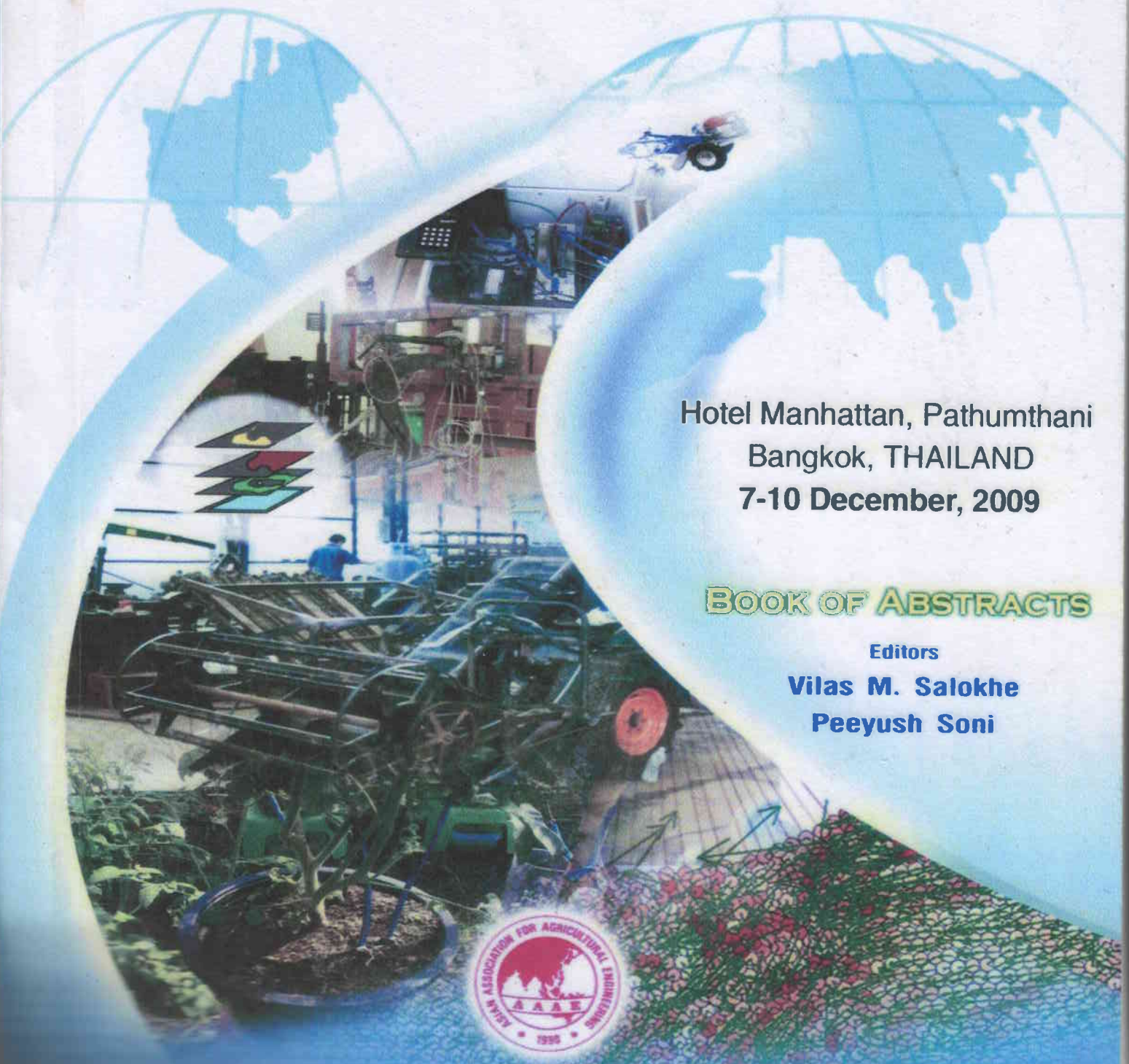
10th International Agricultural Engineering Conference

"Role of Agricultural Engineering in Advent of Changing Global Landscape"



Hotel Manhattan, Pathumthani
Bangkok, THAILAND
7-10 December, 2009

BOOK OF ABSTRACTS

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Published by:

Association for Agricultural Engineering

http://www.aaae.ait.ac.th

Published by the Asian Association for Agricultural Engineering (AAAE), Asian Institute of Technology, P. O. Box 4, Klong Luang, Pathumthani 12120, Thailand.

Based on the abstracts/papers received for presentation at the 10th International Agricultural Engineering Conference (IAEC) – 2009 held at the Hotel Manhattan at Klong Luang, Thailand, during December 7 – 10, 2009.

ISBN 978 974 8257 70 9

I. Vilas M. Salokhe, II. Peeyush Soni

Recommended citation:
International Agricultural Engineering Conference (IAEC), Book of Abstracts. Hotel Manhattan at Klong Luang (Thailand), 7 – 10 December, 2009. Vilas M. Salokhe and Peeyush Soni (Editors).

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Foreword

Agricultural Engineering profession is recognized as a key for high quality agricultural production. New agricultural engineering approaches and technological innovations are being introduced in different parts of the world for sustainable agricultural development. Such efforts enable efficient and sustainable use of limited resources and speed up the agricultural production. Currently, agricultural production system faces complex challenges due to increasing global food demands, diminishing natural resources and sourer impacts of climate change. Consequently, role of Agricultural Engineers is becoming increasingly important in context of this changing global landscape.

Asian Association for Agricultural Engineering (AAAE) is proud to provide an appropriate platform for the discussion and information transfer of new technological innovations, current researches, achievements and practical applications in all allied fields of agricultural engineering through its biennial event of International Conference. To address the approaches in successful handling of complex challenges, the theme of this conference is kept as "***Role of Agricultural Engineering in Advent of Changing Global Landscape***".

Tenth in its series, this conference is conceived to highlight and showcase the new developments, technological innovations and successes of the various research activities conducted by agricultural professional, including but not limited to, engineers, scientists, researchers, academicians, students, managers and entrepreneurs from different continents. Moreover, we also duly recognize the contribution of senior colleagues and encourage young professionals by felicitating their achievements.

Technical sessions at the conference are arranged systematically to cover the different areas of agricultural engineering, in alphabetical order, Agricultural Machinery and Management (AMM), Contemporary Topics in Agricultural Engineering (CTA), Food Engineering and Bioprocess Technology (FBT), Post Harvest Technology (PHT), Soil, Water, Irrigation and Drainage Engineering (SWIDE).

On behalf of the Conference Advisory and Organizing Committees of the International Agricultural Engineering Conference- 2009, I would like to express our sincere appreciation and gratitude to all the participants, colleagues and all those who in one way or another have brought forth valuable contributions to make this International Conference a resounding success!

