



A Review on Custom Hiring Services under Indian Conditions: Farmer's Perception, Associated Factors, Constraints, and Suggestions

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Review Article

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ABSTRACT

Indian agriculture has witnessed a dearth in farm mechanization resulting in inadequate production and productivity in various parts of the country. Despite its need and usefulness, farm mechanization is still far off the reach of small and marginal farmers, who by the virtue of their poor economic condition are unable to acquire the various farm implements needed for timely farm operations. Custom hiring centers (CHC) are a reliable source for bringing a considerable change in the farming situation across the country by availing hiring services of farm implements at affordable rates to the farmers. CHCs are capable to realize the labor shortage, efficient and timely operations, and increased yields. Many studies have demonstrated different dimensions regarding the custom hiring centers and their services. This review paper is collated to provide a better understanding of the perception of the farmers, associated factors, constraints experienced by the farmers, and suggestions regarding utilization of custom hiring services (CHS).

Keywords: *Associated factors; constraints; custom hiring services; farmer's perception; suggestions.*

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1. INTRODUCTION

Agriculture is the backbone of the Indian economy as it has been the major source of livelihood for its population. The contribution of the agriculture sector to the country's GVA at current prices is recorded as 18.80 percent and the agricultural exports have grown by 19.92 percent during the year 2021-22. Out of the total geographical area of the country, the net sown area is reported as 139.4 million hectares. The majority of the rural household in India still depends primarily upon agriculture for their livelihood and around 82% of the farmers belong to the small and marginal category and around 54.3% of the total workforce is engaged in agriculture and allied sector [1]. To perform the various agricultural operations the workforce needed is scarce as the population of draft animals is decreasing and there is labour shortage in the country due to the migration of the rural workforce to urban areas for non-agricultural work in search of earning livelihoods. Therefore the wages for the labour have also increased. Delay in timely sowing and harvesting of crops leads to low quality and quantity yield of the produce. This suggests the utilization of mechanized farm power as it plays a significant role in timely and precision operations, drudgery reduction, the safety of labours, reduced crop loss, and increased food grain productivity with better economic returns to the farmers. The farm power availability (FPA) in the country per ha in the year 2020-21 was 2.761 kW. Out of which the power availability per ha from tractor was the highest i.e. 1.64 kW (59.38%), followed by the power tiller, diesel engine, electric motor, animal and human was, 0.03 kW (1.02%), 0.39kW (14.028%), 0.54 kW (19.57%), 0.084 kW (3.025%) and 0.080 kW (2.98%), respectively. There is a need to increase the FPA by 4.0 kW per ha by the year 2030 for which Indian agriculture needs to expand the agricultural mechanization to accelerate its productivity per unit area.

Marginal and small farmers due to their poor socioeconomic condition are unable to afford the costly machines required for farm operations. Many such farmers still practice their old traditional methods of farming which are tedious, time-consuming, as well as produce low yields. The hiring of machinery at cost-effective prices has helped the farmers in enhancing agricultural production with efficient use of inputs, and precise farm operations. The use of farm

machinery helps in timely operations, larger land coverage in a short time, saves costs and effective resource utilization with timely inputs and aids in soil conservations. Custom Hiring Centre (CHC) is a unit consisting of a set of farm machinery, implements, and equipment that is provided to the farmers at affordable prices on a hiring basis. Custom hiring was first introduced in the country in the year 1912 in Punjab with the use of a steam thresher. In 1971, the Government of India launched a scheme to set up agro-advisory services. After the 1990s the custom hiring services increased with the launch of government schemes. The farm implements were rendered to the farmers according to their needs in various farm operations.

With this background, this paper intends to discuss the services provided by the custom hiring centers, the importance of farm mechanization, farmer's interest and disinterest in the custom hiring services, and the constraints experienced by the farmers in availing the services from the custom hiring centers and the suggestions to overcome the existing hiring situations. Based on the various available evidence, we aim is to infer some relatable questions like whether the services provided by the CHCs are suitable for farmers, what importance farm mechanization holds in the country's current farming situations, what is the attitude of farmers towards CHS, and how they perceive the services of CHC, what possible ways could be provided by the government and non-government institutions to overcome the problems faced by the farmers in availing the CHS.

2. PERSONAL, SOCIO-ECONOMIC, COMMUNICATION, AND PSYCHOLOGICAL CHARACTERISTICS OF FARMERS

A range of factors, as shown in Fig. 1, are involved in determining the perception of farmers towards the usage of CHS which include: Age of farmers, educational background of the farmer, their occupation, family size, land holdings, annual income, cropping pattern, farm power/implements, farming experience, social participation, communication behaviour, extension agency contact, information processing & sharing behaviour, economic motivation, the extent of utilization of CHS by the farmers. In the coming sub-sections, these will be discussed in detail.

