



Capacity strengthening of different stakeholders to prompt cactus pear plantation and use

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Odisha project team : Smruti Sethi and Apurba Dash



RESEARCH
PROGRAM ON
Livestock

CAPACITY DEVELOPMENT REPORT

About ICARDA

Established in 1977, the International Center for Agricultural Research in the Dry Areas (ICARDA) is a non-profit, CGIAR Research Center that focusses on delivering innovative solutions for sustainable agricultural development in the non-tropical dry areas of the developing world.

We provide innovative, science-based solutions to improve the livelihoods and resilience of resource-poor smallholder farmers. We do this through strategic partnerships, linking research to development, and capacity development, and by taking into account gender equality and the role of youth in transforming the non-tropical dry areas.

Address

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Project title: Spineless Cactus in Hilly/Degraded Lands, and Grass pea in Winter Crop Fallows for Fodder, Food & Nutrition Security in Tribal Areas of Odisha

Action site: Odisha State

Activity: Conducting farmers/ extension staff training on project practices

CRP: CGIAR Research Program on Livestock

Flagship: Feed and Forage

Center: International Center for Agricultural Research in the Dry Areas (ICARDA)

Key national partner: Directorate of Soil Conservation (DCS)- Odisha

Objective: Increase cactus awareness, dissemination and adoption for improved drought resilience, and to enhance capacity building of all partners.

Target audience: Smallholder farmers, livestock keepers and extension agents

1. Introduction

Livestock based farming system makes significant contribution for livelihood security of farmers in arid and semi-arid zones of India. However, availability of fodder for livestock is not sufficient due to water scarcity and land degradation leading to low productivity of grazing lands. The arid zones are less suitable for crop production due to inherent soil constraints like low water retention, sandy texture, shallow depth, occurrence of rocks and stones. However, certain species of forage value and economic importance such as spineless cactus can grow well and help in augmenting forage production. Besides its fodder value, cactus fruits and other plant-parts can be used for human food and value-added products. The crop has a great potential for arresting soil erosion and carbon sequestration.

Cactus pear (*Opuntia ficus indica* L.) is a xerophytic cactus species widely cultivated in arid and semi-arid regions worldwide. As most of species belonging to the Cactaceae family, *Opuntia ficus-indica* (OFI) exhibits Crassulacean Acid Metabolism (CAM), with nocturnal stomata opening and CO₂ uptake occurring typically from dusk to dawn. OFI plays an important economic role as a fruit, forage and fodder provider for subsistence agriculture with minimal agronomic inputs and for their resistance to drought. Cactus species fit most of the requirements of a drought-resistant palatable fodder crop.

Opuntia ficus indica have developed phenological, physiological, and structural adaptations to the arid areas characterized by drought, erratic rainfall and poor soils. Thus, this species has gained an important place in the agricultural systems as versatile species with multiple applications for fruit, forage and fodder production, particularly in subsistence agriculture where they have a comparative advantage for their capacity to grow with minimal agronomic inputs and for their resistance to drought.

The overall goal of this activity is to promote spineless cactus (*Opuntia ficus indica*) as drought resilient feed resource in the degraded lands to enhance livelihoods of livestock holders of the Odisha state, India and to enhance capacity building of all partners (emphasis on farmers and particularly woman).

Within the capacity development activity of this project a program was made by Dr. Sawsan Hassan to visit Odisha project sites from 24 to 27 September 2019. The purpose of this visit was to provide on-the-job technical guidance to the project team, community members and others associated with the project, and review/ assess the progress of the project in Odisha.

During her four-day stay in the state, Dr. Hassan visited foundation nurseries, and cactus plantation fields. She conducted a coordination meeting with the field team of ICARDA and Government Officials. Dr. Sawsan interacted with the stakeholders including community members, farmers, livestock keepers, dairy entrepreneurs and shared the objective of promoting spineless cactus in hilly/degraded lands.

3. Farmer Field Days:

During this mission, Dr. Sawsan Hassan participated in five Farmers' Field Days attracting around 285 participants (45% were female farmers), these events were organized in the following villages:

- Mujango village, Koraput district (September 24th) and was attended by 73 farmers, project staff, Directorate of Soil Conservation (DCS) staff and extension agents (30 females) (List of Participants is in Annex 1).
- Gadiaguda village, Koraput district (September 24th) and was attended by 32 farmers and project staff (20 females) (List of Participants is in Annex 2).
- Mayabarha village, Bolangir district (September 25th) and was attended by 74 farmers, project staff, Directorate of Soil Conservation (DCS) staff and extension agents (32 females) (List of Participants is in Annex 3).
- Matikhai village, Bolangir district (September 26th) and was attended by 45 farmers, project staff and extension agent (20 female participants) (List of Participants is in Annex 4).
- Kangaon village, Bolangir district (September 26th) and was attended by 60 farmers, project staff, Directorate of Soil Conservation (DCS) staff and extension agent (29 female participants) (List of Participants is in Annex 5).



