International Journal of Advanced Research in Commerce, Management &Social Science (IJARCMSS)
ISSN :2581-7930, Impact Factor : 6.809, Volume 05, No. 04(II), October-December, 2022,pp 135-143

AGRICULTURAL PRODUCTS WASTE MANAGEMENT: PAST, PRESENT, AND FUTURE IN ERODE DISTRICT

Mr. J. Balaji*
Dr. R. Prabusankar**

ABSTRACT

Agricultural waste is various agricultural operations. It comprises compost and other wildernesses from ranches, poultry houses, and slaughterhouses; produce waste; manure run-off from fields; insecticides that arrive into the water, air, or soils; and salt and deposit exhausted after fields care manure and dirtied waters out of surface and groundwater and controlling the application of manure nutrients to cropland such that nutrients are available in the right quantity, at the correct stretch, and the right place. These include composting and recycling, which can help protect the environment. Organic fertilizers can be reprocessed, and animal waste can be used in composting – both permit farming land to succeed. Cultivated residues such as straw, winery waste, or compost can be improved and transformed into nourishment, liveliness, ingredients, and fragments offering both monetary and environmental benefits, approach a society uses to position, diminish, reprocess, and avert waste. Imaginable left-overremoval methods are reutilizing, composting, burning, and landfills. Agricultural awareness requires a sympathetic to elementary concepts connected to cultivation, and their impacts on the communal and financial life of the humanity, an understanding of the agricultural products, Major Crops utilized in the Agri land, and a level of awareness of Agri-waste. Functions of Awareness in Agri Waste Management Systems and their Types of Agri waste and finally, major problems faced by the Farmers and methods of Disposing of Food Waste.

Keywords: *Agri, Market, Product, Waste, Management, Cropped Area.*

Introduction

Agriculture is the most overriding sector in the economy of the state. Around 70 percent of the state's population in Tamil Nadu. Major fruit crops are Banana, Mango, Citrus, Grapes, Guava, Sapota, Papaya, and Pine -apple. These are grown in 2,93,146 Ha mainly in districts like Krishnagiri, Dindigul, Thirunelveli, Vellore, Theni, Erode, Trichy, Thiruvallur, Dharmapuri, and Madurai. Major Vegetable crops grown are Tapioca, Onion, Tomato, Potato, Brinjal, Bhendi, Drumstick, beans, and Carrot in an area of 2,26,502 Ha mainly in districts like Namakkal, Salem, Dharmapuri, Trichy, Tirupur, Dindigul, Erode, Villupuram, Krishnagiri, Preambular, Nilgiris and Theni Districts.

Tea, Coffee, Rubber, and Cashew are important Plantation Crops grown in an area of 2,32,988 Ha in Districts like Nilgiris, Ariyalur, Cuddalore, Kanyakumari, Dindigul, Coimbatore, Pudukkottai and Salem. Growing day by day due to high export prospects. Flowers are grown in an area of 25309 ha in districts like Dindigul, Dharmapuri, Krishnagiri, Salem, Madurai, Tirunelveli, Thiruvallur, Vellore, and Tiruvannamalai. Medicinal and Aromatic crops like Gloriosa, Senna, Coleus, Lemon-grass, and Periwinkle are grown in an area of 11,230 Ha., in districts like Virudhunagar, Dindigul, Thiruvallur, Ariyalur, Madurai, Thiruvarur, Dharmapuri, Salem, Nagapattinam, Trichy.

* Ph.D. (Part-Time) Research Scholar, D J Academy for Managerial Excellence (An Exclusive B-School), (Affiliated to Bharathiar University), Coimbatore, Tamil Nadu State, India.
** Professor, D J Academy for Managerial Excellence (An Exclusive B-School), Coimbatore, Tamil Nadu State, India.

Agricultural wastes are defined as the residues from the growing and processing of raw agricultural products. Agricultural Waste Management for ecological agriculture and sustainable development has become an issue of concern for policymakers Hai & Tuyet (2010).

