



The IVC model adopted different horticultural crops to be grown on the borders of the farm land that included seasonal vegetables, perennial vegetables, green leafy vegetables, and fruit bearing trees. Selection of crops ensured an effective utilization of farm land and availability of vegetables for consumption and sale round-the-year. The steady flow of harvest assured a year-round income for farming households. Inclusion of components, such as solar powered irrigation pumps, drip irrigation system, and measures for judicious use of water and other resources made the IVC as an economically viable and sustainable business model for farmers.

However, the model required a significant upfront investment for irrigation facilities, land development, and input costs. Availability of irrigation facility throughout the year was critical for IVC. In most cases, resource poor tribal households in remote and arid part of the country were unable to make such investments.

The IVC model is based on the making available required inputs through existing programmes and schemes of various organizations. Lack of access to finance was a major gap. When the program was being designed, the following challenges were documented to promoting vegetable cultivation:

- Low productivity of agricultural and vegetable crops
- Majority land were upland and did not have access to irrigation
- Lack of water year around
- Lack of access to finance for small and marginal farmers
- Lack of knowledge on package of practices on crop management
- Lack of access to remunerative markets
- Lack of availability of quality inputs

### **3. 50-Cent Model**

The project envisaged transforming the livelihoods of small and marginal farmers through loan-based integrated vegetable cultivation. It aimed at enhancing household income to more than INR 75,000 per year, thus substantially enhancing their incomes and providing them with sustainable livelihoods. It was designed in such a manner that the farmer should not be burdened with loans, nor be flooded with grants. Therefore, a grant-cum-loan product was developed for facilitating IVC implementation by the farmers.

At the time of this study, in August 2017, 144 households were covered under the project. Each household identified 50 decimals of their land to be brought under integrated vegetable cultivation. The objective of the project was to develop an integrated high value crop model in 50 decimals (0.50 acre) of land area. Figure 2 presents a typical 50-cent model plot.

### 3.1 Project Components

An integrated vegetable cultivation model in 50 decimal lands had the following components:

- 1) Permanent wire-based boundary and live hedge: A low cost wire-based boundary was provided with concrete pillars in the corners of the plot and wooden pillars in between. Live hedges were developed along the boundary through plantation of Duranto and Glyricidia.
- 2) Border crops like drum sticks and papaya: On the boundary of the 50 decimal land, around 100 drumstick and papaya plants were planted.
- 3) Seasonal vegetable cultivation in 20 decimal land: In 20 decimal of land seasonal vegetables were grown with irrigation using sprinkler or drip systems. In each season, at least two vegetables were grown in these 20 decimals. Vegetables like brinjal or tomato and beans were preferred during Kharif season. In Rabi season the focus was on growing onion and pea. Vegetables like Okra and Chilli or Capsicum was grown during summer season.
- 4) Perennial gourd cultivation in 10 decimal land: Perennial gourds like pointed gourd, spine gourd or little gourd was cultivated on trellis in 10 decimal land. This was expected to ensure regular income to the families in most times of the year.
- 5) Seasonal Gourd in 10 decimal land: Seasonal gourds like ridge gourd, bottle gourd and bitter gourds were cultivated in different season on trellis in 10 decimals of land.
- 6) Banana in 5 decimals: Banana was cultivated in 5 decimal of land that would generate income annually.
- 7) Greens in 5 decimals: Green leafy vegetables like spinach etc. were cultivated in 5-decimal land for home consumption.
- 8) Water source to provide water round the year: Water sources like perennial streams or springs were tapped to avail water for irrigation throughout the year. In the absence of the above, dug wells or bore wells were provided as a source of water for irrigation.
- 9) Irrigation: The crops were irrigated either through gravity-based pipe flow system or by lifting water through pumps. For lifting water from the streams, wells and bore wells, solar operated portable pumps were used. Water was applied to the crops either through drip irrigation system or gravity irrigation.

