



Economics and Marketing of Hub and Spoke based Model: A Descriptive View of Mint Business in Northern India

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ABSTRACT

India has total mint production of 39,000 t covering an area around 3,36,000 ha. Last 15 years' studies were taken into consideration to find the three items viz; Producer's Net Price, Price Spread and Producer's share in Consumer Rupee with their highest and lowest values. It was found that highest Producer's net price was received through Channel II (U.S. Nagar, Uttarakhand), highest price spread in channel II (Sitapur) and highest Producer's share in Consumer Rupee was received through channel I (Moradabad), while lowest Producer's net price was received through Channel II (Rampur), lowest price spread in channel I (Moradabad) and lowest Producer's share in Consumer Rupee was received through channel II (Sitapur). Numbers of lacunas were observed in existing supply chain viz. high input cost, inadequate market information and improper price mechanism. Present study proposes "A Hub and Spoke Based Mint Business Model" which directly approaches buyer without any intermediaries. This business model would increase per kg return and decrease amount of costs.

Key words: Business Model, Hub and spoke, Marketing channels, Mint oil, Price spread, Producer's share.

Present status of mint production in india

The Mint (*Mentha*) is an important aromatic and medicinal herb having highest scope for value addition. It is also known as bonus cash crop grown in Zaid season between Rabi and Kharif. From pharmaceutical to cosmetic industry, mint products like menthol flakes, menthol crystals, mint oils are used as raw materials in preparation of bakery products, perfumes, mouth fresheners, pharma products, toothpastes, lotions, soap and shampoos, chewing gums, candies, beverages, etc. Presently, India has total mint production of 39,000 t covering the area around 336,000 ha with average yield of around 116 kg per ha during 2022 (Multi Commodity Exchange of India, 2022) however it was 46000 tons and 44000 tons in two consecutive previous years as shown in the Graph 1.

India is the largest producer and an exporter for mint oil and its derivatives. Nation contributes around 80% to the total global mint oil production followed by China (9%), Brazil (7%) and USA (4%). India shares 33% of world export. (Directorate of Horticulture, 2021). India exports mint oil to more than 130 countries. Mint contributes only 2% in terms of quantity but approx. 15% in terms of export income (Spice Board of India, 2023). However mint oil export has been affected after import of synthetic mint in Indian market. Mint oil export has been declined by 17.9% from 2014-15 to 2015-16 this is due to increase production and use of synthetic mint oil. Synthetic mint market was valued at more than \$ 30 million in 2021 held 27.22% total mint market in 2021 held 27.22% of total mint market in India. Graph 2 depicted mint oil export was lowest for two years i.e. 2017-18 and 2018-19, thereafter increased (Innovius Research, 2022).

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State wise statistics of mint oil

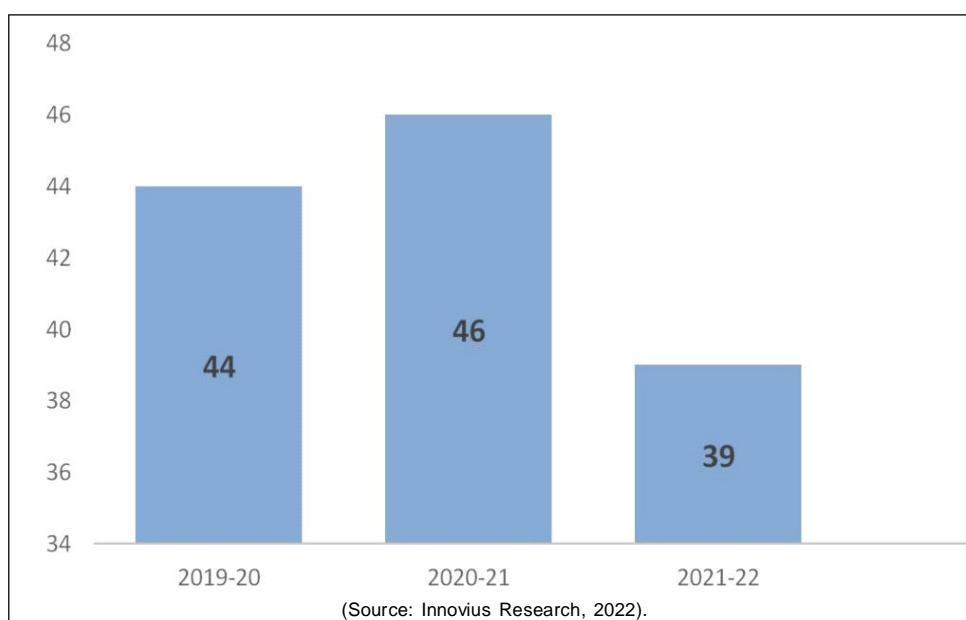
In India, mint is cultivated mainly in Uttar Pradesh, Bihar, Madhya Pradesh, Haryana and Punjab States. Uttar Pradesh is the largest producer of mint (90% of total production and 80% of total area available for mint), while remaining portion is shared by other states (Directorate of Horticulture, 2021). Total production of mint is approx. 35,000 t covering 275,000 ha area in Uttar Pradesh state. Barabanki, Moradabad, Bareilly, Badaun, Pilibhit, Shahajahanpur, Hardoi, Lucknow are the major districts of Uttar Pradesh in mint production and area (Verma *et al.*, 2019). Among all districts, Barabanki is the biggest producer of mint having 1009,00 kg production and 90,090 ha area

