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INFLUENCE OF FARMING AND TECHNOLOGICAL ANTECEDENTS ON EXTRACTION OF GROUNDNUT OIL IN TUMAKURU DISTRICT

Dr. SHIVAPPA

Assistant Professor, Department of Economics, Government First Grade College, Koratagere-572129, Tumakuru Distrtict, Karnataka

Abstract: The cultivation then spread to different parts of the world and eventually was introduced to southern India by Portuguese in 16th century. Groundnut, an oilseed derived from the fruit of groundnut plant. It is commonly mistaken as a nut though it is not a nut exactly; it's a seed rather and is also known by the name of peanut. The main objective of the study is to explore the influence of farming and technological antecedents on extraction of groundnut oil in Tumakuru district. Descriptive research methodology was followed to attain the framed objective; the required primary data have been collected from 240 groundnuts farmers and also who involved in groundnut oil extraction process by using convenient sampling technique. In Tumakuru District, the required primary data have been collected by using a well-structured and pre- tested interview schedule Such collected data have been analysed with regression analysis. It is found that, the unique contribution of the variables related to farming factors such as Sophisticated farming knowledge, growing only under contract, Season specific plans, Resource availability, Choice of an appropriate market channel, and Irrigation facilities have found significant influence factors in predicting the extraction of groundnut oil in Tumakuru district. is accepted. The unique contribution of the variables related to technological factors such as Physical Squeezing, Cold-Pressing Technology, Application of Pressure, Hydraulic Jacks, Plate Presses, and Rams Press have a significant relationship with the extraction of groundnut oil in Tumakuru district.

Keywords: Farming, Technological, Factors, Groundnut Oil, Tumakuru District.

INTRODUCTION

Groundnuts especially those produced in the developing countries have been used traditionally since the origin of humanity. It is rich in oil and protein and has a high-energy value. Developing countries account for nearly 95 percent of world production (Beaman, L., and Dillon, A. 2018). Asia accounts for about 70 percent of this amount where the major producers India and China together represent over two-thirds of global output. Other important producers are Nigeria, Senegal, Sudan and Argentina (Gorfad, P.S., 2018). In most of the developing countries kernels are used for oil extraction, food and as an ingredient in confectionery products (Glover, D., Sumberg, J., Ton, 2019). Following extraction, the residual cake is processed largely for animal feed, but is also used for human consumption. The quality attributes that are important for end uses of groundnut vary among the developed and developing countries (Rutsaert, P., Chamberlin, J., 2021).

Oilseed sector plays an important role in generating foreign exchange earnings and it is mainstay of rural and national economy of India (Daudi, H., Shimelis, H., 2018). Groundnut is an oilseed crop which is the highly nutritious, economically important and, improve soil fertility through providing nitrogen to soil. It requires drained loose and sandy loam soil to

grow. Groundnut is mostly used to solve malnutrition problem, improve health and generate income for smallholder farmers for cash (Fisher, M., Holden, S.T., 2018). Though the product is produced in low land areas and consumed highly, it is affected by aflatoxin. Aflatoxin is a group of mycotoxins produced by fungi which is a central problem in groundnut production and productivity and highly toxic to human and animals. Increased use of quality, improved and well-adopted crop varieties seed enhances the production and productivity of agricultural product (Beaman, L., BenYishay, A., 2021).

