A Scale to Measure the Level of Management Orientation of the Members of Farmer Producer Company with Reference to Potato Production in Assam

Original Research Article

ABSTRACT

In the absence of a suitable scale to measure the management orientation of potato growers in relation to potato planning, potato production and potato marketing in Assam, there was a need to construct a management orientation scale. Therefore, effort was made to construct a scale to measure the level of management orientation of the members of the Farmer Producer Company with reference to potato production in Assam.A scale was developed with Likert's summated rating technique. A list of 90 statements resulted after edition of 110 statements as per the fourteen criteriasuggested byThurstone and Chave. Statementswere sent to 80 extension specialist working in various field of Assam Agricultural University for the critical evaluation of statements on a 3 point continuum.Based on the responses received from 60 out of 80 judges, the relevancy percentage (RP), Relevancy Weightage (RW) and Mean Relevancy Scores (MRS) were estimated. 74 items with RP > 60, RW > 0.60 and overall MRS > 2.0 were considered for item analysis. These items were administrated to 40 farmers for item analysis and items with 't' value equal or greater than 1.75 were selected and those with 't' value below 1.75 were rejected. Out of 74 statements, 30 statements were retained on the final scale through t-test item analysis. Thus, the instrument developed to measure the level of management orientation of the members of farmer producer company with reference to potato production in Assam consists of 20 positive and 10 negative statements.The dependability coefficient was determined using Rulon's formula and it was 0.8994. As a result, the developed scale was proven to be highly reliable.The scale developed to measure the level of management orientation of the members of Farmer Producer Company with reference to potato production in Assam is found to be reliable and can be utilized by researchers in similar studies.This scale will be very advantageous and convenient for researchers to examine the management orientation of potato growers in relation to potato planning, potato production and potato marketing.

Keywords:Farmers Producer Company; Management Orientation; Members; Potato Growers, Potato Production, Scale

1. INTRODUCTION

The current state of horticultural crops in India is quite promising. The horticulture sector now accounts for 33 percentof the overall agricultural output.Potato (*Solanumtuberosum* L.) popularlyknown as 'the king of vegetables',is one of the major food crops produced in the world (Nyunza and Mwakaje 2012).Many people believe that there is money in potato production, and it

is getting a boost to enter world market, thus globalizing agriculture or horticulture. The potato crop possesses the capacity to play a substantial role in facilitating food accessibility within households as well as generating income for small-scale farmers. Consequently, it contributes to the economic sustainability of agricultural systems in developing nations.(Thompson and Scoones, 2009).India has taken a giant leap in terms of potato area and production since independence. FAO figures indicate that the total area harvested globally in 2021 was 18,132,694 hectares – a world average of about 21 tonnes per hectare. (FAOSTAT, 2023). In Assam potato is cultivated in an area of 103.44 thousand hectares during 2021-22 with a production of 761.80 thousand tonnes and productivity 7,365 Kg/hectare (Ag. Stat. at a glance 2022).Assam is the state with the most potato area and output in the country, and it is also the state with the most potato acreage among the northeastern states.

Farmers face a wide range of obstacles, including limited access to advanced technology, inadequate storage facilities, suboptimal post-harvest management practices, insufficient transportation infrastructure, and challenges related to marketing their agricultural products. Farmers' Producer Companies (FPCs) play a crucial role in assisting farmers in overcoming these problems, aided by governmental support and collaboration with allied organizations. Government support will play a crucial role in fostering sustainable development within the agriculture industry.In order to support the adoption of technology, boost productivity, enable better access to inputs and services, and raise farmer income of particularly small farmers, are encouraged to organize into Farmers' Promotion Companies (FPCs) at different levels throughout the states.The Department of Agriculture and Horticulture and the Assam Small Farmers' Agri Business Consortium (ASFAC), promoted by the Government of Assam, have resulted in the formation of 19 farmer producer companies.Outof these nineteen FPCs, only two FPCs are involved in commercial potato production are selected. These two FPCs are the Satbhani Potato Producer Company Limited in the Biswanath district and the Sankar Azan Agro Producer Company Limited in the Nagaon district.This study focuses on the Farmer Producer Companies (FPCs) in the state of Assam that are especially involved in the commercial production and marketing of potatoes. It was felt that an analysis of management orientation of farmer members of FPCsshall facilitate to enhance the yield of potato in Assam in order to meet the rising demand.

