



RESEARCH PAPER

Penetration of farm mechanization services through FPOs: rural dynamics-based business modelling

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Abstract : Farm mechanisation although one among the essential input to raise the agriculture productivity, but individual owning of agricultural machinery by resource constrained small and marginal farmers who constitute around 85% of operated land holdings in India is uneconomical. Hence, innovative arrangements such as custom hiring centres' (CHCs) are being encouraged through farm aggregation models like cooperative farming, Joint Liability Groups (JLG), Farmer Producer Organizations (FPOs) to get access to farm machinery services at affordable prices and promote mechanization of operations on small farms. With this background, the present study is taken upto assess the feasibility for the establishment of FPO owned and operated model custom hiring centre (CHC) in Nimmanapalle mandal of chittoor district of Andhra Pradesh state and formulate suitable business strategies for ensuring viability of the unit. The sample size of the study was 120 farmers. The major crops grown in the study area are tomato, paddy and groundnut and the market potential for farm machinery is estimated at Rs. 269.73 lakhs. The SWOT analysis conducted indicated the opportunity for establishment of CHC due to inadequate farm machinery services, labour shortages and farmers habituated to hiring services. The financial assessment for the proposed unit over a five year period showed that the unit is worth investing as reflected by positive NPV of 6.56 lakhs at 12% discount rate, BCR of 1.05 and IRR of 17.27%. The debt service coverage ratios of greater than two from second year onwards and annual increase of positive cash accruals signifies the unit strength in meeting the debt obligations. The unit if established shall have long term social benefits that includes increase in input use efficiency of farm resources due to timeliness of operations, productivity, yields, income levels in addition to creation of employment in non-farm sector.

Key Words : Farmer producer organizations, Market potential, Custom hiring centre, Financial assessment, Social benefits

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INTRODUCTION

The development of agriculture and allied sectors are very important in socio-economic contextual

framework as it has greater impact in reducing poverty, improving food security (Pawlak and Kolodziejczak, 2020), capable of employment generation directly and indirectly contributing for growth of secondary and

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tertiary sectors. Among several challenges hindering the growth of agricultural sector, a decline of work force in agriculture from 62.56 % in 1991 to 41.49% in 2020 (World Bank, 2020) has been observed due to internal, external factors and exogenous shocks indicating a structural shift in the work force. In the light of declining labour force, farm mechanization remains one of the critical intervention in improving agricultural productivity especially in crops that are labour intensive and widely grown across pan India (FICCI, 2015). In addition small and fragmented land holdings are imposing several challenges to farm sector like limited access to technology and markets, less capital investments and poor adoption of farm mechanization.

In India, certain farming activities like land preparation, sowing, transplantation, weeding, harvesting are done manually affecting efficiency and increase in labour cost unlike in developed countries where these activities are mechanized. Several studies had concluded that farm mechanization directly enhances the production, productivity, gross returns due to efficient use of inputs, timeliness of operations, reducing drudgery and cost of cultivation significantly (Singh, 2001; Sarkar *et al.*, 2013; Sinha and Mishra, 2020 and Takeshima, 2017). As per NABARD report, 2015-16 the average farm holding size shrunked to 1.1 hectare and the tractor is owned by only 5.2 per cent of agricultural households and 1.8 per cent own a power tiller in the country. With the continuous reduction in operational land holding size, individual owning of agricultural machinery by the resource constrained marginal and small farmers, constituting around 85 % of operational land holdings shall be against the economies of scale (Singh, 2018). Innovative arrangements such as custom hiring centres' (CHCs) shall enable the small holders get access to farm machinery at affordable prices and promote mechanization of operations on small farms (Yes Bank, 2016 and Singh, 2018). Thus, to enhance the level of farm mechanization and reap the benefits of large-scale farming one of the solution is availing the services of the custom hiring centre. CHC is a center which ensures wider access to agricultural machinery to farmers, who cannot purchase the machines due to high financial investment but are ready to use services on payment basis. The lack of mechanization leads to delayed seedbed preparation, high costs of land preparation and harvesting and increased harvest losses. Thus CHC would address problems like improved timeliness of operations, reduce

the labour burdens, increasing land productivity and profits. The advantage of running CHC through group of farmers organising themselves as a 'Farmer Producer Organization' shall benefit the farmers in enhancing the yields of crops, incomes and reduces costs.