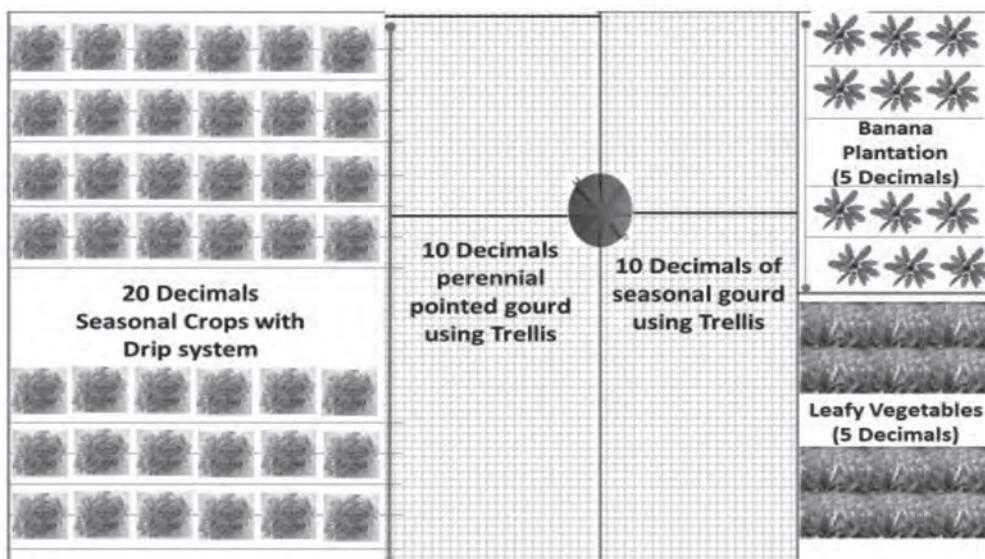


Figure 2: Diagrammatic representation of 50-cent model

Source: PAPCL

The concept of 50-cent model is an innovative model and a break-away from the traditional cultivation practices as reported in Table 1.

Table 1: Comparison between traditional cultivation practices and the 50-cent model

Traditional Cultivation Practices	50 Cent Model
Mono crop cultivation and low cropping intensity	Multiple crops with high cropping intensity
Traditional way of cultivation	Use of technology with proper package of practices
Not as per the demand of market	As per the demand of the market
Seasonal crops	Off season and high value crops
Depends on the rain and moistures only	Assured irrigation throughout the year
Use of traditional seeds	Hybrid and high yield variety seeds with resistant variety
High operational cost	Low operational cost due to use of drip, solar systems, mulching, raised bed plantation
Low productivity and low Income	High productivity and low income

Source: PAPCL 2017

Other than aiming to increase farmer income, the intervention had a goal of attaining water efficient irrigation technologies and enhancing nutritional security of households in the area.

### 3.2 Outreach

400 families were to be covered under IVC project. Till 2017, the project had an outreach of 144 households, all belonging to the Scheduled Tribe community.

Table 2: Outreach of IVC project (till 2017)

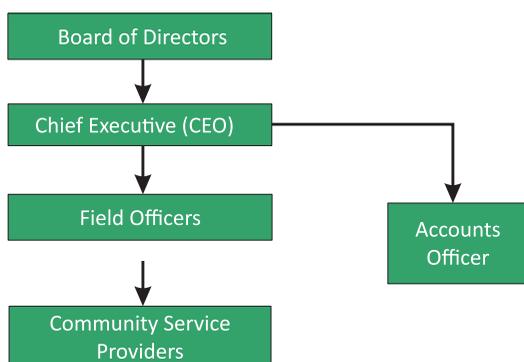
Block	No. of Beneficiaries		
	Male	Female	Total
Muniguda	45	5	53
Bissam Cuttack	82	9	91

Selection of beneficiaries was done on the basis of landholding - the household needed to have atleast 50 cent land available with them; interest in and experience of vegetable cultivation;

and their economic status. Preference was given to below poverty line (BPL) households. Availability of irrigation, or potential for irrigation was also taken into consideration, as without irrigation, vegetable cultivation would not have been possible. were selected in a village meeting or *gram sabha*.

### 3.3 Implementation Process

The PAPCL officials went to notified villages and provided information about the project. In particular, they highlighted that the loan component must be repaid, and during this process, the interested farmers were identified. Application from the concerned farmers was obtained after verifying their proof of identification through Voter ID/Aadhaar card. Once the farmers were identified, the need for inputs and loans were estimated. Efforts were made to provide all support in the form of material instead of cash. Some of the material were provided through convergence with various government agencies such as Department of Horticulture, Government of Odisha. Training programmes were conducted, in which issues such as appropriate quantity of fertilizer, pesticide, etc. and methods of cultivation were discussed.