"Management" has been described as the process by which a farmer can increase the farm's income over time so that the family can reach its goals.To consistently generate high returns from a production system, effective management is essential. To make more money from commercial potato farming, you need to be careful and have good management skills. It's not worth it for farmers to grow potatoes unless they can make enough money to cover their costs. Because of this, the level of management orientation is also an important part of any study about commercial potato crop production.In this back drop, developing and standardizing a scale to measurethe level of management orientation of the members of Farmer Producer Company with reference to potato production in Assam was carried out.

2. MATERIALS AND METHODS

The measuring instrument was developed using the Summated Ratings method

pioneered by Likert (1932). The ensuing sections provide a comprehensive account of the procedures undertaken, detailing the process followed in standardizing the scale for measuring the level of management orientation of the members of Farmer Producer Company with reference to potato production in Assam. A standard procedure followed as suggested byPrabhu (2006), Dehengeet. al., (2018), Vijay et.al., (2018),Harikrishnaet. al., (2021), Sharma(2023), Rathodet. al., (2023), Singh et. al., (2023), Praneethet. al., (2024).

3. RESULTS AND DISCUSSION:

3.1 Item collection

As the first step in developing perception scale, a large number of statements related to management orientation of potato production in Assamwere gathered from Package of Practices of potato crop recommended by AAU, several literature, books, bulletins, articles, journalsand through in-depth discussions with experts in the fields of agronomy, agricultural extension, and progressive farmers.As a result, under the planning, production, and marketing components, a set of 110 statements was produced to demonstrate how potato growers approach management orientation.

3.2 Editing of statements

The statements were then carefully looked at in light of the fourteen criteriasuggested byThurstone and Chave in (1929). From the 110 statements, only the 90 that fulfilled the criteria were chosen. These statements were framed in such a way that they could express thebothpositive or negative practices of management orientation of potato production.

3.3Relevancy of statements by experts

An investigation was subsequently conducted once these statements were confirmed and experts in the relevant subject matter, drawn from Assam Agricultural University, Extension Education Institutes (EEI Guwahati), and extension education specialists. They were requested to add or delete any statement which they deemed fit for the conclusion or deletion.In order to accomplish this goal, the statements were given to a panel of judges of 80 persons, and they were asked to determine the suitability (relevancy) of each statement for inclusion in the scale.The responses were evaluated on a three-point continuum, marked as "most relevant," "relevant," and "least relevant," with scores of 3, 2, and 1 for positive statements, respectively, and 1, 2, and 3 for negative statements, respectively.Out of 80 judges only 60 experts had returned the same set of statements after duly recording their judgments and were considered for the analysis.

3.4 Relevancy Test

Using the formulas provided by Edward(1969), relevancy percentage, relevancy weightage, and mean relevancy score were calculated for each of the 90 items individually based on the information gathered.

3.5 Relevancy Percentage (RP)

The percentage of relevance was found by adding the scores of those who said "most relevant," "relevant," and "least relevant," and then turning those numbers into a percentage.

$$\text{Relevancy Percentage} = \frac{[(MR\ X\ 3)+(R\ X\ 2)+(LR\ X\ 1)]}{180\ (Number\ of\ Judges\ 60\ X\ 3)} X\ 100 \text{----------Equation -1}$$

Where, MR= Most relevant, R = Relevant and LR = Least relevant

3.6 Relevancy weightage

The following standard formula was used to find out the relevance weightage (RW).

$$\text{Relevancy weightage} = \frac{(MR\ X\ 3)+(R\ X\ 2)+(LR\ X\ 1)}{180\ (Number\ of\ Judges\ 60\ X\ 3)} \text{----------Equation -2}$$

Where, MR= Most relevant, R = Relevant and LR = Least relevant

3.7 Mean relevancy score

The mean relevance score (MRS) was calculated by using this formula.

$$\text{Mean Relevancy Score} = \frac{(MR\ X\ 3)+(R\ X\ 2)+(LR\ X\ 1)}{(Number\ of\ Judges\ i.e.\ 60)} \text{----------Equation -3}$$