(DHO Office, 2023). As the demand is more than supply of Indian mint not only in domestic as well as international markets, the constructive efforts are putting to increase the production and area of mint. More than 50,000 t menthol mint is required globally while India produced less than 40,000 t, so being largest exporter / producer, India has huge scope to bridge this gap. CSIR- CIMAP, 2022 has developed total 12 new varieties. Some of these are. CIM-Kosi, CIM-Kranti, CIM Saryu etc. having better yield and need low cost of production per hectare. These early varieties are known as Early Mint Technologies and promoted under CSIR-Aroma Mission (CSIR-CIMAP, 2022). Where old varieties are planted from the month of March to April and harvested in the month of May to June, early varieties planted in Late January to February and harvested in April to May with comparatively minimum losses and damages. Report says by cultivating these early varieties

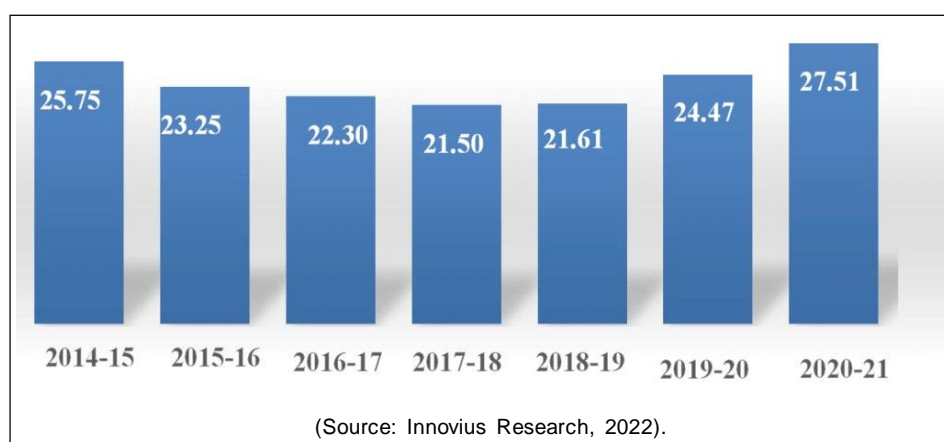
yield has been increased by 20-25% and cost decreased by 25-30% per ha, it is mentioned in Table 1.

Mint market in India

Mint market is unorganized and supply chain is very fragmented, there is poor connect between forward and backward ends. Presence of huge number of middlemen makes it more unproductive. It was analyzed through literatures that variation in prices is very high during season and off season and due to this accurate demand and supply might not be forecasted. The prevailing price of spot market is ₹ 350-650/kg. During June-July reach ₹ 900-980/kg. During October-November. Investors and speculators bidding on crude oil and future contracts have also been the driving force behind fluctuations of mint oil and derivatives' prices. Though mint oil is an ideal commodity for futures trading, it is a well standardized, storable, high



Graph 1: India mint production in three consecutive years (in 000' t).



Graph 2: Natural mentha oil exported from India to other countries (000' t).

valued and low volume commodity which does not require any expensive infrastructure for storage. Mint oil is also having presence in commodity market (Fig 1) viz. Multi Commodity Exchange (MCX) of India, National Commodity and Derivatives Exchange (NCDEX) and National Multi Commodity Exchange of India (NMCEIL) trade in mint oil and derivatives. (Shubhendu, 2014). Malpractices in weighing, grading and pricing are very common in mint business at small level. New entrants may usually be played by buyer. Thus, it was advised to have the proper knowledge about mint oil business before making the investment. Because of unawareness, local traders and village aggregators offer the low price and cut profit margin. In that condition, producer / seller should check the real time price online before making the deal with buyer. Online price and market price might be slightly different but can't be deviated high. If differences are high, it shows buyer is not offering remunerative prices and must be skipped to next one.

