Research Article

Assessment of Ecophysiological Barriers and Production Challenges of *Senecio vulgaris* in Temperate Zones of Poonch, AJK

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ABSTRACT

This study examined the socioeconomic and ecophysiological factors influencing *Senecio vulgaris* distribution and cultivation in the temperate regions of Poonch, Azad Jammu and Kashmir. Using a multistage sampling technique, data was gathered from 120 randomly chosen farmers in three agricultural zones using a structured interview schedule. IBM SPSS Statistics 20 was used to analyze the data using mean scores, percentages, and frequencies. According to the results, 64.2% of the respondents were primarily farmers, and 71.6% of the respondents were men. Just 7.3% had contact with extension agents, 37.4% harvested ≤2 bunches in the previous season, and the majority (59.3%) reported having trouble finding S. vulgaris. 35% only harvested once every four months, indicating a low harvest frequency. Due to a lack of institutional support, the majority of respondents (79.7%) relied on family members for crop information. Poor planting material availability (24.4%), low nutritional awareness (19.5%), and low yield (18.7%) were the main production constraints. The most practical approach for year-round production was determined to be irrigation (35%). The results emphasize S. vulgaris' endangered status and the necessity of domestication, better seed availability, and concerted efforts by farmers, extension agents, and academic institutions to promote sustainable cultivation and use.

Keywords: Constraints to production, *Senecio vulgaris*, Asteraceae, under-utilized, neglected, leafy vegetable.

INTRODUCTION

Protein-energy malnutrition has posed a significant global challenge for many nations over the past few decades. However, the most pressing nutritional issue confronting both the affluent and the economically disadvantaged is now micronutrient malnutrition. According to Singh et al. (2016) and Khatibzadeh et al. (2016), over half of the world's population lacks adequate levels of zinc and iron, highlighting a significant public health issue. This deficiency is mostly common in developing countries, where a large number of people eat unbalanced diets and haven't access to rationally priced food items that contain essential vitamins and minerals.

Several chronic diseases including diabetes, obesity, cardiovascular diseases, and respiratory disorders, have been connected with poor and unbalanced nutritional diet (Ayeni and Oyeyemi, 2021). Although the health and nutritional values of these neglected fruits and green leafy vegetables are documented they have a vital role to improve food and nutrition composition to discourse micro and macronutrient deficiencies. Similarly the potential of these underutilized and neglected plant species is already being reported for their food and therapeutic use (Baiyeri et al., 2018). According to Kumar et al. (2020) In temperate regions of Azad Jammu and Kashmir several neglected and underutilized leafy plant species and edible wild vegetables can be found even without the involvement of human efforts especially crop management and domestication. However, due to drastic climatic changes and extensive deforestation in these temperate regions, several wild plant species are in danger of going extinct (Kumar et al., 2020).

Senecio vulgaris considered as an important but underutilized and neglected green leafy vegetable

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particularly found in temperate forests and in high concentrations in fallow areas of AJK especially in division Poonch and considered as a choice for the elderly people of this region. The importance and health benefits of *S. vulgaris*, locally known as "Asteraceae" or "Hannd" are frequently ignored in young generations but was used mostly in soups as green vegetable in Poonch (Rawalakot) (Bussmann et al., 2025; Ebadi and Eftekharian, 2021). In AJK *S. vulgaris* is well-known due to its historical usage as a beneficial wild leafy vegetable by the elderly for its therapeutic properties. *S. vulgaris* still considered as underutilized and neglected plant species even reported as highly nutritive due to its poor domestication and unawareness (Rasool et al., 2022). However, there is a lack of literature on the domestication, crop management, nutritional potential, health benefits, and awareness of *S. vulgaris*. The current study was designed to evaluate the limitations in its production and usage. Evaluating socioeconomic and ecophysiological factors, including sociodemographic characteristics, production techniques, extension campaigns, information sources, and sustainable farming practices adopted by farmers, was the main objective of this study. The study specifically designed to evaluate the socioeconomic characteristics of participants, the role extension agents play in vegetable production, and the revenue generated by vegetable sales to farmers in temperate regions of AJK.