Among several farmer collectivization models such as co-operative societies, joint liability groups, commodity interest groups, farmer producer organizations (FPOs), farmer producer organizations are getting greater support from farming community due to its intrinsic framework and wider scope of pooling, development and optimization of resources. Group farming has potential advantages in terms of economies of scale, a dependable labour force, resource pooling, adoption of farm mechanization, accessibility to funds, markets, technology adoption and thus could perform better to individual farming subject to specific conditions (Agarwal, 2018). The advantage of running CHC through group of farmers organising themselves as a 'Farmer Producer Organization' shall benefit the farmers in enhancing the yields of crops, through timeliness of operations, better use of inputs, reducing labour requirement and thereby improving their income levels.

In India, FPOs are being promoted and supported by several producer organizations promoting agencies (POPIs) In the study area *i.e.* Nimmanapalle mandal of Chittoor district of Andhra Pradesh state, several organizations like Andhra Pradesh Mahila Abhivruddhi Society (APMAS), NABARD and state Horticultural Department are thriving to strengthen the FPO farmers through experimenting with various FPO based business models both by capital infusion and capacity building for evolving leaders, who shall manage and run the unit in business mode. Paddy, tomato, groundnut are the major crops in the study area and demands for mechanization of farm operations due to shortage of labour and existence of prevailing higher hiring rates for farm machinery. Hence, with this background, the study is taken upto assess the feasibility and formulation of suitable business model for establishment of FPO operated CHC in study area with the following objectives.

- Identification of demand assessment of farm machinery in the study area
- SWOT Analysis of the study area
- Estimation of cost and income from for the proposed CHC unit.
- Conducting feasibility assessment of the proposed unit

– Formulation of suitable business strategies for ensuring viability and sustainability of the proposed unit.

MATERIAL AND METHODS

Chittoor district of Andhra Pradesh state was selectively identified for the study. This district comprises of 66 mandals of which Nimmanapalle mandal was selected purposively due to prominence of ‘Farmer Producer Organizations (FPOs) and organizations like APMAS, NABARD and state horticultural department thriving to strengthen FPO farmers and around 1003 FPO farmers were available in the mandal. The secondary data related to Nimmanapalle mandal has been collected from the local government agencies like agriculture office, horticulture office, MRO office. From the mandal identified, 5 panchayats namely Rachavetivaripalle, Reddivaripalle, Mastur, Agraharam and Kondaiahgaripalle were selected purposively as they had larger area grown under tomato, ground nut, paddy compared to other Panchayats. The list of farmers in identified panchayats were obtained and 24 farmers from each village were selected randomly from the list. Thus, the total sample size is 120. The primary details like pertaining to cost of cultivation, constraints in custom hiring of agriculture machinery, pattern of custom hiring, custom hiring rates prevailing in the study area and other necessary aspects of crop production was collected through well-structured questionnaire. The data collected pertains to the year 2018-19. The details of techniques employed along with their justification to arrive the findings are explained in the results and discussion section.

RESULTS AND DISCUSSION

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads :

Demand assessment for farm machinery in the study area:

The crops grown by the farmers in Nimmanapalle mandal are ground nut, tomato, paddy and other pulse, fruit and flower crops. Three major crops namely tomato, ground nut and paddy grown in an area of 483, 2650 and 250 hectares were targeted for estimating market demand assessment of farm machinery as these crops are grown in larger area compared to other crops, they have high potential for investment and farmers were adopting mechanization practices in these crops to certain extent. Market demand assessment of farm machinery in each crop selected for the study was done by obtaining data with respect to farm machinery employed in each crop, hiring charges of machinery and usage rate. The details are shown in Table 1 and represented in Fig.1, 2 and 3.