Erode lies in the northeastern part of the South Indian state of Tamil Nadu and is located about 400 kilometers southwest of the state capital, Chennai. Agriculture plays a significant role in the economy of the district, as the mainstream of the inhabitants be contingent on gardening for their livelihood. The district constitutes 4.8 out of a hundred of the topographical area and 4.0 percent of the net cropped area of the state. The cropping intensity and the area under irrigation of the district constitute 109 % and 70.40 % as against the state average of 117 percent and52.80 percent respectively.

Review of Literature and Research Gap

Agricultural Waste

Emphasizes the idea of waste preclusion complete the utilization of all Uyen Nguyen Ngoc (2009) wildernesses as development contributions, important to the opportunity of creating an ecosystem in a loop of materials. Asadi et al (2010) imperative that wheat berry waste management requirements to be habitually and long-time programming with courtesy to grower and persons tutoring Mushtaq Ahmed Memon (2010).

Shen et al (2011) ensure waste minimization, waste conversion, and utilization. The agri-food business is dependent on different partners such as farmers, trading agents, government, and consumers; therefore, to sustain this business and curb the losses, in terms of waste, the synchronization among the stakeholders is essential Gustavsson et al., (2011).

Agri-food products have an increasing demand for the rapidly increasing population across the globe; the increase in population has been noticed from 2.5 billion in the 1950s to 6.9 billion in 2010 which could reach up to 9.15 billion in the 2050s Alexandratos & Bruinsma (2012). Waste is used for the needs of agriculture (organic fertilizer, litter, and livestock feed), some for other sectors of the economy, and the rest of the biomass is left unused and often recycled (incinerated, dumped) without any benefit. Much of the unused biomass seems appropriate to involve in energy production (Geletukha & Zhelyezna, 2014).

Obi, Ugwuishiwu & Nwakaire (2016) the effects of these toxic agricultural wastes on the environment were discussed as well as their management model the drivers. Ankur Chauhan (2018) evidence broadcasting, and training & awareness programs for farmers are most vital for tackling the issue.

Oluseun et al (2021) farming solid wastes, their probable risks, and Andreichenko et al (2021) formal pointers are required for the efficiency of farmed non-waste construction. Awogbemi & Von Kallon (2022)various pretreatment practices aimed at improving the biodegradability and digestibility of agricultural lignocellulosic biomass. Performs such as physical, chemical, biological, and physicochemical as well as the different green reread and highlighted to improve their viabilityand pertinence, assistances, and problems of the numerous pretreatment techniques to accompanying enrich the fiction and arouse renewed inquiries in the research space, farming waste conversion and utilization. Implementation of policies and Guo (2021) rules that encourage waste reduction, reutilization, recycling, and regeneration that can eventually settle the construction sector towards zero waste is required Pattanaik et al (2019).

Product Processing Waste

Waste from fruit and plant dispensation is similar in nature to the food itself. Some processes give rise to large volumes of weakly polluted effluents such as vegetable washing water, which only contains soil and small amounts of organic matter. More concentrated wastewaters Nemerow and Agardy (1998) come from processes that either prepare the food or transform it in some way, such as the blanching of vegetables.

Cannery effluents are basically the similar as domestic kitchen waste. The waste originates from trimming, culling, juicing, and blanching of fruit and vegetables. The wastewaters are high in suspended solids, and colloidal and softened biological material, the main components being starch and fruit sugars. 85% to 90% of the organic waste Nemerow and Agardy (1998).

Mundada (2004) Conservational and work-related threats related to e-waste processing are outlined by since hazardous substances and their configuration, means of handling, and processing

arrangement and operational plan etc. The wastes chiefly crop residues and animal waste (manure). Sabiiti, Bareeba, et al (2005) renewable, and almost free; hence they can be a significant reserve, Parfitt et al (2010) food waste produced by food source shackles, several developing and industrialized nations have inspected waste levels at each stage in the supply chain agricultural wastes can be used to augment nutrition sanctuary.

Sabiiti, Akgul & Macaroglu (2011) Agricultural awareness requires an, "Agricultural Waste" refers to waste from the farm and/or livestock or similar. Among the different types of residues, the present work regards the following: used tires, used oils, packaging from plant protection products, veterinary products packaging, and plastics non-hazardous. The final destination of those residues on the island is established by law and involves penalties for undue disposal IRA (2012).