MATERIALS AND METHODS

Study Area and Sampling

The study was carried out in Rawalakot, Poonch Division AJK. District Poonch is one of the major *Senecio vulgaris* (Asteraceae) producing areas in Azad Jammu and Kashmir. The multistage sampling technique was employed for the study in selecting respondents. The population used for the study comprised of *Senecio vulgaris* farmers in the study area. The multistage sampling technique was employed for the study in selecting respondents. In the first stage the three Agricultural Zones (Zones 1, 2 and 3) in the State were selected. In the second stage, two blocks were randomly selected in each of the agricultural zones. In the third stage, two circles were randomly selected in each of the blocks. In the fourth stage ten *Senecio vulgaris* farmers were selected using simple random sampling technique. In all, that gave a total of 120 *Senecio vulgaris* farmers used for the study.

Table 1 Sampling frame indicating zones.

S/N	Agricultural Zone	Block	Circles	Number of Respondent
1.	Zone 1	Singola	Singola and Kharick	20
		Khaigala	Khaigala, Chak and Rawalakot	20
2.	Zone 2	Thorar	Thorar and paniola	20
		Mang	Mang and Chotagala	20
3.	Zone 3	Hajira	Hajira and Tanda gameer	20
		Titrinot	Titrinot and Abbaspur	20

Measurement of variables

The socio-economic characteristics of the respondents were measured as follows:

Sex

The respondents were asked to indicate whether they were male or female.

Age

The respondents were asked to indicate their ages in years.

Marital status

The marital status was ascertained by asking them to tick whether they were ‘single’, ‘married’ ‘separated’ or ‘widowed’.

Education levels

Respondents were asked to indicate their level of education by ticking any of the following: ‘no formal education’ ‘primary education’, ‘post primary education’, etc as it affects them.

Family size

The family size of the respondents was known by asking the respondents to indicate the actual numbers of their households.

Major occupation

The major occupation of the respondents was ascertained by asking the respondents to indicate whether they were into ‘farming’ ‘trading’, ‘civil/public service’, and ‘artisan’ etc.

Extension visit

The respondents were asked to indicate if they had contact with extension agents by ticking either ‘yes’ or ‘no’. If yes, they were asked to indicate the number of extension visits in a year.

For the production characteristics of *Senecio vulgaris*, the respondents were asked to indicate how difficult it was to find the crop by either ticking ‘yes’ of ‘no’. On the frequency of harvest from source, the respondents

were asked to indicate how often they harvested *Senecio vulgaris* using the following options of 'twice a week', 'weekly', 'once in two weeks', and 'once every four months'. The respondents were equally asked to indicate the total quantity (bunches) of *Senecio vulgaris* harvested in the last farming season. This was later categorized into ≤2 bunches, 3-5 bunches and >5 bunches.

On the sources of information on *Senecio vulgaris*, the respondents were asked to indicate from a list provided the sources of information used. They were equally asked to indicate other sources they use in sourcing information that were not on the list. The constraints to cultivation and utilization of *Senecio vulgaris* were equally ascertained by asking the respondents to indicate the constraints encountered. Similarly, the strategies for large scale production and utilization of *Senecio vulgaris* were equally ascertained by asking the respondents to indicate the perceived strategies.

Data analysis

Data were collected from Senecio vulgaris farmers using the structured interview schedule. The interview schedule administered to the *Senecio vulgaris* farmers had relevant questions based on the objectives of the investigation. Data collected were analyzed using frequency, percentage and mean scores. IBM SPSS Statistics 20 was used for the data analysis.

RESULTS AND DISCUSSION

Socio-economic characteristics of the respondents

Sex

Table 2 showed the majority (71.6%) of the respondents were males while 28.5% were females. This implies a male dominated workforce as farming activity is basically a tedious work that demands a lot energy that are associated with men.

Age

Greater proportion (35.0%) was above 60 years of age while 24.4% were between 51-60 years. Also, 17.1% was between 31-40 years while 14.6% and 8.9% were between 41-50 years and less than or equal to 30 years, respectively. This implies that most of the respondents were a little bit advanced in age and this could be because *Senecio vulgaris* perhaps were mostly known by older farmers than the younger farmers.

Marital status

The majority (74.0%) of the respondents were married (Table 2) while 13.0% and 12.2 % were separated and single respectively. This implies that greater percentage of the farmers were married and are likely to produce and consume *Senecio vulgaris* more probably because of nutritional and medicinal attributes peculiar to the crop.

