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A STUDY ON FINANCING AGRICULTURAL MECHANIZATION PRACTICES: WITH SPECIAL REFERENCE TO KUTTANAD TALUK IN KERALA STATEDr. Komal A Dave^{*1}, Mr. Mohammed Ashfaque², Ms. Taniya Lukose³^{1,2} Assistant Professor, St. Joseph's College of Commerce (Autonomous), Brigade Road, Bengaluru.³Scholar – PG Department of Commerce, St. Joseph's College of Commerce (Autonomous), Brigade Road, Bengaluru.

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DOI: <https://doi.org/10.59415/mjacs.v2i2.158>**Abstract**

Cottage Agriculture is the primary livelihood of the majority of India's population. Kuttanad taluk in the Alappuzha district of Kerala is known as the "Rice Bowl of Kerala ". From 2021 June to August, the non-availability of harvesting machines on a timely basis was an issue in Kuttanad, which result in heavy losses in the paddy fields of Kuttanad Taluk. Upon this issue, there is a need to take constructive measures in practicing agriculture and understanding the better practices for the mechanization and financing for the implementation in Kuttanad Taluk. This study titled "A STUDY ON FINANCING AGRICULTURAL MECHANIZATION PRACTICES: WITH SPECIAL REFERENCE TO KUTTANAD TALUK IN KERALA STATE" is focused to study the farmer's knowledge, and the various financing schemes of mechanization of agriculture, to help farmers get relief during such demanding times. It was seen that agriculturists mentioned a need to bring about an adequate change in the mode of farming to survive the yearly floods. The direction of awareness about the financial schemes dedicated to mechanization and its benefits is not reaching at the farmers who are fully invested in this sector for their primary earnings. Therefore, there is a need to expand and improve the information dissipation from the source regarding the financial schemes which will eventually lead to better practices.

Keywords: Agricultural Mechanization, Financing, Financial Schemes, money lenders**1. Introduction**

Farmers in India are largely dependent on the agricultural sector. Besides, agriculture is not just a means of livelihood but a way of living life. Overall, the usage and implementing effectiveness of mechanizing is apparently less in our country. Kerala is still dependent on agriculture labours rather than farming equipment. Agriculture activities ranging from cultivation to storage are maintained by farmers while incurring heavy expenditure with no substantial return. Farmers invest in agriculture by taking loans from different banks and money lenders (informal sources). Kuttanad Taluk in Alappuzha district is famous for being below the sea level and its vast wetlands. The ever present flooding crisis during harvest period lays waste to their cultivation which increases the financial burden of the farmer. The only way to save the agriculture in Kuttanad is by supporting the activities of cultivation and harvesting to be conducted within the desired period. There is a need for innovative rental or ownership for high-cost farm machinery such as combine harvester, paddy transplanter, land leveler, tractor etc. to reduce the cost operation (Mehta, Senthilkumar, & Chandel, 2014) and timely cultivation and harvesting activities. It will reduce the burden of the farmers. Farmers need to be provided with government subsidies to encourage them to buy and apply innovative machinery.

2. Review of literature

(Loon, et al., 2020): Farm mechanization have a potential initiative to support the developing countries. Most projects aim to increase the services providers on farm machinery rather than farmers. This case study assesses the different mechanization service provider models (MSPMs) in Mexico, Zimbabwe, and Bangladesh. It will capture the stakeholders in the projects, on private sectors actors and government employees. The way the MSPMs set up in each country and better than alternatives such as lending and group ownership. Machine dealers got strengthened because the projects provide targeting information on segmentation and market data.

(Ganguly, Gulati, & Braun, 2017): Innovation in business models is the uberization of Agri- mechanization; direct farm linkages. Agricultural technology is merely effective towards the small holder farmers. For the developing countries innovations helps the farmers. In this case study we can see the agricultural impact through innovation. Investing in the innovation solve the common issues facing agriculture. It is important to develop a roadmap to attract

the youth in agriculture. Special incentives are provided to attract young entrepreneurs.

(Liu, Ji, Zhang, An, & Sun, 2021): Here examines the rural financial development on agricultural technology innovation from the perspective of rural financial scale and rural finance efficiency. The results shows that rural finance has a positive effect on the level of agricultural technology innovation and in regions of low degree of marketization. This study provides new insights into the effects of rural financial development on sustainable agricultural development from the perspective of agricultural technology innovation.