During these events, the following characteristics were highlighted:

- Importance of cactus as green fodder for animal feed and as an ideal alternative to increase feed resources;
- Cactus can minimize need for livestock watering and reduce soil erosion.
- Cactus is very easy to establish and can grow well with very little inputs.

A detailed outline of the activities being carried out within the project implementation was mentioned also the importance of the role of increasing the awareness and efforts to promote spineless cactus, as well as encouraging farmers to grow spineless cactus for feeding animals during the dry periods was highlighted.

Dr. Sawsan Hassan explained ICARDA's mission to target poor farmers in the dry areas in order to improve their livelihoods. She described the importance of cactus as a multipurpose crop for the dry areas also she mentioned that the adoption of cactus is now worldwide as it has been proven that cactus has the potential to mitigate climate change, to reduce the green fodder gap and to also enhance farmers' income. She mentioned that that cactus dissemination started four years ago in India through the collaboration program between ICAR institutions and ICARDA since then, the number of farmers growing cactus has steadily increased which reflects the great potential of cactus as livestock feed resource in India.

Dr. Hassan also stated that research initiatives between Odisha government and ICARDA is aiming at improving the farmers food security and livelihoods through ideal use of land resources, including soils, water, animals and plants in a sustainable manner. During these field days, Dr. Sawsan presented the best agronomic practices and required environment conditions to ensure successful cactus plantations. This includes, soil preparation, cladodes planting methods, maintenance and the recommendations for of cactus use to feed animals.

She summarized the benefits of cactus as below:

- Cactus plant does not require any kind of costly inputs and it can grow in harsh conditions with very little irrigation and also tolerant to high temperature.
- As it's a perennial crop, fodder can be available for a longer period (i.e 15 – 20 years) without any additional investment in fertilizer and pesticide.
- Cactus plant is a good source of nutrition for livestock and can enhance the milk production of cows when served with proper proportion, which will enhance the income and improve the livelihood conditions.
- The Cactus plant can be grown in wasteland and do not require any fertile soil. The farmers can grow any other low duty crop in between the cactus, and which enhance the income of the farmer.

Afterwards, all participants were invited to have a general discussion and the issues discussed in the program are as follows:

- After one year of plantation, it can be harvested for fodder purpose
- If mixed with protein rich feed resources (such as lintel straw, blackgram straw and grasspea straw) in appropriate proportion, then it will be very helpful for increase in body weight as well as milk production.
- Apart from fodder, many industrial utilization of cactus i.e. pharmaceutical, cosmetics and dye industry etc.
- Cactus pads as well as its fruits being utilized for human consumption in some countries.
- With very low attention, it can give a tremendous growth which ultimately helps to improve the income as well as the livelihood of farmers.

Cactus seems to be highly satisfactorily in terms of growth performance. Many other farmers showed interest in planting cactus which will help them enhance their livelihoods.



3. Team Coordination Meeting

During this visit, a coordination meeting with the State team, District team and Field Facilitators of Koraput, Kalahandi and Bolangir districts was held on September 26th (List of Participants is in Annex 6). The highlights of this meeting are summarized below:

- Though cactus survives in very harsh conditions, but to get maximum growth, the site must be in open space which receives maximum sunlight. Sandy loam with light textured soil is the most preferable one.
- The plantation site must be well drained to minimize the water logging.
- Heavy soil (Ex- Black cotton soil) should be avoided for maximum root growth and expansion which ultimately affects plant growth.
- During cladode plantation or replacement, foremost thing is matured pad selection.
- Cladodes should be treated with fungicides (Ex-Bavistin) to avoid infection.
- Cladodes should be kept under a shaded area for 7 to 10 days before planting.
- 50 - 75 % of cladode portion must be under the ground with a 25- 30 °C tilt facing towards the sun rise direction.
- Supplementary irrigation might be provided as per requirement, particularly during peak summer period.



4. Conclusion

- Discussion with farmers showed general acceptance of cactus due to the potential role in providing a source of livestock feed.
- The benefits of the spineless cactus as a feed source are useful especially during low forage periods, such as the dry seasons.
- The Farmers cactus fields is practical approach to demonstrate cactus plantation.
- The technology of feeding livestock with cactus is new, training on this topic is required conducted for extension and farmers.
- Monitoring is required on continuous and regular basis through visits to cactus field to record observations, get the feedback from the farmers and extension workers.