Educational level

Table 2 showed a greater proportion (30.1%) of the respondents had secondary education while 25.2%, 22.8% and 22.0% had primary education, no formal education and post-secondary education respectively. This shows a high level of formal education among the respondents in the study area and this could have a positive influence in farmers accessing information on *Senecio vulgaris*. Adebayo et al. (2025) asserted that literacy and acquisition of formal education could enhance farmers' level of understanding and desirability of adopting new farm technologies or relating in a good way with the extension agents.

Family size

The majority (38.0%) of the respondents had a family size of between 4-6 persons while 20.3% did not specify their family size. However, 16.3%, 14.6% and 10.6% had 7-9 persons, 1-3 persons and 10 and above persons, respectively. The mean family size was 2 persons. This indicates a low family size which could deprive family labour for Senecio vulgaris production, if they grow this on their fields. Omobowale et al. (2021) revealed that large household size could contribute to labour availability in crop production.

Major occupation

The majority (64.2%) of the respondents were farmers while 14.6%, 13.8% and 10.6% were artisans, traders and students, respectively. The result indicated a possible high level of experience among the respondents which could likely increase their production capacity of *Senecio vulgaris* (Riah et al., 2025).

Table 2. Socio-economic characteristics of the respondents.

Socio economic characteristics	Frequency	Percentage	Mean
Sex			
Male	88	71.6	
Female	35	28.5	
Age (years)			
≤30	11	8.9	
31-40	21	17.1	
41-50	18	14.6	

51-60	30	24.4	
>60	43	35.0	
Marital status			
Single	15	12.2	
Married	91	74.0	
Divorced	3	0.8	
Separated	16	13.0	
Educational status			
No formal education	28	22.8	
Primary education	31	25.2	
Secondary education	37	30.1	
Post secondary education	27	22.0	
Family size			
Not specified	25	20.3	
1-3	18	14.6	
4-6	47	38.2	
7-9	20	16.3	2 Persons
10 and above	13	10.6	
Major occupation			
Farming	79	64.2	
Civil service	8	6.5	
Artisan	18	14.6	
Trading	20	13.8	
Student	13	10.6	
Extension contact	9	7.3	
No of extension contact in the last farming season			
Once	1	11.1	0.4
Two time	0	0	
Three times	0	0	

Production characteristics of *Senecio vulgaris*

The majority (59.0%) of the respondents (Table 3) indicated that *Senecio vulgaris* was difficult to find. This could be because the crop is an endangered species and little or no efforts have been made for its domestication and inclusion into the traditional cropping systems, the nutritional and medicinal values notwithstanding (Abbott, 2023).

Frequency of harvest from source

A greater proportion (35.0%) indicated they harvest the crop once every four months (Table 3) while 22.8%, 20.3% and 12.2% indicated they harvest the crop once in whole year respectively. This could be because of subsistence nature of production of the crop, poor yield, lack of awareness and poor domestication and production practices (Ndihokubwayo et al., 2016).

Total quantity harvested in the last farming season (bunches)

The information in Table 3 illustrates a number of production issues that farmers growing *Senecio vulgaris* in Poonch, AJK's temperate zones face. The claim that *S. vulgaris* is an endangered species in the region is supported by the fact that a sizable majority of respondents (59.3%) said

they had trouble finding the crop. This is consistent with Abbott (2023) observation that habitat-specific declines are occurring in the species as a result of the dominance of ruderal environments and the lack of domestication efforts. Its current dependence on natural stands as opposed to farmed plots indicates that it has not been well incorporated into conventional farming systems, which restricts its availability and frequency of harvest.

Greater proportion (37.4%) of the respondents indicated they harvested less than or equal to two bunches of *Senecio vulgaris* in the last farming season while 6.5% and 4.0% indicated they harvested more than 5 and 3-5 bunches respectively. This indicates a poor yield and could stem from poor domestication and poor production practices (Pang et al., 2023).

The lack of organized cultivation and the subsistence-level character of production are further reflected in the low harvest frequency, with 35% of respondents reporting only harvesting once every four months. Lack of seed availability, ignorance of appropriate agronomic techniques, and environmental constraints like erratic rainfall or inadequate irrigation infrastructure are the causes of this low frequency (Ndihokubwayo et al., 2016). Similar to this, (Leiss and Müller-Schärer, 2001b) reported that environmental factors have a major impact on *S. vulgaris* performance, particularly when the plant is grown outside of its ruderal niche or without crop management inputs.