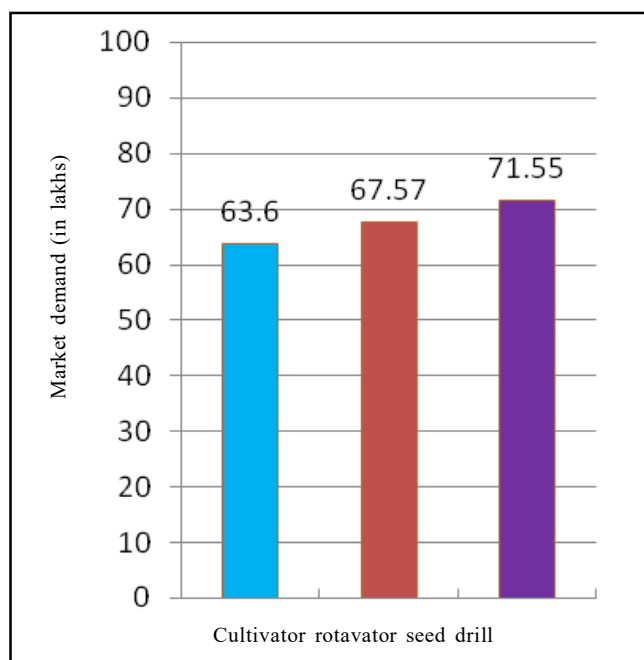


Fig. 1: Market demand for groundnut (in lakhs)

	Groundnut (lakhs)	Tomato (lakhs)	Paddy (lakhs)	Total (lakhs)
Cultivator	63.6	11.59	5.25	80.44
Rotavator	67.57	16.42	15	98.99
Harvester	-	-	18.75	18.75
Weeders	0	0	0	0
Easy planter	-	0	-	0
Seed drill	71.55	-	-	71.55
Total demand	202.72	28.01	39.00	269.73

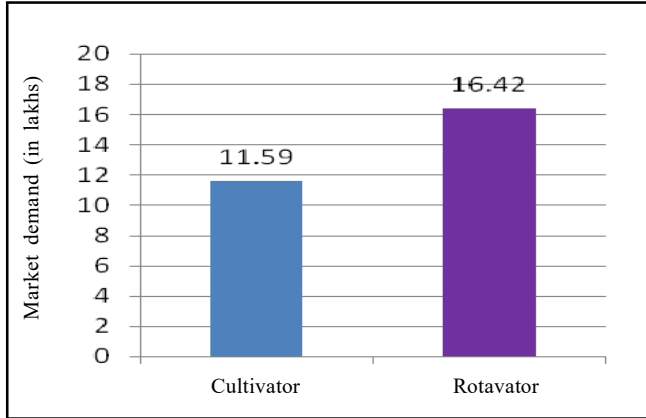


Fig. 2: Market demand for tomato (in lakhs)

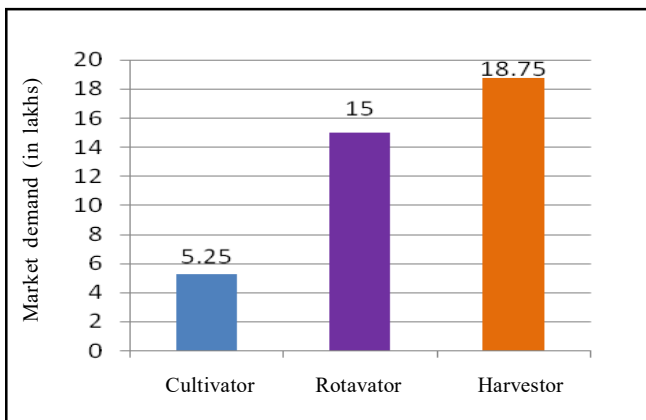


Figure 3 : Market demand for paddy (in lakhs)

Operational holdings of the sample farmers :

The operational holdings of the sample farmers is shown in Table 2.

Table 2 infers that in the study area, around 77 per cent of sample farmers were small and marginal while 22 per cent were medium framers indicating the presence of large percentage of small and marginal farmers in the study area and suitable for establishment of CHC. CHC is ideal to be established in places where large number of small and marginal farmers exists in nearby villages within a radius of 5-7 Kms (Yes Bank, 2016).