Personal information including Name, Business Title, Email, Phones, Images and GPS points included in this report have been authorized in writing or verbally by the data subject.



**Spineless Cactus in Hilly/Degraded Lands, and Grasspea in Winter Crop
Fallows for Fodder, Food & Nutrition Security in Tribal Areas in Odisha**

Mujango Village 24 Sep 2019

List of Participants

#	NAME	SIGNATURE	*Permission
1	Kenu Kuldeep.	Kenu Kuldeep	☒
2	Surenendra Bage	Surenendra Bage	☒
3	Lachma Jami	Lachma Jami	☒
4	Dalu Mudali	Dalu mudali	☒
5	Kanta Badnaya	Kanta Badnaya	☒
6	Rajni Mudali	Rajni Mudali	☒
7	Kuma Nayak	Kuma Nayak	☒
8	Ramach Badnaya	Ramach Badnaya	☒
9	Poonvader Bage	Poonvader Bage	☒
10	Banga Mudali	Banga Mudali	☒
11	Arun Bage	Arun Bage	☒
12	Keshab Badnaya	Keshab Badnaya	☒
13	Suresh Khela	Suresh Khela	☒
14	Babula Bage	Babula Bage	☒
15	Bika Bage	Bika Bage	☒
16	Latan Khara	Latan Khara	☒
17	Laxmi Badnaya	Laxmi Badnaya	☒
18	Kara Mudali	Kara mudali	☒

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Spineless Cactus in Hilly/Degraded Lands, and Grasspea in Winter Crop Fallows for Fodder, Food & Nutrition Security in Tribal Areas in Odisha

Mujango Village 24 Sep 2019

List of Participants

#	NAME	SIGNATURE	*Permission
19	Shyama Badnayan	ଶ୍ୟାମା ବାଦନାୟକ	☒
20	Ganesh Bashi	ଶ୍ରୀମନ୍ତ ବାସି	☒
21	Diso Badnayan	Diso Badnayan	☒
22	Bhaskar Muduli	ଭିଷ୍ଣୁ ମୁଦୁଲି	☒
23	Litam Bashi	ଲିଟାମ ବାସି	☒
24	Neta Bashi	ନେଟା ବାସି	☒
25	Sita Krishani	ଶିତା କ୍ରିଷ୍ଣାନୀ	☒
26	Suresh Panu	Suresh Panu	☒
27	Rama Jami	ରାମା ଜାମି	☒
28	Lokanath Homdebande	ଲୋକନାଥ ହୋମ୍‌ଡେ‌ବାନ୍‌ଡେ	☒
29	Ganuboru Paika	ଗନୁବୋରୁ ପାଈକା	☒
30	Sambade Badnayan	ସମ୍ବାଦେ ବାଦନାୟକ	☒
31	Charitra Muduli	ଚରିତ୍ରା ମୁଦୁଲି	☒
32	Seba Badnayan	ସିବା ବାଦନାୟକ	☒
33	Kwer Muduli	କ୍ୱେର ମୁଦୁଲି	☒
34	Kenu Bhoi	କେନୁ ଭୌ	☒
35	Aitarai Paika	ଆଟାରାଇ ପାଈକା	☒
36	Ananta Bashi	ଆନନ୍ତ ବାସି	☒

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Spineless Cactus in Hilly/Degraded Lands, and Grasspea in Winter Crop Fallows for Fodder, Food & Nutrition Security in Tribal Areas in Odisha

Mujango Village 24 Sep 2019

List of Participants

#	NAME	SIGNATURE	*Permission
37	Hebal Bagh.	Hebal Bagh	☒
38	Rajam Bagh	Rajam Bagh	☒
39	Rabintra Khara.	Rabintra Khara	☒
40	Sanjaya Khara.	Sanjaya Khara	☒
41	Sorajani Bagh.	Sorajani Bagh	☒
42	Kanula Bagh.	Kanula Bagh	☒
43	Sagarika Bagh	Sagarika Bagh	☒
44	Dipti Rani Bagh.	Dipti Rani Bagh	☒
45	Soradene Dongai	Soradene Dongai	☒
46	Sabina Bagh.	Sabina Bagh	☒
47	Sabina Bagh	Sabina Bagh	☒
48	Jibanti Dongai	Jibanti Dongai	☒
49	Jamke Bagh.	Jamke Bagh	☒
50	Gatamali Bagh.	Gatamali Bagh	☒
51	Sorajani Bagh.	Sorajani Bagh	☒
52	Shumpa Bagh.	Shumpa Bagh	☒
53	Salmi Khara.	Salmi Khara	☒
54	Kuldeep	Kuldeep	☒