Table 3. Production characteristics of *Senecio vulgaris.*

Production characteristics of *Senecio vulgaris*	Frequency	Percentage
Difficulty in finding *Senecio vulgaris*		
Yes	73	59.3
Frequency of harvest from source		
Once in year	28	22.8
Once every four months	43	35.0
Total quantity harvested in the last farming season (bunches)		
≤2	46	37.4
3-5	5	4.0
>5	8	6.5

Furthermore, 37.4% of farmers report harvesting ≤2 bunches per season, which is concerning given the yield data. The high percentage of people who rely on family members for information (79.7%) suggests that poor agronomic practices, such as inadequate spacing, delayed planting, or lack of fertilization, may be the direct cause of this low productivity. These practices are frequently influenced by non-scientific, oral knowledge systems. The low yields found in this study are supported by Baumann et al. (2001), who claim that plant competition and inadequate light and nutrient optimization in unmanaged systems can significantly lower *S. vulgaris*'s biomass and reproductive potential.

Sources of information on *Senecio vulgaris* (Asteraceae)

Figure 1 indicates that the majority (79.7%) of the of the respondents sourced information on *Senecio vulgaris* from family members while 21.1% sourced from other farmers. Similarly, 3.3% each of the respondents indicated extension agents and internet as sources of information on *Senecio vulgaris* production respectively. The respondents' reliance on family members and other farmers as sources of information on *Senecio vulgaris* could be because these information sources could be faster, affordable, available and accessible and are disseminated orally in the local languages the farmers could easily understand. Also, these sources of information though non-institutional, could be relied on based on perceived farming experience and their relationship with the respondents. However, reliance on these information sources could lead to error in the sustainable production and utilization of *Senecio vulgaris* because such information might not be scientific and research-based. This could result to poor

yield and low productivity that could lead unsustainable production and utilization of *Senecio vulgaris*. On the contrary, the poor extension support to the respondents on *Senecio vulgaris* indicates that farmers lack scientific-based information on *Senecio vulgaris*. As a formal institution, the role of extension agents in supporting farmers at subsistent level in making informed decision necessary for household food security is paramount (Cheng and Xu, 2015). When these supports are lacking, farmers can quickly depend on available non-institutional sources as alternatives. It can equally results to farmer sticking to their subsistence and traditional methods of production and utilization of *Senecio vulgaris* which has perhaps low potentials for high yield and improved nutrition and standard of living (Leiss and Müller-Schärer, 2001b).

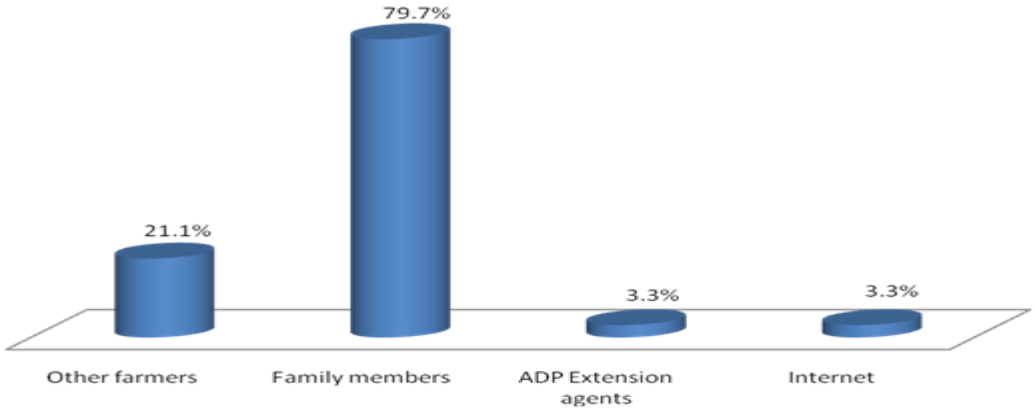

Figure 1. Sources of information on *Senecio vulgaris* (Asteraceae).