Adopted marketing channels

Total six studies were reviewed and comparison is revealed through graphical representation from Graph 3 to 8. It was found that stakeholder adopted different channels for distribution of mint oil and derivatives. Most of the channels

having large number of intermediaries between producers and processor/industry. Though few are directly distributing the produce/oil without any middlemen. Length of distribution channels depend upon many factors viz. Size of produce, transportation facilities available with sellers, price offered by local traders, quality of oil. Last fifteen years' studies pertaining to six different districts of Northern India were taken into consideration to find the three items viz. Producer's net Price, Price Spread and Producer's share in Consumer Rupee with their highest and lowest values. It was found that highest Producer's net price was received through Channel II (Graph 7), highest price spread through channel II (Graph 8) and highest Producer's share in Consumer Rupee was received through channel II (Graph 3), while lowest Producer's net price was received through Channel II (Graph 6), lowest price spread in channel II (Graph III) and lowest Producer's share in Consumer Rupee was received through channel II (Graph 8).

Marketing channels practiced by stakeholders

- Channel I: Producer- Processor.
- Channel II: Producer-Local Traders-Processor.
- Channel III: Producer-Local Trader- Registered Trader.
- Channel IV: Producer-Commission agent Processor.

Table 1: Income and expenses of old and early mint varieties (₹/ha).

Particular	Old mint varieties (First/Second Arrival)	Early mint technology (First/Second Arrival)
Total expenses (₹)/ha	65,000/85,000	50,000/65,000
Oil production (kg)/ha	140/200	150/250
Gross income (₹)	1,40,000/2,00,000	1,50,000/2,50,000
Net income (₹)	75,000/1,15,000	1,00,000/185,000

(Source: Aroma Mission, CSIR-CIMAP, Lucknow).

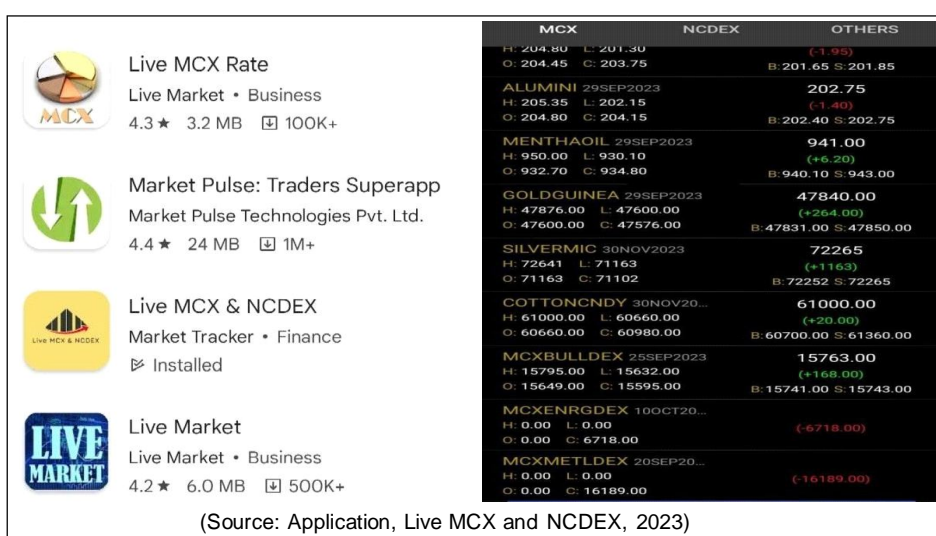


Fig 1: Real time price check of mint oil and others before decision as on 17.09.2023.

- Channel V: Producer-Wholesaler Processor.
- Channel VI: Producer- wholesaler cum Processor-Retailer-Consumer.
- Channel VII: Producer-Village Trader-Wholesaler cum Processor-Retailer-Consumer.
- Channel VIII: Producer-Commission agent-Wholesaler-Processor.