(Vishwanathan & Radhakrishnan, 1991): This paper examines the impact of farm planning and outside financing in the form of short-term credit on agricultural incomes in the small finance in Kerala. Linear programming technique is used for the study of combinations of existing from plans and the possibility of improving the plans with existing capital. From the analysis resulted that net incomes of borrower farms both in existing plans and reworked plans. Thus, shows that with better availability of credit, farm incomes and employment could be increased. If this happens, agricultural credit must be development oriented than targeted oriented. In Kerala where with exists as office of the state department of agriculture in every panchayat; it will not be difficult to achieve the development in agricultural financing with better coordination between the governmental agencies and the financing institutions.

(Maniyosai et al., 2018): Agricultural activities are done by farmers with operations, preparation of market, delivery to storage and carriers with incurred expenses. Farming activities especially in Kuttanad, wetland farming need a huge number of labourers. In Kerala, the wage rate is high compared to other states in India. The state government of Kerala had declared a wage rate of Rs 900 and Rs 1000 for women and men respectively on a per day basis. While high wages are in favor of the labourers, the farmers are often at a loss due to the high labour cost.

(Mehta et al., 2014): The only way to save the agriculture in Kuttanad is by supporting the activities of cultivation and harvesting to be conducted within the desired period. Mechanization can play a key role in improving agriculture production in a timely manner. But the farmers are faced with issues like limited availability of machines provided by the government and the private machinery. There is a need for innovative rental or ownership for high-cost farm machinery such as combine harvester, paddy transplanter, land leveller, tractor etc. to reduce the cost operation and timely cultivation and harvesting activities.

(Kumar, Singh, & Sinha, 2010): From the Avari Committee Report, a composite loan policy for financing farm activities and irrigation. Pledging of land as a form of security to fulfill loan availing criteria is only a small portion of farmers' problems (Devarajan, 2004). Large number of agencies like Co-operatives, Regional rural banks (RRBs), Scheduled commercial banks (SCBs), non-banking financial institutions (NBFIs) and self-help groups etc. are involved in short- and long-term needs of farmers. The major milestone in improving the rural credit is Rural Credit Survey Committee Report (1954), Nationalization of Commercial Banks (1969&1980), Establishment of RRBs (1975), National Bank For Agriculture And Rural Development (NABARD) (1982) and Financial sector Reforms (1991), Special Agricultural Credit Plan (1994-95), Kisan Credit Cards (1998-99), Doubling Agricultural Credit Plan Within Three Years (2004), and Agricultural Debt Waiver and Debt Relief Scheme (2008).

(V.P, et al., 2014): The Union Government had introduced Interest Subvention Scheme for short term crop loans (2006-7) that; interest nine percentage per annum by banks and available to agriculture sector persons at seven percentage. Self-help groups and microfinance institutions mobilized in reducing the indebtedness. Certain cases, indebtedness increased but the repayment capacity was improved. For the financing of mechanization for the proper cultivation, through implementing different financial schemes comprises group lending, self-help groups, microfinance institutions, farmer entrepreneurial group, KCC scheme and joint liability. The level of indebtedness of members of SHGs was less compared to the nonmembers. Mobilized group ventures in the country, comprising Self Help Group (SHG), Microfinance Institution (MFI), Farmer Entrepreneurial Group (FEG), Bharat Kisan Centre (BKC), Swayam Sahayak Sangh (SSS), Ayalkoottam (AK) etc., perform an appropriate micro-enterprise with microfinance as essential component ensuring sustainable development. The mobilized group venture with a productive economic activity initiated by deposits and sustained by an appropriate micro-enterprise either independently or by the intervention of an external agency where microfinance is the basis. To create a group of farmers under each padashekaram unit in Kuttanad Taluk for the joint liability financing for the rental or owning of agriculture machines to achieve proper period cultivation and harvesting to save the paddy field from before floods issues.