Need for improvement on the existing waste management system in these Edwin (2014) farms to curb the environmental impact of these wastes. Furthermore, increasing food production will also result in larger amounts of food waste being produced. As a consequence, food wastage is becoming a major factor in Papargyropoulou et al (2014) in addressing long-term sustainability and food security.

Lopes et al (2015) several practices to appraise the conservational impressions of processes, counting those of waste management, indicators that give information on relevant environmental aspects. A proportional conservation calculation between a valorization process was developed.

An important issue identified by the survey was the need for consumer education that is specifically aimed at promoting the consumption of produce with cosmetic defects Ghosh, Fawcett, Sharma, Perera & Poinern (2016) The rejection of produce on purely visual appearance was found to be a major cause for food wastage. Fudala-Ksiazek et al (2016) multivariate data set, well-looked-after by a principal module analysis, offers valuable info for the design, action, and risk assessment of modern MSWPs.

Designing waste management systems utilization of these wastes as resources in a circular economy Wojnowska et al(2020) To improve the response rate and decrease, Joensuu, Katri (2020) it is important that the survey is designed Duque-Acevedo (2020) agricultural waste has resource efficiency, supportable making and ingesting, and the reduction of negative environmental impact. Agri waste management and encourage custom hiring middles to influence high-cost technologies Ravi et al (2022) to the farmers.

Research Gap

Despite exploring numerous studies are agricultural (Fruits and Vegetables) measures, the current study conducts the problems faced and Past, Present and Future of the Agricultural Waste Management sector. The present study exertions to slender this research gap, that is “Agricultural Products in Waste Management”.

Objective

- To understand the agricultural products, Major Crops utilized in the Agri land and level of awareness of Agri-waste.
- To determine the Functions of Awareness in Agri Surplus Management Systems and their Types of Agri waste.
- To identify the major problems faced by the Farmers and methods of Disposing of Food Waste.

Research Methodology

The methodology used in this work is the investigative approach, which include, visitation to some mechanized farms and administration of structured questionnaires. An assessment of the farmers agricultural product waste level and facilities for waste handling and disposal was made. Simple random sampling was used in this study. This research study examined 310 potential farmers in Erode district. Erode district involves of 5 taluks, 4 Municipalities, 42 Town Panchayats, 230 Village Panchayats, and 375 Revenue Villages along with 14 Community Development Blocks. Target audience are FPO (Farmer Producer Organisations). According the farmer’s survey agricultural land 266012.1 in Hec. Understand the elementary perceptions connected to farming product waste. Therefore; participants’ cultivated mindfulness as a requirement for literacy was examined. Quantitative data analysis and Qualitative analysis are used in the study.

Findings And Results

- **Proportion Analysis**

The characteristics of the perpetrators are given in Table - 1. The results explain gender is males working in agricultural 55 percent, the maximum working age category people is30-49 years of people are 47 percent, and her average qualification is Under Graduate40 percent. Working experience is Above 12 Years41% and daily went for working area. The level of awareness in Agri waste is Medium in percent 44 and selling own manufacturing products- Selling through online is 43%

Table 1: Outline of the Accused

Sort	Frequency	Percent
Gender		
Male	116	54.5
Female	97	45.5
Age		
20-29 Years	17	8.0
30-49 Years	100	46.9
50-59 Years	25	11.7
Above 60 Years	71	33.3
Education Qualification		
Less than elementary level (Illiterate)	25	11.7
High school	36	16.9
Diploma	24	11.3
Under Graduate	83	39.0
Post Graduate	45	21.1
Year of Experience (Agricultural)		
< 1 year	15	7.0
2-5 years	22	10.3
6-8 years	24	11.3
9-11 years	64	30.0
Above 12 years	88	41.3
Duration of Working		
Daily	118	55.4
Weekly once	8	3.8
Weekly twice	24	11.3
Week thrice	43	20.2
Week End	20	9.4
Level of Awareness in Agri-Waste		
Low	46	21.6
Medium	94	44.1
High	73	34.3
To whom do Sell your Products		
Directly to consumers	5	2.3
Retailers	51	23.9
Wholesalers	47	22.1
Governmental corporation	18	8.5
Selling through online	92	43.2

- **ANOVA**

Table 2: Functions of Awareness of Waste Mgmt. System & the Level of Awareness of Agri Waste