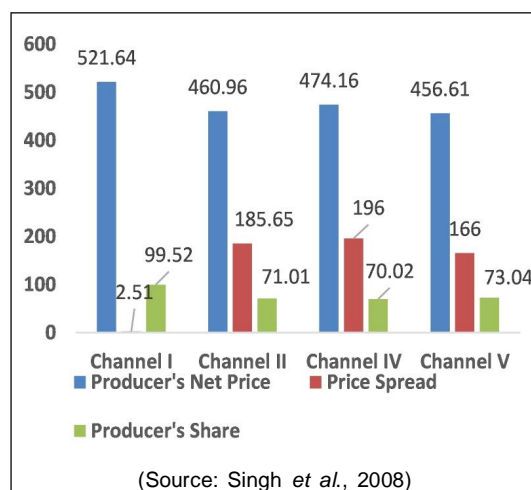
Producer's net price and price spread in ` and producer's share in consumer rupee (%) during 2008-09 to 2012-13

Hub and spoke based mint business model (Proposed)

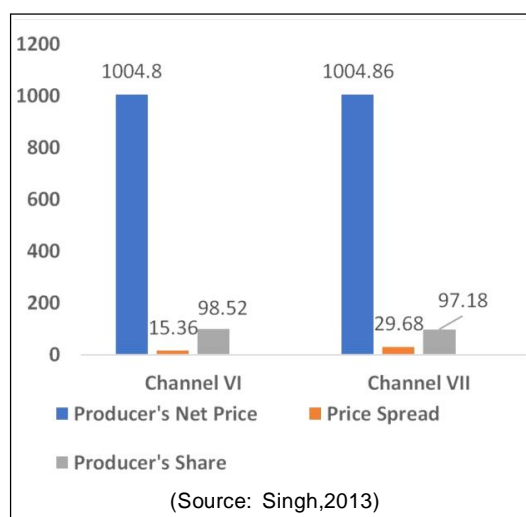
The following model which is presented in Fig 2 is proposed by considering the present marketing scenario of Mint oil and its derivatives. This model skips the number of intermediaries involved in channels. Farmer Producer Organization / NGO / Farmer's Federation should adopt this Hub and Spoke based business model. Central Facilities would work as Hub and Clusters are spokes. Produce would be collected from different village clusters and forward to central facilities in bulk which is integrated with processing unit and central storage facilities. Mint oil might be stored until good price will offer by the buyers

This is market driven model because it will enable stakeholders to match supply with demand of mint oil and its derivatives during season and off season. Different kinds of cost viz. Transportation cost, storage cost, container cost etc. would be reduced at producer's level. This model would decrease the risk as producer will no need to take produce from one to another market in the hope of remunerative prices.

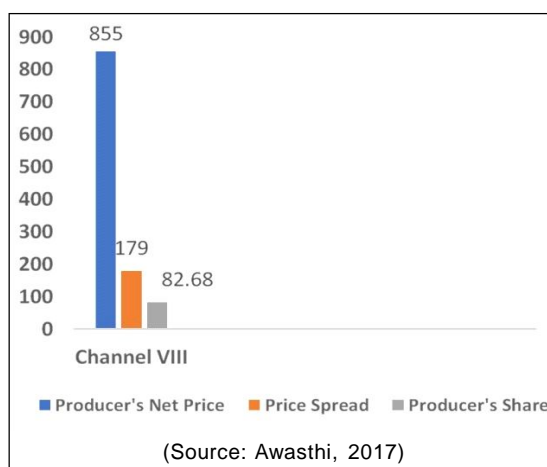
Profit earned by organization might be shared among member producers apart from net return received for their produce sold. Nonmembers may also send produces but they receive only net return for their produce. So, this business model will provide two opportunities to producers (members) for earning. Quality Measures would ensure to match the standard of IT Support to run model and Data Base Management for Demand and Supply Forecast Table 2 shows the difference between existing and modern marketing channel of mint. It is clearly revealed that gross price received by farmers in modern channel is increased approximately 15.00 per cent in comparison to existing channel. Cost incurred by farmers is reduced up to 50.00 percent as concerned organization make inputs and other services available at farm. Producers net price increased by ` 550.81 and marketing cost is nil for producer in modern channel. Assuming company price same as existing channel, Price spread lowered to ` 58.02. Difference between gross marketing margin of existing and modern channel becomes ` 159.98 and Marketing margin received in modern channel is 2.85 per cent which is approximately double the existing channel. Producer's share industry rupee also increased by 114.8 per cent in modern channel



Graph 3: Moradabad Study in 2008.



Graph 4: Barabanki Study in 2013.



Graph 5: Lakhimpur Kheri Study in 2017

in comparison to existing channel. The marketing efficiency achieved in modern and existing channel is 2.72 and 0.92 respectively.