Groundnut is an important Oilseed crop in the world with over 100 countries cultivating and playing a significant role in the world economy and is believed to have its origin in South America (Richardson, M., Coe, R., 2021). The Groundnut or Peanuts species belongs to the family of Fabaceae (commonly known as bean, legume or pea family). The groundnut is an annual herbaceous plant with feather type leaves yellow flowers and a legume shaped fruit with two to three seeds which develops inside the earth (Chandio, A.A., and Jiang, Y. 2018). The oil extracted from groundnut/peanuts is also known as Arachis Oil, which is a mild tastes vegetable oil with a light-yellow transparency, clear colour and lustre, mild pleasant fragrance accompanied by a good taste and relatively easy to digest. The oil from the groundnut seeds is proven to be an excellent source of vitamin E various fatty acids, good quality proteins (approx. 28%) and carbohydrates. Groundnut oil is generally used in cooking, frying and manufacturing of margarine and shortening throughout the world (Kalinda, T., G. Tembo, & E. Kuntashula. 2014). The kernel of groundnut contains approximately 45%- 55% of oil. The oil cake/ leftover meal from the extraction makes a significant component of animal feeds for poultry and cattle. The aroma and taste of groundnut oil traces back to its parent legume family (Shasani, S., Banerjee, P.K., 2020). The groundnut oil comprises of more than 80 % UFA (unsaturated fatty acids with around 42 % Oleic Acid, 38% Linoleic Acid and around 20% Palmitic acid, Steric acid, Arachidic acid along with some other unsaturated fatty acids in trace amounts. It is a rich source of all B vitamin except B12, minerals, phosphorus, calcium, iron. The biological value of groundnut protein is the highest among all vegetable proteins (Kimaru-Muchai, S.W., 2020).

LITERATURE REVIEW

FARMING FACTORS

In the rural areas, the levels of unemployment and underemployment remain uncomfortably high for responsible policy makers. The groundnut enterprise is labour intensive and if viable, should reasonably fit into the rural set-up, providing the much needed employment for the unemployed active rural dwellers (Vecchio, Y., Agnusdei, G.P., 2020). Socio-economic factors that affect the viability and profitability of the groundnut enterprise are not easily apparent to rural dwellers (Orr. A., 2018). The small holder farmers are generally less knowledgeable and take these factors for granted. The extent of their influence if any, on profitability, need to be established through research. Farmers have not grown groundnuts on a self-sustaining basis where they can even chose groundnuts ahead of other crops, maize for example, in the knowledge that groundnut is more profitable even under unsupported conditions. In this case, the income earned from groundnuts will be able to secure enough food(maize) for more than a season, such that the argument to secure food by growing only

maize is made redundant (Simtowe F., 2019). Farmers have mostly gone into commercial groundnut growing only under contract where they are supported with inputs, technical advice and guaranteed markets (Nelson, R., Coe, R., & Haussmann, B.I. 2019). Yet proven profitability under normal smallholder operating conditions, and assuming a normal cost and pricing structure should help improve the independent and sustainable uptake of the crop by farmers, thus broadening their choice base and opening up ways for better and more efficient resource utilization (Norton, G.W., & Alwang, J. 2020). This will help farmers move away from the narrow and often erroneous view that food security is guaranteed only through maize production. Maize can be bought from income obtained from other more profitable enterprises like groundnut, such that the comparative advantage from growing groundnut is exploited (Nyumba, O., Wilson, T., 2018). The need to analyse the profitability of this enterprise and establish the factors that affect its profitability becomes even more compelling.

