Zonal Project Directorate, Zone-II

Indian Council of Agricultural Research

Bhumi Vihar Complex, Sector - III

Block - GB, Salt Lake

Kolkata - 700 097

Zonal Project Directorate,
Zone-II

Farmers' Innovations

FARMERS' INNOVATIONS

हर कदम, हर डगर
किसानों का हमसफर
भारतीय कृषि अनुसंधान परिषद
Agrisearch with a human touch

FARMERS' INNOVATIONS

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Indian Council of Agricultural Research
Bhumi Vihar Complex, Sector-III, Block-GB,
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सचिव एवं महानिदेशक
Dr. S. AYYAPPAN
SECRETARY & DIRECTOR GENERAL

भारत सरकार
कृषि अनुसंधान और शिक्षा विभाग एवं
भारतीय कृषि अनुसंधान परिषद
कृषि मंत्रालय, कृषि भवन, नई दिल्ली 110 001

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MESSAGE

Innovation is one of the fundamental keys for augmenting agricultural production and productivity which include Farmers' Innovations as well. The drivers of Farmers' innovations are multifaceted in terms of economic, environmental, social, cultural and political factors wherein farmers may innovate out of necessity, adversity, opportunity and or ways to improve the past outcomes as a means to improve existing farming practices.

Recognizing and supporting the knowledge and experience of farmers for inculcating confidence and improving the capacity of evolving and or reinventing of innovations is need of the hour. Because, these farmers' innovations have applicability in the areas of technological solutions, managing livelihood through networking, communication, institution building, information management, accessing resources and managing natural resources which would be beneficial to other farmers.

In this context, the compilation on 'Farmers' Innovations' highlighting innovations of farmers would be useful for enhancing adoption of such innovations by farmers. I appreciate the efforts of Agricultural Extension Division, New Delhi and Zonal Project Directorate, Zone-II, Kolkata for bringing out this important and timely publication.

(S. AYYAPPAN)

Date: 26th September, 2013

DR. K. D. KOKATE
Deputy Director General
(Agricultural Extension)

INDIAN COUNCIL OF AGRICULTURAL RESEARCH
Krishi Anusandhan Bhavan – 1, New Delhi 110 012

FOREWORD

Small-holder agriculture in India is both complex and dynamic and farmers are constantly required to respond to emerging social, economic and environmental challenges. For managing challenges, farmers apply their creativity to find innovative solution to the problems either as an individual farmer or as farmers group.

Innovations can be equally applicable to agricultural, social and economic situation which may be in the form of new practice, community mobilization and low cost device. To broaden the horizon of local situation-based innovations, there is a need to recognize the knowledge and practice of farmers, document and share successful farmers' innovations after assessing the scientific base as well as create facilities for knowledge sharingamong stakeholders involved in agriculture/social research, extension and allied fields.

In this context, efforts to document farmers' innovation is a significant step towards encouraging other farmers to try newer ideas to cope-up with adverse agricultural situation. Such documentation also would help assessment of merits of such innovations and using appropriate methodology to outscale the identified innovations. The publicationentitled "Farmers' Innovations" is different in terms of documenting agricultural innovations as well as social innovations which would contribute to the overall agricultural development.

I congratulate the team of Zonal Project Directorate, Zone-II, Kolkata for bringing out this useful publication.

(K. D. Kokate)

PREFACE

In India millions of rural people who depend primarily on agriculture confront technical, social, cultural and traditional obstacles to improving their livelihood every day. To cope up with these obstacles, the farmers draw on indigenous knowledge and innovate through local experimentation and adaptation. For innovation to occur, knowledge must be created, accumulated, shared and used. Innovations i.e. new ideas, practices or products that are successfully introduced into economic or social processes can involve technologies, organizations, institutions or policies. Innovations in the abstract sense mean putting ideas, knowledge and technology to work in a manner that brings about a significant improvement in performance or product quality.