The major activities were undertaken by the field officers and the community service providers of PAPCL (organogram of PAPCL in Figure 3). The Chief Executive Officer (CEO) was responsible for overall planning, review and monitoring. A project management team comprising of five members and based out of project location played an important role in delivering the project.

Figure 3: Organization structure of PAPCL

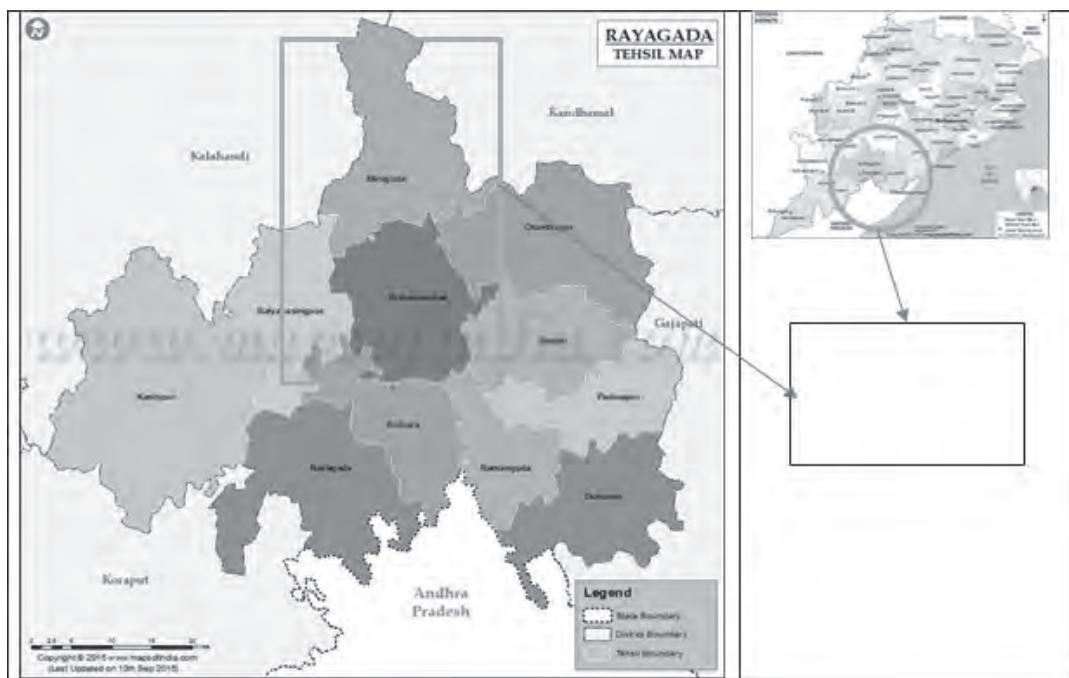
While NABARD lent to PAPCL at 10% per annum, on-lending to farmers was done at 15% per annum. The Producer Company planned to recover loans from the sale proceeds of vegetables and having a share in the produce like bananas.

## 4. Project Setting

The IVC Project was implemented in Muniguda and Bissamcuttack blocks of Rayagada district. This area is situated in the Southern part of Odisha (see Figure 4) and is characterized by hilly and undulated terrain. The population is predominantly from scheduled tribes. Agriculture is the primary occupation of tribal populace in the area, followed by animal husbandry.

### 4.1 Socio-economic Profile of Farmers

75 respondents were surveyed from the IVC project area covered under UPNRM. Out of 75 respondents, 58 had taken loan from the project, while 17 were non-loanees. The survey revealed that while loanee farmers had benefited from capacity building workshops and technical inputs other than loans, non-loanee farmers also benefited in terms of training and some technical inputs. The loan component of the project was used for building basic infrastructure and meeting working capital requirements, it was observed that:



Source: Rayagada District Administration weblink

Figure 4: Index map of project area, Rayagada

- About 90% of the loanee farmers were male, while all the non-loanee respondents covered in this study were male.
- Average age of the respondents veered around 40-45 years for both loanee and non-loanee farmers
- 64% of loanee respondents and 74% non-loanee respondents were from the scheduled tribe category; about 12% of loanee and 17% of non-loanee groups were from scheduled caste category and the rest were from other backward castes
- 62% of loanees and 70% of non-loanees had below-poverty-line (BPL) status