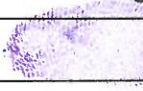
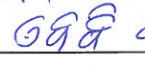
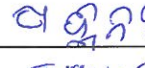
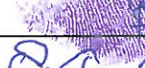
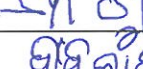
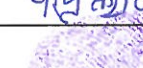
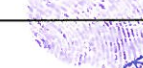
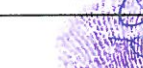
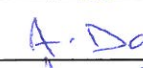
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Spineless Cactus in Hilly/Degraded Lands, and Grasspea in Winter Crop Fallows for Fodder, Food & Nutrition Security in Tribal Areas in Odisha

Mujango Village 24 Sep 2019

List of Participants

#	NAME	SIGNATURE	*Permission
55	Mania Dash	 Mania Dash	☒
56	Beje' Paikra	 Beje' Paikra	☒
57	Padmuni Paikra	 Padmuni Paikra	☒
58	Jayanti Dash	 Jayanti Dash	☒
59	Pyoni Muduee	 Pyoni Muduee	☒
60	Magn Badnayan	 Magn Badnayan	☒
61	Babula Dash	 Babula Dash	☒
62	Sonu Muduee	 Sonu Muduee	☒
63	Gula Jany	 Gula Jany	☒
64	Goloru Gladba	 Goloru Gladba	☒
65	Fulmati Hani Jan	 Fulmati Hani Jan	☒
66	Sangita Breda	 Sangita Breda	☒
67	ADURBA DASH	A. Dash ICARDA-odisha	☒
68	Sunofi Ranjan Sethi	 Sunofi Ranjan Sethi (ICARDA-Odisha)	☒
69	Sangeya Khilan	FF Kalamudi	☒
70	BINOD BASH	Bino Bash	☒
71	Deepak Ku. Behar	Deepak Kumar Behr	☒
72	Ashok Ku Mishra	FI, KPT Ash	☒

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Spineless Cactus in Hilly/Degraded Lands, and Grasspea in Winter Crop Fallows for Fodder, Food & Nutrition Security in Tribal Areas in Odisha

Mujango Village 24 Sep 2019

List of Participants

#	NAME	SIGNATURE	*Permission
73	DURYA DHANA RAUT	Durya dhana Raut	☒
74			☐
75			☐
76			☐
77			☐
78			☐
79			☐
80			☐
81			☐
82			☐
83			☐
84			☐
85			☐
86			☐
87			☐
88			☐
89			☐
90			☐

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Spineless Cactus in Hilly/Degraded Lands, and Grasspea in Winter Crop Fallows for Fodder, Food & Nutrition Security in Tribal Areas in Odisha

Gadiaguda Village 24 Sep 2019

List of Participants

#	NAME	SIGNATURE	*Permission
1	Tilki Sawnta		☒
2	Purci Sawnta		☒
3	Annala Sawnta		☒
4	Madan Mandi		☒
5	Bela Sawnta		☒
6	Ramachandra Sawnta		☒
7	Jagabandhu Sawnta		☒
8	Kansari mandir		☒
9	Bimala Sawnta		☒
10	Rushi muska		☒
11	Padma muska		☒
12	Bala Sawnta		☒
13	Pasara muska		☒
14	Lachan Sawnta		☒
15	Ghina Sawnta		☒
16	Malanti muska		☒
17	Daina Sawnta		☒
18	Susma muska		☒

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Spineless Cactus in Hilly/Degraded Lands, and Grasspea in Winter Crop Fallows for Fodder, Food & Nutrition Security in Tribal Areas in Odisha

Gadiaguda Village 24 Sep 2019

List of Participants

#	NAME	SIGNATURE	*Permission
19	Kuntiima Sawnta	କୂନ୍ତିମା ସାଂନ୍ତା	☒
20	Sebanti Mulkan	ସେବାନ୍ତି ମୂଲକା	☒
21	Meena Sawnta	ମିନା ସାଂନ୍ତା	☒
22	Ratnara Roca	ରାତନାରା ରୋକା	☒
23	Rameesh Samta	Rameesh Samta	☒
24	Ballana Samta	Ballana Samta	☐
25	ADURBA DASH	Adash ICARDA-odisha	☒
26	Sumati Ranjan Sethi	Sumati Ranjan Sethi ICARDA- Odisha	☐
27	Deepak Kumar Behr.	Deepak Kumar Behr.	☒
28	Sanjay K. Red.	Sanjay K. Red.	☒
29	Alok Kumar Mishra	RF, Kotra Put	☒
30	Duryo DHANA KATO	Duryo dhyanakato	☐
31	ANOD BASH	Anod Bash	☒
32	Sanjoy Khilen	PF Kalahandi	☒
33			☐
34			☐
35			☐
36			☐