Where, MR= Most relevant, R = Relevant and LR = Least relevant

Table :1. Statements given by the extension specialists with relevancy percentage, relevancy weightage and mean relevancy score

Sl. No.	Statements	Relevancy Ratings		
		RP	RW	MRS
A.	**Planning orientation**			
1.	Consultation with scientists/specialists helps in better planning for potato production.	95.55	0.95	2.86*
2.	It is unnecessary to consider the availability of infrastructure facilities while planning for potato production.	76.11	0.76	2.28*
3.	Frequent visit to agricultural research station/KrishiVigyan Kendra is helpful in planning for potato production.	77.22	0.77	2.31*
4.	One should plan and maintain appropriate farm records for potato production.	86.66	0.86	2.60*
5.	Each year one should think afresh about the variety of potato crop to be cultivated keeping in view its characteristics.	54.44	0.54	1.63
6.	It is inappropriate to prepare the annual budget for potato production.	81.11	0.81	2.43*
7.	It is not necessary to make prior decision about the variety of potato crop to be cultivated.	80.55	0.86	2.60*
8.	One should prepare a plan for proper utilization of funds in production of potato.	87.22	0.87	2.61*
9.	It is necessary to think ahead about the management of commercial potato	90.00	0.90	2.70*

	production.			
10.	The amount of seed/tubers, fertilizers and plants protection chemicals needed for raising potato crop should be assessed before cultivation.	88.33	0.88	2.65*
11.	It is necessary to work out in advance the quantity of inputs required for potato production.	90.00	0.90	2.70*
12.	One needs not to bother about the risk in potato production.	54.44	0.54	1.63
13.	Potato production is possible without having the formal training on scientific potato production technologies.	50.00	0.50	1.53
14.	Possession of knowledge about recommended scientific cultivation practices is not necessary for production of potato.	55.00	0.55	1.65
15.	It is necessary to think ahead of the cost involved in raising potato crop.	82.77	0.82	2.48*
16.	One should have knowledge about scientific potato production technologies to be adopted during aberrant weather conditions.	90.55	0.90	2.71*
17.	One need not to consult the agricultural experts while planning for potato cultivation.	50.55	0.50	1.51
18.	One need not consult an agricultural expert for planning potato production.	47.77	0.47	1.43
19.	One should have knowledge of Government Schemes implemented to promote scientific potato production.	73.33	0.73	2.20*
20.	One should think of measures to increase quantity rather than quality of potato tubers.	56.66	0.56	1.70
21.	It is unnecessary to prepare calendar of operations for better management of potato crop.	76.66	0.76	2.30*
22.	One should prepare for availing the benefit of Crop Insurance Scheme to cope up with crop failure due to natural disasters.	85.55	0.85	2.56*
23.	One should analyses the reasons for varying financial outcomes in the past and plan remedial measures.	65.00	0.65	1.95
24.	One should work out in advance the requirement of human labour for potato production.	83.33	0.83	2.50*
25.	One need not think of using Indigenous Technical Knowledge (ITK) for management of potato crop.	53.77	0.52	1.58
26.	One should think of innovative ideas to earn more money from the potato cultivation.	81.66	0.81	2.45*
27.	One need not identify the different sources of availability of credit for potato cultivation.	51.11	0.51	1.53
28.	It is necessary to think ahead about financial requirements for potato production.	84.44	0.84	2.53*
29.	Working out water requirement for potato production is very essential.	77.77	0.77	2.33*
30.	One should use various sources for collecting market information regarding potato.	84.44	0.84	2.53*
31.	It is unnecessary to consider the available resources and facilities with the grower before undertaking potato cultivation.	68.88	0.68	2.06*
32.	It is necessary to understand the consumer's preference before potato production.	76.66	0.76	2.30*
33.	One should collect the information about institutions/ agencies/ companies/persons engaged in marketing of potato.	81.11	0.81	2.43*
34.	It is necessary to select institutions/ agencies/ companies/persons giving maximum profit through selling of potato.	84.44	0.84	2.52*
35.	One should decide in advance the marketing channels that will give maximum profit.	83.88	0.83	2.51*