SWOT analysis of the study area:

The SWOT framework has been done for the study area to assess the internal strengths and weakness and external opportunities and threats.

Strengths	Weakness
<ul style="list-style-type: none"> ✓ Organizations like APMAS, NABARD and horticulture department are actively supporting farmers in upliftment of their livelihoods in study area. ✓ FPO penetration in the area and presence of around 1003 FPO farmers. ✓ Wide variety of crops grown including agriculture and horticulture crops. ✓ Farmers habituated to hiring services. 	<ul style="list-style-type: none"> ✓ Non-availability of skilled operators’labours. ✓ Farmers are habituated to avail services oncredit basis. ✓ Most of the land cultivated under rainfed conditions. ✓ High Initial capital investment.
Opportunities	Threats
<ul style="list-style-type: none"> ✓ No presence of organized CHC. ✓ Availability of subsidy to farm machinery. ✓ Need for crop specific machineries likemulching machines, raised bed makers etc. ✓ Inadequate farm machinery services. 	<ul style="list-style-type: none"> ✓ Competition from unorganized players. ✓ Changes in technology. ✓ Increase in Agri- start-ups in providing technology-based input services

Utilization pattern of custom hiring of agricultural machinery:

Out of 120 selected farmers, 10 per cent farmers had their own tractors, cultivators and rotavators and 90 per cent of sample farmers were using tractor attachments on hiring basis for farm activities like land

Table 2: Operational holdings of sample farmers

Category	Frequency	Per cent
Marginal farmers (< 1 Hectare)	26	21.67
Small farmers (1-2 Hectare)	68	56.67
Medium farmers (2- 4 Hectare)	22	18.33
Large farmers (> 4 Hectare)	4	3.33
Total	120	100

preparation, harvesting and other operations as and when required. None of the farmers were using trans planters for transplanting seedlings. Farmers were also using seed drill for sowing of seeds of ground nut. The hiring farmers reported the problems of high cost of hiring, inadequate and lack of timely availability of custom hiring services in the study area.

Tomato is a major horticulture crop grown by the farmers and all tomato operations like from mulching, transplanting, stacking were being carried out manually without using any machines by sample farmers. Further farmers in the study area were willing to use the crop specific implements like easy planter and mulch layer for tomato crop if available at affordable hiring charge.

The expenditure figures pertaining to driver wages and lease rentals are as per the prevailing rates in the study area. The farm machinery dealers in chittoor district of Andhra Pradesh state were contacted personally for obtaining the depreciation rates for deciding the second-hand farm machinery prices. Straight line depreciation method was applied to calculate year on year depreciation values. As the farm machinery are purchased for commercial activities at CHC, assuming that the farm machinery are operated at their full potential, the junk value at the end of the tenth year has been considered zero. The preliminary investigation revealed that, 10 years is considered as economic life for most of the farm machineries; hence 10 % depreciation rate was used to estimate annual depreciation costs. (NABARD, 2015). The service centres of branded farm machinery were contracted to arrive the annual costs incurred on the repairs and maintenances of the popular farm machinery used in the study area. The service centres reported an annual 5% of purchase price as repairs and maintenance costs. Hence, these realistic market estimates were taken for estimating operating expenditures. The average annual

market insurance premium rate charged by insurance companies for the farm machineries is @ 2.5 % of equipment cost to be renewed yearly and the same rate is used for expenditure estimation. Fuel consumption vary according to usage rate of machinery for various field activities. For this purpose, the demand for annual hiring hours of various farm machineries services were estimated (Table 5). The hourly fuel consumption of farm machinery as indicate by the manufactures for each activity was considered to estimate the fuel consumption. The average annual fuel consumption for field operations (litres/hour) are estimated based on usage hours and multiplied with prevailing fuel cost per litre. (Edwards, 2015). Then these figures are multiplied with number of units of each equipment proposed in the model CHC. The projected expenditure for the proposed unit over a period of five years is shown in Table 4.