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Annex 3. Farmer field day in organized in Mayabarha village, Bolangir district list of Participants



Spineless Cactus in Hilly/Degraded Lands, and Grasspea in Winter Crop Fallows for Fodder, Food & Nutrition Security in Tribal Areas in Odisha

Mayabarha Village 25 Sep 2019

List of Participants

#	NAME	SIGNATURE	*Permission
1	Rohita Sahu	Rohita Sahu	☐
2	Dola Barika	Dola Barika	☐
3	makandhuj Sahu	ମକାନ୍ଦହୁଜ ସାହୁ	☒
4	Radhakanta Barika	ରାଧାକାନ୍ତ ବରିକା	☒
5	Pintu Roul	Pintu Roul	☒
6	Debasoy patra	Debasoy Patra	☒
7	Uchhas Barika	ଉଚ୍ଛାସ ବରିକା	☒
8	Nabina Patel	Nabina Patel	☒
9	Comanath patel	କୋମନାଥ ପାଟେଲ	☒
10	Tikaseth	Tiku Seth	☒
11	Sudhir Sahu	Sudhir Sahu	☒
12	Lingoraj Dharua	Lingoraj Dharua	☒
13	Gudam Roul	Gudam Roul	☒
14	Rath Sahu	ରଥ ସାହୁ	☐
15	Deogir Die	ଦିଓଗିର ଦି	☐
16	Raghunath Roul	ରାଘୁନାଥ ରୌଲ	☒
17	Batubana Sahu	ବାତୁବାନା ସାହୁ	☒
18	Chantym Patel	ଚାନ୍ତୟମ ପାଟେଲ	☐

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Spineless Cactus in Hilly/Degraded Lands, and Grasspea in Winter Crop Fallows for Fodder, Food & Nutrition Security in Tribal Areas in Odisha

Mayabarha Village 25 Sep 2019

List of Participants

#	NAME	SIGNATURE	*Permission
19	Santosh Sethi	Santosh Sethi.	☒
20	ସୁବିଜୟ ଦାସ	SUBODH DAS -	☒
21	Santosh	Santosh	☒
22	Kailash K. D.	Kailash K. D.	☒
23	Bikash Patel	Bikash Patel	☒
24	Niranjan Rout	Niranjan Rout	☒
25	Suresh Sahu	Suresh Sahu	☒
26	Raj Sahu	Raj Sahu	☒
27	Pooresh Sahu	Pooresh Sahu	☒
28	Pooresh Sahu	Pooresh Sahu	☒
29	Gandaraman Sahu	Gandaraman Sahu	☒
30	Narayan Sahu	Narayan Sahu	☒
31	Suresh Barik	Suresh Barik	☒
32	Narayan Sahu	Narayan Sahu	☒
33	Jitendra Patel	Jitendra Patel	☒
34	Prabanna Nayak	Prabanna Nayak	☒
35	Khishor Sahu	Khishor Sahu	☒
36	Ashok DHARUA	Ashok Dharua	☒

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Spineless Cactus in Hilly/Degraded Lands, and Grasspea in Winter Crop Fallows for Fodder, Food & Nutrition Security in Tribal Areas in Odisha

Mayabarha Village 25 Sep 2019

List of Participants

#	NAME	SIGNATURE	*Permission
37	Gopanjali Sahu	ଗୋପାଞ୍ଜଳି ସାହୁ	☒
38	Santoshini Seta	ସନ୍ତୋଷିନୀ ସେତା	☒
39	Santoshini Seta	ସାନ୍ତୋଷିନୀ ସେତା	☒
40	Kunjalek Pradhan	କଞ୍ଜାଳେକ ପ୍ରଧାନ	☒
41	Dipanjali Seta	ଦିପାଞ୍ଜଳି ସେତା	☒
42	Madan Patel	ମଦନ ପଟ୍ଟନାୟକ	☒
43	Anjali Barhih	Anjali Barhih	☒
44	Sujata Barhih	Sujata Barhih	☒
45	Banahiseta Meno	Banahiseta Meno	☒
46	Ratanakar Seta	ରତନାକର ସେତା	☒
47	Litjani Pradhan	ଲିଟ୍‌ଜାନି ପ୍ରଧାନ	☒
48	Prananda Gadath	ପ୍ରମାନ୍ଦା ଗଡାଡ଼	☒
49	Sadananda Bag	ସାଦନାନ୍ଦା ବାଗ	☒
50	Durjodhan Patel	ଦୁର୍ଯ୍ୟୋଧନ ପଟ୍ଟନାୟକ	☒
51	Gopal Seta	Gopal Seta	☒
52	Yashwanth Bag	ୟଶଞ୍ଜନ ବାଗ	☒
53	Himansu Seta	Himansu Seta	☒
54	Nitika Seta	ନିତିକା ସେତା	☒