36.	It is possible to increase the potato yield through farm production plan.	81.11	0.81	2.43*
B.	**Production orientation**			
37.	Timely planting of potato crop ensures good yield.	96.66	0.96	2.90*
38.	Growing of short duration and disease tolerant varieties of potato gives more production.	90.55	0.90	2.71*
39.	The ideal size of potato tuber for planting should be about 2.5 cm in diameter and 25-40 g in weight.	81.66	0.81	2.45*
40.	Seed rate in potato cultivation should be given as recommended by the concerned specialist.	89.44	0.89	2.68*
41.	One should adopt preventive measures for nutrient deficiency, insect pest infestation and disease attack.	91.11	0.91	2.73*
42.	Seed/tuber treatment in potato cultivation should be done as recommended by the concerned specialist.	93.33	0.93	2.80*
43.	Adoption of furrow method of irrigation in potato cultivation helps in higher production.	83.33	0.83	2.50*
44.	Application of three irrigations at stolon formation, tuber formation and tuber development stages increases potato production.	84.44	0.84	2.53*
45.	While irrigating potato crop, care should be taken not to submerge the ridges completely.	90.00	0.90	2.70*
46.	Earthing up in potato crop should be done just before first and second irrigation.	91.66	0.91	2.75*
47.	One should use as much fertilizer as he likes in potato cultivation.	48.88	0.48	1.46
48.	Entire quantity of recommended fertilizers should be applied in furrows as basal application.	88.88	0.88	2.66*
49.	Fertilizers applied in furrows should be covered with a thin layer of soil to avoid direct contact of potato tubers with fertilizers.	82.77	0.82	2.48*
50.	Determining fertilizer dose by soil testing saves money.	82.22	0.82	2.46*
51.	Timely application of the inputs reduces higher production of potato.	78.88	0.78	2.36*
52.	Skin of the potato tubers may turn green due to exposure to sunlight making them unsuitable for consumption.	83.33	0.83	2.50*
53.	Growth regulators should be used in potato crop as recommended by the Scientists.	76.11	0.76	2.28*
54.	Integrated Nutrient Management in potato cultivation reduces yield.	68.33	0.68	2.05*
55.	Organically produced potato gets more price in the market.	68.88	0.68	2.06*
56.	Intercultural operations in potato cultivation reduce weed infestation.	84.44	0.84	2.53*
57.	Adoption of mulching under rain fed situation increases tuber yield.	85.00	0.85	2.55*
58.	Recommended chemical pesticides should be applied in the soil at the time of first earthing up to control red ants and other soil insects in potato cultivation.	82.77	0.82	2.48*
59.	Application of mustard oil cake at the time of earthing up reduces red ant and white ant infestation in potato cultivation.	82.77	0.82	2.48*
60.	Use of improved machinery saves expenditure on labourers.	84.44	0.84	2.53*
61.	Proper care of potato at stolon and tuber formation stage gives more yield.	87.22	0.87	2.61*
62.	Weeding in potato cultivation helps to reduce insect-pest infestation.	82.22	0.82	2.46*
63.	Soil testing is wastage of money on fertilizer consumption.	82.77	0.82	2.48*
64.	Application of well decomposed FYM in furrows before planting helps in higher tuber production.	84.44	0.84	2.53*
65.	Use of IPM technology reduces inputs cost.	53.77	0.52	1.58
66.	One should cultivate the varieties as decided.	53.88	0.53	1.61