Projected income of the proposed custom hiring centre :

The projected income statement gives a picture of the scope, ability and potential of the businesses in generating incomes in addition to support for loan proposals. But the critical task is to project the estimations accurately accounting for all the risks. The major revenue source for any CHC unit is hiring charges coupled with usage rate of farm machinery at its optimal capacity. For the proposed model CHC unit, the projected income was estimated by multiplying hiring charges per hour and annual usage hours for each farm equipment. The average hiring charges in the study area was taken as basis. As it takes a minimum of three years to penetrate into the market much deeper and operate at full capacity, the first-year target for the unit was fixed at 60 per cent of area operated by FPO farmers and projected to increase at 80% and 100 % during second and third year

Table 3: Willingness of the farmer to use services of custom hiring center

Sr. No.	Particulars	No. of farmers having own	No. of farmers on rental	Usage rate on hiring basis (%)
1.	Tractor	12	108	90
2	Cultivator	12	108	90
3	Rotavator	12	108	90
4	Seed drill	4	116	96
5	Mulch layer	0	120	100
6	Easy planter	0	120	100
7	Power weeder	0	120	100
8	Harvester	0	120	100
9	Raised bed maker	0	120	100

of operations, respectively. To further enhance the operations, in addition to FPO farmers, non FPO farmers

are also targeted to an extent of 5% and 10%, respectively in fourth and fifth years. The projected income of the

Table 4: Projected expenditure statement for the unit		(Rs.)					
Type	Particulars	Years					
		1	2	3	4	5	
Tractor (No.3)	Leased land on rental basis	50000	50000	50000	50000	50000	
	3 drivers' salary@Rs. 6000each per month	216000	226800	249480	286902	344282	
	Progressive FPO farmer(@Rs. 6000 per month paid as honorarium)	72000	72000	72000	72000	72000	
	Depreciation@10% cost oftractor (3 tractors)	194700	194700	194700	194700	194700	
	Insurance premium@2.5% per year	48675	48675	48675	48675	48675	
	Repairs and maintenance 5% cost of 3 tractors	97350	97350	97350	97350	97350	
Trailer(No.2)	Fuel cost	319200	425600	532000	558600	585200	
	Depreciation @ 10% cost oftrailer	22000	22000	22000	22000	22000	
	Repairs and maintenance @5% cost of trailer	11000	11000	11000	11000	11000	
Tractor attached implements	3 Cultivators-9Tyne (depreciation @ 10% cost)	9000	9000	9000	9000	9000	
	Fuel cost	205200	287280	342000	359100	376200	
	Repairs and maintenance @5% cost of 3 Cultivators-9 Tyne	4500	4500	4500	4500	4500	
	3 Rotavators - Depreciation@ 10% cost	9000	9000	9000	9000	9000	
	Fuel cost	205200	287280	342000	359100	376200	
	Repairs and maintenance @5% cost of 3 Rotavators	4500	4500	4500	4500	4500	
	Seed drill-depreciation @10% cost	3000	3000	3000	3000	3000	
	Fuel cost	25855	43092	51300	53865	56430	
	Repairs and maintenance@5% cost of seed drill	1500	1500	1500	1500	1500	
	Mulch layer – depreciation @ 10% cost)	4000	4000	4000	4000	4000	
	Fuel cost	73872	98496	123120	129276	135432	
	Repairs and maintenance 5% cost of mulch layer	2000	2000	2000	2000	2000	
	1 Raised bed maker depreciation@10% of cost)	2600	2600	2600	2600	2600	
	Fuel cost	16416	21888	27360	28728	30096	
	Repairs and maintenance @5% cost of raised bed maker	1300	1300	1300	1300	1300	
	Harvester(No.1)	Depreciation @ 10% cost	180000	180000	180000	180000	180000
		Fuel cost	164160	218880	273600	287280	300960
		Repairs and maintenance @5% of cost of harvester	90000	90000	90000	90000	90000
Tools for Repairing of machines	Insurance premium @2.5% per year	45000	45000	45000	45000	45000	
	Depreciation @10 % of cost	2000	2000	2000	2000	2000	
Easy planters (No.5)	Depreciation @ 10% of cost	1500	1500	1500	1500	1500	
	Repairs and maintenance @5% of cost of 5 easy planters	750	750	750	750	750	
Total		2082278	2465691	2797235	3132126	3274075	

proposed unit is shown in Table 5.