Critical observations

High input cost declined the profit margin at producer's level. Inadequate market information and improper price mechanism were observed also observed Stakeholders were not aware of export market and its mechanism. The study further highlighted the other challenges faced by mint growers including market volatility, climate-related issues and access to credit and technology (Kumar *et al.*, 2011).

One more study described the marketing constraints (in percentage position) of mentha oil make the supply chain inefficient and weak. These constraints are viz. high transportation cost (96.15%), followed by distance from market (88.46%), delay sale and payment (80.76%), poor roads and transport (73.07%), quality degradation (65.38%), unawareness about schemes (57.69%), unawareness about direct selling to buyer (50%), lack of market knowledge (42.30%), lack of good infrastructure (34.61%), lack of storage facility (26.92%), lack of MSP (19.23%), malpractices by middlemen (11.53%) and frequent price fluctuations with 3.84% (Chaturvedi *et al.*, 2022).

A study done in Kullu, Himachal Pradesh on Medicinal and Aromatic Plants (MAPs) has identified four policy related problems viz. State government intervention is very less to provide the business opportunities for MAP producers, there is lack of research and development facilities resulted into poor quality of MAPs. Extension activities and training were also not done at village level. Lastly, farmers were not aware of subsidies and projects run by state government (Gupta and Gupta, 2020).

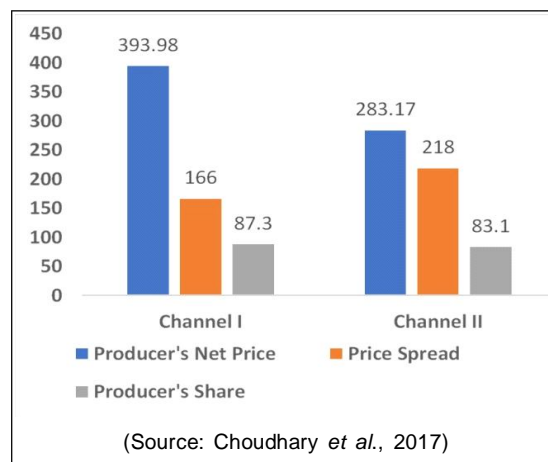
A study Impact of amended APMC act on apple business in HP which depicted the market orientation in deep way as mostly farmers were not aware of amendments and mostly apple producers did not know the new pattern of marketing came in to their existence helping them to provide productive and Non productive loans and advances to primary growers (Hussain and Singh, 2017).

An empirical study done in district Rampur by researchers (Chaudhary *et al.*, 2017) concluded that mint business is profitable in study area but there are some lacunas. The major hinders are related to distillation unit, high transportation cost etc. Producers are unaware of government policies and subsidies for mint production and mint oil marketing. Study stressed that govt should take immediate initiative to address the issues.

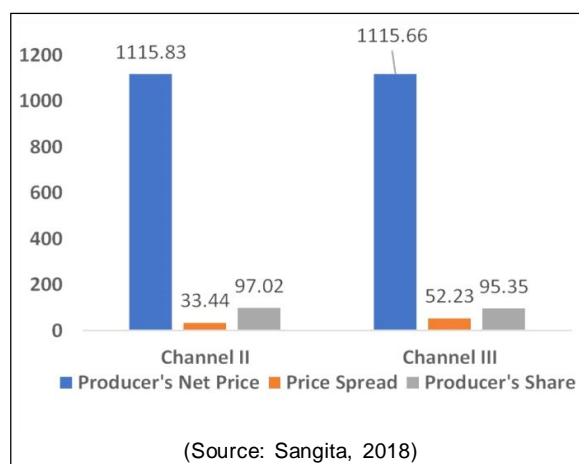
A study done in J & k on Medicinal flora reported that medicinal plants can be used to enhance the economy of local inhabitants. In nutshell, this study could be of greater help in forming the pioneer compilation of medicinal wealth of the region (Humaira *et al.*, 2021).

A case study of mint cultivation in Central Uttar Pradesh shows that without any additional input for cultivation a

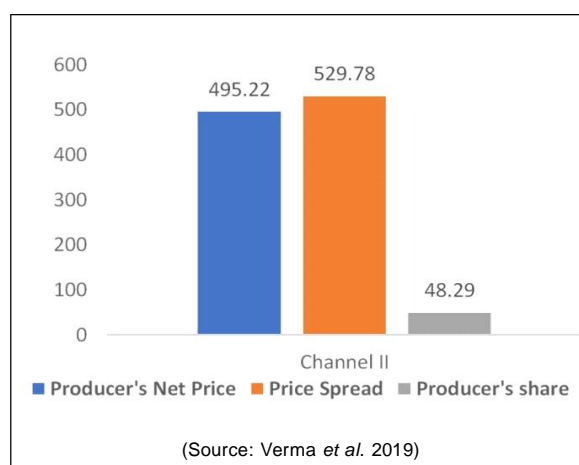
newly developed variety is suitable for commercial cultivation of menthol mint to generate additional income to farmers (Sharma *et al.*, 2019).