Prof. Vilas M. Salokhe
Conference Convener, IAEC- 2009

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51	**Saeid Abbasi** Abstract ref: IAEC-**119** - AMM performance and evaluation of threshing unit in a single plant thresher	Graduate Student Department of Agricultural Machinery College of Agriculture University of Mohaghegh Ardabili, Ardabil **(Ezzatollah Askari Asli-Ardeh, Yousef Abbaspour-Gilandeh)** sabbasi8857@yahoo.com	
52	**Samaneh Shojaei** Abstract ref: IAEC-**120** - PHT coefficients of dynamic friction of paddy grains on various metal surfaces	Graduate Student Department of Agricultural Machinery College of Agriculture University of Mohaghegh Ardabili, Ardabil **(Ezzatollah Askari Asli-Ardeh, Yousef Abbaspour-Gilandeh)** samaneh_shojaei25@yahoo.com	
53	**Dr. Mohammad Hashem Rahmati** Abstract ref: IAEC-**127** - PHT effect of drier temprature and paddy moisture content on broken percentage and milling yield for high yielding varieties of paddy in north of iran	Assistant Professor Agricultural Machinery Eng. Dept. Islamic Azad University of Dezful, Dezful **(A. Hedayatipour, A. Rezaei Asl)** hmrahmati@yahoo.com	
54	**Rashidi Abolfazl** Abstract ref: IAEC-**131** - FBT the relation between some morphological and phenological traits of cuminum (cuminum cyminum) with grain yield	Faculty member Islamic Azad University Shahre-Rey branch **(Moraghebi Farhang)** ab_rashidi@yahoo.com	
55	**Majid Noori Mohammadie** Abstract ref: IAEC-**139** - SWIDE evaluation of the fao methods for calculation eto with limited data (case study: north west of iran) Abstract ref: IAEC-**140** - SWIDE evaluation of priestley–taylor method for estimating reference evapotranspiration (case study: north west of iran)	M.Sc student Tehran university Irrigation and Reclamation Engineering Department, Karaj **(Masoud Mohammadi, Abdolmajid Liaghat)** **(Masoud Mohammadi, Teymour Sohrabi)** m.noori.64@gmail.com	
56	**V. Rasooli Sharabian** Abstract ref: IAEC-**144** - AMM determination of agricultural mechanization indices according to traction power of common tractors in ardabil plain-iran	Department of Agricultural Machinery, Faculty of Agriculture, University of Mohaghegh Ardabili Ardabil **(Yousef Abbaspour-Gilandeh)** vrasooli@uma.ac.ir	
57	**Kamran Kheiralipour** Abstract ref: IAEC-**145** - PHT investigation on some engineering properties of wild pistachio of ilam, iran Abstract ref: IAEC-**151** - AMM fea optimization of tractor connecting rod	Ph.D.student Mechanical Engineering of Agricultural Machinery Dept., College of Biosystem Engineering Faculty of Agricultural and Natural Resources University of Tehran, Karaj **(K. Heidarbeigi, H. Ahmadi, A. Tabatabaeefar)** **(Mohammad Reza Asadi, Mansoor Rasekh, Ali Mohammad Borghei)** kamrankheiralipour@gmail.com	

o. Name/Ref/Abstract	Affiliation/Address	Country
Neda Poustizadeh Abstract ref: IAEC-**150** - SWIDE discharge prediction using fuzzy inference system (fis) and artificial neutral network (ann) (case study: zayanderood river)	M.Sc student Water Structures Engineering Faculty of Agriculture Tarbiat Modares University, Tehran **(Naeeme Najafi)** ava_882005@yahoo.com	Iran
Dr. Ali Reza Astaraei Abstract ref: IAEC-**156** - SWIDE urban solid waste compost leachate and vermicompost as foliar spray and root media on nutritional performance of phaseolus vulgaris l.	Associate Professor Ferdowsi University of Mashhad, College of Agriculture Department of Soil Science, Paradiz Compass Azadi Sq.-9177948974-1163 , MASHHAD alirezaastaraei@yahoo.com	Iran
Sadegh Afzalinia Abstract ref: IAEC-**157** - AMM effects of subsoiling on some soil physical properties and wheat yield in dryland conditions	Department of Agricultural Engineering Agricultural Research Center of Fars province Zarghan, Shiraz **(Ali Akbar Solhjou, Iraj Eskandari)** Sja925@mail.usask.ca	Iran
Dr. Hamid Mashhadi Meighani Abstract ref: IAEC-**165** - AMM design and manufacturing a new platform for rapeseed harvesting in iran	Assistant Professor Department of Agricultural Machinery Islamic Azad University Arak Branch hamid_mashhadi@yahoo.com	Iran
Fatholah Keshavarz Abstract ref: IAEC-**170** - CTA extension-education methods to support policies of green agriculture in iran	Scientific & Applied Center of Jihad-e-Keshavarzi Rasht Guilan **(Mohammad Sadegh Allahyari)** f_keshavarzshal@yahoo.com	Iran
Dr. Mohammad Sadegh Allahyari Abstract ref: IAEC-**171** - CTA perceptions of iranian extension professionals regarding target groups of extension system toward sustainable agricultural development Abstract ref: IAEC-**172** - CTA potentials of new information and communications technologies (icts) in agriculture sector	Assistant Professor Agricultural Extension & Education College of Agriculture Islamic Azad University, Rasht branch, Rasht **(Fatholah Keshavarz)** allahyarister@gmail.com	Iran
Dr. Bagher Emadi Abstract ref: IAEC-**173** - PHT aerodynamic properties of sunflower seed, kernel and its nut, azargol variety as a case study, as affected by moisture content and size Abstract ref: IAEC-**251** - PHT recognition of toughness on the basis of mechanical properties	Department of Agricultural Machinery Ferdowsi University of Mashhad, Mashhad **(Rasool khodabakhshian, Mohammad Hossein Abbaspour Fard, Mohammad Hossein Saiedirad)** bagher_emadi@yahoo.com	Iran
Dr. E. Velayati Abstract ref: IAEC-**176** - PHT some physical properties of berberies fruit (berberis vulgaris)	Department of Agricultural Machinery Ferdowsi University of Mashhad, Mashhad **(B. Emadi, M.H.saiedirad, M. khojastehpour)** ehsanvelayat@gmail.com	Iran
Dr. Ali Rasoulzadeh Abstract ref: IAEC-**179** - SWIDE evaluation of parameters estimation using inverse method in unsaturated porous media	Assistant professor Department of soil science, Faculty of Agriculture University of Mohaghegh Ardabili Ardabil, P. O. Box:179 arasoulzadeh@gmail.com	Iran