67.	Seeking advice from extension personnel helps in solving field problems in potato cultivation.	83.33	0.83	2.50*
68.	Spraying of recommended chemical pesticides should be done at proper interval to control late blight disease in potato crop.	90.00	0.90	2.70*
69.	Depending upon weather condition particularly on cloudy weather, recommended chemical pesticides should be sprayed as prophylactic measure against late blight disease in potato crop.	87.77	0.87	2.63*
C	**Marketing orientation**			
70.	One can get good price by grading of potato tubers.	91.66	0.91	2.75*
71.	Collecting the required information about markets e.g. demand, quality, rate etc. helps in better marketing of potato.	95.55	0.95	2.86*
72.	It is unnecessary to contact with various marketing agencies for seeking market update information	76.66	0.76	2.30*
73.	Harvesting of potato tubers at proper time deteriorates the quality.	82.22	0.82	2.46*
74.	One should not select damaged potato tubers for marketing.	83.88	0.83	2.51*
75.	Co-operatives/ Farmer Producer Companies can help the potato growers to get better price for produce.	85.55	0.85	2.56*
76.	Market news is not useful to a potato grower.	48.88	0.48	1.46
77.	One should sell his produce by collecting information on various market channels.	82.77	0.82	2.48*
78.	One should purchase the inputs from the licensed /certified input dealers.	88.88	0.88	2.66*
79.	One should seek help of middleman for selling of produce.	49.44	0.49	1.48
80.	One should sell his produce to nearest market irrespective of price.	50.00	0.50	1.58
81.	Transportation of produce collectively with other potato growers reduces transportation cost.	86.11	0.86	2.58*
82.	One should use online marketing channel for fast sale of produce.	83.88	0.83	2.51*
83.	One should use traditional marketing channel to reduce risk in marketing of potato.	76.11	0.76	2.28*
84.	Monitoring of market information is wastage of time for better marketing.	82.77	0.82	2.48*
85.	Proper handling of potato tubers after harvesting maintains quality of tubers.	88.88	0.88	2.66*
86.	Cold storage can help potato growers to get better price for their produce.	93.88	0.93	2.81*
87.	Collective marketing of produce by potato growers can give them higher profit.	88.88	0.88	2.66*
88.	Collective purchasing of inputs by potato growers can help in reducing input cost.	83.88	0.83	2.51*
89.	Warehouse can help the potato growers to get better price for their produce.	88.33	0.88	2.65*
90.	Collective marketing of produce by potato growers increases their bargaining power.	83.33	0.83	2.50*

The variables with relevancy percentage, relevancy weightage and mean relevancy scores were tabulated in table 1. The statements having relevancy percentage more than 60 per cent, relevancy weightage of more than 0.60 and mean relevancy scores of more than 2 were considered for the final selection of statements.By this process, 74 statements were selected in the first stage.

3.8 Item analysis

A questionnaire was prepared consisting of 74 statements and responses were collected from 40 farmers from non-sample area through direct interview.The respondents were asked to indicate the degree of agreement on a three point continuum namely agree, undecided and disagree with the weightages of 3, 2, 1 for positive statements and 1, 2 , 3 for negative statements respectively.A respondent's overall score on the management orientation component was determined by adding up their scores for all the items in each of the component.Thus the total score achieved by each respondent was computed by component wise, such as planning, production, and marketing, ranging from 37 to 72, 34 to 66, and 22 to 42, correspondingly, and the scores of respondents were ordered in decreasing order.For item analysis, 25% of the respondents with the highest overall scores and 25% of the respondents with the lowest overall scores were chosen.These two groups served as the criterion groups for the item analysis that was completed.Using the formula given by Edwards (1969), determined the t value, also known as the critical ratio, which is a measurement of the degree to which a particular statement differentiates between high and low groups of subjects for each statement.

$$t = \frac{X_H - X_L}{\sqrt{\frac{S_H^2}{n_H} + \frac{S_L^2}{n_L}}}$$ ----------Equation - 4

Where, X_H= the mean score on a given statement for the high group

X_L= the mean score on the same statement for the low group

S_H^2= the variance of the distribution of responses of high group to the statement

S_L^2= the variance of the distribution of responses of low group to the statement

n_H = number of subjects in the high group

n_L = number of subjects in the low group

Table : 2. Statements of item analysis by farmers of non-sample area

Sl. No.	Statements	't' values
A.	**Planning orientation**	
1.	Consultation with scientists/specialists helps in better planning for potato production.	2.68 *
2.	It is unnecessary to consider the availability of infrastructure facilities while planning for potato production.	2.23 *
3.	Frequent visit to agricultural research station/KrishiVigyan Kendra is helpful in planning for potato production.	0.80
4.	One should plan and maintain appropriate farm records for potato production.	1.25
5.	It is inappropriate to prepare the annual budget for potato production.	1.80 *
6.	It is not necessary to make prior decision about the variety of potato crop to be cultivated.	0.61
7.	One should prepare a plan for proper utilization of funds in production of potato.	1.35
8.	It is necessary to think ahead about the management of commercial potato production.	1.11
9.	The amount of seed/tubers, fertilizers and plants protection chemicals needed for raising potato crop should be assessed before cultivation.	5.30 *