Increasing competitiveness of the groundnut oil sector requires action in two fronts (i) increasing efficiency in groundnut production and (ii) increasing efficiency in oilseed processing. Many studies on groundnut (Konja, D.T. 2022) revealed that the old and outdated varieties and sub-optimal use of micronutrient (gypsum) are the main reasons for yield gaps (Sawe, J., Mungâ, C.G., & Kimaro, G.F. 2018). Non-availability of seeds of newly released varieties at villages is also hindering wider adoption of new varieties even though they perform better than old varieties like TMV-2. Under rainfed conditions, the plant population is sub optimum, whereas under irrigated conditions, it is in excess of the recommended number (Mwatawala, H.W., & Kyaruzi, P.P. 2019). Due to high seed and other input costs required at the time of sowing (40-50% of total cost of cultivation) and the crop being mostly grown under uncertain rainfed conditions where yields and profitability vary widely, farmers are not willing to risk their money on high-cost recommended cultural practices, and adoption rates are low (Krejcie, R.V., & Morgan, D.W. 1970). To make groundnut production more competitive, delineation of groundnut production zones and seasons based on agro-climatic suitability and charting zone and season specific plans is essential to exploit productive potential of both high and low productive zones and seasons. Productivity in the rabi season is much higher than in the kharif (rainy season) (Oluwatoyin, B.C. 2021). In some agro-climatic zones of Uttar Pradesh and Gujarat states, groundnut productivity is much higher compared to arid zones like Anantapur district. Nevertheless, groundnuts from these systems not only contribute to a major share of edible oil production but also to improved livelihoods, nutrition for the family, fodder for livestock and indirect income from livestock (Mehmood, K., 2021). Among the most frequent cited constraints to greater use of inputs by smallholders are production and price risks and resource availability. A focus on reducing risk rather than maximizing yield will increase adoption rates of recommended practices, which will be profitable to smallholder farmers in India (Mwaisakila, S.R., & Matemani, J.K. 2021). Hence, under rain fed conditions, the research and extension system should focus on low cost technologies that have higher adoption rate. Purchasing external inputs such as ‘improved seed’ requires a financial commitment by farmers. When the prices and output are highly variable, as is common in groundnut, it becomes risky to make the investment in recommended practices, in spite of high yield responses (Lee, H. 2020). lack of adequate number of groundnut farmers’ market channels remain long lasting problems in the study area. however, the choice of an appropriate market channel enables farmers to get reasonable profits

ISSN PRINT 2319 1775 Online 2320 7876
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from groundnut production. India has favorable agro ecological condition of groundnut production of. in the country it is largely produced especially lowland parts of the country share greater proportion in groundnut production (Mwalongo, S., Akpo, E., 2020).

Identification of market channel choice determinants contributes to identify issues related with production and sales; lead consumers to gain maximum satisfaction through making decision over market channel selection, improve the extent of production produced; and the selected channel can significantly affect other market channels (Omair, A. 2015). Better access to markets is needed if the production and sale of groundnuts, and hence higher incomes for farmers, are to be facilitated (Selahkwe, C., Nformi, M.I., 2021). with better market access, the production of and income from grain legume production could be improved significantly (Polit, D.F., & Beck, C.T. 2010). markets offer farming households the opportunity to benefit from trade, according to their comparative advantage, as they can sell their surpluses and purchase the goods and services they need. low market participation by smallholder farmers in developing countries has hampered agriculture-driven economic growth and exacerbated poverty, since farmers have not been able to benefit from the associated welfare gains and income growth. for agriculture to make a meaningful contribution to economic growth, smallholder farmers have to commercialize their farming activities to produce marketable surpluses (Shiferaw, B., Kebede, T., 2015).

TECHNOLOGICAL FACTORS

In India, nearly 90% of the total 24 million tonnes of produced oilseeds are crushed using this method. Traditional oil expellers are simple mechanical devices that are hand/animal operated (Ojomo A. O., Ologunnagba F. O., Alasha S. A. 2011). These equipments work on the principle of mechanical compression and require no electricity or fuel for operation. They are fabricated using inexpensive components that can often be manufactured locally (Abdulaziz Y. U. 2014). The main extraction method of peanut oil is physical squeezing, including hot-pressing technology and cold-pressing technology. When compared with hot-pressing technology, oil produced by cold-pressing technology preserves more bioactive substances, such as vitamin E and sterol etc (Olawale J. Okegbile, 2014). The quality of peanut oil produced by cold-press is better for the reasons of more clear appearance, higher linoleic acid content, lower low acid value and peroxide value as compared with the oil from hot-pressing. At the same time, the meal from cold-pressing technology possesses higher nutritional value. Based on above benefits, cold-pressing technology is an ideal method for oil extraction (Adesoji M. O., Kamaldeen A. Y., 2013). The mechanical process is a method for oil extraction. Mechanical expression of oil requires the application of pressure to force oil out of the oil-bearing material (Kabutey, A., Heak. D., and J. Henus 2010).