(Baby, 2020): Covid-19 has influenced the agricultural sector in a negative manner. This paper highlights the impacts

on the agricultural sector and addresses the problems faced by the farmers due to the sudden lockdown. The survey results that the income of the farmers has been reduced by more than half making it difficult to meet their loans and debts. In addition to that the problems faced by the farmers are labor shortage; non availability of machines; timely harvesting; disruption of supply chains; lower price for yield and loss of yield due to heavy rains. This paper specifies the steps the government need to implement to uplift the farmers from the ongoing crisis. At a microlevel, the authorities need to implement policies. In the upcoming years need to adopt a series of development plan to hold the agricultural sector.

(Harikumar.S, 1986): This study indicates that the effectiveness of agricultural credit to achieve agricultural growth. Kerala land development corporation scheme having a project with consists of rice fields grouped in blocks; spread over 79 villages each village have one or more blocks. It is proposed to take up construction of permanent bunds 'R' block reclamation. Alleppey – Changanacherry road cum canal would appear through road formation cutting across the waterflow would have increasing the flood hazard in the region. A canal alongside the AC road should be execute; to carrying the floodwaters through the canal towards the thanneermukkum bund or thottapally spillway into the sea. It will protect the side bunds of the paddy field.

After going through the above mentioned articles, the researcher has identified the features of Kuttanad Taluk and various activities practiced for agricultural machinery in other panchayats and areas, different financial institutional funding scheme models practiced such as joint liability, MSPMs, group lending, crowdfunding, Wadakkancherry green army, RKVY, self-help groups, and institutional credit as well. This has enabled the identification of gaps for further study in the areas of knowledge level and different financing schemes of mechanization of agriculture in Kuttanad taluk, which has prompted this study titled, "A STUDY ON FINANCING AGRICULTURAL MECHANIZATION PRACTICES: WITH SPECIAL REFERENCE TO KUTTANAD TALUK IN KERALA STATE"

3. Statement of the problem

Agriculture is the most important livelihood of India's population. Kuttanad Taluk is located below sea level in Alappuzha District in Kerala and has wetlands. We needed a timely cultivation and harvesting time here. Mechanization plays an important role in improving and saving agriculture. The problem with Kuttanad is the lack of harvesters, which results in significant loss and waste of paddy fields.

4. Objectives of the study

The objectives of the study are as follows:

- To study the various financing schemes for implementing mechanization practices.
- To assess the knowledge level of farmers on different financial institutional funding schemes.

5. Hypothesis

Hypothesis 1

H0 - There is no significant relationship between the bank of the agriculturist and awareness regarding the financial scheme.

H1 - There is a significant relationship between the bank of the agriculturist and awareness regarding the financial scheme.

Hypothesis 2

H0 - There is no relationship between years of experience and awareness of the financial schemes related to mechanization.

H1 - There is a relationship between years of experience and awareness of the financial schemes related to mechanization.

6. Research methodology

To determine the farmer’s knowledge towards the financing of mechanization practices and different financial institutional funding schemes; exploratory research was conducted. Findings followed through the primary data and secondary data. Primary data was collected through direct interview structured questionnaires with the sample size of fifty-one selected agriculturists in the Alappuzha District in Kuttanad Taluk. The fifty-one sample of agriculturists interviewed from the Champakulam, Muttar, Kainakary, Edathua, Veliyanad, and Ramankary panchayats of Kuttanad Taluk. Secondary data of all scheduled commercial banks credit limit to the agriculture southern region Kerala based on Direct finance and Indirect finance referred from the EPWRF India Time Series (EPWRFITS) initiative taken by the EPW Research Foundation. Data on the SMAM scheme initiated on Alappuzha District and Kuttanad Block referred from the Agricultural Department in Alappuzha District, Kerala taken from the Digital Platform for Farm Mechanization and Technology. In this study, all the primary data collected is analyzed with the help of various statistical tools such as Spearman’s rho correlation coefficient test and Pearson Chi square test through IBM SPSS statistical software package. The analysis conducted through the SPSS package is provided with the results in a numerical form, which is duly interpreted by drawing inference from the results duly obtained.

7. Analysis and interpretation

7.1 Examination of relationship between selected demographic variables such as age group and familiarity on financial schemes:

NULL HYPOTHESIS: Ho – there is no association between age group and familiarity on financial schemes.

ALTERNATIVE HYPOTHESIS: H1 – there is an association between age group and familiarity on financial schemes.