**Table 3: Descriptive information of respondents**

	Beneficiary (loanee)	Non-beneficiary (non-loanee)	Total
No. of respondents	58	17	75
Male	52	17	69
Female	6	0	6
Average age	42	45	43
Social category—SC	7	3	10
Social category—ST	37	10	47
Social category—OBC	14	4	18
Poverty status—APL	22	3	25
Poverty status—BPL	36	14	50

It was also observed that family size of respondents was 5.69 and 5.41 for loanee and non-loanee farmers respectively. Each family had 2.91 and 3.00 literate members on average in loanee group and non-loanee group respectively. The loanee farmers had on average 3.76 earning members while non-loanee respondents had 3.11 earning members in the household.

As given in Table 4, it can be observed that loanee respondents had a higher income than non-loanees attributed to the increased income from IVC project. Loanee respondents had a greater dependence on agriculture and allied activities than non-loanee. 92% of the income of loanee farmers came from agri-and allied activities while the proportion for non-loanee was only 79%.

**Table 4: Income and landholding of respondents**

	Loanee	Non-loanee
Average land cultivated (in acres)	4.50	3.80
Income from agri-and allied activities (in INR)	98,774	57,920
Total income from all sources (in INR)	107,089	72,878
Proportion of agri-income as that of total Income	92%	79%

It was also observed that:

- 45% of loanee farmers and 29% non-loanee farmers owned livestock (cattle/buffaloes) while the rest did not; these animals were the non-descript local breed
- 72% of the loanee farmers and 59% non-loanee farmers had one or more bullocks
- 38% loanee and 24% non-loanee respondents reared goats
- 79% loanee respondents and 88% non-loanee respondents had kutcha houses; none of the houses had a boundary wall
- Borewell and tube wells were the major sources of water with around 85% of loanees as well as non-loanees depending on them
- 24% of loanees and 35% non-loanees owned television. About 15% of loanee and 5% of non-loanee farmers owned bike/scooter, while 84% of loanees and 76% non-loanees had bicycles. There were only two tractors, one with loanee and the other with a non-loanee respondent

## 4.2 Impacts of the IVC Intervention

IVC intervention had brought in cash crops to farming practices. This has gradually led to the replacement of staples with cash crops. The earlier cropping pattern used to be paddy, ragi, maize, and in a few places, cotton. With the advent of IVC, farmers received support on infrastructure as well as input costs. The non-loanee farmers also received benefits like information and some input costs. In the first season itself, farmers observed that the return from vegetable cultivation was significant.

For example, cultivation of rice on 1 acre of land costs around INR 7000, while cultivation of vegetables in the same area costs INR 16,000 per acre. However, the income obtained from both the crops is significantly different. Rice cultivation provides a Benefit-Cost Ratio (BCR) of 1.96, Ragi 2.31, and vegetable 3.77. In terms of net profit too, vegetable cultivation is way ahead of others – it is about six times to that of rice, and 14 times that of Ragi. Table 5 provides further details.

**Table 5: Comparative profitability statement of vegetables vs. staple crops**

	Rice	Ragi	Vegetable
Income per acre in (INR)	13,754	5671	60,321
Cost per acre (INR)	7,000	2450	16,000
Net benefit (INR)	6,754	3221	44,321
Benefit Cost Ratio	1.96	2.31	3.77

The profitability of vegetables was found to be higher than that of other crops. In fact, some farmers found that income from vegetable cultivation exceeded income from all other sources. A case in point was that of Mr. Laxman Raju (See Box 1).

### Box 1: Vegetable cultivation or migration: Opportunity to Laxman Raju

Laxman Raju, resident of village Sindhipanga in Bishamakataka block of Rayagada district is a school dropout. He lives with his mother, one son and two daughters. There was no source of earning in his native village. Therefore, he used to migrate to Bengaluru. In 2017, however, he decided to stay back in his village and undertake the 50-cent model vegetable cultivation. This decision changed his life. He not only received capacity building training and inputs, he was also provided with technical support for a farming model that diversified the risk of various weather and market related ups and downs. He realized that for the success of vegetable farming, fencing is must. The support for this was provided by the implementing partner. He also received seeds and seedlings of different types of vegetables. Another critical input he received was credit.