10.	It is necessary to work out in advance the quantity of inputs required for potato production.	0.87
11.	It is necessary to think ahead of the cost involved in raising potato crop.	4.36 *
12.	One should have knowledge about scientific potato production technologies to be adopted during aberrant weather conditions.	1.05
13.	One should have knowledge of Government Schemes implemented to promote scientific potato production.	0.60
14.	It is unnecessary to prepare calendar of operations for better management of potato crop.	4.33 *
15.	One should prepare for availing the benefit of Crop Insurance Scheme to cope up with crop failure due to natural disasters.	6.70 *
16.	One should work out in advance the requirement of human labour for potato production.	0.81
17.	One should think of innovative ideas to earn more money from the potato cultivation.	1.15
18.	It is necessary to think ahead about financial requirements for potato production.	4.05 *
19.	Working out water requirement for potato production is very essential.	0.89
20.	One should use various sources for collecting market information regarding potato.	0.61
21.	It is unnecessary to consider the available resources and facilities with the grower before undertaking potato cultivation.	1.86 *
22.	It is necessary to understand the consumer's preference before potato production.	0.97
23.	One should collect the information about institutions/ agencies/ companies/persons engaged in marketing of potato.	0.95
24.	It is necessary to select institutions/ agencies/ companies/persons giving maximum profit through selling of potato.	6.33 *
25.	One should decide in advance the marketing channels that will give maximum profit.	0.87
26.	It is possible to increase the potato yield through farm production plan.	0.57
B.	**Production orientation**	
27.	Timely planting of potato crop ensures good yield.	2.92 *
28.	Growing of short duration and disease tolerant varieties of potato gives more production.	2.60 *
29.	The ideal size of potato tuber for planting should be about 2.5 cm in diameter and 25-40 g in weight.	1.25
30.	Seed rate in potato cultivation should be given as recommended by the concerned specialist.	0.60
31.	One should adopt preventive measures for nutrient deficiency, insect pest infestation and disease attack.	1.63
32.	Seed/tuber treatment in potato cultivation should be done as recommended by the concerned specialist.	1.25
33.	Adoption of furrow method of irrigation in potato cultivation helps in higher production.	6.12 *
34.	Application of three irrigations at stolon formation, tuber formation and tuber development stages increases potato production.	1.05
35.	While irrigating potato crop, care should be taken not to submerge the ridges completely.	0.84
36.	Earthing up in potato crop should be done just before first and second irrigation.	1.54
37.	Entire quantity of recommended fertilizers should be applied in furrows as basal application.	1.40
38.	Fertilizers applied in furrows should be covered with a thin layer of soil to avoid direct contact of potato tubers with fertilizers.	0.61
39.	Determining fertilizer dose by soil testing saves money.	1.15
40.	Timely application of the inputs reduces higher production of potato.	2.09 *
41.	Skin of the potato tubers may turn green due to exposure to sunlight making them unsuitable for consumption.	1.63
42.	Growth regulators should be used in potato crop as recommended by the Scientists.	2.88 *
43.	Integrated Nutrient Management in potato cultivation reduces yield.	1.54
44.	Organically produced potato gets more price in the market.	1.05
45.	Intercultural operations in potato cultivation reduce weed infestation.	5.42 *
46.	Adoption of mulching under rain fed situation increases tuber yield.	1.39