No.	Name/Ref/Abstract	Affiliation/Address	Cou
67	**Majid Raoof** Abstract ref: IAEC-**181** - SWIDE estimating saturated and unsaturated hydraulic conductivity in steady state in sloping lands	PhD Student Water science engineering Department University of Tabriz, Tabriz **(A. H. NAZEMI, S. A. A. SADRADDINI, S. MAROOFI)** majidraoof2000@yahoo.co.uk	
68	**Prof. Mahmood Shafai Bejestan** Abstract ref: IAEC-**184** - SWIDE manning's roughness of channels covered with different gravel shapes	Professor Shahid Chamran University Ahwaz **(Mohammad Bahramiyarahmadi)** m_shafai@yahoo.com	
69	**Prof. Mahmood Shafai Bejestan** Abstract ref: IAEC-**185** - SWIDE shorter stilling basin downstream of gates using rectangular elements on the bed	Professor Shahid Chamran University Ahwaz **(Kobra Neisi)** m_shafai@yahoo.com	
70	**Amin Masoumi** Abstract ref: IAEC-**186** - AMM measurement of specific energy consumption for grinding alfalfa chops by hammer mill Abstract ref: IAEC-**187** - AMM prediction of specific energy consumption in milling by some physical and mechanical properties of alfalfa grind	Assistant Professor Department of Agricultural Machinery Faculty of Agriculture Isfahan University of Technology, Isfahan **(Z. Ghorbani, A. Hemmat)** masoumi@cc.iut.ac.ir	
71	**Seyyed Jafar Hashemi** Abstract ref: IAEC-**190** - FBT analysis of the mechanism of fissure formation during the drying by differential scanning calorimetry	Department of Agricultural Machinery Engineering University of Agricultural & Natural Resource Sciences- Sari **(T. Kimura)** szhash@yahoo.com	
72	**M. Rasekh** Abstract ref: IAEC-**194** - PHT determination of some of physical and rheological properties of barley	Assistant professor Department of Agricultural Mashinery College of Agriculture, University of Mohaghegh Ardebili **(A. H. Afkari Sayyah, E. Aaskari Asli Arde)** ma_rasekh1349@yahoo.com.au	
73	**Seyed Mohammad Taghi Gharib-Zahedi** Abstract ref: IAEC-**197** - PHT determination of some physical, mechanical, chemical and thermal attributes of black seed (nigella oxypetala boiss) Abstract ref: IAEC-**198** - PHT effects of moisture content on some physical properties of castor seed (ricinus communis l) Abstract ref: IAEC-**207** - PHT some physical and mechanical properties of acorn (cv. ori)	Department of Food science, Engineering and Technology, Faculty of Biosystems Engineering, University of Tehran, Karaj **(Amin Taheri Garavand, Seyed Mohammad Mousavi, Manochehr Hamedi)** **(Amin Taheri Garavand, Seyed Mohammad Mousavi, Hosein Kiani)** **(Javad Mirarab Razi, Mahbobeh fos'hat, Vahid Etemad, Seyed Mohammad Taghi Gharib-Zahedi, Seyed Mahdi Alizadeh)** gharibzahedi@ut.ac.ir	
74	**Amin Taheri Garavand** Abstract ref: IAEC-**200** - PHT some of nutritional and engineering properties of sesame seed (sesamum indicum l.) Abstract ref: IAEC-**214** - PHT investigation of moisture-dependent physical and chemical properties of red lentil cultivated in iran	M.Sc student Department of Agricultural Machinary Engineering, Faculty of Biosystems Engineering, University of Tehran, Karaj **(Seyed Mohammad Taghi Gharib-Zahedi, Shahin Rafiee, Seyed Mohammad Mousavi)** **(Hojat Ahmadi, Seyed Mohammad Taghi Gharib-Zahedi)** amintaheri@ut.ac.ir	

Name/Ref/Abstract	Affiliation/Address	Country
Moslem sami Abstract ref: IAEC-**202** - AMM input–output energy analysis in apple production: a case study of esfahan province, iran	M.Sc student Department of Agricultural Machinary Engineering, Faculty of Biosystems Engineering, University of Tehran, Karaj **(Abbas Asakereh, Amin Taheri Garavand, Hojat Ahmadi)** amintaheri@ut.ac.ir	Iran
Javad Mirarab Razi Abstract ref: IAEC-**203** - PHT some physical and mechanical properties of acorn (cv. uri)	Department of Forest Engineering Faculty of Natural Resource University of Tehran, Karaj **(Mahbobeh fos'hat, Vahid Etemad, Seyed Mohammad Taghi Gharib-Zahedi, Seyed Mahdi Alizadeh)** javadmirarab@gmail.com	Iran
Keyvan shamsi Abstract ref: IAEC-**206** - AMM the effects of planting density on the trend of grain filling; yield and yield components of three chick pea (cicer anetinum l.) varieties in kermanshah	Islamic Azad University Kermanshah Branch **(Reza Shahriari)** shams2_k@yahoo.com	Iran
Ghahderijani Mohammad Abstract ref: IAEC-**208** - AMM evaluation and determination of energy consumption for potato production in various levels of cultivated areas in isfahan province of iran Abstract ref: IAEC-**209** - AMM economical analysis and determination of input - out put energy for wheat production in irrigated condition in iran (case study: western of isfahan province)	PhD Student Islamic Azad University Science and research campus Tehran branch **(Keyhani Alireza, Tabatabaeefar Ahmad, Omid Mahmood, Khaleghi Hamid)** **(Keyhani Alireza, Tabatabaeefar Ahamad, Omid Mahmood, Khaleghi Hamedani Hamid)** ghahderijani2005@yahoo.com	Iran
Ali Rasoulzadeh Abstract ref: IAEC-**211** - SWIDE effect of cow manure on infiltration and some soil physical properties on a sandy clay loam soil of ardabil, iran	Assistant Professor Department of soil science Faculty of Agriculture University of Mohaghegh Ardabili, Ardabil **(A. Yaghoubi, Sh. Asghari, A. Kanooni)** arasoulzadeh@gmail.com	Iran
Abbas Asakereh Abstract ref: IAEC-**215** - AMM investigate energy flow in sustainability of agriculture Abstract ref: IAEC-**216** - AMM energy consumption pattern and economic efficiency of dry farming chickpea in koohdasht county, iran Abstract ref: IAEC-**217** - AMM energy consuming in dry farming wheat in kuhdasht county of iran	Department of Agricultural Machinery Engineering Faculty of Biosystems Engineering, University of Tehran, Karaj **(Alireza keyhani, Moslem sami, Amin Taheri Garavand)** **(Alireza Keyhani, Hojat Ahmadi Mojtaba Safaienejad, Amin Taheri Garavand)** **(Shahin Rafiee, Hojat Ahmadi, Abolhasan Sadati, Mojtaba Safaienejad)** asakereh@ut.ac.ir	Iran
Hossein Reza Rouhi Abstract ref: IAEC-**218** - FBT the effect of different thermal treatments on germination and vigor indexes in bersim clover Abstract ref: IAEC-**219** - FBT the effect of osmothermal priming on germination traits of tall wheatgrass (agropyron elongatum (host) beauv.)	Department of Agronomy and Plant Breeding Faculty of Agriculture University of Tehran, Karaj **(Ahmad Noushkam, Yousef Sasani, Mostafa Sarrajchi)** **(Farzad Sharifzadeh, Mohammad Ali Abutalebian)** hosseinroohi@ut.ac.ir	Iran