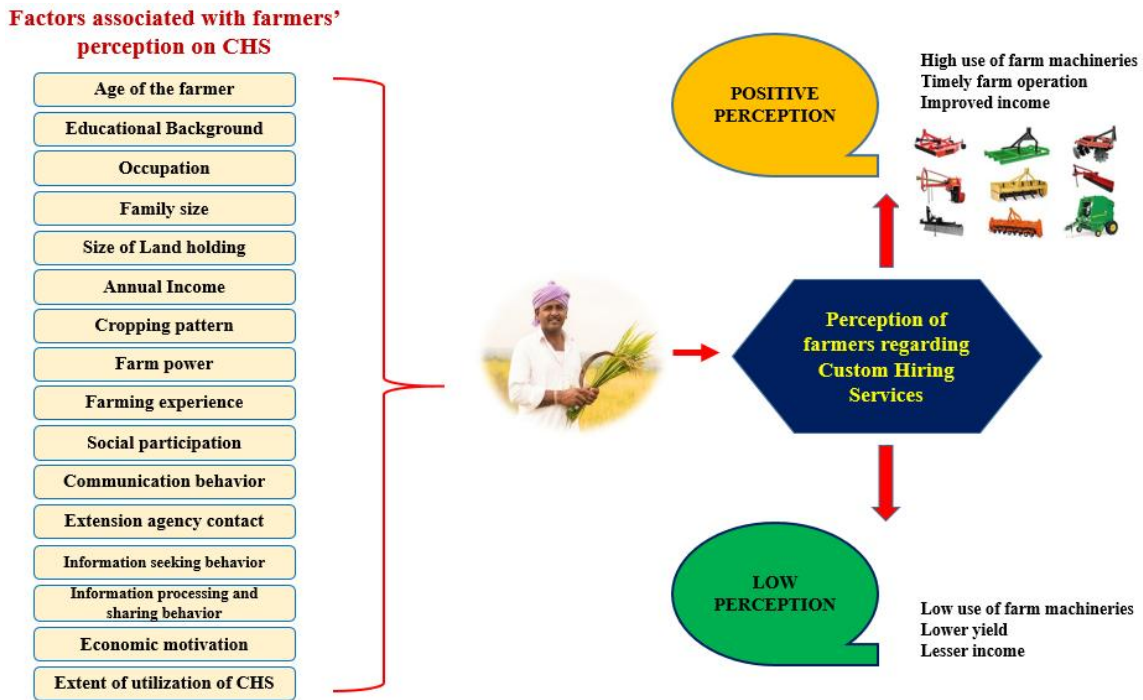


Fig. 1. Factors associated with farmers' perception of Custom Hiring Services

2.1 Age of Farmers

Age is the indicator of experience one has, maturity, role, and status in society. The age of the farmers utilizing the services of the CHC is an important factor to be considered to understand their perception of the utilization of farm mechanization and CHS. Deshmukh et al. [2] in their study on knowledge and adoption of agricultural technologies in Maharashtra observed that a maximum number of respondents were of middle age (47.22%) and then young age (34.72%) and old age farmers (18.06%). In the Dharwad district of Karnataka, it was found that more than half (51.87%) of the cotton growers using farm mechanization belonged to the middle age category and 42.50% and only 5.63% belonged to the young age category respectively [3] whereas Musa et al. [4] in their study on the mechanization effect on farm practices discovered that 55.00 percent of the respondents were in middle age, 24.00 per cent in an old age category, and only 21 percent in the young age category. Nagaraj [5] revealed that the middle age group farmers were most common (75.00%), in a study on the knowledge and adoption of farm mechanization by paddy growers. Kumar [6] in a study on agricultural mechanization in Karimnagar district of Andhra Pradesh reported that young age farmers were less in number (42.5%), old aged farmers

medium in number (45%), and (52.5%) a large number of farmers were in the middle-aged category. Krishna [7] in a study on the economic analysis of mechanization in rice cultivation concluded that in the age group of 26 to 35 years (45.72 percent) partially mechanized farmers made up the majority of the sample farmers. Thakur and Sharma [8] in their study on the farmer's attitude toward modern farm mechanization found that the major number of respondents constitute 65.00 percent belonged to the 35-45 years category followed by 22.50 and 12.50 percent belonged to above 45 and 25-35 years age groups, respectively. Most of the farmers practicing agriculture incidentally belonged to the middle age group. Individuals in the middle age group have physical vigour and more responsibility towards family than the younger ones.

2.2 Educational Background of Farmers

Education is the level of formal education attained by the individual. The formal education attained by any individual reveals their ability to understand and have an attitude towards any concept or situation. The education of any farmer could play a crucial role in having a level of perception towards utilizing the CHS and the adoption of any new technology could be dependent on the educational level of the farmer.

Deshmukh et al. [2] in their study on the Knowledge and adoption of agricultural technologies in Marathwada found that most of the farmers were educated up to higher secondary and above (25.69 per cent) followed by secondary (24.65 percent), primary (16.66 percent), and middle (15.97%) levels of education and 17.01 percent of respondents were illiterate. Akila and Chander [9] in their study on farmer's attitude towards utilization of draught bullocks in Indian agriculture reported that the illiterate respondents were consisted of 28.60, followed by primary educated who consisted of 27.60 and 19.10 percent had secondary education, 12.90 percent of students can read and write and only 7.10 percent of students had high school education. Feng et al. [10] in their study on Farmers' brand perception toward agricultural machinery in China revealed that 64.79 percent of respondents had received junior high school education, 12.68 percent had received primary school education, 9.86 percent had received senior high school education, 6.57 percent had received college-level education, and 6.10 percent had received below primary school education. Musa et al. [4] found that Primary education was held by 55.00 per cent of the respondents, with secondary and higher education held by 30.00 per cent and 13.00 per cent of the respondents, respectively and only 1% lacked a high school education. Another study on the Information source utilization behaviour of paddy farmers regarding farm mechanization by Pauline [11] it was found that more than a quarter of the respondents (23.00%) had completed primary school education, followed by 21.00 per cent completed middle school education, and 19.00 percent completed secondary school education. The functionally literate accounted for 17.00per cent of the respondents, while the illiterate accounted for 12.00per cent. Collegiate education accounted for 8 per cent of the total. Also, Karunthadankanni [12] in a study on Impact of Farm Mechanization in the Rice Based Irrigated Agro-Ecosystem (RIAES) in Coimbatore District of Tamil Nadu outlined that high school education was discovered in 30.00 per cent of the respondents, followed by middle school education in 27.50 per cent of the respondents. Higher secondary was responsible for the rest (19.16%), followed by college (18.34%). Primary schooling accounted for just 5.00 per cent of the total number of respondents. Jyoti [3] in a study revealed that a total of 29.37 per cent of cotton growers had completed high school, while 9.37 per cent were illiterate. The remaining cotton

farmers had received education up to PUC (21.87%), middle school (15.62%), elementary school (12.50%), and graduate-level (11.25%), respectively. Nagaraj [5] revealed that 14.17 per cent were illiterate, 19.17 per cent had primary education, 22.50 per cent had secondary education, and only 24.17 per cent had a college education, 10.83 per cent and 9.17 per cent had secondary education. While Gbegeh and Akubilo [13] in their study on Athe adoption of selected improved agricultural technologies by farmers in River state, Nigeria found that more than one-third (37.78%) of respondents received primary education, followed by secondary education (30.00%), higher education (22.22%), and formal education. It was shown that there was no education by (10.00%) of the farmers. Kumar [6] revealed that the majority of respondents had education up to primary school (37.5%) followed by functional literates (28.00%), illiterate. (20.00%), middle to high school (12.00%) and college level and above (2.50%) education. Thakur and Sharma [8] in their study found that the most of respondents had a metric level of education (50%), followed by a bachelor's degree (25%), higher secondary education (22.5%), and graduate research (2.50%). Verma et al. [14] in their study, factors Associated with Adoption of Drip Irrigation System by the Farmers in Bikaner District of Rajasthan found that 14.53 per cent of the people asked were illiterate and 32.48 per cent were literate up to elementary school. Similarly, 23.51, 15.81, and 8.97 per cent of respondents belonged to the categories of secondary, secondary, and higher secondary education, respectively. Only the remaining 4.70 per cent of those surveyed had a college degree or higher. The majority of the farmers in rural areas receive the primary level of education and most of them also attain a high school level of education. This might be due to the unavailability of higher secondary schools and colleges in the village area or due to their family's financial situation to get support in higher studies. Also in rural areas, individuals prefer to drop education and invest their time in other activities to gain a mere source of income. They fail to realize the importance of higher education and their prospects.