Various types of machines can be used for compression: screw presses, hydraulic presses, roll presses and mills, collapsible-plate and frame-filter presses, disc mills, interlocking- finger juice extractors, juice reamers. Pressing technology of oleaginous material meal occurs under the influence of compression forces in mechanical presses (Mangesh A. Pachwade,Prof. 2013). Non-motorized expellers are used in rural settlements for domestic crushing of oilseeds, such as copra (dried coconut meal), mustard, groundnut, soybean etc. Being hand operated, these devices have low expelling capacities of about 2 - 5 kg/hr, or 20 – 30kg/day (Harmanto, A., Headnadi, 2009). Ghanis originated in India where they are primarily used to

express oil from mustard and sesame seeds, although in some cases they can be used for coconut and groundnut processing. Traditionally ghanis are operated by animals and can be manufactured locally (Arowosaiye M. J. 2002). They consist of a wooden mortar and wood or stone pestle (K.S. zakiuddin, J.P. Modak, H.V. 2012). The mortar is fixed to the ground while the pestle, driven by one or a pair of bullocks or draught animals is located in the mortar where the seeds are crushed by friction and pressure. Depending on the size of mortar and type of seeds, an animal – powered ghani can express about 10 kg of seeds every two hours (TDRI, Private Communication). The ghani process requires much mechanical energy. A ghani operated by one bullock (the equivalent of 0.35 kW) can process 5 kg oilseed in about one hour. Hence, 0.3515 or 0.07 kWh is required to process 1 kg of an oilseed into oil (Aliyu, M. 2008). This energy consumption is about equal to the maximum amount of energy required by small oil expellers. Many different types of mechanical press are in use but they fall into two basic types, plate presses and rams presses (Nalumansi, S.R. and Kaul, R.N. 1992). In the first type a plate or piston is forced into a perforated cylinder containing the oil bearing material by means of a worm. In some cases hydraulic jacks have been used, care is needed to make sure there is no leakage of hydraulic fluid that might contaminate the edible oil (Ajao, K.R, Ajimotokan, 2009). The ram press is a manually operated mechanical press capable of pressing a range of oil-seeds including sunflower, sesame and groundnuts, as well as seeds from pumpkin, rape, watermelon, mustard, and Jatropha Curcas. The ram press can be operated continuously without the need to remove cake. The capacity of the press is 14 litres of oil for an eight-hour shift, which approximately amounts to pressing a 55-kg bag of seeds, although the capacity would depend on the type oilseed and its temperature at the time of pressing (Abdulrahman, A. 2011).

Operation of the press is very simple and therefore an operator can be trained to use the equipment in about one hour. Maintenance is limited to simple routine cleaning and general checks (Ibrahim, I. I. 2010). In screw press, that is manually operated the substance from which the oil is to be expressed is pressed slowly and with maximum pressure by plunger (round steel plate), forced down by a screw, and into a cylinder with a large number of small holes. In hydraulic press that can be manually or power operated, pressure is exerted by hydraulic device such as a lorry jack (Abdulsalam, A. 2013). They require a heavy, rigid frame structure. Because of the weight of such a structure the press must be stationery and cannot be moved as easily as a screw press (Bayero University Kano. Isiaka, M. 2005). Hydraulic presses can process mesocarp (fruits), oil-seeds and nuts as they generate greater pressure than a screw essential to ensure that hydraulic fluid, which may be toxic, does not come into contact with the food stuff. The chemical extraction method requires the use of organic solvents to recover the oil from the products (Bashir I. D. 2014). Solvent extraction method involves the use of organic solvents such as straight chain hydrocarbons, chlorinated hydrocarbons, alcohols and ketones to recover the oil from the sources. The process for solvent extraction of nut (groundnut) is similar to that of seeds (soybean, cotton, etc) (Abdullahi,U.S.2008). Solvent extraction is capable of removing nearly all the available oil from oil-seeds or nuts. About 98% of the oil is being extracted by solvent method (Dunmade, V.B. 1991). In addition to the high yield of oil, the method produces oil with better qualities, and a higher protein meal. The method generally requires more capital expenditure, and refining the oil before use (Ewoada, M.O., El-Okene, A.M.I. and D.D. Yusuf., 2008). There is

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also possibilities of toxicity from the solvent used and danger of fire explosion from the use of volatile organic solvent (Abubakar Y. 2012).