Constraints to cultivation and utilization of Senecio vulgaris (Asteraceae)

Table 4 shows that the majority (24.5%) of the respondents indicated that poor availability of planting materials were the major constraint to production and utilization of *Senecio vulgaris*. Similarly, low awareness on nutritional values (19.5%), low yield (18.7%) and lack of finance (15.4%) were also indicated by the farmers as other constraints to *Senecio vulgaris* cultivation and utilization. Sustainability of any crop production is a function of seed availability. When seeds are readily available, farmers are likely to produce *Senecio vulgaris* provided the nutritional and economic values are known and the finance needed for the production of the crops are available. The crop can also be cultivated and utilized if the farmers are motivated through high yield of the crop. In developing countries however, one the major challenges to agricultural productivity is poor availability of improved variety of seeds among others (Baumann et al., 2001; Lutman et al., 2008).

Table 4. Constraints to the cultivation and utilization of *Senecio vulgaris* (Asteraceae).

Constraints	Frequency	Percentage
Poor availability of planting materials	30	24.4
Low awareness on nutritional values	24	19.5
Low yield	23	18.7
Lack of finance	19	15.4
High cost of labour	12	9.8
Aging of farmers	12	9.8
Post-harvest diseases	5	4.1
Low market demand	3	2.4

Perceived strategies for large scale production and utilization of *Senecio vulgaris* (Asteraceae)

A greater proportion (35.0%) of the respondents indicated that the major perceived strategy for large scale production and utilization of Senecio vulgaris was rainfall and humidity. Also, 9.8%, 6.5% and 5.7% indicated that planting continuously, shading and swamp planting were other perceived strategies for large scale production of *Senecio vulgaris*. Similarly, appropriate good cultivation (4.9%), intercropping (4.9%), staking (4.1%), and fertilizer application (4.1%) among others (Table 5) were other perceived

strategies as indicated by the respondents for large scale production and utilization of *Senecio vulgaris.* Due to non-availability of the seeds (as a major constraint in Table 4), irrigation could be a good strategy for enhancing a sustainable large scale production of *Senecio vulgaris* and this could ensure continuous production and all-year-round production. Alternatively, swamp production will make water readily available, hence the cost of irrigation and labour could be cut down. Good cultivation that could include fertilizer application, not uprooting while harvesting, intercropping and staking are possible strategies that could lead to large scale production of *Senecio vulgaris.* All things being equal, proper agronomic practices could lead to good yield, profit, proper nutrition and improved standard of living of the farmers (Leiss and Müller-Schärer, 2001a; Söchting and von Redwitz, 2025).

Table 5. Perceived strategies for large scale production and utilization of *Senecio vulgaris* (Asteraceae).

Perceived strategies for large scale production and utilization of *Senecio biafre*(Asteraceae)	Frequency	Percentage (%)
Planting continuously	12	9.8
Shading	7	5.7
Irrigation	43	35.0
Stem or seed propagation	4	3.3
Staking	5	4.1
Appropriate/good cultivation	6	4.9
No uprooting while harvesting	3	2.4
Intercropping	6	4.9
Swamp planting	8	6.5
Fertilizer application	5	4.1
Financial aid	4	3.3

The respondents' strong preference for irrigation (35.0%) as the main tactic for increasing *Senecio vulgaris* production on a large scale is among the study's most notable findings. The crop's ecophysiological sensitivity to moisture availability is the basis for this preference. Growing close to streams, shady moist spots, or fallow lands, *S. vulgaris* prefers humid, temperate climates with steady water supplies (Bussmann et al., 2025; Cheng and Xu, 2015). The harvest frequency data confirms that the crop's availability is highly seasonal and irregular due to its reliance on rainfall and natural moisture, with 35% of farmers harvesting only once every four months.

Farmers recognize irrigation as a dependable way to get around these restrictions and ensure production throughout the year, even during dry periods. Swamp planting (6.5%) and shade plantation (5.7%) were also revealed, highlighting the importance of moisture preservation for successful farming. In similar climates, *S. vulgaris* yield and sustainability can be significantly increased by even simple moisture management techniques like swamp farming or shading., as reported by Söchting and von Redwitz (2025).

CONCLUSION

S. vulgaris is a neglected and endangered crop with limited supply because of inadequate domestication, a lack of knowledge, and a lack of research-based guidance. The farmer's reliance on unapproved information sources is the cause of its low productivity. Strengthening extension services and promoting irrigation-based home garden farming can ensure its sustainable, year-round production.

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