Laxman has a sound knowledge about the local market. Though he is not highly qualified, he has good understanding of crop related activities. He understands that market timing plays a major role in pricing of vegetables and accordingly he has phased his crop production cycle. He always tries to space the crops in such a manner that the production takes place in lean period and he gets a higher price.

Prior to this intervention, he raised traditional crops like paddy and ragi which did not meet his financial requirements. He now cultivates crops like *parval* (pointed gourd), cowpea, okra and banana. He earns about INR 70,000 to INR 80,000 annually from this activity, which is far higher than what he would earn if he migrated to Bengaluru. From *parval* alone, he earns INR 30,000 in one season. Seeing his interest and success in vegetable cultivation, The State Government has taken an initiative to finance a tractor. He has been repaying the loan regularly. His success has inspired many others to take up vegetable cultivation.

The benefits accrued to farmers due to vegetable cultivation motivated them to inculcate them in their cropping practices. This has resulted in a change in cropping pattern. Earlier hardly anybody cultivated vegetable. Now more than 90% of the farmers have a component of vegetable in their crop portfolio that can be observed from the Table 6.

Table 6: Changes in cropping pattern among beneficiaries

Cropping pattern	3 years ago	Present situation
Paddy/Ragi/Pulses	33	
Paddy/Ragi	8	
Ragi/Pulses	15	
Others (oilseed/maize/ cotton/Kosla)	19	5
Paddy /vegetable		7
Paddy/vegetable/Ragi		12
Paddy/vegetable/Pulse/Ragi/Cotton		23
Paddy/vegetable/Ragi/pulses		15
paddy/Ragi/oilseed/others		13

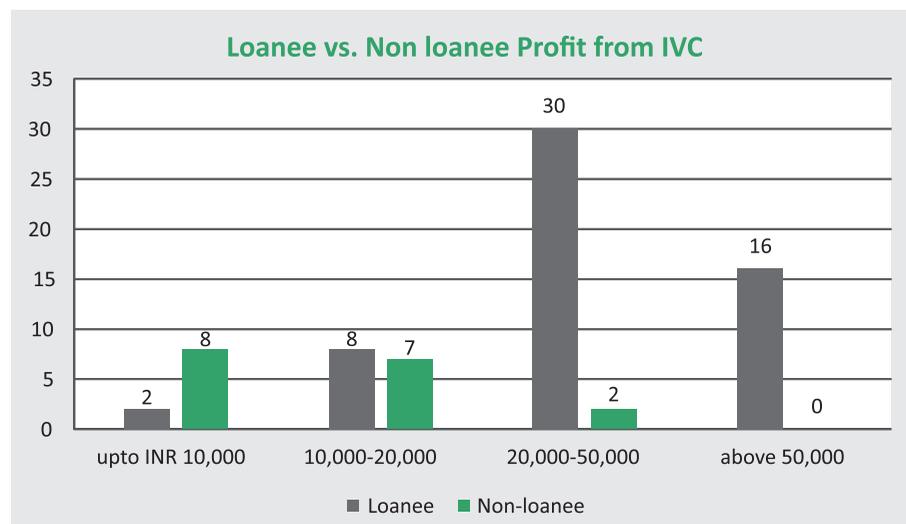
Table 7 presents the findings related to profitability of loanee and non-loanee farmers. On an average, net income of loanee farmers from the agricultural activities was INR 60,787, which was about almost twice that of non-loanee. Similarly, from IVC activities, the income to loanees was INR 7306, which is 156% higher than that of loanees. The loanees also observed a markedly higher BCR than that of non-loanee.

**Table 7: Profitability of loanee vs. non-loanee farmers (in INR)**

	Agri and allied activities		Integrated vegetable cultivation	
	Loanee	Non-loanee	Loanee	Non-loanee
Average income	98,774	57,920	47,895	19,546
Average expenses	37,987	29,023	7,525	4,793
Average profit	60,787	28,897	37,306	14,559
BCR	2.60	2.00	6.36	4.08

It is clear that a loanee farmer earned INR 22,747 more than the non-loanee farmers on an average. Given that the population of loanee farmers was 144 in the IVC intervention, the total extrapolated income came about INR 3.28 million in one year.