2.3 Occupation of Farmers

The occupation of a farmer is the main and subsidiary source of livelihood from their attained income. Farmers with agriculture as their main occupation will be more interested in improving their farming conditions by adopting new

technological practices to gain increased income. Satyachitradevi [15] in a study on the spread and acceptance of low-cost technologies of major crops by resource poor farmers in Tamil Nadu revealed that the majority (69.17 per cent) of the respondents were solely dependent on agriculture, whereas 16.67 percent of them had both agriculture and labour, followed by agriculture and business (10.83 percent). Only a negligible percentage (3.33 percent) had agriculture and services. Sathyakala [16] in a study on developing training strategy to rural youth on rice-based farm implements in Tamil Nadu, found that the majority of the respondents (50.83 per cent) had farming alone as their occupation, followed by farming + services (21.67 per cent). This was followed by 16.67 per cent of the respondents with their occupation as farming + business, 8.33 per cent were farming + wage earners. Less number of respondents (2.50 percent) were wage earners. Pauline [11] reported that half of the respondents (50.00 per cent) had farming as their profession, followed by farming + business (22.00 per cent) and farming + wage earner (17.00 per cent). The remaining 11.00 per cent of the respondents belonged to farming + service as their occupation. Karunthadankanni [12] stated that the majority of the respondents (84.17 per cent) solely dependent on agriculture, whereas 5.83 percent of them were doing farming as well as acted as agricultural labour followed by 5.00 per cent on agriculture and business and agriculture and government/private service 5.00 percent. As the farmers reside in rural areas and agriculture is their traditional occupation they had not diversified their occupation into other sectors such as service and business. CHS is majorly utilized by the farmers with agriculture as their primary occupation.

2.4 Family Size of Farmers

Family size refers to the total number of members present in the family. It is an important factor upon which the major decision of a family is based. A rural farming family with fewer members would be able to manage their finances more efficiently as compared to the ones with more family members. A study on farm implements utilization behaviour of farmers in Maharashtra by Salunke [17] concluded that about half of the farmers had medium family size (6 to 10 members) and also Patil et al. [18] reported that 41.61% of farmers had the medium size of families in their study on tractorization in Ahmednagar district of Maharashtra. Jalak [19]

revealed that around half (51.34%) of the farmers in the study area of Rahuri, Maharashtra had medium size family, followed by (43.00%) small size family and the least number (0.66%) had large family size. Another study in Maharashtra by Dhere [20] in a study in Maharashtra on the knowledge and attitude of farmers towards farm mechanization inferred that more than two-fifth (43.00%) of the farmers had medium size family, followed by one-third (33.00%) and 24.00% had small and large family size. It was seen that families in rural areas lived in a joint family which even burdens the family's income bearers with more responsibilities. These factors might be a reason for the lower adoption of new technologies in farming.

2.5 Land Holdings of Farmers

Land holding is the actual size of the land acquired by the farmer. The land is a main source of income in any agrarian society and a large percentage of farmers have small and marginal followed by medium land holdings and a very less percentage of farmers possess large landholdings in the country. A farmer with more land holdings will require farm implements to complete the farm operations timely. The small and marginal farmers cannot manage buying implements while they can have the provision of hiring them at affordable rates through the CHC. A study on the status of farm machinery in Indian agriculture by Pandey [21] reported that 22.00% each of the farmers were semi-medium (2-4 hectare), medium (4-10 hectare), and large (more than 10 hectares) farm holders. The average size of farm holding was 1.55 hectares. About 78.00% of the farm holders had an area of fewer than 2.00 hectares. Satyachitradevi [15] in Tamil Nadu found in a study that 58.33% of the respondents belonged to a marginal category, whereas about two-fifth of the respondents (41.67%) belonged to the small farmer category. Vanetha [22] in a study on the utilization behavior of farm equipment in commercial crops in Tamil Nadu reported that 40.00% of sugarcane farmers possessed farm sizes of 2.5-5.0 acres, while 30.66% of farmers had farm size up to 2.5 acres and 23.34 had farm size above 5.00 acres. Persis [23] in a study on retrospect and prospects of farm mechanization in tribal agriculture reported that one-third of the respondents (35.80%) had small farms, followed by high level (34.20%), whereas more than one-fourth of the respondents (30.00 percent) were marginal farmers. Bite [24] in his study on the attitude of farmers towards farm mechanization

in Maharashtra inferred that maximum farmers (78.24%) had medium land holding and very few farmers were in semi medium (21.76%) category. Another study on farm mechanization in paddy cultivation by Pauline [11] concluded that the majority (43.00%) were marginal farmers, followed by small and medium and big farmers with (37.00%) and (10.00%) respectively. A study on the profile of farmers in the utilization of farm equipment in Tamil Nadu by Vanetha and Senthil [25] observed that the sugarcane farmers utilizing farm implements had farm sizes of 2.5 to 5.0 acres (40%) followed by the farmers who had less than 2.5 acres, and above 5.0 acres (30%), respectively. Kumar [6] in a study on agricultural mechanization in Andhra Pradesh revealed that respondents belonged to large, medium and small farmers' categories with 33.40%, 33.30%, and 33.33% in descending order respectively.

2.6 Annual Income of Farmers

The annual income of a farmer is the total household earnings of the family per year through the farm and non-farm sources i.e. agriculture, dairy, business, service, labour, and other sources pooled together to calculate the gross annual income of the family. Farmers with low to medium annual income usually resort their ways to custom hiring centers for using the farm equipment. Satyachitradevi [15] inferred that 73.33 percent of the respondents were found to fall under the medium income category. Nearly 20 per cent of the respondents were found under the low-income category. The respondents under high income category were minimum (7.50 percent). Sathyakala [16] reported that respondents under the medium category of annual income were larger in number. Karunthadankanni [12] in a study on the farm mechanization in the rice-based irrigated agroecosystem in the Coimbatore district of Tamil Nadu found that the majority of the respondents (40.83 percent) had a medium level of annual income followed by 30.00 per cent with high and 29.17 per cent with a low level of annual income. Also Pauline [11] in a study on farm mechanization in paddy cultivation in Madurai district of Tamil Nadu concluded that the maximum respondents (44.00 per cent) had a medium level of annual income. Thakur and Sharma [8] studied farmer's attitudes towards modern farm mechanization and found that 47.50 percent of the respondents had an annual income of more than Rs 1,10,000 followed by an equal 15.00 per cent of the respondents who had an annual income of less than Rs. 50,000 and

Rs. 50,000-70,000 and Rs. 90,000-1,10,000, respectively. The remaining 7.50 percent of the respondents had Rs 70,000-90,000 annual income. Hence, it is observed that the farmers in rural areas had a medium level of annual income and most of them were not capable to own any farm machinery. Therefore, CHC is helpful for these farmers in providing the necessary farm machinery.

2.7 Cropping Pattern Followed by the Farmers

Cropping pattern refers to the proportion of land planted for different crops at any given time. Different type of crops requires the usage of different machinery. CHC has offered the farmer's farm implements specific to their grown crops. Karmakar and Majumdar [26] in their study on farm mechanization in West Bengal, India, noticed that rice was a dominant crop in the state. In *kharif* season, 80.00 per cent of the land was covered in rice and other *kharif* crops were jute, maize, and pulses. The area under cereals was 78.44 percent of which covered by paddy was 93.18 per cent and wheat covered only 6.30 per cent. The coverage of pulses, oilseeds, fiber crops, and cash crops was 4.63 percent, 7.96 per cent, 5.82 percent, and 4.70 per cent, respectively. Bite [24] reported that the majority of the farmers (71.67 per cent) belonged to a medium cropping pattern, 15.00 per cent had a high cropping pattern and 13.33 per cent had a low cropping pattern. Dhere [20] found that the majority (70.00 per cent) of the farmers were having medium cropping patterns, followed by 17.00 per cent with high cropping patterns and 13.00 per cent with low cropping patterns. Further, he revealed that a large majority (90.00 per cent) of the farmers had cultivated *kharif* crop, followed by *rabi* (65.00 per cent), perennial (20.00 per cent), annual (15.00 percent), and summer (9.00 per cent).