Graph 6: Rampur study in 2017.



Graph 7: U.S. Nagar Study in 2018.



Graph 8: Sitapur study in 2019.

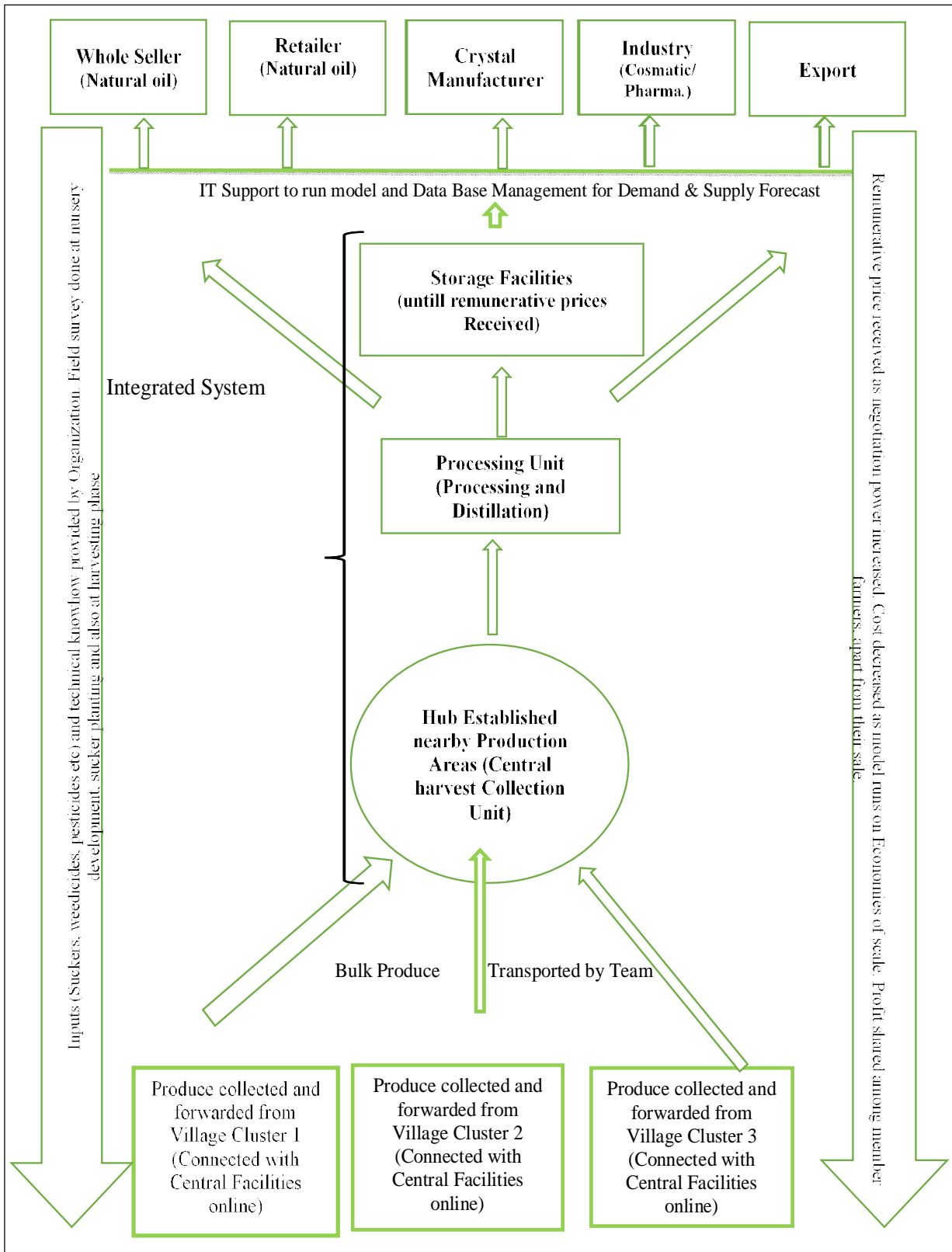


Fig 2: Hub and spoke based mint business model.