No.	Name/Ref/Abstract	Affiliation/Address	C
82	**S. J. Hashemi** Abstract ref: IAEC-**220** - FBT effect of final moisture content on the quality and quantity properties of rice bran oil	Vice chancellor of Tehran Payame Noor University (PNU) Department of Agricultural Machinery Engineering, University of Agricultural & Natural Resource Sciences- Sari, **(Z. Lasemi)** szhash@yahoo.com	
83	**Reza Shahryari** Abstract ref: IAEC-**221** - FBT influence of potassium humate on ashes content in wheat flour under end drought Abstract ref: IAEC-**238** - CTA increasing biological yield of wheat by a humic substance	Academic Staff Member Agriculture Department Islamic Azad University, Ardabil Branch, **(Hassan Ali Hosseinpour)** **(Keyvan Shamsi)** rz_shahriari@yahoo.com	
84	**Dr. Mohammad Esmaeil Asadi** Abstract ref: IAEC-**225** - SWIDE evaluation of tape and furrow irrigation systems for two varieties of soybean under different irrigation managements	Assistant Professor Department of Agricultural Engineering Research Agricultural and Natural Resources Research Center of Golestan Province Gorgan **(Parisa Shahinrokhsar)** iwc977127@yahoo.com, shahinrokhsar@yahoo.com	
85	**Dr Arzhang Javadi** Abstract ref: IAEC-**229** - AMM development & evaluation of a variable rate liquid fertilizers for locally management in precise agriculture Abstract ref: IAEC-**230** - AMM developing and testing a horizontal sensor for measuring soil resistance on-the-go during tillage operation	Associate Prof., DG Agricultural Engineering Research Institute Karaj **(Behzad Behzadi Mackvandi)** **(Bahareh Jamshidi, Ahmad Sharifi Malvajerdi)** email2arzhang@yahoo.com	
86	**Dr. Abbas ali Dehpour joybari** Abstract ref: IAEC-**232** - FBT effect of gamma radiation on germination and embryogenic callusin rice (oriza sativa)	Faculty member Islamic Azad University Ghaemshar branch **(Massoud Moradi, R. Bishekolai, H. Yaghoobzade)** mr.massoud@yahoo.com, dehpour@gmail.com	
87	**Sayed Abolhasan Sadati** Abstract ref: IAEC-**234** - CTA survey effective factors on using of organic methods in iran: a case study rice cropping farmers in babol county	M.Sc student Department of Agricultural Extension and Education, Faculty of Agricultural Economics and Development, University of Tehran, Karaj **(Khalil Kalantari, Yasser Mohamadi, Hojat Ahmadi, Abbas Asakereh)** abolhasansadati@gmail.com, abolhasan_sadati@yahoo.com	
88	**Parvaneh Rahdari** Abstract ref: IAEC-**237** - FBT effect of gamma irradiation and salt stress on germination and embryogenic callus in rice (oryza sativa)	Teacher Islamic Azad university Tonekabon branch **(Parvaneh Rahdary, Dehpour A.A)** gholampour_mana@yahoo.com, dehpour@gmail.com, rahdari_parvaneh@yahoo.com	
89	**Behrooz Rasekhi** Abstract ref: IAEC-**257** - CTA vision inspection of ict in rural areas of kermanshah with swot and delphi technique	Islamic Azad university Kermanshah Branch **(A. Papzan, K. Zarafshani)** behroz_university@yahoo.co.uk	

Name/Ref/Abstract	Affiliation/Address	Country
Ramadhan Hamza Mohammed Abstract ref: IAEC-**169** - SWIDE protect cultivation by reducing soil erosion using gis technology in duhok dam watershed north-iraq (case study)	Dept. of Scientific Affairs University of Duhok ramadhan56_2000@yahoo.com	Iraq
Roseliza binti Kadir Basha Abstract ref: IAEC-**130** - FBT water vapour transmission rate of biomass based film materials	Student Graduate School of Agriculture Hokkaido University Sapporo 060-8589 **(Katsumi Konno, Hiroshi Kani, Toshinori Kimura)** toshibio@bpe.agr.hokudai.ac.jp, roselizakadir@hotmail.com	Japan
Mugiho Yokota Abstract ref: IAEC-**132** - FBT production of fermented pancake utilizing food processing byproducts, tofu (soybean curd) -residue and cheese whey	Laboratory of Agricultural Process Engineering Hokkaido university **(N. Shimizu, T. Kimura)** mugiho@bpe.agr.hokudai.ac.jp, toshibio@bpe.agr.hokudai.ac.jp	Japan
Dr. Ryozo Noguchi Abstract ref: IAEC-**189** - AMM system dynamics analysis for renewable energy utilization for alternative energy in automobiles	Faculty of Agriculture Utsunomiya University 350 Mine-Machi, Utsunomiya **(Mizuki Koyama)** noguchi@cc.utsunomiya-u.ac.jp	Japan
Francis Shire Chachi Abstract ref: IAEC-**125** - CTA importance of agricultural engineering for women farmers, and how more attention for them could make an enormous difference in this current food crisis	Programs Coordinator Performance Dynamics fchachi@gmail.com	Kenya
Mr. Juhyeon Ju Abstract ref: IAEC-**159** - AMM an experimental study on spray characteristics of biodiesel fuel Abstract ref: IAEC-**160** - AMM simultaneous reduction of smoke and nox with biodiesel fuel	Department of Mechanical Engineering, Chonbuk National University 664-14, 1ga, Dockjin-dong, Dockjin-gu Jeonju, Chonbuk 561-756 **(Youngtaig Oh, Seunghun Choi, Daehyun Lee)** **(Seunghun Choi, Youngtaig Oh, Kyusik Kwon, Kyoungchul Kim)** wnwngus83@chonbuk.ac.kr	Korea
Mr. Farhad Taghipour Abstract ref: IAEC-**126** - FBT the study of salt tolerance of iranian barley (hordeum vulgare l.) genotypes in seedling growth stages	PhD Student Department of Biotechnology University Technology Malaysia **(Fahrul Zaman Huyop)** taghipour.farhad@gmail.com	Malaysia
Zaimah Hasan Abstract ref: IAEC-**199** - AMM automatic rotating feeding mechanism for aqua applications	Mechanical Engineering Department, College of Engineering, Universiti Tenaga Nasional, KM7, Jalan Kajang Puchong 43009, Kajang, Selangor **(Mohd Azree Idris)** zaimah@uniten.edu.my	Malaysia
Dr. Enkhbayar Gonchigdorj Abstract ref: IAEC-**188** - AMM research on possibility of increased fuel economy while at operating of the diesel engine of the wheeled tractor	Director Director of Engineering school Mongolian State University of Agriculture miraj34@yahoo.com, enkhbayar@msua.edu.mn	Mongolia
Dr Eng , Professor Gantulga. G Abstract ref: IAEC-**192** - AMM research study on assessment the performance of an engine at dealer of agricultural tractor	Professor Secretary scientific in chief Mongolian State University of Agriculture Ulaanbaatar **(Ulziibaatar Ts)** gantulg@yahoo.com	Mongolia