Table showing Pearson Chi-square test run on relationship between the age group and familiarity on financial schemes

	Value	Degree of Freedom	Asymptotic Significance (2 sided)
Pearson Chi-Square	24.731	30	.738
Likelihood Ratio	25.694	30	.691
Linear-by-Linear Association	1.067	1	.302
N of Valid Cases	51		

Source: Results of analysis from SPSS

7.2 Examination of the relationship between selected demographic variable such as age group and beneficial of the present institutional funding schemes towards the mechanization of agriculture:

Table showing respondent’s age group and beneficial of the present institutional funding schemes towards the mechanization of agriculture and Pearson Chi-square test.

	Are the present institutional funding schemes towards mechanization of agriculture scheme beneficial to you?		Total
	Yes	No	
Age Group:			
Below 40	0	3	3
40-50	5	4	9
50-60	16	5	21
Above 60	15	3	18

Total	36	15	51
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Source: Primary data collected through structured questionnaire

Null Hypothesis: H_0 – there is no association between age group and beneficial of the present institutional funding schemes towards the mechanization of agriculture schemes.

Alternative Hypothesis: H_1 – there is an association between age group and beneficial of the present institutional funding schemes towards the mechanization of agriculture schemes.

Table showing Chi-Square Test Results

	Value	Degree of Freedom	Asymptotic Significance (2 sided)
Pearson Chi-Square	9.905 ^a	3	.019
Likelihood Ratio	10.153	3	.017
Linear-by-Linear Association	7.557	1	.006
N of Valid Cases	51		

Source: Results of analysis from SPSS

7.3 Examination of the relationship between selected demographic variables such as the awareness of the financial institutional funding schemes and what they think is best mechanizing agriculture:

Null Hypothesis: H_0 – there is no association between the awareness on the financial institutional funding schemes and they think is best for mechanizing agriculture.

Alternative Hypothesis: H_1 – there is an association between the awareness on the financial institutional funding schemes and they think is best for mechanizing agriculture.

Table showing Pearson Chi-square test run on relationship between the awareness on the financial institutional funding schemes and they think is best for mechanising agriculture.

	Value	Degree of Freedom	Asymptotic Significance (2 sided)
Pearson Chi-Square	15.029 ^a	12	.240
Likelihood Ratio	13.052	12	.365
Linear-by-Linear Association	.285	1	.594
N of Valid Cases	51		

Source: Results of analysis from SPSS

7.4 Examination of secondary data of all scheduled commercial bank’s credit limits from 2015 to 2020 to the agriculture southern region of Kerala:

Table showing the compounded annual growth rate, amount outstanding and credit limit of all scheduled commercial banks credit limit from 2015 to 2020 to the agriculture southern region of Kerala based on direct finance and indirect finance.

Table showing all scheduled commercial banks agriculture accounts:

	No. of Accounts	Amount Outstanding (Rupees Lakh)	Credit Limit (Rupees Lakh)
Month Year	SOUTHERN REGION: Kerala	SOUTHERN REGION: Kerala	SOUTHERN REGION: Kerala
Mar-15	5415354	5435154	5931168
Mar-16	5038776	5134398	5708887
Mar-17	5000417	5316845	5961752
Mar-18	5977624	6577384	7221500
Mar-19	6760045	7460705	8076628
Mar-20	7859151	8029135	8965042
Total	36051367	37953621	41864977
Average	6008561.167	6325603.5	6977496.167
CAGR	6%	7%	7%

Source: Secondary data source from EPWRF

Table showing direct finance

Direct Finance			
Month Year	No. of Accounts	Amount Outstanding (Rupees Lakh)	Credit Limit (Rupees Lakh)
	SOUTHERN REGION: Kerala	SOUTHERN REGION: Kerala	SOUTHERN REGION: Kerala
Mar-15	5103300	4953137	5243454
Mar-16	4886839	4796413	5176170
Mar-17	4930162	5112270	5561236
Mar-18	5850069	6377294	6900193
Mar-19	6693762	7324830	7883483
Mar-20	7741109	7844760	8730271
Total	35205241	36408704	39494807
Average	5867540.167	6068117.333	6582467.833
*CAGR	7%	8%	9%