Table 2: Comparison between existing market channels and modern marketing channels under hub and spoked mint business model.

Particulars	Existing marketing channel II Rampur study, graph 6 (₹)	Modern marketing channels assumed figures (₹)
Gross price received by farmer (₹/kg)	1065.20	1224.98 (Price increased by minimum of 15% of existing channels)
Cost incurred by farmers (₹/kg)	782.03	391.00 (Cost reduced by app. 50% as Org. make inputs and others at farms)
Producers net price (₹/kg) (Item 1- Item 2)	283.17	833.98
Marketing cost incurred by Farmers (₹/kg)	162.00	Nil
Industry/company price (₹/kg)	1283.00	1283.00
Price Spread in different Format (₹/kg)	218.00	58.02
Total gross marketing margin (Rs. Per Kg) Item 2 + Item 4 + Item 6)	1162.00	449.02
Marketing Margin as %of industry price (Item 5 over Item 7)	1.10	2.85
Producer's share in indus. Rupee (% of producer net price to industry price); $P_s = (P_p/P_c) \times 100$	83.10	95.47
Marketing efficiency (Item 1 over Item 7) Shepherd's Formula	0.92	2.72

A study done in Moradabad on marketing channels of mint oil highlighted that huge number of middlemen are involved in supply chain. These middlemen played the malpractices and due to this, producers are deprived of fair prices (Singh *et al.*, 2008).

It was also observed that local trader malpractice in weighing as they use heavy weighted metal instead of iron weights. They don't have electronic weighing system. After processing, the producer / stakeholders keep the oil in large containers washed with detergent. This causes foam formation in the oil. Since foams/ bubbles are indicators of adulteration or presence of contaminant in oil. This foam formation leads into reduction in the price. This price reduction ranges from ₹ 50 to 150 at local markets while it goes to ₹ 10-20 only in big markets (Malik, 2022).

Padhy *et al.* (2024) highlighted in their study the importance of cluster approach, developing better drainage systems and advance supply of inputs and materials as a strategy for better management, supervision and monitoring. Cluster approaches become more useful through participatory decision-making processes.

Suggestions

- State government is required to upgrade the Mint (mentha) processing unit in the terms of technology and scale.
- Government may think about MSP to mint. This will cushion the interest of primary producer and enhance the decision-making ability of them.
- Community Processing Unit (CPU) should be established where oil would be extracted at minimum charges for marginal and small producers.
- Storage facilities nearby distillation units should be provided by state govt. This initiative will decrease transportation charges and increase the shelf life of oil. Also, quality would be controlled.
- Proper training regarding production and marketing should be conducted from time to time at village level.

- Extension activities may enhance producers' and stakeholders' awareness about govt. policies and projects. Program should be designed to provide opportunities for export market.
- Existing business model might be replaced by Proposed Hub and Spoke based model. This would increase per kg return and decrease number of costs. As there are no intermediaries between producer and buyer, price spread will also be reduced.
- User friendly mobile applications could be launched for effective mentha cultivation and efficient oil distillation makes farmers aware about the market status and assist the farmer to manage various complexities arises during oil distillation or selling the mentha oil.
- There can be a modern marketing system where farmers can come together in-group in order to enhance their bargaining power so that farmers can get better price for their product.
- Pricing of mentha is decided based on crude method instead of quality of mentha. So, there is need to set up a quality assessing laboratory so that prices can be decided based on quality.

CONCLUSION

In the present study, it was found that the existing supply chain is very weak having fragmented front and back ends. This gap results in high production and marketing cost and poor value addition. It was also found that mint growers lack information *viz.* fluctuations in market price, govt. announcement *etc.* Besides, buyers usually do the malpractices in price setting, bill settlement and weighing of produce. Thus, the system urgently needs to be improved in the terms of capacity building of distillation units, bridging the gap between growers and buyers with govt. interventions and demarcating the specific area nearby mint processing units for marketing and selling of mint oil and

derivatives. This will bring transparency, decrease price spread, lower production and marketing cost as well as lesser time would be required by growers to dispose of the produce at market. Further, a hub and spoke based mint business model is also suggested in order to eliminate intermediaries and approach the customer directly. This business model works in integrated way. A farmer federation should run this driven system. This business model provides dual opportunities to farmers to increase their income viz. they receive produce as well as entertain some profit made by organization.