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Spineless Cactus in Hilly/Degraded Lands, and Grasspea in Winter Crop Fallows for Fodder, Food & Nutrition Security in Tribal Areas in Odisha

Mayabarha Village 25 Sep 2019

List of Participants

#	NAME	SIGNATURE	*Permission
55	Lingaraj Sahu	LINGARAJ SAHU	☒
56	Tejarej Sahu	ଟେଜରୀଜ ସାହୁ	☒
57	Jayakumar patel	Jayakumar Patel	☒
58	Debasuj Rout	ଦେବସୁଜ ରାଉତ	☒
59	Rajaram Gadhik	ରାଜାରାମ ଗାଦିକ	☒
60	Siba Thakur	ସିବା ଥାକୁର	☒
61	Krushana patel.	କୃଷ୍ଣାନା ପଟେଲ	☒
62	Dinlek Rout	ଦିନେକ ରାଉତ	☒
63	Pranod patel	Pranod Patel	☒
64	Casawa Sahu	କାସାବା ସାହୁ	☒
65	Dayanidhi majhi	ଦୟାନିଧି ମାଝି	☒
66	Kshirodra Sahu	Kshirodra Sahu (FF)	☒
67	Asok Kumar Mishra	FF I CARDIA	☒
68	BINOD BAGH. FF ICARDA	Binod Bagh	☒
69	DURMO DHANA RAUT	Durmo dhana Raut.	☒
70	Deepak Kumar Behem.	Deepak Kumar Beh.	☒
71	Bijay Kumar Satpaty	Bijay	☒
72	Anishha Mishra	Anishha	☒

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Spineless Cactus in Hilly/Degraded Lands, and Grasspea in Winter Crop Fallows for Fodder, Food & Nutrition Security in Tribal Areas in Odisha

Mayabarha Village 25|Sep 2019

List of Participants

#	NAME	SIGNATURE	*Permission
73	APURBA DASH	A. Dash ICARDA-odisha	☐
74	Sunuti Panja Sethi	S. (ICARDA-odisha)	☐
75			☐
76			☐
77			☐
78			☐
79			☐
80			☐
81			☐
82			☐
83			☐
84			☐
85			☐
86			☐
87			☐
88			☐
89			☐
90			☐

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Annex 4. Farmer field day in organized in Matikhai village, Bolangir district list of participants



Spineless Cactus in Hilly/Degraded Lands, and Grasspea in Winter Crop Fallows for Fodder, Food & Nutrition Security in Tribal Areas in Odisha

Matikhai Village 26 Sep 2019

List of Participants

#	NAME	SIGNATURE	*Permission
1	Bholashankar Padhan	Bholashankar Padhan	☒
2	Karna Rana	Karna Rana	☒
3	Uddhab Bag	Uddhab Bag	☒
4	Mamari ke Koomar	ମମାରି କେ କୁମାର	☒
5	Faker Mahan Padhi	faker mahana padhi	☒
6	Dibyankanta Kumbhar	Dibyankanta Kumbhar	☒
7	Jasobanta Padhi	Jasobanta Padhi	☒
8	Rudramani Bag	Rudra mani Bag	☒
9	Gireemanta Bhu	Gireemanta Bhu	☒
10	Mitrabhanu Majhi	ମିତ୍ରାବହନ ମାଝି	☒
11	Bhiseen Malik	Bhiseen Malik	☒
12	Abhi Bhu	Abhibhu	☒
13	Kamesh Bhu	Kamesh Bhu	☒
14	Dartani Malik	Dartani Malik	☒
15	Machab Bhu	Machab Bhu	☒
16	Purnachandra Jami	ପୂର୍ନାଚନ୍ଦ୍ର ଜାମି	☒
17	SUDHIR MAHAJUD	Sudhir Mahajud	☒
18	Falguni Majhi	ଫାଲ୍‌ଗୁନି ମାଝି	☒

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Spineless Cactus in Hilly/Degraded Lands, and Grasspea in Winter Crop Fallows for Fodder, Food & Nutrition Security in Tribal Areas in Odisha