STATEMENT OF THE PROBLEM

With the large-scale import of cheaper palm oil and soy oil (together contributing 52% of domestic edible oil consumption), which directly compete with groundnut oil, farmers replaced areas under oilseeds including groundnuts with other, competing, crops (Ojiewo, C., Ajeigbe, H., 2020). As a consequence of the scarcity of oilseeds for crushing, most of the processing units either closed down or operated at less than full capacity. Further, the groundnut production and processing sectors are exposed to an uncertain production environment owing to more than 70% of the groundnut area being rain fed, the low resource base of smallholder farmers and processors, and low adoption rates of improved technology. The adoption rate of improved varieties is very low. Inefficiencies in the processing industry are still high, as the sector has been reserved for small-scale units for over five decades (Banla, E.M., Dzidzienyo, D.K., 2018). This resulted in the persistence of inefficiencies in both the oilseed production and the processing industry, despite the availability of some high-yielding and profitable technology for oilseed production and processing units. Communal farmers have not harnessed the potential benefits derived from growing groundnuts and there is need for research to clearly establish the viability or otherwise of the groundnut enterprise in order to assist farmers with enterprise choice decisions.

OBJECTIVES OF THE STUDY

1. To explore the relationship between farming factors and the extraction of groundnut oil in Tumakuru district.
2. To explore the relationship between technological factors and the extraction of groundnut oil in Tumakuru district.

HYPOTHESES

H01: There is no significant relationship between farming factors and the extraction of groundnut oil in Tumakuru district.

H1: There is a significant relationship between farming factors and the extraction of groundnut oil in Tumakuru district.

H02: There is no significant relationship between technological factors and the extraction of groundnut oil in Tumakuru district.

H2: There is a significant relationship between technological factors and the extraction of groundnut oil in Tumakuru district.

SCOPE OF THE STUDY

The purpose of this study is to find out and analyze the Influence of Farming and Technological antecedents on extraction of groundnut oil in Tumakuru District.

RESEARCH METHODOLOGY

Descriptive research methodology was followed to attain the framed objective; the required

ISSN PRINT 2319 1775 Online 2320 7876
 UGC CARE Listed (Group -I) Journal Volume 11, Iss 13, 2022

primary data have been collected from 240 groundnuts farmers and also who involved in groundnut oil extraction process by using convenient sampling technique. In Tumakuru District, the required primary data have been collected by using a well-structured and pre-tested interview schedule Such collected data have been analysed with regression analysis.

POPULATION, SAMPLING METHOD AND SAMPLE SIZE

There were 10 talukas in Tumakuru district, all the talukas were selected for the study and. Villages from each taluka were randomly selected according to the convenience of the researcher, and The sample frame constituted all smallholder groundnut farmers from the communal farming sector of selected talukas and villages in Tumakuru district. Primary data was collected from the 240 smallholder groundnut farmer's households. Structured questionnaire, the head of the household was interviewed, and where absent a proxy privy to the pertinent household data was interviewed.

DATA COLLECTION

Primary Data

The first time data has been through a self-administered structured questionnaire, which was developed and asked to be filled out. Personal interviews were also done with respondents. A structured questionnaire was prepared containing the "5-point Likert scale." A semi-structured interview with open-ended discussion was conducted in the Kannada language, which is the official language of Karnataka state.