ANOVA						
Functions of Awareness		**Sum of Squares**	**DF**	**Mean Square**	**F**	**Sig.**
Production	Between Groups	3.161	2	1.580	4.437	**.013**
	Within Groups	74.792	210	.356		
	Total	77.953	212			

Collection	Between Groups	5.272	2	2.636	8.412	**.000**
	Within Groups	65.808	210	.313		
	Total	71.080	212			
Storage	Between Groups	5.478	2	2.739	8.796	**.000**
	Within Groups	65.395	210	.311		
	Total	70.873	212			
Treatment	Between Groups	6.892	2	3.446	10.254	**.000**
	Within Groups	70.573	210	.336		
	Total	77.465	212			
Transfer	Between Groups	3.161	2	1.580	4.437	**.013**
	Within Groups	74.792	210	.356		
	Total	77.953	212			
Utilization	Between Groups	5.932	2	2.966	9.560	**.000**
	Within Groups	65.148	210	.310		
	Total	71.080	212			

There is no significant difference between the functions of awareness of waste management system and the level of awareness of Agri waste. All the sub variables sig value is less than 0.05, so that the insignificant hypothesis is rejected.

Paired Sample T- Test

Table 3: Types of Agri Waste and the Agricultural Waste in Products

Paired Samples Statistics					
Pairs		**Mean**	**N**	**Standard Deviation**	**Std. Error Mean**
Pair 1	Liquid waste	4.59	213	.883	.061
	Grape Vines	4.17	213	1.028	.070
Pair 2	Organic Waste	2.55	213	1.579	.108
	Fruit Bearing Trees	4.37	213	.970	.066
Pair 3	Recyclable Rubbish	4.44	213	.891	.061
	Vegetables	3.90	213	.999	.068
Pair 4	Harmful Waste	4.54	213	.780	.053
	Date Palm Fronds	4.77	213	.592	.041

The above table mentioned, Paris of types of Agri waste and agricultural waste in products. Comparing 4 to 4. Total Number of 213 respondents. Standard Deviation range from .592 – 1.579.

Table 4: Paired Samples Test

Paired Samples Test							
Pairs		**Paired Differences**			**t**	**DF**	**Sig. (2-tailed)**
		Mean	**SD**	**Std. Error Mean**			
Pair 1	Liquid waste - Grape Vines	.423	1.299	.089	4.746	212	**.000**
Pair 2	Organic Waste - Fruit Bearing Trees	-1.812	1.931	.132	-13.697	212	**.000**
Pair 3	Recyclable Rubbish - Vegetables	.540	1.385	.095	5.688	212	**.000**
Pair 4	Harmful Waste - Date Palm Fronds	-.230	.999	.068	-3.360	212	**.001**

Table 3 represents the comparison of Agri waste and types, with a t-value range from -13.697 to 5.688. All the sig value is less than the p-value of 0.05. So the comparison of Agri waste hypothesis is rejected.

- **Mean Square- Anova**

Table 5: Mean Square of Problems Faced by the Farmers

Categorise and Metrix	Groups	Sum of Squares	DF	Mean Square	F	Sig.
To whom do sell your products * Cope with climate change, soil erosion, and biodiversity loss	Between Groups	66.991	3	22.330	15.731	**.000**
	Within Groups	296.671	209	1.419		
	Total	363.662	212			
To whom do sell your products * Satisfy consumers' changing tastes and expectations	Between Groups	28.501	3	9.500	5.924	**.001**
	Within Groups	335.161	209	1.604		
	Total	363.662	212			
To whom do sell your products * Meet rising demand for more food of higher quality	Between Groups	11.777	3	3.926	2.332	.075
	Within Groups	351.885	209	1.684		
	Total	363.662	212			
To whom do sell your products * Invest in farm productivity	Between Groups	7.118	3	2.373	1.391	.247
	Within Groups	356.544	209	1.706		
	Total	363.662	212			
To whom do sell your products * Adopt and learn new technologies	Between Groups	9.145	4	2.286	1.341	.256
	Within Groups	354.517	208	1.704		
	Total	363.662	212			
To whom do sell your products * Stay resilient against global economic factors	Between Groups	23.548	4	5.887	3.600	**.007**
	Within Groups	340.114	208	1.635		
	Total	363.662	212			
To whom do sell your products * Inspire young people to stay in rural areas and become future farmers	Between Groups	18.892	4	4.723	2.849	**.025**
	Within Groups	344.770	208	1.658		
	Total	363.662	212			

Meet rising demand for more food of higher quality, invest in farm productivity, and adopt and learn new technologies. These three major problems are faced by the farmers in their job. Other factors are satisfied with the factors.