The farmers of Zone-II comprising the states of Bihar, Jharkhand, West Bengal and Union Territory of Andaman & Nicobar Islands are also trying out different ways to cope up with given situation in the field of agriculture, animal husbandry, fishery as well as mobilization of community. Such efforts if put forth in a desired manner can influence lot many farmers, youths, women and others to overcome farm and related problems with their own innovative manner. Accordingly, it has been decided to systematically present such innovations with details of practical utility that might be accrued out of such innovative ideas. Different practices observed in nearly all the fields of agriculture, horticulture, farm mechanization, animal rearing, fish and fingerling production, human resource mobilization etc. have been highlighted through this publication. In all the cited cases innovative thinking on the part of farmers, youths and women has been given due recognition.

The authors owe the success of this compilation to constant encouragement received from respected Director General, ICAR and guidance of Deputy Director General (Agril. Extension), ICAR. The Directors of Extension Education of State Agricultural Universities and the KVKs as a whole have contributed a lot in bringing out this publication. Assistance received from all the scientific and other staff of Zonal Project Directorate also made the task easier. The publication would be considered appropriate if the innovations are replicated in other agro-climatic zone of this country or the farmers get inspired to try out non-conventional means to overcome their problems related to agriculture and allied aspects.

A. K. Singh

Name of farmer:
Sri Kameshwar Mahto
Address:
Vill: Bemrotand, Block: Kasmar,
Dist: Bokaro, Jharkhand
Contact No.:

INTERCROPPING OF CAULIFLOWER,GINGER AND SPINACH

—An Innovative Production Model

Details of the Innovation: Kharif cauliflower cultivation in Bokaro district of Jharkhand is a common practice among the farmers who are having wells as irrigation facility. Ginger as cash crop is cultivated with the onset of monsoon. In some area spinach or Amaranthus is also taken up as a subsidiary component. However, cultivation of all three crops at a time has not been practiced so far. Sri Kameswar Mahto, a progressive farmer of this district thought differently and worked out an intercropping plan to cultivate ginger, cauliflower and spinach at a time, in the same piece of land and with common water and other resources. In this method, spinach seeds are broadcast in the field followed by preparation of ridges at 40 cm apart to transplant cauliflower seeding at plant to plant distance of 30 cm. The space between two cauliflower plants is utilized for sowing two rhizomes of ginger. Irrigation provided through furrow fulfils the requirement of water for all three crops. While preparing land, fertilizer dose of 100:60:60 :: N: $P_2 0_5$: $K_2 0$ kg/ha and FYM as per availability. Entire cultivation practice starts from first week of April onwards provided well or other assured source of water is available. Spinach becomes ready for harvesting after 25 to 30 days of sowing whereas cauliflower is harvested 60 to 65 days after transplanting. With harvesting of cauliflower, earthing up is also done for on field ginger crop. Ginger reaches harvesting stage in October to complete the series of intercropping.

Practical utility of the Innovation: Apart from optimum utilization of land, the innovative intercropping practice also increases water use efficiency to the extent of 1349 kg/cm/ha. As this practice is carried out with limited availability of water, efficient utilization of water is assured. In addition, the system fetches nearly Rs.7.0 lakh/ha net profit with 5.1 BC ratio against gross return of Rs. 3.5 lakh from conventional crop ginger. The calculated return from this practice is more than the cumulative return of three crops when cultivated individually. The innovative idea has been well accepted by the farmers of adjoining 5-6 villages where alternate source of irrigation is available.

Name of farmer:
Ashim Kumar Paul
Address:
Vill: Kalikapur, PO- Bagnan,
Bagnan I Block,
District – Howrah, West Bengal
Contact No.: 09735735336

SUGARCANE BASED INTERCROPPING FOR ROUND THE YEAR CROP CULTIVATION

Details of the Innovation: Round the productive utilization of cultivable land has been possible due to innovative thinking of a progressive farmer of Howrah district, West Bengal. Mr. Ashim Kumar Pal put his thinking into practice in his own land of nearly one acre situated at the eastern bank of river Damodar. The land is very fertile in nature and has assured irrigation facility through RLI system. He planned his intercropping option in such a way as to keep his land engaged for the entire year. He sowed radish, amaranthus, bottle gourd, onion seeds and chilli seedlings in 1st week of October and planted sugarcane on the very next day. Seeds of pumpkin were sown in the 4th week of October. After harvesting of amaranthus in the 1st week of November, he took up beans and after harvesting of radish during last week of November, potato tuber was planted. From January onwards, chilli, beans, potato and pumpkin were harvested. With the harvesting of sugarcane in the last week of May to early June, the land becomes free for kharif paddy cultivation. Intercropping of sugarcane with radish, potato, bottle gourd, onion, beans and pumpkin followed by paddy cultivation as sole crop has enabled him to carry out agricultural practices throughout the year.