Financial assessment of the proposed custom hiring centre :

From the estimated income and expenditures statements shown in Table 4 and 5, the estimated net income of the unit is shown in Table 6. Now the investment and incomes has to be appraised to assess the viability of the project. For this purpose all the cash flows at different points of time are brought to one single point by employing discounting techniques or project evaluation techniques namely net present value (NPV), benefit cost ratio (BCR) and internal rate of return (IRR). NPV is the sum of present value of all the cash flows, positive as well as negative, that are expected to occur over the life of project. BCR is the present value of benefits divided by present value of costs. A project is worth investing, if its NPV is greater than zero and BCR is greater than one. IRR is the discount rate that equates the present value of future cash flows with the initial investment (Chandra, 2015 and Pandey, 2015). NPV and BCR are computed at different discount rate for assessment of feasibility and profitability of the projects at different market interest rates. Forestration of feasibility analysis of agricultural and rural investment

projects, the discount rate on a lower end is assumed at 6 % and on higher end at 15 %. (IFAD, 2015; FAO, 1991; ADB 2017 and NABARD, 2015). Accordingly, for the model CHC proposed, discount rate or discount factor (DF) is assumed at 12% DF , which is also the market lending rate charged by financial institutions for agricultural term loans. The formulae used for estimating the discounting techniques and estimations obtained are shown in Table 6 and the explanation part is discussed in detail under feasibility analysis.

$$\text{Net present value (NPV)} = \sum_{j=1}^n \frac{B_j - C_j}{(1+i)^j}$$

$$\text{Benefit cost ratio (BCR)} = \frac{\sum_{j=1}^n \frac{B_j}{(1+i)^j}}{\sum_{j=1}^n \frac{C_j}{(1+i)^j}}$$

$$\text{Investment} = \sum_{t=1}^n \frac{C_t}{(1+r)^t}$$

where, C_j is cash flow at the end of year j, i is the discount rate or discount factor or IRR and n is number of years.

Debt serving capacity of the proposed unit :

The importance of agro service centres has been recognized and Government of India (DACFW, 2018 is giving due emphasis for establishment of these units

Table 5 : Projected income for the unit						(Rs.)				
Sr. No.	Items of investment	Cost of the item (Rs.)	Charge per hr	Annual usage hours	Total income (in Rs.)	Extent of coverage by the unit				
						60%	80%	100%	105%	110%
1.	Tractor- 45 hp	1947000								
2.	Trailer	220000	800	2000	1600000	960000	1280000	1600000	1680000	1760000
3.	Tractor attached implements									
a.	Cultivator-9 Tyne	90000	650	900	585000	351000	468000	585000	614250	643500
b.	Rotavator	90000	700	900	630000	378000	504000	630000	661500	693000
c.	Seed drill	30000	650	150	97500	58500	78000	97500	102375	107250
e.	Mulch layer	40000	650	360	234000	140400	187200	234000	245700	257400
f.	Raised bed maker	26000	650	360	234000	140400	187200	234000	245700	257400
4.	Harvester	1800000	2000	600	1200000	720000	960000	1200000	1260000	1320000
5.	Tools for repairing of machines	20000								
6.	Easy planter	15000	50	300	15000	9000	12000	15000	15750	16500
	Total (Rs.)	4278000			4595500	2757300	3676400	4595500	4825275	5055050

Table 6: Financial assessment of the unit

Particulars	Years					
	0	1	2	3	4	5
Capital costs (Rs.)	4278000					
Recurring expenditure (Rs.)		2082278	2465691	2797235	3132126	3274075
Total income (Rs.)		2757300	3676400	4595500	4825275	5055050
Net income (Rs.)		675022	1210709	1798265	1693149	1780975
Present value (PV) of net income at 12% discount factor (DF)		586975.7	915469.94	1182388.43	968063.4	885459.1
NPV @ 12 % discount factor (Rs.)	656437.14					
Total discounted costs @12% DF (Rs.)	13942148.18					