Source: Secondary data source from EPWRF

*CAGR – Compounded Annual Growth Rate

Table showing indirect finance

Indirect Finance			
Month Year	No. of Accounts	Amount Outstanding (Rupees Lakh)	Credit Limit (Rupees Lakh)
	SOUTHERN REGION : Kerala	SOUTHERN REGION : Kerala	SOUTHERN REGION : Kerala
Mar-15	312054	482017	687713
Mar-16	151937	337985	532717
Mar-17	70255	204574	400516
Mar-18	127555	200090	321306
Mar-19	66283	135874	193144

Mar-20	118042	184374	234771
Total	846126	1544914	2370167
Average	141021	257485.6667	395027.8333
CAGR	-15%	-15%	-16%

Source: Secondary data source from EPWRF

8. Interpretation

From the report from the Reserve Bank of India on all scheduled commercial banks March 2015 to March 2020 Agriculture credit report on distributing towards Direct Finance and Indirect Finance. The Compounded Annual Growth Rate (CAGR) says that every year 15% increase towards agriculture credit. Distributing the agriculture credit towards direct finance every year increases by 9% and towards indirect finance decreasing by -16%. According to Section 1 of the RBI definition on direct finance and indirect finance.

In section-1 of indirect finance the machineries:

- Finance for hire-purchase schemes for distribution of agricultural machinery and implements.
- Advances to Custom Service Units managed by individuals, institutions or organizations who maintain a fleet of tractors, bulldozers, well-boring equipment, threshers, combines, etc., and undertake work for farmers on contract basis.
- Finance for setting up of Agri clinics and Agribusiness Centre's.

Here, we can see that every year growth only on the direct finance agriculture allied activities for the support of meeting the farmers' expenses on short term and long term. These loans are granted for only pre-harvest and post-harvest activities. To support the agriculture on the current environment, machinery is beneficiary. But according to the RBI report, decreased the credit towards the indirect finance. Without machinery the agriculture cannot survive from the changing environment effects like heavy rains etc and high labour cost. Presently, expenses are more than production yield. To support the agriculture, should implement the indirect finance and support the farmers by implementing machinery.

9. Findings

This study had the aim of identifying the knowledge level of farmers on the financing of mechanization practices. It speaks to them about the different financing activities to take up machines on rental or purchases for the current period of cultivation and harvesting. The fieldwork was conducted via primary data collection with the farmers in the Kuttanad area. In this study responses were taken from the agriculturist in the Kuttanad area through the means of a structured questionnaire.

The following are the detailed analysis and findings of the study:

- Though the narrative is that with age and experience one's awareness on the schemes and programmes is likely to improve. But from the data collected it is seen that awareness on the financial institutional funding schemes doesn't depend on age. All age groups have similar levels of awareness of financial institutions and their funding schemes. From our analysis, we find that all age groups are aware of the financial institutional funding schemes but are using the facilities of only popular schemes such as: the Kisan credit card scheme and Pradhan Mantri Samman Nidhi, other than availing agricultural loans from financial institutions. Though there were schemes related to mechanization, they are unaware about it. From this we can understand that lack of access to information can be a major reason for non-utilisation of such schemes related to mechanization financial schemes.
- From the survey, it is seen that there is no direct relationship between the awareness of financial institutional funding schemes and educational qualification. So, one can determine those higher educational qualifications will not lead to eventual increase in awareness and larger access to knowledge on the financial institutional funding schemes for mechanization as it is generally expected. Thus, we can say unless they take an interest in using technology for agricultural purposes and we cannot assume that they will seek out information on it. It can also be due to the fact that the younger generation of

farmers are not invested in it, as they see it as a secondary or tertiary source of income.