Conflict of interest

The authors certify that they have NO affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

REFERENCES

- Awasthi, A. (2017). A Study on production and marketing of mentha in lakhimpur kheri district of Uttar Pradesh, Project Report, MABM, BHU.
- Chaturvedi, A., Kumar, S. and Pathak, A. (2022). Constraints analysis of mint plant (*Mentha spp.*) growers in central Avadh region (Barabanki) of Uttar Pradesh. *International Journal of Agricultural Sciences*. 18(1): 149-153.
- Choudhary, H. P., Badal, S. Singh, V., Osti, R., Shah, R. and Saryam, M. (2017). Marketing of menthol mint (mentha) in Uttar Pradesh, India. *International Journal of Pure and Applied Bioscience*. 5(6): 1323-1327. ISSN: 2320-7051.
- Gupta, G. and Gupta, P. (2020). Marketing channel of medicinal and aromatic plants (MAPS) in the great Himalaya National Park (GHNP), Kullu, Himachal Pradesh India. *Journal of Medicinal Plant Studies*. 8(5): 107-120. ISSN (E): 2320-3362.
- Humaira *et al.* (2021). Diversity and utilisation of medicinal flora of baba ghulam shah badshah university campus rajouri Jammu and Kashmir, India. *Indian Journal of Agricultural Research*. 55(1): 1-12. doi:10.18805/IJARE.A-5305, ISSN: 0367-8245.
- Hussain, M. and Singh, A. (2016). Impact of amended APMC act on apple business in Himachal Pradesh, India. *Indian Journal of Agricultural Research*. 51(1) 2017 : 38-43. doi: 10.18805/ijare.v51i1.7059. ISSN: 0367-8245.
- Innovius Research (2022). Retrieved from. <https://www.innoviusresearch.com/blog/market-report/synthetic-menthol-market-india/>.
- Kumar, S., Suresh, R., Singh, V. and Singh, A. K. (2011). Economic analysis of menthol mint cultivation in Uttar Pradesh: A case study of Barabanki district. *Agricultural Economics Research Review*. 24(2): 345-350.
- Malik, I. (2022). Technical Request. Retrieved from <https://youtu.be/XUP4LO0goQM?si=HEIor8aQcDRyyIB> accessed on 18.09.2023.
- MCX Market Watch. retrieved from www.mcxindia.com accessed on 18.09.2023.
- Padhy, C., Reddy, M., Devendra and Raj R.Kumar. (2024). Socio-psychological, technological and input based strategies to be adopted by cotton growers of odisha to manage risks and stresses in cotton cultivation. *India Journal of Agricultural Research*. 58(1): 175-179. doi: 10.18805/IJARE.A-6157. ISSN: 0367-8245.
- Report, (2021). Directorate of Horticulture, Bihar.
- Report, (2022). CSIR-CIMAP, Lucknow.
- Report, (2022). Multi Commodity Exchange of India.
- Report, (2023). DHO, Vikas Bhawan, Barabanki. Uttar Pradesh A compendium on Key Schemes for the Spices Exporters 2023, Spice Board of India.
- Sangita, K.M. (2018). Economics of production and marketing of mentha in udham singh nagar district of Uttarakhand, M.Sc. thesis, Agricultural Economics, GBPUAT.
- Sharma, R.S. *et al.* (2019). Performance evaluation of newly developed variety of menthol mint at farmer's field- A case study of mint cultivation in Central Uttar Pradesh. *Agriculture Science Digest*. 39(1): 67-69. doi: 10.18805/ag.D-4842. ISSN: 0253-150X.
- Shubhendru, V. (2014). Profitability of mentha oil futures for Farmers. *international Journal of Management, MIT College of Management*. 2: 44-48. ISSN 2321-6700.
- Singh, P.M. (2013). Economic viability and export potential of mentha value added products in barabanki district of Uttar Pradesh, Project Report, MBA Agribusiness Management, Acharya N. G. Ranga Agricultural University, Hyderabad.
- Singh, S.R; Sharma, P. and Gummagolmath, K.C. (2008). Channels of Marketing of Mint in Moradabad district of Uttar Pradesh, National Seminar on Emerging Challenges in Harvesting Plant Biodiversity, C.S. Azad University of Ag. and Tech, Kanpur held on 28.10.2008.
- Verma, K.L., Singh, Nigam, P., Rashmi and Singh, J, (2019). Cost and return analysis of Mentha Oil Production in Sitapur district of Uttar Pradesh. *International Archive of Applied Sciences and Technology*. 10(3): 55-58. ISSN: 2277-1565.