2.8 Farm Power/Implements Owned by the Farmers

Farm power is the amount of farm machinery or implements that farmers own to perform various agricultural operations. Utilization of custom hiring services depends upon the possession of the farm machinery and equipment by the farmers and their needs according to the farming area and the type of crops grown. Farmers with low farm power will require machinery to support agricultural tasks efficiently. Anandaraja [27] in his study on farm mechanization reported that a

maximum of respondents (63.13%) had a low level of farm power status while more than one-fifth (22.25%) had a medium and high level of farm power status (15.62%). While Persis [23] observed that nearly half of the respondents (49.00%) were under the low category of farm power and 29.00% of them had a high level and more than one-fifth (22.00%) were found under the medium level of farm power. Whereas Sathyakala [16] inferred that many farmers (39.17%) belonged to a medium level according to their farm power status, followed by low (34.17 percent) and high (26.66 percent) levels of farm power status. Ghosh [28] found in West Bengal that 33 percent of sample farmers used bullocks for ploughing and mainly for transporting crops. Only 10 percent of farmers had their tractors and power tillers; 40 per cent of the sample farmers had diesel pump-sets and 24 percent of farmers had their electric pump-sets for supplying irrigation to their land.

Jangid et al. [29] in their study on, the status of farm power and machinery and promotion of farm mechanization in Southern Rajasthan, found that the majority of the farmers (70.00%) possessed bullock-drawn indigenous implements such as wooden ploughs, blade harrow (230mm), bullock cart, sowing implements, and planked; whereas, 47.30% possessed improved iron plough, 32.50% had improved iron blade harrows, 23.60% had improved seed cum fertilizer drill and 19.80% possessed mould board plough. Furthermore, Dange [30] in his research on the mechanization needs of sugarcane growers in Belgaum district, Karnataka inferred that 40.00 per cent of big farmers belonged to high status of farm mechanization, while 46.00 percent of the small farmers had low status and 36.00 per cent of the medium farmers belonged to medium status category.

Jyoti [3] reported that nearly half (45.00 per cent) of the respondents belonged to the medium material possession category followed by low (31.25 per cent) and high (23.75 per cent) material possession categories. Nagaraj [5] revealed that all the respondents possessed sprayer, pickaxe, kurtis, sickle, and spade. Tractor, cage wheel, MB plough, cultivator, and harrow were possessed by 73.33, 66.67, 65.00, 53.33, and 50.83 percent of the respondents, respectively. Nearly one-fifth of the respondents had a power tiller and puddler. While 10.00 percent of the respondents possessed rotavator and wooden plough. Whereas, 7.50, 5.83, and 3.33 percent of the respondents possessed

bullock cart, paddy transplanted, and conoweeder, respectively. Roy et al. [31] assessed socio-economic status of hill farmers and revealed that the majority (60.00 per cent) of the respondents belonged to the medium material possession category followed by high (21.67 percent) and poor (18.33 percent) material possession categories.

2.9 Farming Experience of Farmers

Farming experience refers to the number of years of familiarity of the farmer in farming practices. Experienced farmers want to improve their farming conditions and are ready to change their methods in farming operations to gain enhanced produce and income. Therefore, availing of the custom hiring services of farm machinery holds importance with the farming experience of a farmer. Satyachitradevi [15] revealed that 43.33 per cent of the farmers had medium level of farming experience, followed by low (29.17 per cent) and high (27.50 per cent) levels of farming experience. Vanetha [22] reported that most of the sugarcane growers (53.33 per cent) had a high level of farming experience followed by medium (33.33 per cent) and low level (13.34 per cent) respectively. Persis [23] observed that 49.20 per cent of the farmer had high level of farming experience, followed by medium (46.70 per cent) and low level (4.10 per cent). Sathyakala [16] reported that majority of the respondents (45.83 per cent) had medium level of farming experience. Low and high levels of farming experiences were possessed by 23.34 per cent and 30.83 per cent of the respondents, respectively.

Pauline [11] found that many farmers (63.00 per cent) had medium level of farming experience. Low and high levels of farming experience were possessed by 19.00 per cent and 18.00 per cent of the respondents respectively. Karunthadankanni [12] reported that the majority of the paddy growers had a high level of farming experience, 28.33 percent of a medium level of farming experience, and 9.17 per cent with low-level farming experience. Musa et al. [4] revealed that more than one-fourth of the farmers (31.00 percent) had a farming experience of 6-10 years followed by more than 20 years (19.00 percent), 16-20 years (17.00 percent), 11-15 years (17.00 percent) and 1-5 years (16.00 percent). Chouhan et al. [32] in their study on adoption dynamics of improved sugarcane cultivation revealed that majority (65.00 percent) of the respondents had a medium farming experience followed by less

(22.50 percent) and a high (12.50 percent) farming experience.

2.10 Social Participation of Farmers

Farmer's participation in any formal or informal organizations in society refers to their social participation. A farmer associated with any organization is up to date with farming-related information and will be likely to adopt improved ways of farming such as utilizing farm machinery. Medium to a high level of social participation among the farmers is found to promote the use of farm implements through custom hiring services.

Jalak [19] in his study on knowledge and adoption of improved farm implements in Maharashtra reported that more than one-third (34.00%) of the farmers had low social participation, while 26.00 percent of them had a medium level of social participation and also 24.00% were non-participants and 16.00% had high social participation. Another study in Maharashtra on the utilization of improved farm implements by sugarcane growers observed that the majority of farmers (65.84%) had a medium level of social participation and 24.16% had a low level of social participation while very less percentage of farmers had a moderate and high level of social participation respectively [33]. Furthermore, it was found that the majority of the farmers (70.00%) belonged to the high-level social participation category, and less percentage of farmers i.e. 17.50% and 12.50% belonged to low-level and medium-level categories of social participation [12]. Whereas, it was observed by Singh et al. [34,35] in Bharatpur, Rajasthan that the maximum of wheat growers (63.37%) was not associated with any organization. Vanetha and Senthil [25] in their study on the profile of cotton farmers in the utilization of farm equipment in Tamil Nadu reported that nearly two-third (63.33 percent) of the respondents had medium social participation followed by high (20.00per cent) and low (6.67 percent) social participation. Therefore, it is observed that farmers with a low level of social participation have low adoption and usage of farm implements.

2.11 Communication Behaviour of Farmers

Rogers (1969) defined communication behaviour as the degree to which an individual is willing to seek information and advice. The tendency of

farmers to seek out and share technical information about farming practices to advance their knowledge and abilities was referred to as the communication behaviour of a farmer. To determine the communication behaviour of the farmers for agriculture, the factors like how the farmers require information regarding production technology, what sources they use, how do they evaluated and stored as a result of processing the gathered information, and to what extent farmers share the store information to others are considered. Knowledge regarding CHS will be disseminated to a greater extent with the help of the farmers having better communication behaviour. This might motivate other fellow farmers in utilizing CHS.