- It is also important to note that the awareness level on the financial schemes depends upon the banks of farmers. In cooperative banks, employees will explain to the agriculturist about the new financial schemes and procedure on it because employees work for the rural society. But the approach from commercial banks is different, either they are not aware of it or are not interested in informing the customers about it. This can also be considered as a case of asymmetry information among institutions and farmers.
- From the survey, it was seen that the possibility of the existing financing schemes which the people are aware of are not helpful in providing for mechanization in agriculture or increasing the usage of machines in their field. They mentioned that their knowledge in this area is limited, and it is inadequate to support even if they want to bring in technology for their benefit. So, from this we can say that their knowledge is limited in one sense, on another level, we can say that the popular schemes are ineffective in providing the necessary financial support for them.
- As part of the analysis, we can conclude that the majority of people availed of loans from cooperative banks for various reasons. The main reason that was provided was that, after post harvesting, the minimum support price for the rice is directly getting from the supply-co corporation to the district cooperative bank. They mentioned the awareness and share of information they receive from district cooperative banks is much more than compared to commercial banks and financial institutions. Agriculturists are also faced with sudden needs and treating expenses; therefore, they prefer those institutions which provide agriculture loans and gold loans with less procedure and faster means.
- The data suggests that that with years of experience doesn't determine one's ability in assessing and identifying the financial schemes that are best for mechanizing agriculture. It can be assumed that even with years of experience in the field, they are fairly unaware of the financial schemes which are open to them as farmers apart from the obvious and known ones. Thus, we can conclude that their awareness on the financial schemes best for mechanizing agriculture is very low. After explaining to them about the present financial schemes; Kisan credit card scheme, Rastriya Krishi Vikas Yojana, SMAM and agricultural gold loan are the financial schemes that will help to bring mechanization.

10. Suggestions

As an outcome of our study from understanding the situation on the ground regarding mechanisation in agriculture and the farmer's situation in general we have arrived at a brief section on policy suggestions which can possibly be effective in improving the state of agriculture in Kuttanad Taluk.

While we have a general idea of the farming system, one of the major drawbacks faced by farmers is they are often unaware of the developments in the sector or the new schemes which have been implemented by the State and Union government. From our survey, it is seen that, agriculturists are aware of the widely advertised schemes like Kisan credit card, Pradhan Mantri Samman Nidhi and Agricultural loan, but are unaware of the financial support and training schemes which can improve the mechanization practices in farming. To resolve this problem, the farmers in the padeshekaram can use social media for sharing information. For example, consider a WhatsApp group of agriculturists, and its admin could be a member from the agricultural department who can share notices and notification from their side and answer queries, specifically regarding procedures involved and benefits of existing schemes and new schemes which are implemented. In this case the access to this group is limited only by the requirement of a smartphone. In case, there are people who do not have access, then it can be taken up by the local government/ group sharing initiatives which are of rather negligible costs.

Other ideas on building awareness on the schemes in general and specifically related to mechanisation can be done through forming teams among like-minded farmers preferably in the same area or panchayat. If they are able to bring in people who can provide information on the financial institutional funding schemes and funding schemes for the mechanization, it could be helpful for them as well. Take the example of a recent government scheme like SMAM 80%, which support for the purchase of machinery is not widely popular among the farmers. The lack of information could be a main reason why they are not ready to invest in these factors of production by taking calculated risks. Mechanization service provider model, joint leasing with operators and Wadakkancherry green army are working practices which are in place. Therefore, an effective channel to improve awareness to the agriculturists, will have an immense impact on the field. The updated information can be disseminated through financial institutions, agro service

centres, and agricultural department. An initiative from the government side to make sure such information is shared with people through these agencies can lead to larger sections gaining the relevant and complete information related to such matters.

From an administrative standpoint, it is seen that as Kerala often goes through a change of government after their initial five periods, the new government often tries to change the norms of the schemes or changes the scheme all together as it depends on their perspective. The constant shift in schemes and plans hinders people from planning for the long run. The investment in heavy machinery is a long term and expensive process, therefore stability in policy is a requirement as well.

10. Conclusion

The study was conducted to understand the knowledge level of farmers on financial institutional funding schemes for implementing mechanization in paddy cultivation in the Kuttanad Taluk. As part of the study, we collected samples across the taluk, from which we found that awareness of the farmers on the institutional funding schemes for the mechanization was comparatively less. The familiar financial schemes which they were aware of farmers were not supported for the mechanization. On the government side, they are trying to implement mechanization schemes by forming schemes which not only provide financial opportunities but also share information and training to the farmers which are often missed by the general public for various reasons. The direction of awareness about the financial schemes for improving mechanization and increasing their technological capability is not reaching the farmers who are fully invested in making their primary earning from this sector. From our findings, we see that the accessibility to the source of and knowledge on the financial schemes should be improved by using which are mostly reaching out to the people and in an easy format for making them understand the benefits of the new developments in the farming sector. The study also considers the study of financial schemes which can be used to implement mechanization practices at the ground level.