- **Discriminant Analysis**

Summary Of Canonical Discriminant Functions: Methods of Disposal Food Product Waste

Table 6: Eigenvalues

Eigenvalues				
Function	**Eigenvalue**	**% Of Variance**	**Cumulative %**	**Canonical Correlation**
1	.083[a]	50.5	50.5	.277
2	.047[a]	28.4	79.0	.211
3	.025[a]	15.1	94.0	.155
4	.010[a]	6.0	100.0	.099

a. First 4 canonical discriminant functions were used in the analysis.

Eigenvalue range from .010 to 0.083 is 10% to 83% in the Disposal product waste.

Table 7: Wilks' Lambda

Wilks' Lambda				
Test of Function(s)	**Wilks' Lambda**	**Chi-square**	**DF**	**Sig.**
1 through 4	.853	32.960	20	.034
2 through 4	.923	16.486	12	.170
3 through 4	.966	7.066	6	.315
4	.990	2.018	2	.365

The above table mentioned Wilks' Lambda with a chi-square value. Wilks' Lambda varieties from 85 to 99 percent and the chi-square is 2 to 32.

Table 8: Standardized

Standardized Canonical Discriminant Function Coefficients				
	Function			
	1	2	3	4
Animal feed	-.759	-.200	.617	.025
Composting	.480	.181	.490	-.252
Donated	.313	.517	.501	.217
Dumping	.610	-1.162	.353	.405
Incineration	-.489	.977	-.400	.579

Animal feed third position is in height at .617 and fourth place is low-slung (.025), Composting third position is tall at 490 and fourth place is low (-.252), Donated second position is high at .517 fourth place is low (.217), Dumping first situation is huge .610 second position is low (-1.162), Incineration second place value .977 and first place number (-.489).

Table 9: Structure Matrix

Structure Matrix				
	Function			
	1	2	3	4
Animal feed	-.710*	-.161	.679	.058
Donated	.226	.494	.528*	.321
Composting	.444	.161	.487*	-.276
Incineration	-.041	.191	-.095	.895*
Dumping	.257	-.428	.114	.843*

Pooled within-groups associations amid discriminating variables and standardized canonical discriminant functions. Variables are ordered by the absolute size of correlation within function.

*. Largest absolute correlation between each variable and any discriminant function

Table 10: Group Centroids

Functions at Group Centroids				
Major Crops	Function			
	1	2	3	4
Paddy	-.013	-.310	.160	-.141
Ground nut	.140	-.133	.072	.160
Banana	.698	.094	-.210	-.078
Coconut	-.352	-.114	-.266	.004
Sugarcane	-.116	.259	.077	-.016

Unstandardized canonical discriminant functions evaluated at group means.

Suggestions and Conclusion

As technological innovation increases, so does the potential for improving agricultural productivity. For large-scale and small-scale farmers, adopting new innovations can increase production, and crop yield, reduce costs, streamline management, and improve the quality of crops. Applying recent tech to agriculture, Monitoring, and regulatory crop irrigation schemes via smartphone, Sonographies for livestock, Practice of mobile expertise and photographic camera, and Crop Sensors. Present Tech Involved in Agri Tech these two Livestock Farming Technologies, Modern Greenhouses, in future trends technologies are Internet of Things, Robotics, Artificial Intelligence, Whirrs, Big Information& Analytics, and Block chain**.** With technological advancement and research findings, agricultural waste is no longer an environmental issue but a resource for energy production.