No.	Name/Ref/Abstract	Affiliation/Address	C
100	**Hajia Salamatu Garba** Abstract ref: IAEC-**123** - CTA importance of agricultural engineering for women farmers' to boost food production	Executive Director- Women Farmers Advancement Network-(WOFAN) Kano salamatujgarba@yahoo.com	
101	**Engr. E.O. Atanda** Abstract ref: IAEC-**175** - AMM training of agricultural machinery operators and mechanics in nigeria – ammotrac perspective	Agricultural Mechanics and Machinery Operators' Training Centre (AMMOTRAC) Federal Department of Agriculture, P.M.B 636 Akure, Ondo State	
102	**F.T. Fayose** Abstract ref: IAEC-**201** - FBT product temperature response of cassava to different extrusion conditions	Department of Agricultural Engineering Rufus Giwa Polytechnic, Owo – Nigeria fayosesayo@yahoo.com	
103	**Dr. Muhammad Zafarullah Khan** Abstract ref: IAEC-**224** - CTA an analysis of professional competencies of agricultural extension officers to cope with problem of weeds in nwfp-pakistan	Assistant Professor Department of Agricultural Extension Education & Communication NWFP Agricultural University Peshawar zafarullah66@yahoo.com	F
104	**Prof. Ahmad-Ur-Rahman Saljoqi** Abstract ref: IAEC-**226** - AMM integrated management of potato-peach aphid, myzus persicae (sulzer)	Professor Department of Plant Protection NWFP Agricultural University Peshawar **(Imtiaz Ali Khan, Sadur-Rehman)** drsaljoqi@yahoo.com	F
105	**Dr. Javid Ullah** Abstract ref: IAEC-**227** - FBT storage of fresh tomatoes treated with 2% (cacl2) for the determination of optimum storage temperature	Professor Department of Food Science and Technology NWFP Agricultural University Peshawar javidullah@hotmail.com	F
106	**K.E.D. Sumanasiri** Abstract ref: IAEC-**158** - CTA research on production of polymer composites using natural fibres from agricultural wastes	Department of Mechanical Engineering PNG University of Technology, Private mail bag Lae. MP 411 **(Steve K. Ales)** skorokan@mech.unitech.ac.pg, ksumanasiri@mech.unitech.ac.pg, ksumanasiri@hotmail.com	Pap
107	**Dr. Ruel M. Mojica** Abstract ref: IAEC-**152** - PHT development, evaluation and optimization of a microcontroller-based mechanical coffee roaster for small-scale roasting	Chairperson, Department of Agricultural and Food Engineering Cavite State University Indang, Cavite **(Jessie C. Elauria)** ruelmojica@yahoo.com	Ph
108	**Saowaluk Taechutrakul** Abstract ref: IAEC-**124** - FBT utilization of palm shell charcoal adding in paper board for ethylene adsorption of fruit packaging	Department of Printing and Packaging Technology King Mongkut's University of Technology Thonburi, Bangkok 10140 **(Suchapa Netpradit, Krittika Tanprasert)** saowaluk_ying@hotmail.com	
109	**Jiraporn Benjaphragairat** Abstract ref: IAEC-**133** - AMM design and development of a mechanical device to insert cassava stakes vertically	Associate Professor Dept. of Agricultural Engineering, Faculty of Engineering King Mongkut's Institute of Technology Ladkrabang (KMITL) Chalongkrung Rd., Ladkrabang, Bangkok 10520 **(Sanyaluck Kingthong, Preechanun Srikaew)** kbjirapo@gmail.com, kbjirapo@kmitl.ac.th	

lo.	Name/Ref/Abstract	Affiliation/Address	Country
10	**Mohammad Naghi Eshtiaghi** Abstract ref: IAEC-**147** - FBT producing quick cooking rice (instant rice) by high hydrostatic pressure, supercritical carbon dioxide and conventional pretreatment methods Abstract ref: IAEC-**148** - FBT impact of high hydrostatic pressure on gel formation of low methoxyl pectin	Visiting Professor Mahidol University Department of Chemical Engineering **(Suthiwat Karavekphand, Sermchai Virojanakud)** **(Jarupan Kuldiloke)** mnorange1@hotmail.com	Thailand
11	**Rattapon Saengrayup** Abstract ref: IAEC-**166** - FBT effective moisture diffusivity of asparagus undergoing microwave-vacuum drying Abstract ref: IAEC-**167** - FBT prediction of mass and volume of marian using artificial neural network and regression models	Dept. of Food Engineering King Mongkut's University of Technology Thonburi 126 Pracha u-tid Rd., Bangmod, Toongkru, Bangkok **(Ampawan Tansakul, Mr. Rattapon Saengrayup)** **(Ampawan Tansakul, Mr. Rattapon Saengrayup)** ampawan.tan@kmutt.ac.th	Thailand
12	**Korakot Ittiwittayawat** Abstract ref: IAEC-**168** - FBT color degradation kinetics of papaya puree undergoing different evaporation methods	Dept. of Food Engineering King Mongkut's University of Technology Thonburi 128 Pracha u-tid Rd., Bangmod, Toongkru, Bangkok **(Ampawan Tansakul, Mr. Korakot Ittiwittayawat)** ampawan.tan@kmutt.ac.th	Thailand
13	**Napasiri Laosanguanek** Abstract ref: IAEC-**239** - FBT thin layer infrared radiation drying of turmeric slices	M.S. Student FEBT Asian Institute of Technology **(Rittichai Assawarachan, Athapol Noomhorm)** rittichai.assawarachan@gmail.com	Thailand
14	**Ms. Kingkan Pongtong** Abstract ref: IAEC-**246** - FBT vacuum drying kinetics of pomegranate arils	M.Sc student FEBT Asian Institute of Technology **(Rittichai Assawarachan, Athapol Noomhorm)** rittichai.assawarachan@gmail.com	Thailand
15	**Vikramsinh Shinde** Abstract ref: IAEC-**258** - PHT performance evaluation of commercial rice mill in chiplun tehsil, maharashtra, india	Student ASE, SERD AIT **Bharat Pawar and Sudhakar Padhye** vikramshinde97@gmail.com	Thailand
16	**Mr. Vikramsinh Shinde** Abstract ref: IAEC-**259** - CTA thailand orchid cooperative limited: a feasibility study and business plan	Student ASE, SERD AIT **Chananya Thimaporn, Phianphen Rattanarat, Thanasri Kongsompong, Kulthida Chalooddong and Sahdev Singh** vikramshinde97@gmail.com, dr.sahdevsingh@gmail.com	Thailand
17	**Mr. Khagendra Bharambe** Abstract ref: IAEC-**260** - PHT preparation of sapota mix fruit leather	Student ASE, SERD AIT **Girish Jawantre and Gayatri Kulkarni** khagendra007@gmail.com	Thailand
18	**Mr. Chakkrapong Taewichit** Abstract ref: IAEC-**261** - CTA alternative optimal integrated agriculture with ponds using multi-objective linear programming	PhD Student ASE, SERD AIT **(Dolores Mae N. Gicana, Peeyush Soni)** st104371@ait.ac.th	Thailand