47	Recommended chemical pesticides should be applied in the soil at the time of first earthing up to control red ants and other soil insects in potato cultivation.	1.87 *
48.	Application of mustard oil cake at the time of earthing up reduces red ant and white ant infestation in potato cultivation.	0.84
49.	Use of improved machinery saves expenditure on labourers.	2.60 *
50.	Proper care of potato at stolon and tuber formation stage gives more yield.	3.09 *
51.	Weeding in potato cultivation helps to reduce insect-pest infestation.	1.23
52.	Soil testing is wastage of money on fertilizer consumption.	2.27 *
53.	Application of well decomposed FYM in furrows before planting helps in higher tuber production.	0.80
54.	Seeking advice from extension personnel helps in solving field problems in potato cultivation.	2.10 *
55.	Spraying of recommended chemical pesticides should be done at proper interval to control late blight disease in potato crop.	1.04
56.	Depending upon weather condition particularly on cloudy weather, recommended chemical pesticides should be sprayed as prophylactic measure against late blight disease in potato crop.	1.26
C	**Marketing orientation**	
57.	One can get good price by grading of potato tubers.	2.44 *
58.	Collecting the required information about markets e.g. demand, quality, rate etc. helps in better marketing of potato.	2.86 *
59.	It is unnecessary to contact with various marketing agencies for seeking market update information	2.25 *
60.	Harvesting of potato tubers at proper time deteriorates the quality.	3.09 *
61.	One should not select damaged potato tubers for marketing.	1.05
62.	Co-operatives/ Farmer Producer Companies can help the potato growers to get better price for produce.	3.87 *
63.	One should sell his produce by collecting information on various market channels.	1.26
64.	One should purchase the inputs from the licensed /certified input dealers.	1.15
65.	Transportation of produce collectively with other potato growers reduces transportation cost.	1.14
66.	One should use online marketing channel for fast sale of produce.	1.66
67.	One should use traditional marketing channel to reduce risk in marketing of potato.	4.12 *
68.	Monitoring of market information is wastage of time for better marketing.	1.90 *
69.	Proper handling of potato tubers after harvesting maintains quality of tubers.	2.71 *
70.	Cold storage can help potato growers to get better price for their produce.	2.45 *
71.	Collective marketing of produce by potato growers can give them higher profit.	0.84
72.	Collective purchasing of inputs by potato growers can help in reducing input cost.	0.73
73.	Warehouse can help the potato growers to get better price for their produce.	1.60
74.	Collective marketing of produce by potato growers increases their bargaining power.	0.89

The calculated 't' values were found to be distributed between 0.57 and 6.70. The statements with 't' values of 1.75 and above (Table : 2) were considered for final inclusion. Thus, 20 positive and 10 negative statements with highest 't' values were selected for the final scale (Table: 3) as they differentiate between highest and lowest groups.

Table : 3. Statements selected for inclusion in the final Scale

Sl. No.	**Statements**	**Degree of Statements**
A.	**Planning orientation**	
1	Consultation with scientists/specialists helps in better planning for potato production.	+

2	It is unnecessary to consider the availability of infrastructure facilities while planning for potato production.	-
3	It is inappropriate to prepare the annual budget for potato production.	-
4	The amount of seed/tubers, fertilizers and plants protection chemicals needed for raising potato crop should be assessed before cultivation.	+
5	It is necessary to think ahead of the cost involved in raising potato crop.	+
6	It is unnecessary to prepare calendar of operations for better management of potato crop.	-
7	One should prepare for availing the benefit of Crop Insurance Scheme to cope up with crop failure due to natural disasters.	+
8	It is necessary to think ahead about financial requirements for potato production.	+
9	It is unnecessary to consider the available resources and facilities with the grower before undertaking potato cultivation.	-
10	It is necessary to select institutions/ agencies/ companies/persons giving maximum profit through selling of potato.	+
B.	**Production orientation**	
1	Timely planting of potato crop ensures good yield.	+
2	Growing of short duration and disease tolerant varieties of potato gives more production.	+
3	Adoption of furrow method of irrigation in potato cultivation helps in higher production.	+
4	Timely application of the inputs reduces higher production of potato.	-
5	Growth regulators should be used in potato crop as recommended by the Scientists.	+
6	Intercultural operations in potato cultivation reduce weed infestation.	+
7	Recommended chemical pesticides should be applied in the soil at the time of first earthing up to control red ants and other soil insects in potato cultivation.	+
8	Use of improved machinery saves expenditure on labourers.	+
9	Proper care of potato at stolon and tuber formation stage gives more yield.	+
10	Soil testing is wastage of money on fertilizer consumption.	-
11	Seeking advice from extension personnel helps in solving field problems in potato cultivation.	+
C	**Marketing orientation**	
1	One can get good price by grading of potato tubers.	+
2	Collecting the required information about markets e.g. demand, quality, rate etc. helps in better marketing of potato.	+
3	It is unnecessary to contact with various marketing agencies for seeking market update information	-
4	Harvesting of potato tubers at proper time deteriorates the quality.	-
5	Co-operatives/ Farmer Producer Companies can help the potato growers to get better price for produce.	+
6	One should use traditional marketing channel to reduce risk in marketing of potato.	-
7	Monitoring of market information is wastage of time for better marketing.	-
8	Proper handling of potato tubers after harvesting maintains quality of tubers.	+
9	Cold storage can help potato growers to get better price for their produce.	+