The comparison between loanees and non-loanees can be further explored. Figure 5 shows that 47% of the non-loanees earned up to INR 10,000 from IVC, and another 41% earned between INR 10,000 to INR 20,000. Only 11% earned more than INR 50,000. On the other hand, from the loanee group 27% earned higher than that. Only 20% loanees earned less than INR 20,000 from IVC activities.



**Figure 5: Profit from IVC**

The non-loanees received lesser income from IVC activities than the loanee group of respondents.

### 4.3 Productivity and Quality of Produce

Vegetable cultivation has increased the productivity from the same piece of land. An acre of paddy cultivation provided a revenue of INR 13,754, while vegetable cultivation on the same piece of land yielded a revenue of INR 60,321 per annum. Ragi cultivation on an acre of land, provided a revenue of INR 5671 annually. There was also an observable difference in yield of vegetable of beneficiary in comparison to that of non-beneficiary farmer. While per acre yield of vegetable in beneficiary plots was 15.43 quintals, the yield for non-beneficiaries was 10.70 quintals per acre (See Table 8 for indicative results).

Table 8: Vegetable yield - beneficiary vs. non beneficiary

	Number of farmers	Land (acre)	Vegetable production (quintals)	Yield (quintals/acre)
Beneficiary	58	29.3	452.25	15.43
Non-beneficiary	17	6.85	73.30	10.70

Because of the higher availability of vegetable, its consumption had increased manifold at household level. Table 9 shows that while an average loanee household consumed 1.40 Kg per day, a non-loanee farmer consumed 1.24 Kg per day. However, this difference was not found statistically significant as reported in Table 9. When adjusted with family size, it was found that on average, a family member consumed 247 grams of vegetables (loanee farmer) while a non-loanee family member consumed 228 grams.

Table 9: Vegetable consumption

Vegetable consumed at home (Kgs per day)	Loanee	Non-loanee
Average consumption per day	1.40	1.235
Average family size	5.69	5.41
Average consumption per family member	0.247	0.228

A few problems were also faced because of the switch to vegetable production. Due to heavy rainfall, vegetable cultivation was at times affected as it happened with tomato crop in Gatiguda in Kharif 2017. Farmers who had used solar borewell for irrigation also faced problems because of mechanical failures. No mechanic or engineer was available for its locally and the farmers had to go till Bhawanipatna or Rayagada for repair of the solar borewell.

## 4.4 Environmental Impact

IVC project encouraged tribal farmers to apply eco-friendly inputs. As a result, the soil quality has substantially improved due to application of manure in the cultivation plots. At Pinda village of Bisam Cuttack, farmers applied cow urine as pesticide in their 50-cent vegetable field. These vegetables, which had been produced without any chemical inputs such as pesticides and fertilizers attracted consumer demand in the market. The intervention improved soil quality that was validated through soil testing (soil PH, organic carbon content, and the proportion of nitrogen, phosphorous and potash). The soil testing results is given in Exhibit 1. The comparison of soil quality between loanee and non-loanee farmers is given in Table 10.

**Table 10: Soil quality comparison of loanee vs. non-loanee farmers**

	No. of samples	soil pH	Organic carbon (%)	Available Nitrogen (Kg/ha)	Phosphorus (P <sub>2</sub> O <sub>5</sub> , Kg/ha)	Potash (K <sub>2</sub> O, Kg/ha)
Non-loanee	11	6.77	0.43	311.91	10.34	206.27
Loanee	16	6.83	0.51	339.69	13.54	221.88
Difference in percent		0.90%	17.94%	8.91%	31.03%	7.56%
t-value		1.544	1.555	1.771	3.026	1.153
significance		13.5%	13.3%	8.9%	0.6%	26%

From Table 10, it is evident that:

- Soil pH of soil samples was almost similar for both loanee and non-loanee farmers
- Organic carbon content in soil samples collected from loanee farmers' land was 17.94% higher than that of non-loanee farmers.
- Available nitrogen content of soil samples collected from loanee farmers' land was 8.91% higher than that of non-loanee farmers.
- Phosphorous (P<sub>2</sub>O<sub>5</sub>) content of soil samples collected from loanee farmers' land was 31.03% higher than that of non-loanee farmers.
- Potash (K<sub>2</sub>O) content of soil samples collected from loanee farmers' land was 7.56% higher than that of non-loanee farmers.