Jaganarayanan [36] in his work on the profile study of farm implements, machinery, and tools used in the rice farming system in Tamil Nadu observed that more than half of the paddy growers (64.17%) had medium levels followed by low levels (21.67%) and high level (14.16%) of information source utilization. In a study on knowledge and adoption of improved farm implements in Maharashtra, it was revealed that 66.67 per cent of the farmers had medium level use of sources of information, followed by 19.33 percent and 14.00 percent had low level and high-level use of sources of information (Jalak, 2002). Whereas, Sathyakala [16] found that maximum paddy growing farmers (36.67%) had a low level of information source utilization while (32.50 percent) and (30.83 percent) belonged to medium and low-level information source utilization categories respectively in a study on developing training strategy to rural youth on rice-based farming implements in Tamil Nadu.

Aitwade [33] reported that half (51.66%) of sugarcane growers had moderate level use of sources of information, while 30.00% had medium level and 10.83% had high-level use of a source of information and only 7.50% of the sugarcane growers had low-level use of sources of information. Dhere [20] observed that among the personal localite sources, the majority of the farmers had contacted their friends regularly (85.00%) and neighbours (80.00%), and then the progressive farmers (68.00%), and local leaders (40.00%). While *Gramsevaks* and agriculture extension officers were contacted frequently by 36.00 percent and 35.00 percent of farmers respectively among the personal cosmopolite source, where the university scientists were never contacted by most of the farmers (82.00%), and only four percent of farmers were

in regular contact with the University Scientists. *Gram Sevaks* were contacted often by 52.00 percent of farmers. These findings were reported in a study on the knowledge and attitude of farmers toward farm mechanization in agriculture in Maharashtra.

Kumar et al. [37] in their study indicated that about three fourth of the NAIP farmers had medium communication behaviour and 15.83% and 9.16 percent of them had a high and low level of communication behaviour respectively. Whereas, Phukan et al. [38] in their study on the communication behaviour of winter vegetable cultivators in Jorhat district of Assam observe that 70 percent of the respondents belonged to the medium level of communication behaviour category 16.66%, and 13.33% had a low and high level of communication behaviour respectively. Furthermore, it was reported that maximum respondents had medium communication behaviour whereas 22.78 percent and a small percentage (12.66%) had low and high communication behaviour respectively (Hakeem et al., 2014).

2.12 Extension Agency Contact

Extension agency contact refers to the extent of involvement by the farmers in various extension activities conducted by the different extension agencies. Farmers with good extension agency contact under their guidance would prefer to adopt improved methods of farming like using farm machinery provided by the CHC for their farming practices at favourably low costs. A study on the utilization of communication sources by farmers for seeking farm information by Sonawane et al. [39] observed that maximum farmers (96.87%) acquired information from agricultural assistants, 25.78% contacted circle agriculture officers for gaining information, and from subject matter specialist (21.87%) and 21.09% contacted agricultural officer for getting information.

Jyoti [3] in a study on Farm mechanization expectations of cotton growers in Karnataka reported that almost half of the cotton growers (48.13%), had low extension contact and only 30.00% and 21.88% had high and medium extension contact, respectively. A study on the Mechanization needs of sugarcane growers in the Belgaum district of Karnataka concluded that 49.33% of the farmers had low extension contact and 28.00% and 22.67% had high and medium levels of extension agency contacts [40]. In

Nigeria, in a study on the adoption of selected improved agricultural technologies, it was observed that 60% of the farmers had access while 40% had no access to the extension agents [13].

2.13 Information-seeking Behaviour of Farmers

Information-seeking behaviour describes all the actions taken by a person (farmer) to obtain technological know-how, new concepts, and scientific knowledge from many sources. Farmers with good information seeking behaviour will be eager to gain more knowledge to improve their farming situation. Hence, the perception of CHS is affected by the information-seeking behaviour of a farmer. It was observed that most of the paddy growers in Tamil Nadu received information regarding farm mechanization from personal localite channels like input dealers, farm leaders, relatives, neighbours, friends, and progressive farmers. Whereas in the state of Tamil Nadu it was found that more than half of the paddy growers (52.00%) had a high level of information source utilization and 31.00% and 17.00% had a medium and low levels of information source utilization respectively. Furthermore, it was inferred that the paddy growers acquired information from personal localite channels like the input dealers, farm leaders, relatives, neighbours, friends, and progressive farmers [41].

Vanetha [22] observed that majority of the sugarcane growers (46.67%) had a medium level of information-seeking behaviour while 30.00% and 23.33% of the farmers had a high and low levels of information-seeking behaviour respectively in Tamil Nadu state. Whereas, Persis [23] in a study on retrospect and prospects of farm mechanization in tribal agriculture in Tamil Nadu observed that majority of the farmers (49.20%) had a medium level of information-seeking behaviour, followed by high (27.50 percent) and low level (23.30 per cent) of information seeking behaviour.

2.14 Information Processing and Sharing Behaviour

Information processing and sharing behaviour refer to the degree to which a person retains the information obtained from various information sources and shares that information with others. The information-sharing behaviour for evaluating

technology by the contact farmers is observed as discussions with their family members, and discussion with friends and neighbours. Farmers with better information processing and sharing behaviour may be responsible for disseminating their gained knowledge to fellow farmers which might motivate them to utilize the farm machinery for their operations. Reddy [42] revealed that more than two-thirds of the respondents (81.67%) had a medium level of information processing behaviour in Andhra Pradesh. Whereas, in Tamil Nadu, it was observed that most of the tribal farmers shared agricultural information mainly with their family members and relatives in a study on the Communication behaviour of tribal farmers of Pachaimalai hills [43].

2.15 Economic Motivation for Farmers

Economic motivation is defined as occupational achievement in terms of profit maximization and an individual's proportionate value placed on economic aims. Farmers having good economic motivation will always be eager to boost their income by raising their level of farming practices. Hence, the economic motivation of a farmer will have a direct effect on their utilization of CHS for improving their farming conditions. A study in Tamil Nadu on Rice-based farm implements reported a maximum number of respondents (37.50%) with a low levels of economic motivation and 31.67% and 30.00% with a high and low levels of economic motivation respectively [16]. While another study by Pauline [11] in Tamil Nadu on farm mechanization in Paddy cultivation observed a medium level of economic motivation by the majority of respondents (76.00%) and a very less percentage of respondents with low (17.00%) and high levels (7.00%) of economic motivation. It was also observed that the majority of respondents (66.67%) had a medium level of economic motivation, followed by low (18.33%) and high levels (15.00%) of economic motivation in Farm Mechanization in the Rice-Based Irrigated Agro-Ecosystem in Coimbatore, Tamil Nadu [12].

2.16 Extent of Utilization of Custom Hiring Services by the Farmers

The process of perceiving the use of external factors, events, and information through the senses is referred to as utilization. The present study examines farmers' use of services offered by custom hiring centers, such as tractor,

thresher, rotavator, seed cum fertilizer drill machine, cultivator, raised bed planter, straw reaper, reversible MB plough, etc. In Punjab, it was observed that there was a high level of adoption of disc harrow (70.00%) by the farmers while a low level of adoption was observed for the implements such as combine harvester (20.00%), sugarcane planter (3.00%), tractor operated reaper (3.00%) and intercultural hoe (30.00%) [44]. While, in the state of Maharashtra, more than two-fifth (42.67%) of the farmers had a medium level of adoption while about one-third (32.66%) and one-fourth (24.67%) of the farmers had a high level and low level of adoption of farm implements respectively [17].