3.9Reliability of scale

A scale is reliable if it can be used to assess the same occurrence in a variety of different contexts and come up with the same results every time. In this particular investigation, the test-retest method of determining dependability was utilized.

3.10 Test retest method:

The management orientation scale, as designed, was administered to 30 commercial potato growers who had not previously been contacted and had no opportunity to participate in the final sample. The same 30 commercial potato farmers were tested after a 15-day period. As a result, two sets of scale scores were acquired. Each pair of statements was regarded as a separate scale, and the two sub-scales were then correlated.The dependability coefficient was determined using Rulon's formula (Guilford, 1954), and it was 0.8994. As a result, the developed scale was proven to be very reliable.

3.11 Validity of the Scale

It refers to the degree to which the test's components adequately represent the entire body of information. It was made sure of when framing the objects that were gathered from accessible books, journals, pertinent literature, and through conversations with scientists, specialists, and progressive farmers.The content validity of the scale was assured by selecting the topics following discussion with professors, extension specialists, and academicians at Assam Agricultural University in Jorhat. This was done in order to ensure that the contents were appropriate.When selecting management orientation statements, appropriate precautions were taken to ensure that a sufficient degree of content validity was obtained. Hence, the present scale satisfied the content validity.

3.12 Administering the developed Scale

Finally, 30 statements were selected to measure the level of management orientation of the members of Farmer Producer Company with reference to potato production in Assam are arranged in such a way that both positive and negative statements appear randomly to avoid biased responses. The scale consists of three parts: planning, production, and marketing.The responses had to be taken on a three-point continuum, namely "agree", "undecided", and "disagree" with a score of 3, 2, and 1, respectively for positive statements and 1, 2, and 3 for negative statements, respectively.As a result, the overall score that an individual may receive ranged from 30 to 90. The total score for each respondent was determined by adding the scores assigned to each of the statements.Based on their mean ($\bar{X}$) and standard deviations (S.D.) of the obtained scores the respondents were put into three categoryi.e. low management orientation, medium management orientation and high management orientation. The higher the score indicates the high level of management orientation of the members of the farmers producer company with respect to potato production in Assam.

4. CONCLUSION

A final scale with 30 statements was developed and standardized to measure the level of management orientation of the members of Farmer Producer Company with reference to potato production in Assam. The scale's accuracy and consistency were determined using standard operating methods, and its validity and reliability were established and highly administrated to measure the management orientation levels of the members of the farmers producer company.Researchers can use the scale to measure the level of management orientation of the members of Farmer Producer Company with reference to potato production or in order to planning of the better management practices for potato cultivation and further more in related to the developmental programmes.The significance of the study is this scale will be very advantageous and convenient for researchers to examine the management orientation of potato growers in relation to potato planning, potato production and potato marketing. This scale can be useful to various training institutions and agricultural development agencies such as KVK's, Regional research stations, and state governments in executing an appropriate strategic plan to enhance potato production in Assam.In future directions, the same could be administered to any other potato growers in other districts of Assam for measuring the management orientation of potato production farmers.The limitation of the study is that considering the restraint of time and resources of the investigator, only two FPCs in two different agro climatic zones of the state of Assam were brought under the purview of the study. In future a similar study may be undertaken covering more number of districts in all the agro climatic zones of Assam with a larger sample size.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Disclaimer (Artificial intelligence)

Option 1:

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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