No.	Name/Ref/Abstract	Affiliation/Address	Co
119	**Dr. Selçuk Arslan** Abstract ref: IAEC-**249** - AMM conventional and conservation tillage systems performance on two different soils in turkey	KSU College of Agriculture Dept. of Agricultural Machinery 46060 K.Maras **(Tayfun Korucu)** sarslan@ksu.edu.tr	
120	**Dr. Ali Aybek** Abstract ref: IAEC-**250** - CTA the effect of pm10 and pm2.5 pollution on feed mill workers	KSU College of Agriculture Dept. of Agricultural Machinery 46060 K.Maras **(Selçuk Arslan, Şanver Genç)** sarslan@ksu.edu.tr	
121	**Dr. Alex Keen** Abstract ref: IAEC-**253** - AMM force measurement between a tractor and a three point linkage mounted cultivation implement	Senior Lecturer Harper-Adams University College **(Madhav Gholkar, James Ward, Vilas M. Salokhe, Peeyush Soni)** 00008413@harper-adams.ac.uk	
122	**Mr. Suresh B. Lokhande** Abstract ref: IAEC-**134** - CTA assessment of planting date and climatic effects on soybean yields in thailand using glycim	Crop Systems and Global Change Lab, USDA-ARS Bldg 1, Rm 328, BARC-West, 10300 Baltimore Avenue Beltsville, MD 20705-2350 **(V. M. Salokhe, V. R. Reddy, D. Timlin)** sureshloks@gmail.com	
123	**Dr. V.R. Reddy** Abstract ref: IAEC-**153** - CTA testing the sensitivity of the cotton simulation model, gossym, for variable nitrogen, mepiquat chloride, water and modern cultivars	Crop Systems and Global Change Lab USDA-ARS, Beltsville, MD 20705 **(K. Raja Reddy, David Brand, Suresh Lokhande, Dennis Timlin)** vr.reddy@ars.usda.gov, Dennis.Timlin@ars.usda.gov, krreddy@ra.msstate.edu	

Factors Controlling the Development of Fruit Processing Industries:

A Case Study of East Java, Indonesia

by

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Abstract

Fruit Processing Industries (FPIs) in East Java, are a key part of agroindustrial activities there. In terms of economic development, these strongly contribute to creating employment opportunities and higher income. In relation to agroindustry, three basic components in any agroindustrial system are procurement of raw material, processing and marketing. How to encourage fruit processing, as an agroindustrial activity and area potential, has become a vital issue and a major priority for area development in East Java. Understanding the problems in FPIs would give support to success cases.

Based on a sample survey of five districts in East Java province (Banyuwangi, Jember, Lumajang, Probolinggo and Malang), this paper reviews controlling factors, based on three basic components of the agroindustrial system. The paper concludes that FPIs are technological problems showed a strong relationship with FPIs' overall performance. Achievement of technology tends to be a determinant factor in processing activities. Understanding these factors can aid policy makers of FPIs in designing and implementing appropriate programs.

Introduction

Agroindustrial sector as a sub-system of agribusiness, has unique advantages of utilizing agricultural raw material in agro-product processing. Some problems associated with the food industry found in other countries, are the shortage of raw material, quality, lack of continuous supply of seasonal raw material, inadequately trained labor force, costly imported packing material, and infrastructure and technological deficiencies (Hicks, 1991).

As agro-processed products are becoming very competitive in the world market, it is important to understand the problems faced by FPIs. The perception of problems by FPIs' owners or operators could influence their activities. For policy makers, understanding of such problems will aid in formulating policies conducive for the development of small and medium industries (SMIs) (Walsh, 1988).

Common criteria for classification of industries is the number of employees, small-scale (1-4 workers), medium scale (5-10 or 11-19 workers), and large-scale (20-99 workers). Small and medium industries are often considered together (Soon, 1984). For the developing countries, SMIs which still are fairly labor intensive, the criterion of employment of less than 50 workers is still applicable (Theng and Boon, 1996).

Mishra (1999) and Tambunan (2000) reported that the most SMIs are still using traditional technology for processing. Tambunan and Keddie (1998), from their study on SMIs in Yogyakarta, revealed that with simple technology and low skill, the ability of SMIs to make innovations in their product and production process will be very limited.

Krishnankutty (2000) in his study argued for setting up the society to facilitate SMIs activities and help adoption of technology.

Tambunan (2000) revealed that passive marketing, selling product locally, unstable demand, difficulties in transportation, limited market and dependence on retailer or wholesalers for marketing are common problems in SMIs.

This study identified the determinant factors in fruit processing industries (FPIs) which are including small and medium fruit processing industries (SMFPIs) and big fruit processing industries (BFPIs). The data used for analysis was obtained through a survey conducted in the study area.

Methods

A questionnaire was prepared to obtain required data from the selected industries. The questions were related to procurement of raw material, processing, and marketing activities. Questions were designed to assist in analyzing current status of SMFPIs. A few other factors felt to be relevant to the local context were included too. The question styles employed were questions requiring open and closed responses and others which used a Likert scale to obtain attitudinal data. Respondents were encouraged to include other useful information based on their individual experiences and knowledge.

Questionnaire was addressed to 63 fruit processing SMIs randomly chosen from five districts in East Java consisting of Banyuwangi, Jember, Lumajang, Probolinggo and Malang. These five districts are major supplier of fruits in Indonesia and provide significant amount of raw material to fruit processing SMIs. The questionnaire was filled in during visits, meetings and interviews with key person or representative of SMFPIs.

This study identified the determinant factors in small and medium fruit processing industries (SMFPIs) and big fruit processing industries (BFPIs). Correlation analysis was used to determine factors which has strong relationship among basic component factors, total score and total sales as determinant factors. The total score and total sales of industries are represented the industry performance. The detail factors of basic components used are:

1. **Company Profile** factors: (1) time existence, (2) age of owners, (3) education, (4) technology used, (5) number of employee.
2. **Procurement of Raw Material** factors: (1) ways of procurement, (2) resource, (3) quantity, (4) continuity, (5) purchasing power, (6) quality, (7) handling and transport, and (8) storage facility.
3. **Processing and Technology Activity** factors are divided into three parts. The first part is **processing activity**: (1) technological achievement, (2) technological problem, (3) quality achievement, (4) location of raw material, (5) location of market, (6) transportation, (7) others processing facility, and (8) product defect. The second part is **activity control**: (9) scheduling of raw material, (10) inventory, (11) capacity testing, (12) contamination, (13) temperature control, (14) chemistry control, (15) nutrition, and (16) packaging. The third part is **training experiences** which include: (17) raw material handling, (18) technology, (19) general management, (20) organization, (21) capital source, (22) marketing, and (23) quality control.
4. **Marketing Activity** factors: (1) consumer level, (2) place of sale, (3) using of label, (4) selling area, (5) product appearance, (6) packaging, (7) color, (8) taste, and (9) promotion.

