing of food intrafamily. As it is very much proven that the adoption of farming can arrange a good quantity and a increased variety of food for their households.

2.6 Improved living conditions

Education and the family's standard of living are causally related to natural farming. For their children, especially girls in countries where patriarchy still reigns, women can spend money on school/university uniforms, study materials, and kitchenware. These investments significantly contribute to closing the education and gender gaps. Farmers use the additional revenue for better irrigation, transportation (motorbikes, bicycles), housing, and communication infrastructure (electricity, water, and sanitation) (direct to home, mobile phones, and televisions). The extent to which peasants profit from these advancements, however, varies greatly from home to household and is heavily dependent on customary methods.

2.7 Lowered farming costs and decreased reliance on farming households for funding

Farmers cited lower input costs as the most significant benefit of organic farming. Chemical pesticides and fertilisers are inputs used in non-organic agriculture that limit small-holder farmers' ability to make a living. The price increases for natural products range from 10 to 300%, and it is estimated that farmers receive 44–50% of this price increase, depending on the region and type of product. As a result, the potential for organic farming must increase (Rajini et al., 2022; Setboonsarng, 2006). Chemical inputs can be replaced with locally accessible organic sources to reduce production costs in the agri-ecosystem (Kumar, 2015, 2020; Setboonsarng, 2006). Nevertheless, organic farming can reduce cultivation expenses because it is a labour- and input-intensive food production method and because small-holder farmers' families typically work on subsistence and scattered farms

(Planning Commission of India, 2013; Kleemann, 2011). In natural farming, homemade organically accessible bio-pesticides and fertilisers are used in place of these chemical inputs, considerably lowering input costs. As a result, smallholder farmers are independent and no intermediary is involved in the whole process, which gradually improves the financial situation. Green financing institutions can play a great role in the organic farming sector, where the government can support and create awareness about the access to green credit to the farmers.

2.8 Diversified income streams provide more leverage to farmers

Organic farming requires intercropping. Therefore, farmers are growing 2–3 crops together, additional products which are then sold on nearby marketplaces. Additionally, there is a new model adopted by the Manj Gaon villagers, as they are in touch with the Japanese embassy and they are growing Japanese crops like a Japanese crop variety called "Kosi Kari" and processing some Japanese spices and dairy products like Tofu, this is a new emerging model which has a humongous scope for the farmers in Uttarakhand region if its government support. Farmers are also able to diversify their sources of income through processing Buransh juice (Rhododendron arboreum).

2.9 Lack of facilitated access to seeds

Farmers recognize the lack of facilitated access to organic seeds as another important factor that needs to be controlled. Native farmer Ajay Singh told that in Dehradun the capital of Uttarakhand state, organic seeds are not available, and farmers are using the same conventional seeds and many farmers are repetitively using the same old seeds which are saved by the farmers from the last harvest, which is also the reason of low yields in the regions. There is no facilitation given by Uttarakhand organic commodity board (UOCB) to the farmers regarding the organic seeds in the hills. Organic seeds are available in Delhi, but there are many barriers to procuring them such as high market prices, not good quality, transportation challenges, and dependency on local debtors due to high prices. As a policy suggestion, a local seed bank must be established by the government in each cluster, especially in the hill region; due to the negligence of the lawmakers no proper implementation is done for the rural hilly areas.

2.9.1 Less training

As per the empirical research done in the past, it is well acknowledged that organic farming is a proficiency-based intensive structure rather than input-intensive, but in practice, the implications are reversed. Moreover, marginal farmers are significantly neglected while executing the policies such as extension policies and programs, while smallholders must receive relevant research schemes and funding that target their needs to reverse their condition (HLPE, 2013; Kumar et al., 2021). By way of breeding, for instance, funding for agroecological research can cause a modest increase in organic production (Murphy et al., 2007) or may enhance the knowledge crop rotation and intercropping, and it may raise the overall yield (Kumar et al., 2013; Ponisio et al., 2015). It is also clear that collaborative studies signify locally relevant soil management techniques, particularly in areas with unfavourable climates where reach to biomass is very insufficient (Kumar, 2015; Zundel & Kilcher, 2007). Various schemes related to soil

testing are affected due to work theft (time) by the government personnel. Central government schemes relevant to soil healthcare execution are significant and must be executed at the grassroot, but to avoid procrastination an appropriate policy measure must be taken.