However, it was found that only phosphorous content was significantly different at 5% significant level. Other soil characteristics (pH, Organic carbon, Nitrogen and Potash) were not statistically significant at 5% level. Although the program is not too old and considering that changes in soil quality is a long-term phenomenon, positive changes in soil quality are beginning to be observed.

## 5. Access to Market

Before the IVC intervention, villagers from Sindhipanga used to buy vegetables from Siripura market. However, now Sindhipanga not only has sufficient vegetable production to meet its own requirement but also villagers from Siripura often come to Sindhipanga for buying vegetables. As is seen in Case Study of Laxman Raju in Box 1, the farmers started phasing their crop production as per the demand in the market. Box 2 captures how Narasingha Jakasika was able to sell the produce locally.

### **Box 2: Linking Market to Narasingha Jakasika**

Narasingha Jakasika, aged 27, from Khuntabadi village of Sivapadar, Munigarh block, Rayagada district belongs to the scheduled tribe community. He is married and has two children. He has two acres of land, of which 50 cent is irrigated, attributed to the IVC project. Both Narasingha and his wife have raised different types of vegetables in different seasons. They work in their land throughout the year. Through their participation in the IVC project, they are able to earn regular income. Narasingha earned about INR 40,000 last year. Narasingha is hopeful that his income will increase by taking some more measures.

Earlier, round-the-year cultivation could not be undertaken because of the lack of irrigation. Now, the IVC project has taken care of this problem. Narasingha has gained knowledge of vegetable cultivation through different training programs imparted by Harsha Trust/PAPCL. Through the project he has also been provided with high quality banana cultivar and other seedlings and seeds. Supply of input is also not a problem now.

The village is 10 K.M away from Muniguda and strategically situated on the side of the highway. This advantage has been exploited by the villagers. One marketing platform has been constructed on the side of the highway under Corporate Social Responsibility scheme of a Corporation. Other farmers of the village also sell their vegetables here. People taking this road regularly have knowledge about this market and purchase from here.

In Khutabadi village of Muniguda Block, a road-side stall has been provided by Harsha Trust/PAPCL. Some farmers like G.Chandankhunti have also been linked with other markets for selling the vegetables. If the market price of their produce goes down in the local market, the farmers take the produces to Ambadola and Lanjigarh market.

However, some farmers are facing a problem of 'right' market access. Kuni Baraika of Gatiguda village (Muniguda block) produced about 20 quintals of brinjal, but could sell it at a low price only.

### Box 3: Access to Dukum Market

A market survey of Dukum, Bissam Cuttack block under Rayagada district was conducted in December 2017. The prime objective of the survey was to understand what products are brought into the Dukum Market and along with its source and selling points.

The data collected for the purposed reveals that Dukum is a vegetable driven market where tomato, brinjal, cauliflower and bitter gourd are predominantly supplied by the local producers from villages such as Pinda, Nuasahi etc. The market sourced the vegetables from about 16 vegetable sellers. It was estimated that in a year, the total transaction of vegetables in the market is worth around INR 2.8 million.

It is interesting to note that vegetable like tomato, radish, peas and fruits are brought from outside the area in lean periods, since vegetables are not produced locally as per the market demand. It means that there is a potential of promoting such vegetables in the area for meeting the demand in lean seasons. The market could also potentially cater to external demand for products such as locally processed rice, small millets (madia, kosla, ragi), pulses (Moong, Bidi, Kandul) etc.

The project is at a nascent stage, and only three seasons of integrated vegetable cultivation had passed at the time of this study. As the need for aggregation to fetch better prices came up strongly, PAPCL plans to address it. Procurement would be done in a collective manner, which could save marketing costs and improve bargaining power of producers.