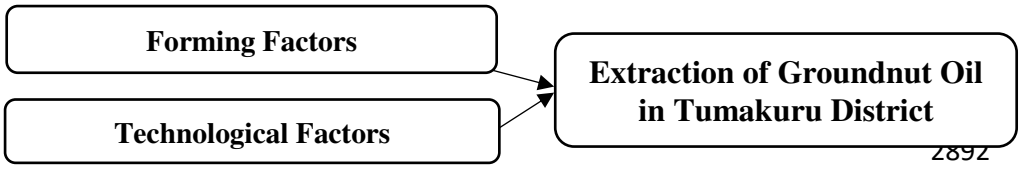
Secondary Data

The following are the sources from which the secondary data was collected, such as information that has been gathered from selected peer-reviewed articles from bibliographic databases (Emerald, Sage journals online, Science Direct, Scopus, Taylor & Francis online, Web of Science, and Wiley (online library). Peer-reviewed journals were considered based on their knowledge validity and their highest impact on the research field. Online E-Sources, Published reports, journals, theses, magazines, research articles, newspapers, etc.

DATA ANALYSIS

Multiple regression analysis was used as the main statistical tool to find out the influence of farming and technological antecedents on extraction of groundnut oil in Tumakuru district. The reliability analysis is used to establish both the consistency and stability of the research instrument. Consistency shows how well the research instrument measures the model and the conceptual framework.

Figure 1.1 RESEARCH FRAMEWORK



ISSN PRINT 2319 1775 Online 2320 7876
 UGC CARE Listed (Group -I) Journal Volume 11, Iss 13, 2022

LIMITATIONS OF THE STUDY

The study is restricted to Tumakuru district. Only ground nut farmers were considered for the study. The study is limited to influence of farming and technological antecedents on extraction of groundnut oil in Tumakuru district only. The limitation of expenditure survey is that it tends to underestimate expenditures. Moreover, a significant limitation of this study is that all the information was self-reported and was based on subjective perceptions. one of the limitations of this study are the data used, which are slightly "outdated" and may not fully reflect the current realities due to time difference. Advanced statistical tools might have used for the study. The other pertinent variable for the study might have missed. The information given by the respondents might be biased because some of them might not be interested in giving correct information.

ANALYSIS AND INTERPRETATION

FARMING FACTORS.

H01: There is no significant relationship between farming factors and the extraction of groundnut oil in Tumakuru district.

H1: There is a significant relationship between farming factors and the extraction of groundnut oil in Tumakuru district.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.664[a]	.441	.419	.78875

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	112.892	9	12.544	20.162	.000[a]
	Residual	143.091	230	.622		
	Total	255.983	239			

b. Dependent Variable: Extraction of groundnut oil in Tumakuru district.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.245	.181		30.690	.000

ISSN PRINT 2319 1775 Online 2320 7876
 UGC CARE Listed (Group -I) Journal Volume 11, Iss 13, 2022

	Sophisticated farming knowledge	**-2.171**	**.799**	**-1.985**	**-2.910**	**.005**
	Growing only under contract	**-4.597**	**1.398**	**-3.914**	**-3.512**	**.001**
	Seeds of newly released varieties	-1.116	.975	-.963	-1.154	.256
	Season specific plans	**4.803**	**1.344**	**4.035**	**3.605**	**.000**
	Resource availability	**3.804**	**1.066**	**3.911**	**3.570**	**.000**
	Financial commitment	-1.000	.598	-.846	-1.682	.095
	Choice of an appropriate market channel	**-1.776**	**.743**	**-1.522**	**-2.422**	**.015**
	Irrigation facilities	**1.934**	**.661**	**1.726**	**2.940**	**.008**
	Commercializing faring activities	-.676	.412	-.558	-1.650	.108
a. Dependent Variable: Extraction of groundnut oil in Tumakuru district.						

The regression analysis shows that, the value of "R" indicates high degree of correlation co-efficient (.664[a]) between farming actors and extraction of groundnut oil in Tumakuru district. in Tumakuru district. R^2 measure the variation explained by the regression model is (.441[a]) being high indicating model fits the data well. Significant of F change is less than 0.05 which indicates farming factors have significant relationship with Extraction of groundnut oil in Tumakuru district. 9 variables of farming factors were used to predict Extraction of groundnut oil in Tumakuru district in Tumakuru districts.