Table 7: Debt service capacity of the unit

	(Rs.)				
	Yr1	Yr2	Yr3	Yr4	Yr5
Income	2757300	3676400	4595500	4825275	5055050
Expenditure	2082278	2465691	2797235	2919226	3061175
Operating income	675022	1210709	1798265	1906049	1993875
Depreciation	427800	427800	427800	427800	427800
Earnings before interest	1102822	1638509	2226065	2333849	2421675
Annual repayments (interest + principal) @12 % interest rate	802411	802411	802411	802411	802411
Cash accruals	300411	836098	1423654	1531438	1619263
Debt service coverage ratio (DSCR)	1.37	2.04	2.77	2.91	3.02

either individually or jointly. Grant of credit facility to these units come under priority sector classification (agri lending). The FPO operated CHC, has the advantage of availing financial support and non-financial support from several societies like SFAC and other NGOs. Financial Institutions lend the credit facility in the form of term loans to these at an average interest rate of 10 %. The repayment capacity of the proposed unit is worked out using the debt servicing coverage ratio (DSCR) at 12% rate of interest and the estimations are detailed in Table 7. The DSCR ratio of 2:1 is generally insisted upon by the term lending financial institutions. In case, the unit wish to source finance from lending institutions, the proposed unit has ability of meeting the debt obligations as evidenced from year on year increase of cash accruals and DSCR ratios of greater than one in first year and more than two from subsequent years.

Feasibility analysis for proposed custom hiring centre:

For the proposed unit, as a part of feasibility studies location feasibility, market feasibility, financial feasibility and socio- cost benefit analysis were worked out and

are detailed under below sections.

Location feasibility of the proposed unit :

The CHC in the study area has to be located in a place where large number of small and marginal land holdings are located within a radius of 5 to 7 kms. This will reduce the transport cost and time of transport of agricultural machinery. In other terms, CHC is expected to cater 4/5 villages and therefore, a common place equidistant from the villages catered is advisable.

Market feasibility of the proposed unit :

The demand assessment studies had illustrated that these exists market for farm machinery services in the study area. But due to the lack of organized players, the demand for services were not actually visible. As the model unit is operated by FPOs, the major target group for the unit are FPO farmers who are numbering 1003. There is good market for the unit in the study area due to constraints being faced by FPO farmers like poor labour availability, high hiring charges being charged by unorganized players and more scope of mechanization for the crops line paddy, ground nut and tomato which are majorly grown in the study area.

Financial feasibility of the proposed unit :

Taking the cost and income parameters into consideration, the financial assessment of the unit was made. The estimated NPV value for the proposed unit at 12 % DF is Rs. 6.56 lakhs, BCR is 1.05 and IRR for the unit is 17.27 % (Table 6). The financial assessment of unit indicated that it is worth taking up this project by FPO farmers as NPV is positive, BCR is greater than one and IRR is 17.27 % which is more than cost of capital *i.e.* 12 % that shall be incurred if the project is financed from financial institutions.

Socio- cost benefit analysis of the proposed unit:

Establishment of the unit in the study area has both merits and demerits.

Merits:

First the project is viable in terms of benefit to cost (1.05 :1) and IRR values (17.27% more than cost of capital @ 12% for the project). Though the project is worth investing in terms of financial aspects but the long-term social benefits are much higher that the unit can generate. Some of the major social benefits identified are timely availability of farm machinery and thus taking up of farm activities on time. This activity results in input use efficiency of farm resources thereby enhancing crop productivity, yields and income levels in addition to reduction of cost of cultivation. The non farm employment opportunities also tends to increase for small and marginal farmers (Singh *et al.*, 2013).

