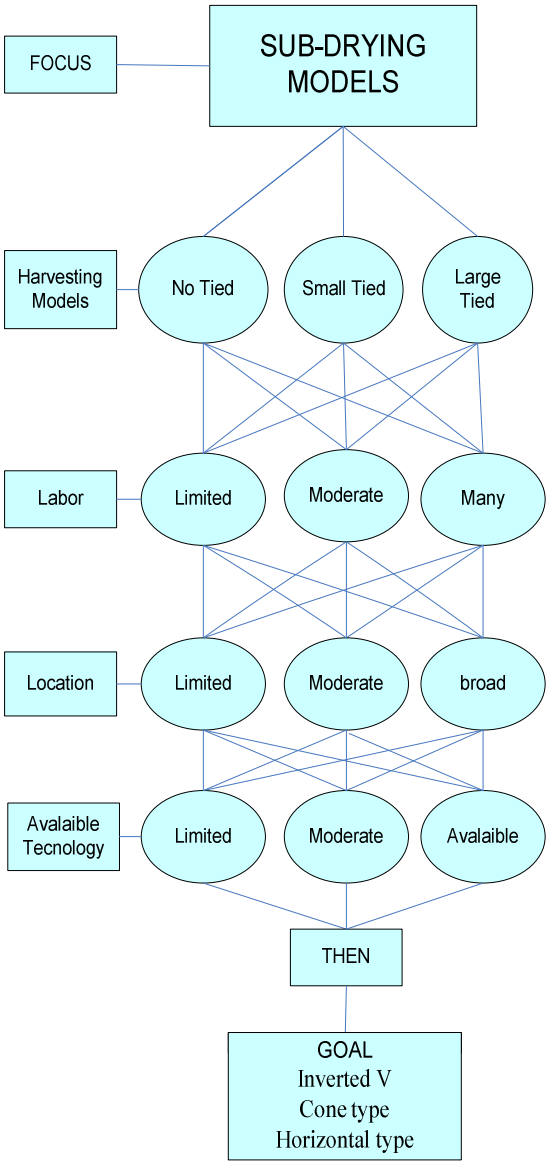


Fig. 9 Structure rule base sub- drying models

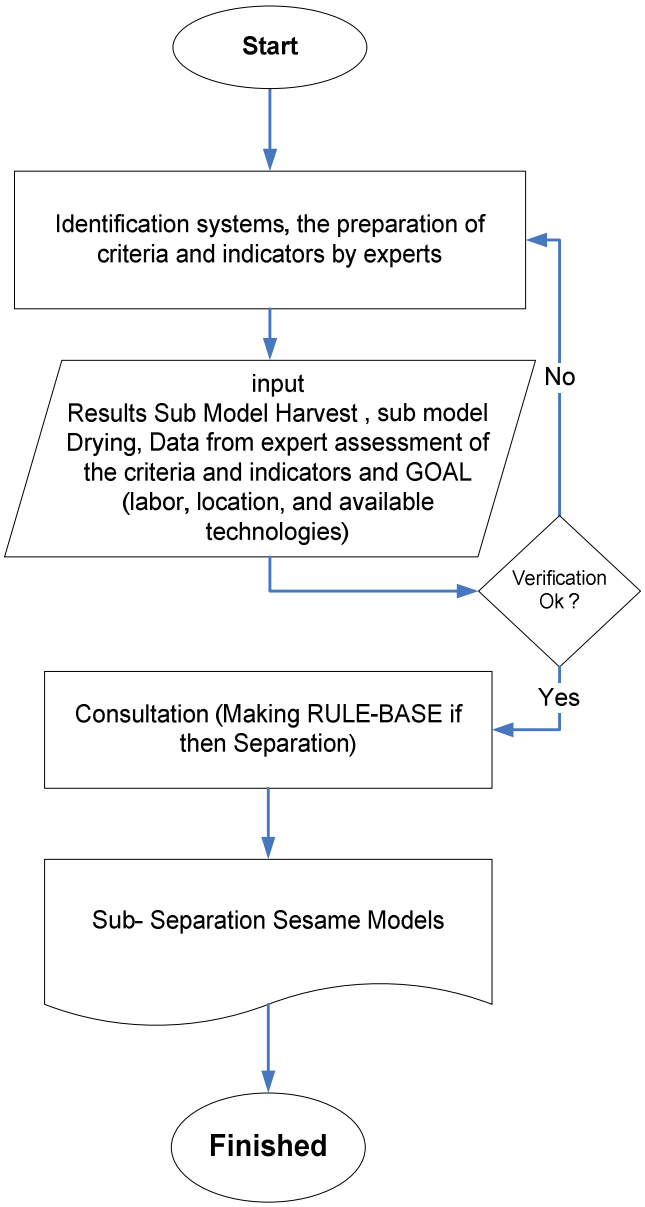


Fig. 10 Chart sub-model of separation of seeds

The next step in the harvest and post-harvest crop is sesame seed separation. Separation can positively impact seed crop results, no matter what size, the variations in density or which contaminants need to be removed. of standard operating procedure for separation, sub-models is considering harvesting submodels, workforce, location and availability of equipment/technology. Related to this sub-separation model, more seeds are presented in Fig. 10.

Sub-model of the separation of seed in Fig. 10, is an integral part of the previous sub-model. Therefore, it would be sub-models of effective and efficient separation.