References

1. Akgul, H. C., & Macaroglu, E. (2011). Agricultural awareness for prospectıve teachers. Scientific Research and Essays, 6 (16), 3371-3377.
2. Alexandratos, N., & Bruinsma, J. (2012). World agriculture towards 2030/2050: the 2012 revision, 1-154, 10.22004/ag.econ.288998

3. Andreichenko, A. V., Andreichenko, S. S., & Smentyna, N. V. (2021). Ensuring Biosphere Balance in the Context of Agricultural Waste Management. ISPC, 26(1), 46-61 https://hdl.handle.net/11300/16458

4. Asadi, A., Akbari, M., Mohammadi, Y., & Hossaininia, G. H. (2010).Agricultural wheat waste management in Iran. Australian Journal of Basic and Applied Sciences, 4(3), 421-428.

5. Awogbemi, O., & Von Kallon, D. V. (2022). Pretreatment techniques for agricultural waste. Case Studies in Chemical and Environmental Engineering, 6(1), 1-9, https://doi.org/10.1016/j.cscee.2022.100229

6. Chauhan, A., Debnath, R.M. and Singh, S.P. (2018), "Modelling the drivers for sustainable agri-food waste management", Benchmarking: An International Journal, 25 (3), 981-993. https://doi.org/10.1108/BIJ-07-2017-0196

7. Duque-Acevedo, Mónica; Belmonte-Ureña, Luis J.; Cortés-García, Francisco Joaquín; Camacho-Ferre, Francisco (2020). Agricultural waste: Review of the evolution, approaches and perspectives on alternative uses. Global Ecology and Conservation, 22(1), 902–910, DOI :10.1016/j.gecco.2020.e00902

8. EDWIN, A. I. (2014). Assessment of agricultural waste management in some mechanized farms in north-central Nigeria. Journal of Applied Sciences in Environmental Sanitation, 9(2).147-155.

9. F. Shen, R.L. Smith Jr., J. Li, et al., Critical assessment of reaction pathways for conversion of agricultural waste biomass into formic acid, Green Chem. 23 (2021) 1536–1561, https://doi.org/10.1039/D0GC04263C.

10. Fudala-Ksiazek, S., Pierpaoli, M., Kulbat, E., & Luczkiewicz, A. (2016).A modern solid waste management strategy–the generation of new by-products. Waste Management, 49, 516-529.

11. Fudala-Ksiazek, Sylwia; Pierpaoli, Mattia; Kulbat, Eliza; Luczkiewicz, Aneta (2016). A modern solid waste management strategy – the generation of new by-products. Waste Management, 3 (4), 501-520,10.1016/j.wasman.2016.01.022

12. Geletukha, Georgii and Tetyana Zhelyezna (2014), Prospects for the use of agricultural waste for energy production in Ukraine. Analitychnazapyska BAU N7, 33 (4), 202-207.https://saf.org.ua/wp-content/uploads/2019/04/position-paper-uabio-7-ua.pdf

13. Ghosh, P. R., Fawcett, D., Sharma, S. B., Perera, D., & Poinern, G. E. (2016). Survey of food waste generated by Western Australian fruit and vegetable producers: Options for minimization and utilization. Food and Public Health, 6(5), 115-122.

14. Glossary of Environment Statistics, Studies in Methods, Series F, United Nations, New York, 1997, 1-67.

15. Groff, S. (2015). The past, present, and future of the cover crop industry.Journal of Soil and Water Conservation, 70(6), 130A–133A. doi:10.2489/jswc.70.6.130a

16. GuoH., S. Wu, Y. ian, J. Zhang, H. Liu, (2021), Application of machine learning methods for the prediction of organic solid waste treatment and recycling processes: a review, Bioresour. Technology, 319(4), 25-35, 10.1016/j.biortech.2020.124114.

17. Gustavsson, J., Cederberg, C., Sonesson, U., Van Otterdijk, R., & Meybeck, A. (2011). Global food losses and food waste. Food and Agriculture Organization of the United Nations, 1-24 Rom http://www.fao.org/docrep/014/mb060e/mb060e00. pdf.