## 6. Access to Credit

Access to credit is one of the major inputs for augmenting agricultural production. In Muniguda block, credit flow generally came from both formal and informal sources. Koraput Central Cooperative Bank (KCCB) was a source of formal credit in the block. During 2016-17, KCCB had extended loans cumulatively amounting to INR 136.2 million to 3890 farmers. During *Rabi* season, the bank extended credit to 1,963 vegetable growers. KCCB in turn, used to recover the loan through the Large sized Adivasi Multipurpose Cooperative Society (LAMPS). Prior to this development, LAMPS verified the documents of the farmers and recommended for loan to KCCB. The rate of interest charged was only one per cent. In spite of the low rate of interest, the defaulter rate was 10 per cent which was a major concern for KCCB. On the other hand, informal sources in general and Micro Finance Institution in particular, had played a significant role in the credit market.

Though the State Bank of India (SBI) had a role in extending credit facilities, but in practical, accessibility to SBI was very low. The rate of interest to the farmers was only 2% per annum as the remaining 5% was borne by the government (3% by Central Government

and 2% by the State Government). The interest rate could be increased from 7% to 10% per annum if repayment was not done at due time, and the differential is paid by the loanee.

The main reasons behind preponderance of non-banking and informal sources were the following:

- Door-step credit delivery is provided by the MFIs/informal sources while banks do not yet have such facilities
- Farmers who are engaged in share-cropping (which refers to a tenant farming) also have credit requirement that is not recognized by the banks.
- Training, handholding and technical support are provided by MFIs and their associate organizations. Such facilities are available with government bodies, but it is difficult for farmers to avail such benefits unless some agency takes up the facilitation role, as has been done by PAPCL here
- Complexity in documentation is a hindrance for accessing bank loans. MFIs do not have this problem, as the customer does not have to undertake such documentation (the MFI staff does it)
- Need of frequent visits (three to four visits to customers) by bank officials becomes a constraint because of the limited number bank staff and remoteness of locations. As the MFI offices are in the remote areas, and their field staff make regular visit to customers, making such services accessible

With the Business Correspondent (BC) model taking off for many banks, it is expected that in future banks will be able to deal with the above problems and access remotely located clients.

## Annexure 1: Soil quality results of IVC fields, Rayagada

Sr. No	Name of Beneficiary	Code Loanee/ Non-Loanee	Soil pH	Organic Carbon (%)	Available Nitrogen (Kg/ha)	P <sub>2</sub> O <sub>5</sub> (kg/ha)	K <sub>2</sub> O (kg/ha)
1	Rama Rao Bag	1	6.78	0.35	320	7.4	150
2	Bhika Bag	1	6.7	0.38	335	8.9	185
3	Teli Bag	0	6.7	0.24	260	6.5	160
4	Damarudhar Pujhari	1	6.82	0.53	325	15.2	215
5	Jagannath Pujhari	0	6.86	0.42	300	11.3	200
6	Charana Pujhari	1	6.79	0.78	420	16.2	265
7	Santosh Pujhari	0	6.78	0.43	355	10.5	215
8	Sadhaba Paresika	0	6.71	0.82	435	13.6	315
9	Narasingha Jakesika	1	6.74	0.46	345	11.2	195
10	Madan Mohan Majhi	1	6.81	0.56	335	16.8	210
11	Tankadhara Majhi	0	6.68	0.42	320	9.3	185
12	Arjun Hikaka	1	6.75	0.35	275	10.6	215
13	Birat Hikaka	1	6.75	0.34	330	9.2	235
14	Tankadhara Nag	0	6.71	0.38	290	9.5	165
15	Goura Nag	1	6.8	0.49	360	16.6	245
16	Sitai Kanika	1	6.85	0.56	324	14.30	275
17	Murti Wadeka	0	6.68	0.35	248	9.80	214
18	Shubasis Shramabuka	1	7.05	0.49	345	13.5	235
19	Depai Wadaka	1	6.8	0.63	368	16.2	226
20	Karika Sharmabuka	0	6.78	0.42	284	11.3	200
21	Rama Sharamabuka	1	6.88	0.61	348	13.8	220
22	Drinju Hikaka	0	6.75	0.39	285	12.8	215
23	Laxman Hikaka	1	6.84	0.56	335	16.8	230
24	Brushaba Hial	0	7.01	0.46	342	8.6	205
25	Udhaba Hial	0	6.78	0.45	312	10.5	195
26	Ratnakara Hial	1	6.81	0.55	345	14.8	215
27	Maheswar Raju	1	7.08	0.56	325	15.2	234

*Source:* Tested by CIFA, Bhubaneswar Odisha and compiled by authors