The structure of the rule base sub-model separation sesame seeds, model based on criteria and indicators is presented in Fig. 11.

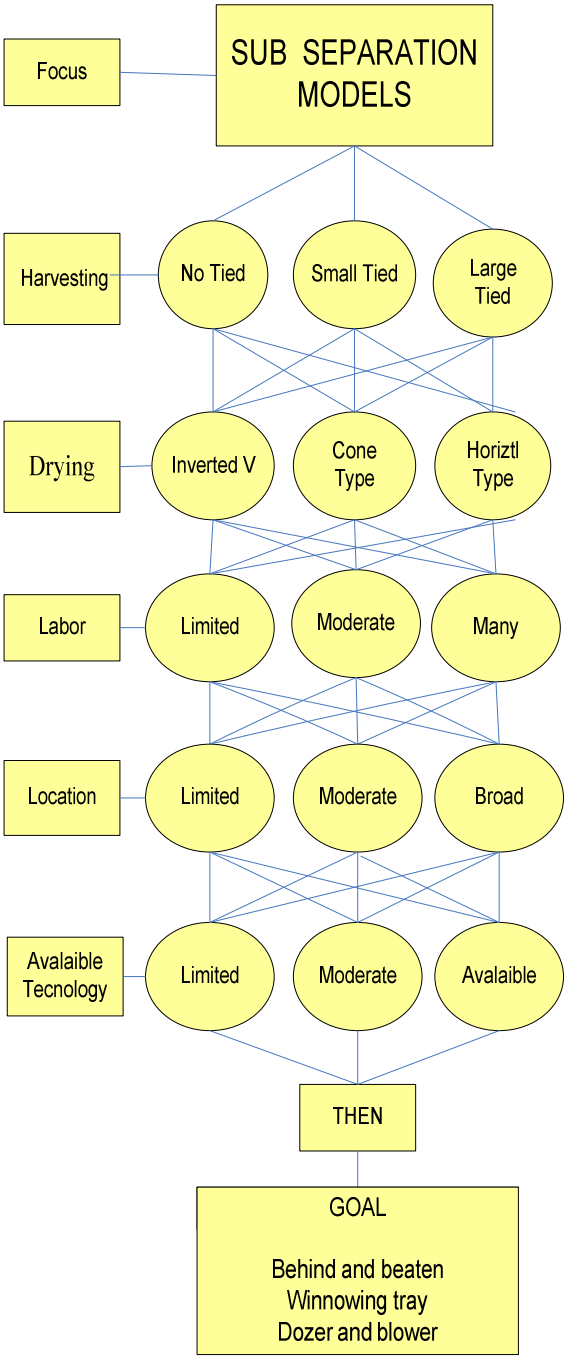


Fig. 11 Construction of sub-model of the separation of sesame seeds

The separation technique in Fig. 11, depends on how to do the harvest, labor, land area and the availability of technology that will determine a suitable method. Besides, it also determined the characteristics of the ease of pods or capsules to rupture or open sesame [20]-[21]. Of sub-models, it can be in use appropriately in decision-making, where each submodel of software is prepared separately in a simple yet comprehensive manner. Decision-making can be used to determine how to repair planting, varieties and harvesting equipment technique more effectively and efficiently. [22]. Rule-base can be arranged in each submodel as in Table 3.