Matikhai Village 26 Sep 2019

List of Participants

#	NAME	SIGNATURE	*Permission
19	Khirontra Maun	Khirontra Maun	☒
20	Mimi Kalam Santa	Mimi Kalam Santa	☒
21	Chaudhary Bhue	Chaudhary Bhue	☒
22	Prathina Bhue	Prathina Bhue	☒
23	Sanjay Bhue	Sanjay Bhue	☒
24	Baba Barana	Baba Barana	☒
25	Jagannath Bhue	Jagannath Bhue	☒
26	Jasobanta Bag	Jasobanta Bag	☒
27	Sadhu Padhan	Sadhu Padhan	☒
28	Nikamathaba Padhan	Nikamathaba Padhan	☒
29	Jyanti Bhue	Jyanti Bhue	☒
30	Jharana Bhue	Jharana Bhue	☒
31	Rupe Bhue	Rupe Bhue	☒
32	Radhika Bhue	Radhika Bhue	☒
33	Radhika Padhan	Radhika Padhan	☒
34	Bhaya Bhue	Bhaya Bhue	☒
35	Uchata Bhue	Uchata Bhue	☒
36	Nataraj Bhue	Nataraj Bhue	☒

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Spineless Cactus in Hilly/Degraded Lands, and Grasspea in Winter Crop Fallows for Fodder, Food & Nutrition Security in Tribal Areas in Odisha

Matikhai Village 26 Sep 2019

List of Participants

#	NAME	SIGNATURE	*Permission
37	Sumanta Barik	Sumanta Barik	☒
38	Saroj Barik	Saroj Barik	☒
39	Krushnakanta Seth	Krushnakanta Seth	☒
40	Rajendra Behara	Rajendra Behara	☒
41	Purnandar Chhatra	Purnandar Chhatra	☒
42	Siba Soma	Siba Soma	☒
43	Bijaya Kumar Sanyal	Bijaya	☒
44	Indramoni Bhui	Indramoni Bhui	☐
45	Ambanisha Mishra	Ambanisha	☐
46			☐
47			☐
48			☐
49			☐
50			☐
51			☐
52			☐
53			☐
54			☐

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Spineless Cactus in Hilly/Degraded Lands, and Grasspea in Winter Crop Fallows for Fodder, Food & Nutrition Security in Tribal Areas in Odisha

Kangaon Village 26 Sep 2019

List of Participants

#	NAME	SIGNATURE	*Permission
1	Laxmidhar Chikater	Laxmidhar Chikater	☐
2	Binod Pradhan	Binod Pradhan	☐
3	ସୁଧାଂଶୁ ଶତପଥୀ	ସୁଧାଂଶୁ ଶତପଥୀ	☐
4	Kshirodhar Mallik	Kshirodhar Mallik	☐
5	Narendra Kharsel	Narendra Kharsel	☐
6	Dambarendhar Jai	Dambarendhar Jai	☐
7	Manoj Kumar Kumar	Manoj Kumar Kumar	☐
8	Karna Ram	Karna Ram	☐
9	Prasanna Meher	Prasanna Meher	☐
10	Chitambar Borchhor	Chitambar Borchhor	☐
11	Mitabhane Majhi	Mitabhane Majhi	☐
12	Rudramani Bag	Rudramani Bag	☐
13	Jashobanta Bag	Jashobanta Bag	☐
14	Kalakanhu Bapat	Kalakanhu Bapat	☐
15	Judhisti's Pradhan	Judhisti's Pradhan	☐
16	Chandrasekhar Rauer	Chandrasekhar Rauer	☐
17	Chandramani Dp	Chandramani Dp	☐
18	Mahadev Bhue	Mahadev Bhue	☐

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**Spineless Cactus in Hilly/Degraded Lands, and Grasspea in Winter Crop
Fallows for Fodder, Food & Nutrition Security in Tribal Areas in Odisha**

Kangaon Village 26 Sep 2019

List of Participants

#	NAME	SIGNATURE	*Permission
19	Nrupamani Adabar	Nrupamani Adabar	☐
20	Phalguni Majhi	Phalguni Majhi	☐
21	Jitendra Baiza	Jitendra Baiza	☐
22	Laxman Pradhan	Laxman Pradhan	☐
23	Gajendra Baiza	Gajendra Baiza	☐
24	Manoj Pradhan	Manoj Pradhan	☐
25	Bhaktaram Pande	Bhaktaram Pande	☐
26	Srikanta Pradhan	Srikanta Pradhan	☐
27	Krupasindhu Rawan	Krupasindhu Rawan	☐
28	Rabi Kharsel	Rabi Kharsel	☐
29	Sadamsinda Kharsel	Sadamsinda Kharsel	☐
30	Niranjana Pradhan	Niranjana Pradhan	☐
31	Jashobanta Pradhan	Jashobanta Pradhan	☐
32	Raghu Nath Singh Barika	Raghu Nath Singh Barika	☐
33	Purnima Barika	Purnima Barika	☐
34	Bhagabana Paulam	Bhagabana Paulam	☐
35	Gangadhar Behera	Gangadhar Behera	☐
36	Rashika Pradhan (Sarpanch)	Rashika Pradhan (Sarpanch)	☐