This analysis based on the score of the questionnaire filled by industries (SMFPIs and BFPIs) consist of raw material, processing and marketing. The result of analysis is classified based on the following criteria: very strong with r value 0.80 to 1; strong with r value 0.60 to 0.79; medium with r value 0.40 to 0.59; weak with r value 0.20 to 0.39; very weak with r value 0 to 0.19.

Result and Discussion

5.4.1 Identification of Determinant Factors in SMFPIs

Table 1 shows that education (r=0.72) and technology (r=0.66) have strong relationship with marketing activity. This indicates that education and technology are considered as determinant factors of marketing activities. Through higher education level, the owners or managers have more ability to market their products. Higher level of technology is required to maintain better quality of product that strongly affect to higher total sales.

Table 1: Relationship (r) between SMAIs Profile and Basic Components of Agroindustries.

Factors	Raw material	Processing	Marketing
Time existence (year)	-0.12 (very weak)	-0.20 (weak)	-0.32* (weak)
Age of owners	-0.15 (very weak)	-0.16 (very weak)	-0.09 (very weak)
Education	0.37**(weak)	0.49**(medium)	0.72**(strong)
Technology Used	0.23 (weak)	0.48**(medium)	0.62**(strong)
Number of Employee	0.44**(medium)	0.42**(medium)	0.46**(medium)

**. Correlation is significant at the 0.01 level (2-tailed)

*. Correlation is significant at the 0.05 level (2-tailed)

Table 2 shows that storage has strong relationship (r=0.60) with the total score as the performance of SMFPIs. This indicates that storage is the most important factor in raw material procurement in SMFPIs. This study revealed that storage facilities need to be improved to maintain better quality raw material quality strongly affect finished product quality. Quantity and quality of raw material are other factors with significant medium positive relationship (r=0.55 and r=0.53) tends to be a strong factors. Better quality and quantity of raw material supply strongly affect processing activity and finished product.

Table 2: Relationship (r) among Raw material Factors, Total Score and Total Sales

Raw Material Factors	Total score		Total sales	
	r	Criteria	r	Criteria
Obtaining of RM (procurement)	0.24	Weak	0.06	very weak
Resource	0.38**	Weak	0.08	very weak
Quantity	0.55**	Medium	0.18	very weak
Continuity	0.47**	Medium	0.30*	weak
Purchasing power	0.48**	Medium	0.09	very weak
Quality	0.53**	Medium	0.27*	weak
Handling and transport	0.49**	Medium	0.36**	weak
Storage	0.60**	Strong	0.23	weak

**.Correlation is significant at the 0.01 level (2-tailed).
*.Correlation is significant at the 0.05 level (2-tailed).

Three parts of processing factor consists of processing activities, control activities and training experiences were evaluated. Table 3 shows that technological problem has strong relationship (r=0.60) with total score as a performance of processing activities. Related to technological aspect, achievement technology has medium relationship (r=0.57) tends to be a strong relationship. This indicates that those two factors dominate the processing activities in SMFPIs. This also related to capital investment and skill of operator as major problems in technological aspect. Most of SMFPIs are still using traditional and simple technology strongly affect to product quality. Up grading

technology as one of processing activities is suggested to improve quality of finish products and SMFPIs' performance.

Table 3: Relationship (r) among Processing and Technology Factors, Total Score, and Total Sales

Processing Factors	Total score		Total sales	
	r	Criteria	r	criteria
Processing Activity				
Achievement of technology	0.57**	Medium	0.12	very weak
Technological problem	0.60**	Strong	0.15	very weak
Quality achievement	0.54**	Medium	0.13	very weak
Location of Raw material	0.32**	Weak	0.11	very weak
Location of market	0.44**	Medium	0.01	very weak
Transportation	0.47**	Medium	0.07	very weak
Other facilities (electricity & water)	0.36**	Weak	0.33**	weak
Defect products	0.24	Weak	0.24	weak
Control Activity				
Scheduling of raw material	0.63**	Strong	0.08	very weak
Inventory	0.69**	Strong	0.23	very weak
Capacity testing	0.74**	Strong	0.12	very weak
Hygiene test	0.01	very weak	0.01	very weak
Contamination	0.22	Weak	0.15	very weak
Temperature control	0.42**	Medium	0.22	weak
Chemistry control	0.18	very weak	0.08	very weak
Nutrition	0.37**	Weak	0.20	weak
Packaging	0.40**	Medium	0.30*	weak
Training Experience				
Raw material handling	0.17	very weak	0.09	very weak
Technology	0.47**	Medium	0.08	very weak
General management	0.68**	Strong	0.24	weak
Organization	0.25**	Weak	0.04	very weak
Capital source	0.49**	Medium	0.16	very weak
Marketing	0.49**	Medium	0.15	very weak
Quality control	0.51**	Medium	0.04	very weak

**.Correlation is significant at the 0.01 level (2-tailed).
*.Correlation is significant at the 0.05 level (2-tailed).

Table 5.7 shows that scheduling for procurement of raw material, inventory, and capacity testing have strong relationship (r=0.63, r=0.69, and r=0.74) with the total score as a performance of processing activities in SMFPIs. Scheduling of raw material supply strongly to the continuity of processing process. Inventory system is needed to maintain

the quality of raw material to be processed. This study revealed that some of SMFPIs pay low attention for scheduling, providing inventory system, and conducting capacity test.

In term of training experience, Table 3 shows that general management has strong relationship (r=0.68) with total score as performance of the SMFPIs. This indicates that general management training was strongly required to improve the SMFPIs' performance. Government officer including training center was suggested to improve facilities and material of training program to support SMFPIs to reach better performance.

Table 4: Relationship (r) among Marketing Factors, Total Score and Total Sales

Marketing Factors	Total score		Total sales	
	r	Criteria	r	criteria
Consumer level	0.50**	Medium	0.13	very weak
Market channel (place)	0.62**	Strong	0.03	very weak
Using of label	0.65**	Strong	0.31*	weak
Selling area	0.60**	Strong	0.36**	weak
Product appearance	0.65**	Strong	0.24	weak
Packaging	0.89**	very strong	0.32**	weak
Color	0.58**	Medium	0.17	weak
Taste	0.70**	Strong	0.06	weak
Promotion activity	0.72**	Strong	0.26*	weak

**.Correlation is significant at the 0.01 level (2-tailed).
*.Correlation is significant at the 0.05 level (2-tailed).

Table 4 shows that packaging has very strong relationship (r=0.89) in marketing activities. Market channel (r=0.62), using of label (r=0.65), selling area (=0.60), product appearance (r=0.65), taste (r=0.70), and promotion activities (r=0.72) have strong relationship with total score. This study revealed that packaging was the most common activities in SMFPIs particularly in marketing activities. On the quality factors packaging tends to be a strong factor. Some of SMFPIs did packaging in simple and traditional way that strongly affects quality and appearance of product. Considering the problems and the strong factors found in this study, it was suggested to improve marketing activities supported by facilities to achieve better performance of SMFPIs.