2.10 Some possible disadvantages of the effect of organic food consumption on the cognitive behaviour of individuals

While organic food consumption is generally considered to be beneficial for overall health and well-being, there are some potential disadvantages when it comes to its effect on cognitive behaviour. Some possible disadvantages such as limited availability, organic foods may be difficult to find in some areas and can be more expensive than non-organic foods. This can make it difficult for some individuals to consistently consume organic foods, which may affect their cognitive behaviour. There is currently limited scientific evidence to support the specific cognitive benefits of organic food consumption. While some studies have suggested that organic foods may have a positive impact on cognitive function, more research is needed to confirm these findings. Nutritional deficiencies in organic foods may have lower levels of certain nutrients, such as certain vitamins and minerals, which hybrid foods do contain. This could lead to deficiencies that affect cognitive function. Organic products are falsely labelled. This can cause confusion and mistrust among consumers who want to consume organic foods.

It is important to note that while these are potential disadvantages, it is still important to be mindful of the food one eats and its impact on overall health. It is also important to consider other lifestyle factors that can affect cognitive function, such as physical activity, stress management, and sleep quality.

3 Research methodology

To inspect these claims, the first phase of the field study has been accomplished between March and May 2021 in the hill village (Manj Gaon) of Uttarakhand and (separately organized) organic marketplaces and the second field of study has been conducted in March 2022 in the hill village (Manj Gaon) of Uttarakhand in India on the behavioural thinking towards organic farming of rural villagers, including impact analysis of organic farming on their interpersonal relationships, livelihoods, food security, etc.

This experimental work is a combination of qualitative interviews with peasants, focused group interviews, and open-ended questions asked, and expert interviews were taken through video recording and structured questionnaires. The research is done independently and is not backed up by any Indian non-governmental organization or governmental organization. Thirty male and female organic farmers participated in qualitative interviews in order to learn more about their opinions on eating organic food, their way of life, and other aspects of their cognitive behaviour in the research region. The content analysis method was used to analyse the interviews (Kuckartz, 2007; Lamnek, 2005). Emic and etic codes were manually entered into Excel using both the top-down (using codes acquired from the field interviews) and bottom-up approaches (see Table 1). The codes discovered during interviews were utilised by Flick.

4 Etic and emic approach

Measuring culture has been a basic difficulty for researchers in various fields and domains. What and which Methods to adopt, regarding culture, and dimensional culture, are their major concerns. The etic and emic approach has been applied by many researchers in the past for human behaviour to elicit open-ended research, combined with comparative analysis, here etic category is useful for comparative analysis and emic is useful for fieldwork studies. Moreover, combining the two the etic and emic approaches benefit researchers across the globe at the national and international level. The two primary tactics that were commonly covered in cross-cultural literature were etic and emic approaches (Stolze and Lampkin, 2009; House et al., 2004). First put forth by was the distinction between the emic and etic methods (Kumar et al., 2013). Additionally, modified for cross-cultural comparison using data from the field (Yuliati and Sukesih, 2022; Sanday, 1979), etic scholars frequently divide related cultural elements and test their hypotheses. The etic method looks at human behaviour from a broad perspective. The emic approach studies one culture at a time and evaluates the participant's responses; on the other hand, etic involves a comparison of different cultures including outside and within the nation or region.

According to Pike (1967), the phonemic and phonetic descriptions of language sounds are where the emic/etic distinction in linguistics first appears. Originally, phonetic accounts were defined as researcher-relevant distinctions about how these sounds are audibly made by native speakers, but phonemic accounts were defined as member-relevant guidelines about the sound contrasts of language that native speakers maintain in their minds (Markee, 2013; Kumar et al., 2021). Comparisons between cultures or environments are possible because to it (see fig (Watson-Gegeo, 1988), applying NVivo software (Tomar & Sharma, 2021). NVivo a qualitative data analysis software is used to organize, and analyse, the unstructured data, such as open-ended survey responses, interview transcripts, and social media posts. Researchers can use it to analyse data from interviews, focus groups, and surveys and can also use it to analyse data from social media platforms, such as Twitter and Facebook. Content analysis is done to systematically analyse and interpret written, spoken communication. It is used to identify patterns and themes in large amounts of data, such as text, images, and audio. Content analysis is a qualitative research method, which means that it is used to understand the meaning and context of the data, rather than to quantify or measure it. Secondly sentiment analysis is done, also known as opinion mining, and is a method used to determine the attitude, emotion, or overall opinion expressed in a piece of text. It is used to classify text as positive, negative, or neutral in sentiment. Sentiment analysis is often used to gain insights from data collected from the respondents. The participant observations were accomplished during the entire field study; Expert interviews (Arora et al., 2022; Gläser & Laudel, 2009) were also conducted with organic farming experts such as renowned agri-expert Bharat Bhushan Tyagi recipient of the third-highest civilian award of India and Dr. Anil Prakash Joshi (HESCO) recipient of the second and third highest civilian award of India (Tables 3 as taken from Top 50 word frequency and Table 4).