## IV. Conclusions

The decision-making process can be obtained from the analysis of a series of mutually influence and can be a complex or holistic approach. Thus, the standard operating procedure is a comprehensive decision. The components of the model which consist of the plant, labor, location, willingness instrument will determine the decision of how to harvest, drying and separation of seeds namely:

Sub Model for Harvesting have three (3) alternative options namely no Bundles/tied, small bundles/ tied and large bundles/tied. Is also consider five (5) factors / criteria: varieties, planting models, labor, location, and availability of technology.

- Sub Model for Drying with three (3) alternatives namely inverted V, cones and horizontal models, to consider four (4) factors / criteria: harvest models, labor, location, and availability of technology and there are > 200 an opportunity decisions.
- Sub model for Separation with three (3) alternatives namely Behind and beaten, Winnowing tray and Dozer and blower, consider four (4) factors / criteria: drying models, labor, location and availability of technology and there are 729 an opportunity decisions.

## Acknowledgment

Thank you very much for supporting this research to (1) The Director General of Research and Community Service Director General of the Higher Education Ministry for Research Technology and Higher Education of the Republic of Indonesia. (2) The coordinator of Kopertis Region VII Surabaya, (3) The Rector of Merdeka Madiun University (4) The Chairman of the Institute for Research and Community Services Merdeka Madiun University.

TABLE III
THE IMPORTANT COMPONENT OF HARVEST MODELS

| Rule-Base (if) | Varieties | Planting Models | Labor | Area drying | Tecnology | *then* | Goal |
|---|---|---|---|---|---|---|---|
| 1 | No branch | Single Row | Limited | limited | limited | *then* | PN1 |
| 2 | No branch | Single Row | Limited | limited | Moderate | *then* | PN1 |
| 3 | No branch | Single Row | Limited | limited | Modern | *then* | PN1 |
| 4 | No branch | Single Row | Limited | Moderate | limited | *then* | PN1 |
| 5 | No branch | Single Row | Limited | Moderate | Moderate | *then* | PN1 |
| 6 | No branch | Single Row | Limited | Moderate | Modern | *then* | PN1 |
| 7 | No branch | Single Row | Limited | Wide | limited | *then* | PN1 |
| 8 | No branch | Single Row | Limited | Wide | Moderate | *then* | PN1 |
| 9 | No branch | Single Row | Limited | Wide | Modern | *then* | PNI |
| etc.. | etc.. | etc.. | etc.. | etc.. | etc.. | etc.. | etc.. |
| etc.. | etc.. | etc.. | etc.. | etc.. | etc.. | etc.. | etc.. |
| etc.. | etc.. | etc.. | etc.. | etc.. | etc.. | etc.. | etc.. |
| 213 | Branch | Squere | Many people | Moderate | Modern | *then* | PN2 |
| 214 | Branch | Squere | Many people | Wide | limited | *then* | PN2 |
| 215 | Branch | Squere | Many people | Wide | Moderate | *then* | PN2 |
| 216 | Branch | Square | Many people | Wide | Modern | *then* | PN2 |

Information: PN1 : Harvest Models 1
PN2 : Harvest Models 2

| Show at Table 3, the meaning of numbers : | | |
|---|---|---|
| 1 | if varieties is no branched, the planting models is a Single row, available labor is limited, area drying is limited, and available technology is limited | **Then:**<br>**The goal :** harvest **model** is No bundles/Tied<br>Harvest without bundles/ Tied :<br>It's how to harvest without No bundles/Tied and be placed on the spread because the available location and available technology make it easy for the next stage |
| 216 | if varieties is branched, the planting models is square, the available labor is many people, area drying is wide, and available technology is modern | **Then:**<br>**The goal :** harvest **model** is small bundles/Tied<br><br>Harvest small bundles/ Tied is a way to harvest small bunch by drying with inverted or cone with a separation behind and pounded |
| | If, ... | Then : |
| | Etc..... | |

## REFERENCES


[1] Budi,L.S"Application of plant cultivation techniques Sesame (*Sesamum indicum* L.) in increased production,"*AGRITEK*Vol 7, Marc, 2007.

[2] Ayana.G.N. "Status of Production and Marketing of Ethiopian Sesame Seeds (*Sesamumindicum* L.)": A Review. Agricultural and Biological Sciences Journal Vol. 1, No. 5 pp. 217-223, 2015,.

[3] Budi.LS."The nature Appearance Agronomist Sesame Germplasm (*Sesamum indicum* L),"*AGRITEK*Vol 5, Marc,2005.