Extraction of groundnut oil in Tumakuru district = (5.245) + **(-2.171* Sophisticated farming knowledge) +(-4.597* Growing only under contract)** +(-1.116* Seeds of newly released varieties) **+(4.803* Season specific plans) + (3.804* Resource availability)** +(-1.000* Financial commitment) **+(-1.776* Choice of an appropriate market channel) +(1.934* Irrigation facilities)** +(-.676* Commercializing faring activities).

Since the above regression model indicates the farming factors and the values are highlighted in bold and italic are < than p value 0.05. Therefore, hypothesis statement. i.e, H1: There is a significant relationship between farming factors and the extraction of groundnut oil in Tumakuru district. is accepted.

TECHNOLOGICAL FACTORS

H02: There is no significant relationship between technological factors and the extraction of groundnut oil in Tumakuru district.

H2: There is a significant relationship between technological factors and the extraction of groundnut oil in Tumakuru district.

Model Summary

ISSN PRINT 2319 1775 Online 2320 7876
 UGC CARE Listed (Group -I) Journal Volume 11, Iss 13, 2022

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.781[a]	.585	.597	.68119

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	162.205	10	16.220	34.586	.000[a]
	Residual	113.778	229	.463		
	Total	265.983	239			

b. Dependent Variable: Extraction of groundnut oil in Tumakuru district.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.475	.357		8.099	.000
	Physical Squeezing	**.071**	**.061**	**.197**	**1.154**	**.027**
	Hot-Pressing Technology	.038	.065	.039	.469	.717
	Cold-Pressing Technology	**.248**	**.086**	**.239**	**2.569**	**.018**
	Application Of Pressure	**.127**	**.071**	**.174**	**1.914**	**.058**
	Non-Motorized Expellers	-.032	.059	-.035	-.460	.655
	Traditional Ghanis	-.028	.084	-.032	-.256	.808
	Hydraulic Jacks	**.232**	**.089**	**.241**	**2.451**	**.017**
	Motor Driven Oil Crushing	.166	.193	.191	1.521	.134
	Plate Presses And Rams Presses	**-.237**	**.096**	**-.273**	**-2.644**	**.009**

a. Dependent Variable: Extraction of groundnut oil in Tumakuru district.

The regression analysis shows that, the value of "R" indicates high degree of correlation co-efficient (.781[a]) between technological actors and Extraction of groundnut oil in Tumakuru district. R^2 measure the variation explained by the regression model is (.585) being high indicating model fits the data well. Significant of F change is less than 0.05 which indicates

ISSN PRINT 2319 1775 Online 2320 7876
 UGC CARE Listed (Group -I) Journal Volume 11, Iss 13, 2022

technological factors have significant relationship with Extraction of groundnut oil in Tumakuru district. 9 variables of technological factors were used to predict Extraction of groundnut oil in Tumakuru district in Tumakuru districts.

Extraction of groundnut oil in Tumakuru district = (2.475) + **(.071* Physical Squeezing)** +(.038* Hot-Pressing Technology) + **(.248*Cold-Pressing Technology) +(.127* Application Of Pressure)** +(-.032* Non-Motorized Expellers) +(-.028* Traditional Ghanis) **+(.232* Hydraulic Jacks)** + (.166* Motor Driven Oil Crushing) **+(-.237* Plate Presses And Rams Presses)**. Since the above regression model indicates the technological factors and the values are highlighted in bold and italic are < than p value 0.05. Therefore, hypothesis statement. i.e,. i.e, H2: There is a significant relationship between technological factors and the extraction of groundnut oil in Tumakuru district. is accepted.