In Kurukshetra, Haryana, a study by Venkattakumar and Sripal [45] revealed that a maximum (63.75%) of the paddy farmers had a low level to medium level of adoption of farm implements and machinery, whereas (36.22%) had a high level of adoption. While, Das [46] in a study on the status of the tractor, power tillers, agricultural implements, and machinery in Hyderabad, Telangana inferred that increased mechanization in small land holdings would improve rice production. Less than half of the cultivated land was found not irrigated but better technology and mechanization for the upland and the lowland rice would enhance the production and productivity of rice.

In Punjab, custom hiring gained importance majorly due to a drop in average land holding and a rise in the cropping intensity. The machines were found uneconomical for single farm operations because of the decrease in the average land holding size in India. Custom hiring rates prevailing in Punjab in 2002-2003 was 35-40 hp and the most used machine for custom hiring work related to combining harvesting was large-size tractors [47]. In the Karnal district of Haryana, it was observed that the implements such as tractors below 26.12 kW (35 hp), electric motors below 3.73 kW (5 hp), and diesel pumps above 506 kW (7.5hp) were mostly used. The most popular implements among the farmers were tractor-drawn disc harrow and cultivator and were owned by 95.37% and 88.00% of them respectively [48].

Another study in Madhya Pradesh on economic evaluation and mechanization gaps of vegetable growers inferred that utilization of tractors was mainly for land preparation and majorly (20h/ha) utilized in potato cultivation and the in brinjal, garlic, and tomato while electric motor was

widely used for irrigation and maximum utilized for tomato (503h/ha) and then for brinjal (177 h/ha), garlic (77 h/ha) and potato (71 h/ha) [49]. Moreover, the tractor population of the 41-60 hp segment increased from 54,685 (22.80% of the total number of tractors in a year) in 2000-01 to 91,741 (31.50%) in 2005-06. It was found that the use of higher hp tractors (> 60hp) had also increased from 265 tractors in 2000-01 to 2068 in 2003-04 [50].

A status on farm mechanization in the Durg District of Chhattisgarh revealed that the farmers adopted the traditional practices and used animal-drawn implements like the indigenous plough which was used highly for tillage, sowing, intercultural operation, harvesting and threshing operations, etc. Some farmers had no animals and tractors but they hired the animal and tractors for farm practices. Good scope for tractor and implements for various inter-cultural operations on a hire basis was observed in the area [51]. Whereas, Farm mechanization status in West Bengal revealed that the farmers in the state were widely using effective types of machinery for paddy and potato cultivation. They were more interested in the machines like self-propelled paddy transplanter, weeder, vertical conveyer reaper and flow through paddy thresher in paddy crop and semi-automatic and automatic potato planter and potato digger in potato provided by the front line demonstration and custom hiring services of IIT Kharagpur [52]. In another study in Punjab, the annual usage (hour/year) of farm machinery services provided by the selected cooperative societies were a tractor, water tanker, trolley with lift, rotavator, cultivator, laser leveller, discs, land leveller, zero till drill, BT cotton drill, wheat drill, cotton drill, plough, harrow, special plough, weeder, leveller, and bund former in descending order. It was also revealed that utilization of machinery in CHCs varied from 100 to 0 percent depending upon the type of machinery used, suitability to the area, awareness about custom hiring service centers (CHSCs), etc. [53]. While in Junagadh, it was found that the annual usage (hours/year) of farm machinery provided by the custom hiring centers was highest for tractors followed by a combine harvester, cultivator, rotavator, thresher, seed drill, disc plough, plough, and harrow [54]. However, in Jabalpur, Madhya Pradesh it was found that 62.50 percent of farmers were having a medium level of utilization of CHS followed by 21.25 percent and 16.25 percent of the respondents belonged to a low and high levels of utilization of CHS, respectively [55].

2.17 Services of Custom Hiring Centers Utilized by the Farmers

This section highlights the various services which are being availed by the farmers from the custom hiring centres in different regions of the country. Ranade et al. [56] in their study on custom hiring of agricultural implements in the Malwa region of Madhya Pradesh revealed that custom hiring services spread equipment ownership costs over various areas. The factors such as the size of the farm, labour availability, selection of crops, and different cultural practices affected the selection of an optimum set of equipment and the required number of machines required for the farming. It was concluded that with the assistance of custom hiring centers, there is a good scope for better access to various implements other than those already owned by the individual farmers.

Anonymous [57] in their study on evaluation of custom hiring services offered for agriculture under the Yantradoot scheme in Madhya Pradesh state recorded that the major services rendered by the custom hiring centers offered for agriculture were rotavator, cultivator, Seed drill, raised bed planter, reaper, pesticide sprayer, and thresher and the farmers were found to have a positive response regarding the scheme as they had a requirement of more number of farm machinery such as Rotavator and Reaper due to non-availability of equipment during the peak farming season when the demand is more than the availability.

Kamboj et al. [58] in their study on 'information regarding nature of custom hiring services provided by co-operatives, the cost analysis for the annual usage' found that rotavator, laser land leveller, disc harrow, and cotton drill were the most widely used machine among all the centers. This concluded that these machines were most demanded by the farmers in the region. The average annual usage of the tractor was 900 hours whereas for the tillage machinery like rotavator, cultivator, disc harrow and laser leveller were around 550 hours and the hydraulic trolley and water tank were in high demand with an average annual use of 750-800 hours.

Furthermore, Srinivasrao et al. [59] in their study on Operationalization of Custom hiring centers on farm implements in hundred villages in India funded by the National Initiative on Climate Resilient Agriculture situated all over India reported that the major farm machines offered on the custom hiring basis were zero seed drill,

multi-crop thresher, tractor operated power sprayer, rotovator, power weeder, ridger, chaff cutter, maize crop thresher, multi-crop planter, seed cum fertilizer drill, leveller, reaper, power tiller, power weeder, combine harvester, conoweeder, rotary power weeder, MB plough, Disk plough, rice transplanter, paddy thresher and post hole digger.

Chahal et al. [60] in their study on the role of co-operatives in the institutionalization of custom hiring in Punjab concluded that laser leveller, rotovator, MB plough, planters, sprayers, disk harrow, bund maker, zero drills, trolley, potato seeder, potato digger, and paddy transplanters were rendered for agricultural operations.

In Raichur district of Karnataka, it was observed that farm machinery such as tractor, rotavator, multicrop thresher, MB plough, cultivator, leveller blade, blade harrow, seed cum fertilizer Drill, Knapsack sprayer, power weedier, and winnowing fan were facilitated by custom hiring service centres (CHSC). The small and marginal farmers in the district benefited from the performance of CHSC [53].