Table 3 (Top 50 word frequency) Content analysis using NVivo software

Word	Length	Count	Weighted percentage (%)
Organic	7	4276	1.86
Food	4	1683	0.73
Farming	7	1153	0.50
Farmers	7	1115	0.48
Agriculture	11	1031	0.45
Women	5	1030	0.45
Conventional	12	947	0.41
Production	10	931	0.40
Systems	7	633	0.28
Studies	7	567	0.25
Research	8	548	0.24
Crops	5	531	0.23
Health	6	524	0.23
Crop	4	519	0.23
Development	11	481	0.21
Market	6	459	0.20
Soil	4	449	0.20
Agricultural	12	437	0.19
Farm	4	405	0.18
Higher	6	404	0.18
High	4	396	0.17
Analysis	8	390	0.17
Trade	5	389	0.17
Sustainable	11	386	0.17
Local	5	355	0.15
Residues	8	351	0.15
Foods	5	348	0.15
Coffee	5	347	0.15
Table	5	340	0.15
Quality	7	334	0.15
Fair	4	331	0.14
Practices	9	326	0.14
System	6	326	0.14
Management	10	314	0.14
Coffee	6	312	0.14
Consumption	11	309	0.13
Cotton	6	305	0.13
Products	8	303	0.13
Yield	5	296	0.13
Land	4	292	0.13
Available	9	288	0.13
Meat	4	287	0.12
Results	7	283	0.12
Lower	5	281	0.12

Table 3 (continued)

Word	Length	Count	Weighted percentage (%)
Countries	9	277	0.12
Knowledge	9	276	0.12
Samples	7	276	0.12
World	5	276	0.12
Community	9	275	0.12
Household	9	274	0.12

5 Policy implications

The application of this research can be utilized for more effective and integrated value chain and policy decisions for improving the operation of organic farmers in different agro-climatic regions. Organic food consumption can lead to positive changes in the lives of the peasants living in the hills areas of India. Under intense conditions in hill states, without proper policy planning and intervention, it is a daunting uphill task to transform hill agriculture into organic farming practices. The picture is clear, organic farming can uplift the whole society in various fields such as socioeconomic, health, and environment. "It shows the farmers living in underprivileged situations, government facilities/schemes, and programs are not benefiting stakeholders due to a lack of policy execution by the state government, which is required in the current scenario".

6 Discussion and results

Human well-being is consisting of physical and mental well-being; factors such as education, economic upliftment, and technology are working as a supporting function. Maslow's hierarchical theory of motivation is also focused on physiological needs as one of main prime fundamental basis of human well-being. It is already proven years ago about the impact of food on the human body, but the impact of food on our mental health compared to physical well-being is still needed to be explored by researchers. So this study is trying to prove the impact of organic food consumption on the overall human being. Indian Vedic texts have already proven the effect of natural farming on human well-being In Indian texts in and around 300 BC Kautilya's arthashastra (Economics) talked about the organic manures such as the use of animal dung oil cakes and excreta for the viable and economical farming system, one of the reference was seen around 550 BC in the Indian Epic called Mahabharat about Kamdhenu cow (The celestial cow) and its role on human life and soil fertility and the impact of organic food on the human cognitive well-being was given in the Rig Veda the oldest text of Sanatan (Hindu) religion. There is an old saying in India, (जैसा आहार, वैसा विचार और वैसा ही व्यवहार) Input > process > output, it means a person's thoughts and behaviour depends on the food intake. Organic food consumption leads to a positive response and helps the brain to elicit positivity in attitude and nature. In other words, tame and untamed behaviour has a positive relationship with food. Apart from mental well-being,