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Spineless Cactus in Hilly/Degraded Lands, and Grasspea in Winter Crop Fallows for Fodder, Food & Nutrition Security in Tribal Areas in Odisha

Kangaon Village 26 Sep 2019

List of Participants

#	NAME	SIGNATURE	*Permission
37	Nepura Chhatar	ନେପୁରା ଚଟ୍ଟର	☐
38	Pankajini Chhatar	ପଙ୍କଜିନୀ ଚଟ୍ଟର	☐
39	Debeki Kharsel	ଦେବକୀ ଖରସେଲ	☐
40	Aahalya Behere	ଆହାଲ୍ୟା ବେହେରା	☐
41	Gumberi Sa.	ଗୁମ୍ବେରି ସା.	☐
42	Dharendra Behere	ଧୀରେନ୍ଦ୍ର ବେହେରା	☐
43	Deepanjali Behere	ଦୀପଞ୍ଜଳି ବେହେରା	☐
44	Purna Mallik	ପୁର୍ଣା ମଲ୍ଲିକ	☐
45	Kamaka Banik	କାମକା ବାନିକ	☐
46	Bipin Redh	BIPIN REDH	☐
47	Karamsingh Chhatar	Karamsingh Chhatar	☐
48	DURYO DHANA RAUT	Duryo Dhana Raut	☐
49	Ashok Ku Mishra	FF. ICARDA	☐
50	BINOD BAGH, FF. ICARDA	Binod Bagh	☐
51	Bijay Kumar Satpathy	Bijay DK, Bolangir	☒
52	Kshirodara Sahu (FF) Bolangir	Kshirodara Sahu	☐
53	Manohar Samant	M Samant	☐
54	Alekhya Tanti	ଅଲକ୍ଷ୍ୟା ତାନ୍ତି	☐

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Spineless Cactus in Hilly/Degraded Lands, and Grasspea in Winter Crop Fallows for Fodder, Food & Nutrition Security in Tribal Areas in Odisha

Kangaon Village 26 Sep 2019

List of Participants

#	NAME	SIGNATURE	*Permission
55	Sarjeet Khilan	Sarjeet PF Kakehandu	☒
56	Deepak Kumar Behr	Deepak K Behr	☒
57	BINOD BAGHI	Binod Bagh	☒
58	Sanjay K. Rout	Sanjay	☒
59	Sanjay K. Rout	Sanjay	☒
60	A. Dash	A. Dash ICARDA-odisha	☒
61			☐
62			☐
63			☐
64			☐
65			☐
66			☐
67			☐
68			☐
69			☐
70			☐
71			☐
72			☐

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**Spineless Cactus in Hilly/Degraded Lands, and Grass pea in Winter Crop Fallows for Fodder, Food & Nutrition
Security in Tribal Areas of Odisha**

Odisha – 26 September 2019

List of participants

No	Name	District	Email	Signature	*
1	Bijay Kumar Sathapathy	Bolangir	bijayparasar@gmail.com	Bijay	☒
2	Sankara Behera	Balangir	sankara.behera@gmail.com	SBehera	☒
3	Ambanisha Mishra	Bolangir	ambanish.mishra.camp@gmail.com	Ambanisha	☒
4	Kshirodza Bahu	Bolangir	kshirodza.bahu2845@gmail.com	[Signature]	☒
5	Indramani Bhu	Bolangir	Indramani Bhu@gmail.com	[Signature]	☒
6	Sanjay Khilan	Kalahandi	SanjayKhilan620@gmail.com	[Signature]	☒
7	Sanjay K. Rout	Kalahandi	routsanjay1994@gmail.com	[Signature]	☒
8	DURGYO DHANA ROUT.	Koraput	sanjayaout666@gmail.com	Duryo dhana Rout.	☒
9	BINOD BAGH	Koraput	binod8613@gmail.com	Binod Bagh	☒
10	Ashok Kumar Mishra	Koraput	ashok_ektal@rediffmail.com	A.k. Mishra	☒

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Spineless Cactus in Hilly/Degraded Lands, and Grass pea in Winter Crop Fallows for Fodder, Food & Nutrition Security in Tribal Areas of Odisha

Odisha – 26 September 2019

List of participants

No	Name	District	Email	Signature	*
11	Deepak Kumar Behera	Koraput	behera.deepak82@gmail.com	Deepak Kumar Behera	☒
12	APURBA DASH	Bhubaneswar	apurbadash72@gmail.com	A. Dash	☒
13	Smriti Ranjan Sethi	Bhubaneswar	smriti.sethi@gmail.com	Smriti Sethi	☒
14					☐
15					☐
16					☐
17					☐
18					☐
19					☐
20					☐

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