18. Hai, H. T., &Tuyet, N. T. A. (2010). Benefits of the 3R approach for agricultural waste management (AWM) in Vietnam: Under the framework of joint project on Asia Resource Circulation Research, 5(4), 1-56

19. Hansen, Conly L. (2019). Handbook of Farm, Dairy and Food Machinery Engineering || Agricultural Waste Management in Food Processing,3(4), 673–716. doi:10.1016/B978-0-12-814803-7.00026-9

20. Hartikainen H, Kuisma M, Pinolehto M, Räikkönen R, Kahiluoto H (2014), Food waste in primary production and food processing. Foodspill 2 -Final project report, 1-179 http://www.mtt.fi/mttraportti/pdf/mttraportti170.pdf

21. Inspecção Regional doAmbiente (2012), Manual de Ambiente. SRAM Press, 1-207.

22. John J. Classen and Harbans Lal (2012).Agricultural Waste Management Systems and Software Tools. Waste Management - An Integrated Vision, 1-159, Doi: 10.5772/50484

23. Lopes, C., Antelo, L. T., Franco-Uría, A., Alonso, A. A., & Pérez-Martín, R. (2015). Valorisation of fish by-products against waste management treatments–Comparison of environmental impacts. Waste management, 46(2), 103-112.

24. Lopes, Carla; Antelo, Luis T.; Franco-Uría, Amaya; Alonso, Antonio A.; Pérez-Martín, Ricardo (2015). Valorisation of fish by-products against waste management treatments – Comparison of environmental impacts. Waste Management, 6(2), 10.1016/j.wasman.2015.08.017

25. Mushtaq Ahmed Memon (2010). Integrated solid waste management based on the 3R approach, 12(1), 30–40. doi:10.1007/s10163-009-0274-0

26. Nemerow, N. L., & Agardy, F. J. (1998). Strategies of industrial and hazardous waste management. John Wiley & Sons, 1-256.

27. Obi, F. O., Ugwuishiwu, B. O., & Nwakaire, J. N. (2016).Agricultural waste concept, generation, utilization and management. Nigerian Journal of Technology, 35(4), 957-964.

28. Oluseun Adejumo, I., & Adebukola Adebiyi, O. (2021). Agricultural Solid Wastes: Causes, Effects, and Effective Management. Strategies of Sustainable Solid Waste Management, 8(2),doi: 10.5772/intechopen.93601

29. Papargyropoulou E., R. Lozano, J.K. Steinberger, N. Wright, and Z. bin Ujang (2014), The food waste hierarchy as a framework for the management of food surplus and food waste. Journal of Cleaner Production, 76(1), 106-115.

30. Parfitt, J., Barthel, M., & Macnaughton, S. (2010). Food waste within food supply chains: quantification and potential for change to 2050. Philosophical transactions of the royal society B: biological sciences, 365(1554), 3065-3081.

31. Pattanaik L., F. Pattnaik, D.K. Saxena, S.N. Naik, (2019), Bio fuels from agricultural wastes, in: A. Basile, F. Dalena (Eds.), Second and Third Generation of Feedstocks, Elsevier, Netherlands, 1-15, 103–142, 10.1016/B978-0-12-815162-4.00005-7.

32. Ravi, G., Savitha, B., Sreenivasulu, M., & Vidyasagar, G. E. C. (2022).A Study on Awareness of Farmers about Agri Waste Management Practices in Medak District of Telangana. International Journal of Environment and Climate Change, 12(10), 405-412. https://doi.org/10.9734/ijecc/2022/v12i1030812

33. Sabiiti, E. N. (2011). Utilising agricultural waste to enhance food security and conserve the environment. African journal of food, agriculture, nutrition and development, 11(6).1-9.

34. Sims, J.T. (1994). [Advances in Agronomy] Advances in Agronomy 52, Poultry Waste Management: Agricultural and Environmental Issues, 2(4), 1–83. doi:10.1016/s0065-2113(08)60621-5

35. Uyen Nguyen Ngoc; Hans Schnitzer (2009). Sustainable solutions for solid waste management in Southeast Asian countries, 29(6), 1982–1995. DOI: 10.1016/j.wasman.2008.08.031

36. Wojnowska-Baryła, I., Kulikowska, D., &Bernat, K. (2020).Effect of bio-based products on waste management. Sustainability, 12(5), 2088-2098.

37. http://dcmsme.gov.in/publications/traderep/erode/erode2.htm

38. https://thestartuplab.in/agritech-india-emerging-technologies-that-are-helping-the-indian-agriculture-sector-to-flourish/.