According to Chandrashekar [61], there were numerous advanced farm machines and implements maintained at custom hiring Centers in the Hassan district, as well as the hiring rates specified by CHCs and commercial agencies. It can be noted that CHCs charged lower hiring fees than private agencies. CHCs provide farm machinery and implements at reasonable prices to promote agricultural mechanization, allowing farmers to access modern machinery and implements and allowing them to complete their farm operations on schedule despite the problem of farm labourer scarcity.

Moreover, the farmers utilizing the CHS in Jabalpur district of Madhya Pradesh were observed to avail service of a tractor (97.50%) followed by use of a thresher (93.75%), Rotavator (86.25%), raise bed planter (73.75%), reversible plough (72.50%), cultivator (67.50%) and seed cum fertilizer drill machine (62.50%) [55].

3. PERCEPTION OF FARMERS REGARDING THE SERVICES RENDERED BY CUSTOM HIRING CENTERS

Perception is the process of comprehending sensations or assigning meanings to them based

on prior experiences. Perception is our cognitive experience of the world around us, which includes both identifying environmental inputs and responding to these stimuli. The American Psychological Association (APA) defines perception as "the process or result of becoming aware of objects, relationships, and events using the senses, which includes activities such as recognizing, observing, and discriminating. Perception of farmers towards any services or practice is very essential for the administration and the policymakers to analyze farmers' feedback on any projects and to develop improved service centers. In this study, farmers' perception towards custom hiring services will provide a better understanding of the level or degree of usage of the farm machinery among the different groups of farmers availing custom hiring services in different regions which might be useful for the concerned authorities and custom hiring center owners to overcome the hindrances faced by the farmers in their machine hiring needs. A study by Alam and Singh [62] on the status and future needs of farm mechanization and agro-processing in India concluded that the farmers had shifted from traditional to the scientific method of agriculture and had increased the cropping intensity, use of tractors, engines, and electric motors along with matching equipment. In Sweden, the farmers had satisfaction with the performance of combine harvester operators with more than 3 years of experience [63] while a study on the status of farm mechanization in India revealed that the farmers had satisfaction with the timely operations of tractors which provided them a better control system [64].

Naushad et al. [65] in their study on the impact of tractors in the rural area of Peshawar observed that the tractors were capable of raising the income of the tractor owners and had changed their social and economic conditions in the project area. The owners were found to have changed their lifestyle (62%) as well as their living standards (53%). The income of the respondents increased with the use of a tractor (53%).

Koike [66] in a study in Southeast Asia on custom hire systems for agricultural machines, the farmers suggested custom hiring services as reliable for implementing various farm practices as well as realizing a better income. The farmers were convinced that a professional custom hire business would be more beneficial for achieving sustainable agriculture to overcome the

constraints in obtaining cheap labour and necessary operating cost.

A study in China on the perception of farmers towards the brand of agricultural machinery found that the 'National' brand which is a Chinese tractor brand gained more attention than the other foreign brands because the customers realized that the latter was more expensive [10]. Under the "Yantra-doot" scheme in the state of Madhya Pradesh, the farmers had a positive response to the scheme as their requirements for machinery for various farm operations were more [57].

Singh et al. [34,35] in their study 'Custom hiring services of farm machinery in Punjab' opined that Punjab agriculture is highly mechanized where the determination of ownership is mainly by economic viability. This was the reason for the development of custom hiring services which helped the majority of small and marginal farmers in reducing their per unit input costs.

Among the paddy growers of Uttara Kanada, Karnataka, 50.00% were fully aware and 33.33% were partially aware of the transplanting machine [67]. While in North Karnataka, 41.33% of the farmers had a medium level, 30.63% and 28.00% had a low and high levels of knowledge of farm implements respectively. The major reason observed was that the farmers had less awareness regarding the new improved implements and the growth of mechanization was slow in that region. Furthermore, it was revealed that a higher percentage (45.33%) belonged to the medium level of adoption where 38% and 16.67% had a low and high levels of adoption regarding farm mechanization respectively [68].

Dash et al. [69] reported that many farmers in the Ludhiana district of Punjab had a high level of satisfaction regarding CHSs through cooperative agricultural service societies.

Moreover, a study on the perception of farmers toward Custom Hiring Service Centers, the result showed that farmers of Punjab and Uttar Pradesh have significantly favourable perceptions toward custom hiring service center based on the dimensions such as availability, accessibility, economic factors, efficiency, social factor, and environmental factor related to CHSCs [70].

In the Jabalpur district of Madhya Pradesh, the majority of the farmers utilizing the custom hiring

services, i.e. 75 percent, were found to have a moderate perception of the services provided by custom hiring centers. The farmers were curious about the benefits and features of the numerous machinery that the CHCs supplied. To properly carry out the farming procedure, most of them were employing various farm machineries [55].

A study on the perception of farmers towards Custom Hiring Service Centres (CHSC) in Tumakuru District of Karnataka revealed the overall perception of farmers indicating that 43.8% were categorized under favourable level of perception towards CHSC. The small and medium-sized farmers could not possess the modern machinery, due to high hiring charges with private vendors they were unable to take the farm machinery for rent and some of the large farmers also were in great need of the modern machinery thus they require modern machinery through custom hiring [71].

4. RELATIONSHIP OF PROFILE CHARACTERISTICS OF THE FARMERS WITH THEIR PERCEPTION REGARDING CUSTOM HIRING SERVICES

There are various factors related to the profile of a farmer which can have a positive as well as a negative effect on their perception regarding the custom hiring services of farm machinery. It is important to understand about the factors that influence the opinions and decision-making behaviour of the farmers to identify the effects of these crucial factors for the improvement in the ongoing ways of availing services from the CHC [72,73].

A positive and non-significant relationship was observed between the variables such as age, education, family size, land holding, cropping pattern, and annual income whereas a significant relationship between the risk preference and the attitude of farmers towards farm mechanization was observed in Akola, Maharashtra [24].

In a study on problems and prospects of mechanized paddy cultivation through government custom hiring centers in Karnataka, the correlation coefficient was analyzed between the personal, socio-economic, and psychological variables and the knowledge level of mechanized paddy cultivation through CHSC where it was found that age, land holding, and mass media participation had a positive and significant relationship with the knowledge level at 5 percent

level of significance. Whereas factors such as education, annual income, extension contact and extension participation had a positive and significant relationship at 1 percent level of significance. The factors namely age, education, annual income, and extension participation showed a positive and significant relation at 5 percent level of significance with adoption level of mechanized paddy cultivation through private CHSC whereas land holding, and extension contact had positive and significant relationship at 1 per cent level of significance. The factors viz. family size, material possession, farming experience, annual income, scientific orientation, mass media participation, innovation proneness, and achievement motivation did not have any significant relationship with adoption level [74].

Another study in the Konkan region of Maharashtra on the attitude of farmers towards agricultural mechanization observed that the correlation relationship between the personal and socio-economic characteristics of farmers viz. age, education, family size, farming experience, land holding, annual income, major occupation, irrigation status, cropping pattern, implement possession, investment capacity, infrastructural facility, and risk bearing ability were positively significant with the attitude towards agricultural mechanization at 0.01 percent level of significance [75].