5.4.2 Identification of determinant factors in BFPIs

Table 5 shows that time existence of industries has strong positive relationship (r=0.60) with marketing activities of BFPIs. This indicates that the existence of big industries has strong effect to marketing performance. Time existence represents the market share of the company or the product. Longer of time existence gives more chance to reach bigger market. Technology used or level of technology has medium relationship (r=0.55) tends to be a strong relationship with raw material activities. Particularly in BFPIs, higher technology used has strongly relationship with large quantity of raw material requirement in processing activities.

Table 5: Relationship (r) between BFPIs profile and basic components

Company Profile	Raw Material	Processing	Marketing
Time existence (year)	-0.15 (very weak)	-0.11 (very weak)	0.60* (strong)
Age of owners	0.51 (medium)	0.43 (medium)	0.40 (medium)
Education	0.05 (very weak)	0.30 (weak)	0.20 (weak)
Technology used	0.55 (medium)	0.42 (medium)	0.42 (medium)
Number of employee	0.15 (very weak)	0.26 (weak)	0.07 (very weak)

**.Correlation is significant at the 0.01 level (2-tailed).
*.Correlation is significant at the 0.05 level (2-tailed).

Table 6 shows that continuity and resource have very strong and strong relationship (r=0.81 and r=0.70) with total score as a performance in big industries. Continuity of raw material was strongly required by BFPIs to support processing activities. This study revealed that BFPIs procured raw material requirement mostly from market and contract system to maintain the continuity of raw material supply. Related to large quantity and continuity of raw material, BFPIs supplied the requirement from other districts as a resource of raw material.

Purchasing power (r=0.55) and quality of raw material (r=0.56) tend to be a strong factor in raw material activity. This study also revealed that there was a competition to buy raw material in the market, because of large quantity requirement. Most of big agroindustries (89 percent) agreed that quality was the driven factor that has strong effect to the consumers.

Table 6: Relationship (r) between Raw material Factors and Total Score

Raw Material Factors	Total score	
	r	Criteria
Obtaining of RM (procurement)	0.06	Very weak
Resource	0.70*	Strong
Quantity	0.43	Medium
Continuity	0.81*	Very strong
Purchasing power	0.55	Medium
Quality	0.56	Medium
Handling and transport	0.11	Very weak
Storage	0.22	Weak

**.Correlation is significant at the 0.01 level (2-tailed).
*.Correlation is significant at the 0.05 level (2-tailed).

Table 7 shows that technological problems, location of market and defect product have strong and very strong factors relationship (r=0.60, r=0.73, and r=0.89, respectively) in processing activities. Higher technology plays important role for big agroindustries to maintain better quality of product and to reduce defective products. Most BFPIs (89%) agreed that technology was the driven factor of activity support the quality of product. This indicates that technology is still a determinant factor to support better quality.

In case of control activities, all of the factors have the strong and very strong relationship to the performance of BFPIs. This indicates that better control activities strongly affect to better performance of BFPIs. This study revealed that all of control activities were done perfectly by BFPIs to maintain better quality of products. Especially in contamination control, it has very strong relationship, stronger than other factors. In

some BFPIs like banana pure product and fruit chips, contamination control practiced in perfect condition. To maintain this perfect condition BFPIs provided in high technology.

In case of training experience (Table 7), raw material and organization have strong relationship (r=0.60 and r=0.77) with total score as the performance of BFPIs. This indicates that these training programs strongly affect better performance of BFPIs. Better raw material handling influences strongly to the quality of finished product. Large quantity of raw material supply needs better handling process to maintain the quality of raw material. Training experience in organization is strongly required to manage complicated process in BFPIs and to improve the performance in general.

Table 7: Relationship (r)between processing factors and total score

Processing Factors	Total score	
	r	Criteria
Processing Activity		
Achievement of technology	0.54	Medium
Technological problem	0.60*	Strong
Quality achievement	0.46	Medium
Location of Raw material	0.23	Weak
Location of market	0.73*	Strong
Transportation	0.13	Very weak
Other facilities (electricity & water)	0.46	Medium
Defective products	0.89**	Very strong
Control Activity		
Scheduling of raw material	0.71*	Strong
Inventory	0.71*	Strong
Capacity testing	0.71*	Strong
Laboratory test	0.71*	Strong
Contamination	0.89**	Very strong
Temperature control	0.71*	Strong
Chemistry control	0.74*	Strong
Nutrition	0.74*	Strong
Packaging	0.71*	Strong
Training Experience		
Raw material handling	0.60	Strong
Technology	0.52	Medium
General management	0.04	Very weak
Organization	0.77*	Strong
Capital source	0.43	Medium
Marketing	0.27	Weak

Quality control	0.44	Medium

**.Correlation is significant at the 0.01 level (2-tailed).
*.Correlation is significant at the 0.05 level (2-tailed).

Table 8 shows that market channel, product appearance, packaging and color of product have strong and very strong relationship (r=0.60, r=0.71, r=0.85, and r=0.63, respectively). This indicates that these marketing factors strongly affect to the performance of BFPIs. Better market channel or product distribution helps the consumer to find the products easier. Packaging, product appearance and color are often used as first consideration in buying process. Better packaging, product appearance and color are still suggested to BFPIs to maintain better product quality.

Table 8: Relationship (r)between Marketing Factors and Total Score

Marketing Factors	Total score	
	r	Criteria
Consumer level	0.43	Medium
Market channel (place)	0.60*	Strong
Using of label	0.14	Very weak
Selling area	0.56	Medium
Product appearance	0.71*	Strong
Packaging	0.85**	Very strong
Color	0.63*	Strong
Taste	0.43	Medium
Promotion activity	0.28	Weak

**.Correlation is significant at the 0.01 level (2-tailed).
*.Correlation is significant at the 0.05 level (2-tailed).

Through identification of strong factors in fruit processing industries includes SMIs and BIs, their owners, operators and managers, may prepare themselves, through a varieties of activities such as information for technology, education and training program. Another, this identification also helps to training organizations, external consultants to identify areas of training and consulting. As well as for the policy maker, support their areas of greatest potential for improvement in fruit processing sector.

Conclusions

In terms of determinant factors of SMFPIs, education and technology found to have a strong relationship with marketing. Storage was strongly related to raw material procurement activities. Technological problems showed a strong relationship with SMFPIs' overall performance. Achievement of technology tends to be a determinant factor in processing activities. Procurement of raw material, inventory system and capacity testing should be considered as determinant factors of control activities.

Time of existence showed strong relationship with marketing activities of BFPIs. Resources availability and continuity of raw material are considered as determinant factors in raw material procurement activities. Technological problems, location of market and defective products are the determinants factors in processing activities.

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