Demerits:

This may lead to lose of business and employment to an extent of 50% by unorganized players in the study area, who are charging high hiring charges as per demand and availability of farm machinery. The other major demerit is lack of employment by farm labour atleast by 50 %. But this should be taken in a positive way. Due to mechanization, the production could increase in the area wherein some of the farm labour can be diverted to other nonfarm activities like post harvesting practices and value addition practices that shall be taken up in the study area over a period of time.

Business strategies for the proposed unit :

Strategies help to sustain, adopt and improve profits in a dynamic market environment. Some strategies are proposed for the unit are briefed below.

Product strategy	<ul style="list-style-type: none"> • Adequate and proper training to the operators and other staff regarding machinery operation, usage dealing with farmers, taking orders phone calls and other services as and when needed. • Major training should be focused on improving the farm efficiency by rendering timely and needed services that improve their incomes and reduce cost of cultivation.
Pricing strategy	<ul style="list-style-type: none"> • Differential pricing strategy to FPO and non FPO farmers • Pricing separately for seasonal and unseasonal operations as per the demand
Promotional strategy	<ul style="list-style-type: none"> • Wall painting of phone numbers. • Field demonstration. • Method and result demonstration. • FPO meetings. • Expert advice meetings
Place strategy:	<ul style="list-style-type: none"> • Wide coverage to more villages by appointing agents (FPO members) and by giving commission of 2-5 % to village business correspondent (VCO). • Selecting a place where large no. of small and marginal land holdings is located within a radius of 5 to 7 kms. This will reduce the transport cost and time of transport of agricultural machinery. • Catering the needs of 4/5 villages and located at a place equidistant from the villages catered is advisable. <p>The model strategy is shown in Fig 4</p>

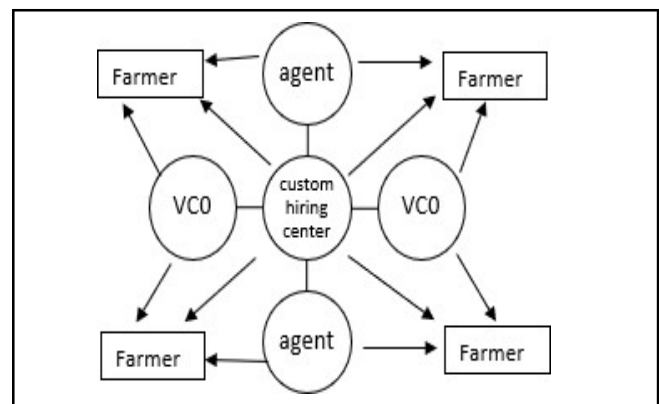


Fig. 4: Model showing the location of unit

Conclusion:

The study majorly aim to assess the feasibility for the establishment of FPO owned and operated model

custom hiring centre in Nimmanapalle mandal of chittoor district of Andhra Pradesh state and formulate suitable business strategies for ensuring viability of the unit. In the study area tomato, ground nut and paddy are the major crops grown and around 77 per cent of sample farmers were small and marginal while 22 per cent were medium. Around 10 per cent of sample farmers had their own tractors, cultivators and rotavators and 90 per cent were using tractor attachments on hiring basis for farm activities. The hiring farmers reported the problems of high cost of hiring, inadequate and lack of timely availability of custom hiring services. The demand assessment for farm machinery in the study area was estimated to be at 269.73 lakhs. The SWOT framework indicated the strength of farmers habituated to hiring services and an opportunity existed for farm machinery services due to shortage of labour, existence of higher hiring rates and demand for crop specific machinery especially for tomato crop. At 12 % DF, the NPV for the proposed unit is a positive value of Rs 6.56 lakhs, BCR is 1.05 and IRR of 17.27 % indicates it is worth investing in this project by FPO farmers. The debt service ratios of greater than one in first year and more than two from subsequent years and an increase of year on year cash accruals showed the ability in meeting the repaying capacity. The unit shall be established at a location equidistant from villages and business strategies formulated include adequate and proper training to operators, differential pricing strategy to FPO and non FPO farmers, rural based promotion strategies such as wall paintings, FPO meetings, method demonstrations and engaging the services of village business correspondents for enhancing the viability and sustainability of the proposed model CHC.

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