Kumar [76] their study on Farmers' Attitude towards Custom Hiring Centers in Punjab found that the majority of the respondents had favorable attitude toward CHCs, followed by 22.78 percent of respondents having a neutral attitude towards CHCs and only 8.89 percent of respondents had an unfavorable attitude toward CHCs.

Kisku [55] a study on the perception of farmers regarding Custom Hiring Services in Jabalpur district of Madhya Pradesh revealed the correlation between personal and socio-economic characteristics of farmers with their perception regarding CHS and it was observed that the relationship between selected characteristics namely age, annual income, cropping pattern, information processing behavior, information sharing behavior and extent of utilization of CHSs were positively significant with the perception of farmers regarding CHSs at 0.05 percent level. Whereas education, occupation, family size, land holding, farm power/ implements, farming experience, social participation, extension agency contact, information-seeking behaviour, and economic motivation did not show any significant relationship with perception regarding CHS.

5. CONSTRAINTS FACED BY THE FARMERS IN UTILIZING THE SERVICES OF CUSTOM HIRING SERVICES AND SUGGESTIONS TO OVERCOME THEM

Many small and marginal farmers in various parts of the country still practice their traditional methods of farming with low production and low income. While the farmers who desire to use farm machinery through custom hiring services at subsidized rates for enhancing their farming situations generally experience numerous problems due to which they are unable to utilize the services efficiently. The problems faced by the farmers in utilizing the services of CHCs are discussed briefly in Table 1.

Table 1. Major constraints faced by farmers in utilizing the services of CHCs

Major constraints faced by farmers	Place	Reference
Small land holdings, non-availability of implements, fragmented fields, lack of electricity, lack of farm roads, poor socio-economic conditions, lack of genuine spare parts, and service credit availability were the constraints faced by farmers in adopting most farm implements	Nalanda, Bihar	Shambhu and Ram [77]
Realizing optimum benefits from farm mechanization mainly for the small and the marginal farmers were old customs and rituals. Lack of support from the government extension agencies in providing knowledge related to new techniques in modern agriculture and low access to institutional credit	Burdwan, West Bengal	Ghosh, [28]
Due to land fragmentation, there was a restricted movement of the machines which resulted in time loss in turning. It was feared that due to increased mechanization there will be labour displacement. The small and marginal farmers had poor investment capacity to	India	Singh et al., [78]

Major constraints faced by farmers	Place	Reference
own the machinery		
Higher cost of custom hiring services, unavailability of tractor services on time, and inadequate tractor services	Punjab	Singh et al., [79]
Public CHSC was reported as an exhausting process in acquiring the tractor services, lack of awareness about the availability of machines in CHC while the constraints in private custom hiring services were reported as unavailability of machines on time, inadequate availability, and high cost of hiring tractor services	Karnataka	Parashunath et al., [80]
NICRA villages faced problems like higher initial cost of equipment, insufficient knowledge about farm operations, maintenance and repair of machines, repair and maintenance under individual ownership with lack of space for shelter, orientation towards the use of tractors and allied equipment, suboptimal asset capacity utilization on account of crop-specific requirements	Jammu and Kashmir	Nissa et al., [81]
During peak seasons, there were not enough CHCs to meet the huge demand.	Punjab	Kumar et al., [76]
The majority of the farmers (81.25%) reported a lack of proper knowledge about CHSC followed by non-availability of machinery during peak season (75.00%), loss of soil structure and texture after using heavier farm machinery (72.50%), less number of government CHC (60.00%), low quality of farm machinery (41.22%), fragmented land holdings (40.00%), the implements and machinery require frequent repair (36.25%) and hiring charges were not affordable (25.00%).	Jabalpur, Madhya Pradesh	Kisku and Bisht, [82]

6. SUGGESTIONS FROM DIFFERENT STUDIES

To improve the services rendered by the custom hiring centers, the suggestions given by the farmers hold key importance for the stakeholders involved in these custom hiring centers. Feedback from the farmers will help to understand the root causes of the lacuna behind the low adoption and improper utilization of the services by the farmers as well as providing the policy makers and owners of these centers to put together necessary changes.

Singh [83] studied the scope, progress, and constraints of farm mechanization in India and suggested the establishment of custom hiring centres, cooperative management of farm machinery, the establishment of standardization and quality-marking centers of farm equipment, communicating technical know-how with suitable farm machinery, training programs for farmers and artisans related to the farm equipment and machinery. In Punjab the suggestions opined by Singh et al. [79] were the development of Primary Agricultural Cooperative Societies as Agro Service Centers for custom hiring services, fixing the rate for hiring machines, reduction in fuel cost, and establishing of more custom hiring centers. While in North Bihar, suggestions on the

perspective of mechanization were integration of fragmented and scattered land holdings, issuing subsidies to small and large scale farmers, the establishment of farm machinery banks, provision of credit at lower interest rates for establishment of CHCs, reduction of tax and duties to set manufacturing units in an area where farm mechanization is low, etc. [84].

Shoba et al. [68] in their study on farm mechanization level of farmers in North Karnataka revealed that there is more scope for developing state agriculture departments for introducing more schemes on farm machinery, agro-industries corporations, private machine owners, co-operative societies for the introduction of custom hiring centers so that the farmers will be able to use the machines on payment basis and conducting farm machinery exhibition to encourage the farmers to know about the importance of farm mechanization.

Kumar et al., [76] their study on Farmers' Attitude towards Custom Hiring Centers: An Exploratory Study in Punjab suggested that machines with low demand should be replaced by machines with high demand.

Kadaraiah et al., [73] their study on the Perception of Farmers towards Custom Hiring

Service Centres in Tumakuru District of Karnataka recommended increasing awareness of the services offered by CHSCs among the farming community and extension efforts to be stepped up. For customized agricultural mechanization, it is crucial to strengthen the public-private partnership/cooperation in running CHSCs to promote socio-economic development among the farming community [85,86].

In another study in the Jabalpur district of Madhya Pradesh on the Custom Hiring Services Available, Constraints and Suggestions Perceived by the Farmers, the suggestions expressed by the farmers to overcome the constraints in utilizing the CHS were that the majority of them (90.00%) suggested dissemination of technical knowledge regarding the situational suitability of farm machinery followed by more CHCs being established under one panchayat (88.75%), accessibility to CHC (83.75%), the assistance provided by government organizations (62.50%), support in obtaining hiring services through the banks (61.25%), the availability of several types of machinery (57.50%), and providing of farm machinery and equipment training to farmers (52.50%) [80].

7. CONCLUSIONS

Custom hiring of farm types of machinery has helped the farmers to ensure timely field operations which have ensured increased productivity, reduced crop losses and improved the quality of grain or produce, increased the use of land and other inputs such as seeds, fertilizers, and irrigation water more effectively and has increased labour productivity by using labour saving and drudgery reducing devices. Efforts may be made to create ability among the farmers by giving them proper guidance while providing them training for learning and having acquaintance with the implements and services. The Government's role in regulating proper hiring prices for farmers may be to increase the different farm machinery in varied regions of the country to ensure its affordability for all farmers. Proper measures must be taken for the provision of quality and timely services by the custom hiring centers to realize its sustainable adoption.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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