[4] Budi.L.S, "Strategy and Structuring Development System Sesame Agroindustrial in Indonesia." International Journal On Advanced Science Engineering Information Technology. Vol 4. 2014

[5] Budi, LS "Correlation Study To The Land Component Content and Quality Some Genotype Sesame oil (*Sesamum indicum* L)". Agritek, Vol 12, pp. 26-35, 1 March 2011

[6] Budi. L.S."The Effect of Planing Method and Variety on Productivity of Sesame (*Sesamum indicum* L),"*Bulletin Agronomy* Vol 8, Aug. 2007.

[7] B. Uzun, E. Yol, S. Furat, M. Topakç, M. Çanakç, D. Karayel. "The Effects Of Diff Erent Tillage Methods On The Post-Wheat Second Crop Sesame: Seed Yield", Energy Budget, And Economic Return,"*Turk J Agric*,pp 399-407. 2012

[8] I.E. Ibrahim, A.E, Ahmed."Identification Of Factors That Influence Technical Efficiency Of Cash Crops Production (Sesame And Groundnut) In North Kordofan State, Sudan". *International Journal Of Scientific & Technology Research2277-8616* Vol. 3, Oct. 2014

[9] D.R. Langham, J. Riney, G. Smith,T. Wiemers. "*Sesame Harvest Guide*."Oklahoma: Sesaco,2008

[10] L.R.RandVerma."Post-Harvest Management of Pulses". Indian Institute of Pulses Research Kanpur Rep.208-024, Oct. 2007

[11] *Post-Harvest Handling Training Manual for Extension Workers No. 650-A-00-09-00003-00*, USAID, 2012.

[12] C.F. Lisboa1, D.D.A. Silva1, I.R. Teixeira1, A.J.Campos, I.A. Devilla, and A.G. Silva. "*Physiological quality of sesame seed harvested at different plant positions and maturity stages"* . African Journal of Agricultural Research. Vol. 11(30), pp. 2825-2832, DOI: 10.5897/AJAR2016.11102 Article Number: C931B4859778, 28 July, 2016

[13] Sutojo, T, Mulyanto, E & Suhartono, V, *Artificial intelligence*, Andi Offset, Yogyakarta. .2011

[14] Kusumadewi, Sri, *Artificial Intelligence (Teknik dan Aplikasinya)*, Graha Ilmu,Yogyakarta. 2003

[15] Marimin,"*Theory and Application of Expert System in Managerial Technology"* . Bogor: IPB Press. 2005.

[16] Oliver "Separation Technology for the Seed Industry". USA. 2012.

[17] Varsha.S, Gupta. S, Pattnaik.S,"AartiGoyal"A Novel Approach to GSA, GA and Wavelet Transform to Design Fuzzy Logic Controller for 1ϕ Multilevel Inverter", International Journal of Power Electronics and Drive System (IJPEDS) Vol. 7, No. 4, pp. 1200~1211, December 2016,

[18] A. Nadeem, S.D. Kashani, N. Ahmed, M. Buriro, Z. Saeed, F. Mohammad, S. Ahmed, "Growth and Yield of Sesame (*Sesamum indicum*. L.) under the Influence of Planting Geometry and Irrigation Regimes," *American Journal of Plant Sciences*, pp.980-986, April, 2015

[19] Djaeni.M, "Innovation And Dryer System Downstream Dehumidification Through Air With Zeolite For Improving The Quality Of Food Ingredients, UNDIP Press, 2016

[20] Bachubhai A. Monpara.and Devshibhai R. Vaghasia,"Optimizing Sowing Time and Row Spacing for Summer Sesame Growing inSemi-arid Environments of India.",Int.J.Curr.Res.Aca.Rev. 4(1):122-131. 2016

[21] St. Stamatov, M. Deshev. St. Ishpekov And R. Zaykov," Application Of The Subjective Independent Method For Evaluation Of Hybrid Materials Sesame (*Sesamum Indicum* L) In The Direction Of Mechanized Harvesting" Bulgarian Journal of Agricultural Science, 22 982–986, (No 6) 2016.

[22] Putri, R.E. Yahya, A. Adam, N.M. and Aziz, S.A, Performance Evaluation of Yield Monitoring System for Rice Combine Harvester in Selangor, Malaysia, IJASEIT, Vol.6 (2016) No. 1 ISSN: 2088-5334

[23] A. Z. Rakhman, *et al.*, " Fuzzy Inference System with Tsukamoto Method as a Gathering of Selection of Concentration Selection (Case Study: Department of Informatics UII), "in National Seminar on Information Technology Applications 2012 (SNATI 2012), Yogyakarta, 2012.