FINDINGS

The unique contribution of the variables related to farming factors such as Sophisticated farming knowledge, growing only under contract, Season specific plans, Resource availability, Choice of an appropriate market channel, and Irrigation facilities have found significant influence factors in predicting the extraction of groundnut oil in Tumakuru district. is accepted. The unique contribution of the variables related to technological factors such as Physical Squeezing, Cold-Pressing Technology, Application of Pressure, Hydraulic Jacks, Plate Presses, and Rams Press have a significant relationship with the extraction of groundnut oil in Tumakuru district.

The existing groundnut oil expellers in the market are too big and too expensive for these small medium size businesses to invest on. Other limitations are its maintenances aspect as well as its operations. This reflects on one hand, the limitation imposed by working capital availability, and on the other the traditionalism in groundnut farming where farmers still use the same old methods that do not use modern production inputs like certified seeds and inorganic fertilisers, both of which need some form of capital. This also represents another major impediment to efforts aimed at transforming peasant agriculture to modern commercial agriculture.

SUGGESTIONS

In considering the factors which influenced crop investment decisions in Limpopo amongst smallholder oilseed producing farmers, a combination of factors is at play, with floods, implements, temperature, rainfall, cash, irrigation equipment, and food security occupying the seats of honour in terms of the most crucial factors that determine which oilseed crop will be produced. It is therefore important to note that different factors are at play when it comes to choosing between various oilseed crops or between different grain crops. A range of factors will also be at play with regards to the processes involved in choosing between oilseed crops and grain crops.

In introducing new technologies, it is important to make comparisons between the proposed improved technology and traditional methods. In some cases, it was found that the improved technology was no better than the traditional method and in fact increased the labor requirements and time inputs or resulted in an excess demand for raw materials. The availability of inputs such as animal power and human power need to be assessed. However,

some aspects of oil expression technology in order to create an interest and awareness of the technology, which may help improving the rural development as wealth and self-employment. The adoption of these simple machines will no doubt develop the capacity of local artisans in the oil extraction business who are quite talented but hardly diversify due to lack of new and adaptable technologies. So that develop a new machine powered by human powered which has tremendous utility in energizing many rural places where reliability of availability of electric energy is much low. Also machine Adoption of simple machines by small oil producers needs more attention for jobs are generated. Engineers should work hand in hand with machine fabricators so as to enable them understand the importance designing machines before fabrication. For the existing roasting machine, the limitations can be addressed by considering the following; The roasting chamber can be made cylindrical and positioned vertically with the top left open as an inlet opening on the roasting chamber to enhance easy admission of groundnut in to the chamber. The capacity of the roasting machine, batch wise, can be made to accommodate the maximum quantity of groundnut seeds usually processed by the small scale processors.

CONCLUSIONS

Production and marketing of a groundnut are undertaken by smallholder farmers in order to improve their living standards in Tumakuru District. Farmers who engaged in this farming are getting low income as the activity is constrained both at production and marketing stages. The problems experienced by groundnut oil processors by the use of traditional methods have resulted to different technological interventions. These interventions were in form of machines that carryout the sub-processing activities, such as; shelling, roasting, de-skinning/winnowing, milling and kneading machines. More so, there were also efforts to developed hydraulic press and screw press machines that can extract oil from the just shelled groundnut seeds. These developed machines notwithstanding, still have areas desiring modifications. In case of the groundnut milling operation, it was established that there is no any effort that targeted the groundnut oil extraction activity.

DIRECTIONS FOR THE FUTURE RESEARCH

Further research can be done on making comparisons of groundnut Oil processing and sunflower seeds Oil processing districts of Karnataka for the better development of edible oil processing industry. Future researchers can substantiate the research findings by conducting similar studies in various districts. This survey should cover a much wider range of areas. The study suggests that similar studies should be conducted following the conceptual model of environmental food supply, which will better identify the gaps left in the empirical research on the said subject. Moreover, groundnuts oil extraction was the least studied component and study related to food processing can be done, so future research must consider it to fill the left research gap.

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