Table 4 Sentiment analysis response

Codes	Very negative	Moderately negative	Moderately positive	Very positive
10.1016@j.jrurstud.2005.10.002 (1)	15	25	30	10
10.1017@S0007114514001366 (1)	17	30	44	16
10.1017@S0007114515005073 (1)	13	26	38	16
10.1080@21639159.2019.1577692	1	7	35	7
10.3390@nu12010007	27	64	77	14
altenbuchner2014	20	40	48	15
apaolaza2018	6	27	93	18
azadi2010	24	60	39	8
bacon2005	38	28	32	8
baker2002 (1)	14	56	54	28
bisht2020	16	39	69	27
bolwig2009	15	33	24	4
Calabi-Floody et al. - 2018	11	37	68	15
CICR_organic_cotton_cultivation	12	12	20	5
computergesttzte-analyse-	0	1	2	0
FLMF022935	0	0	0	0
ouzi2017 (1)	28	44	56	12
kurgat2018	9	19	36	6
\lairon2010 (1)	12	27	23	9
markee2012	3	4	5	3
murphy2007	3	3	13	3
muthamilarasan2020	10	31	21	4
organic agriculture	12	48	45	15
Organic+Agriculture+Womens	49	108	203	81
panneerselvam2010 (1)	9	13	17	3
ponisio2014	9	16	27	15
pre_pov2307	14	0	4	3
qiao2015	12	12	25	9
sanday1979	5	13	12	7
SanDiskMemoryZone_QuickStartGuide	0	0	1	0
stolze2009	6	9	28	5
valkila2009 (1)	20	27	29	6
watson-gegeo1988	5	11	19	6

it is already proven that organic farming practices help the farmers socially and economically also in the hilly areas where there is a dearth of food it also helps in food security for the poor and marginal farmers. The results have shown that *Positive* responses were collected from the farmers, and farmers agreed that there is a positive impact of organic farming practice and consumption on physiological factors. Results obtained from NVivo software, content analysis, and sentiment analysis are supporting the literature reviewed and first-hand responses collected from the respondents such as farmers and experts of organic farming in India. Sentiment analysis results are showing

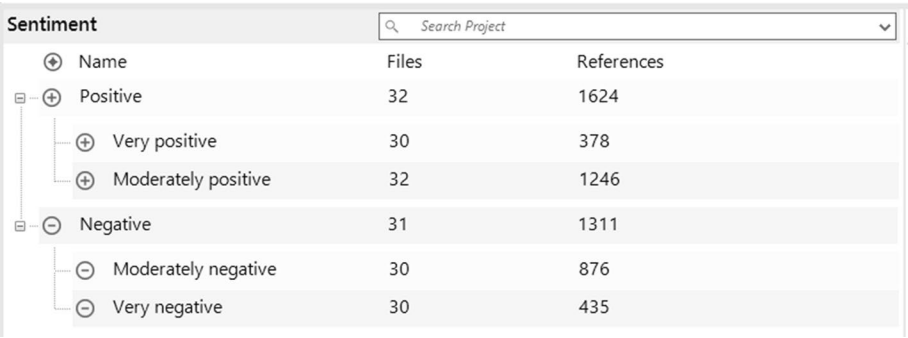

Fig. 2 Sentiment analysis final results

that almost 55.4% of positive results are in favour of the benefits of organic farming practice (see Table 2 and Fig. 2) and consumption on the overall human well-being.

7 Conclusion

Organic farming production and consumption are in the best interest of the whole ecosystem, subjective well-being also plays a bigger role in this study, after the adoption and consumption of organic farming, farmers are more likely to be perceived as having a high quality life because they are comfortable with their lives and frequently feel positive emotions like joy, happiness, and hope. Women farmers accepted that there are fewer family quarrels because of the better and fresh mood among the family members; secondly, economic prosperity, food security, and better child education are the other prime factors for subjective well-being amongst the farmers in the hills. Organic farming practices promote biodiversity. It also helps to conserve soil and water resources, reduce greenhouse gas emissions, and promote sustainable land use. Findings are indicating that organic foods are often considered to be healthier than conventionally grown foods because they do not contain synthetic pesticides or fertilizers. Organic farming is stimulate rural development. It can also help to diversify local economies and improve the livelihoods of farmers. Additionally, organic farming can benefit rural communities by providing healthy food options and reducing the dependency on synthetic chemicals. Most importantly organic farming practices require that animals to be raised humanely, with access to the outdoors and space to move around. This is in contrast to intensive farming practices, where animals are often confined to small spaces. This study is limited to primary and secondary data analysis from the perspective of social sciences, and further study can be pursued with clinical testing for measuring the impact of organic food consumption on human health; for example, a comparative analysis can be done on organic and non-organic consumers in context to lipid profile and impact on the cognitive human functions.

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