References

1. <https://irtcbsf.com/about-kuttanad> [Accessed on January 11]
2. https://www.slideshare.net/indiawaterportal/kuttanad-below-sea-level-farming-system-kbsfs-a-plan-for-its-sustainable-management-a-presentation-by-dr-anilkumar-the-kerala-environment-congress-organised-by-the-centre-for-environment-and-development-2012?qid=88f80d89-ee63-4051-a3cf-5fd3d9a87e29&v=&b=&from_search=1 [Accessed on March 8]
3. <https://www.fao.org/family-farming/detail/en/c/283069/> [Accessed on January 8]
4. <https://kuttanad.org/agriculture-in-kuttanad/> [Accessed on January 28]
5. <https://www.thehindu.com/news/national/kerala/Good-times-ahead-for-Kuttanad/article14424816.ece> [Accessed on February 10]
6. <https://timesofindia.indiatimes.com/city/kochi/uavs-to-aid-kuttanad-farmers-in-face-of-labour-shortage/articleshow/79104782.cms> [Accessed on January 16]
7. <https://www.thehindu.com/news/national/kerala/thrust-on-flood-mitigation-in-kuttanad/article65213949.ece> [Accessed on February 15]
8. <https://www.newindianexpress.com/states/kerala/2013/aug/19/%E2%80%98Implementation-of-Kuttanad-package-was-a-failure-508177.html> [Accessed on January 31]
9. <https://www.onmanorama.com/news/kerala/2020/08/01/thottappally-spillway-opened-to-prevent-flooding-kuttanad.html> [Accessed on January 20]
10. <https://www.newindianexpress.com/states/kerala/2012/nov/15/alappuzha-changanassery-canal-widening-project-still-in-a-limbo-421100.html> [Accessed on March 9]
11. <https://www.ibpsguide.com/iffco-reaches-to-kuttanad-farmers-to-promote-nano-urea-liquid/> [Accessed on February 15]
12. <https://keralagbank.com/about-us/profile> [Accessed on March 20]
13. <https://keralalandbank.in/bank-history/> [Accessed on January 5]
14. <https://www.sbi.co.in/web/agri-rural/home> [Accessed on January 21]
15. <https://keralaagriculture.gov.in/en/2021/05/05/hitech-agriculture/> [Accessed on February 11]
16. <https://byjus.com/free-ias-prep/kisan-credit-card-kcc/#:~:text=Kisan%20Credit%20Card%20Scheme%20The%20Kisan%20Credit%20Scheme,agriculture%20sector%20by%20giving%20financial%20assistance%20to%20farmers.> [Accessed on January 31]

17. <https://byjus.com/free-ias-prep/rkvy-raftaar/> [Accessed on January 16]
18. <https://krishijagran.com/farm-mechanization/smam-scheme-get-50-to-80-subsidy-on-agricultural-implements-direct-link-to-apply-inside/> [Accessed on March 8]
19. <https://en.srbpost.com/sarkari-yojana/smam-kisan-scheme-2021-all-agricultural-machinery-applications-available-with-80-subsidy/> [Accessed on February 20]
20. <https://www.drishtiiias.com/to-the-points/Paper2/self-help-groups-shgs> [Accessed on January 5]
21. <http://www.agriclinics.net/farmmachinery.htm> [Accessed on January 20]
22. <https://www.bankbazaar.com/personal-loan/nabard.html> [Accessed on January 20]
23. <https://agrimachinery.nic.in/> [Accessed on March 8]
24. https://m.rbi.org.in/Scripts/bs_viewcontent.aspx?Id=607 [Accessed on January 29]
25. <https://vikaspedia.in/agriculture/crop-production/crop-management-for-aberrant-weather-conditions/smart-practices-technologies/drum-seeding-of-rice-for-water-saving-and-timeliness-in-planting#:~:text=in%20these%20areas.,Resilient%20practice%20%2F%20technology,water%20and%20allowed%20to%20sprout> [Accessed on January 6]
26. <https://epwrfits.in/>
27. <http://ecostat.kerala.gov.in/index.php/agricultures>
28. <https://agrimachinery.nic.in/>