Practicalutility of the Innovation: Innovative intercropping has assured distribution of earning throughout the year, reduced risk of crop failure and maximized utilization of cultivable land. It has also provided return manifold than the conventional cropping system followed in the district. It was observed that in any given year, the farmer was able to earn a net profit of more than Rs.1.0 lakh out of intercropping and from one acre of land. This practice has become quite popular in the similar agro-ecological situation of the district.

Name of farmer:
Mr. Birbal Oraon
Vill : Salam nawatoli;
Block : Bishunpur
District – Gumla, Jharkhand
Contact No.:

WHEAT AS PAIRA CROP PROVED SUCCESSFUL

Details of the Innovation: A large chunk of rainfed low land in Gumla district remains as rice-fallow after harvest of rice. The land remains sufficiently moist even up to first fortnight of January to prevent on time wheat cultivation. However, the idea of Mr. Birbal Oraon, a farmer of Gumla district, Jharkhand has made it possible to utilize fallow low land in a productive way. Like lentil or linseed, wheat was never thought of cultivating as a paira crop. But Mr. Oraon put his idea successfully into field to harvest a very good wheat crop.

Practical utility of the innovation: Availability of sufficient moisture in low land led to good germination of wheat seeds followed by saving of pre-sowing irrigation. Weed infestation was also reduced and finally Rs.2500 to 3000 per hectare was saved in cost of cultivation.

Name of farmer:
Kiran Sankar Roy
Address:
Village: Uttar Rupaisayer,
P.O.: Amritpara,
District – Bankura, West Bengal
Contact No.: 09609697176

INNOVATIVE VALUE ADDITION IN TERMS OF SPACE THROUGH STRAWBERRY CULTIVATION

Details of the Innovation: Strawberry is predominantly temperate fruit. Cultivation of strawberry in hot and dry climate of Bankura district, West Bengal is an uncommon practice. But Sri Kiran Sankar Roy, one of the progressive farmers of this district successfully produced strawberry through his sheer imagination and risk taking ability. As an alternate crop with adequate profit margin, strawberry cultivation took place in a small piece of land (4 Cottah) with four varieties namely Kamruja, Interdown, Sweet Charlee and Tioguae of Maharashtra in 2009-10. Of all the varieties tried, variety 'Interdown' was found best for this region in terms of quality, quantity and post harvest life. Cultivation practices included maintaining 2X1 ft spacing (Length and width) with land preparation by providing four number of tillage. Cow dung manure @15 tones/acres along with N 30kg + 40kgP_2O_5 + K_2O 30kg + Neem cake 100kg + bone meal 100kg and horn meal 100kg was thoroughly mixed with soil. After one month of planting, 15kg N/acre was added in the soil. Another 15kg N was applied just before flowering and foliar spay of 10-26-26 @ 5gm/lit. of water at an interval of 15 days. The bed was kept moist by providing irrigation and straw mulching. Harvesting of fruits started from January onwards till the end of March. It was found that on an average 500g of fruits per plant can be obtained making the yield of 60 q/acre.

Practical utility of the Innovation: Farmers who are searching for alternate crop in place of paddy and potato, straw berry as a cash crop has well been recognized. This technology is very simple to adopt by the local farmers, though cost of cultivation is more than the other crops. However, profit margin is so lucrative, farmers can very well venture towards cultivation of strawberry. Area of strawberry cultivation has started increasing also and presently 5 acres of land has been put under cultivation of this crop. A number of outlets like Big Bazar, Reliance Mart etc. are approaching the farmers for buy-back arrangements which is expected to ensure steady return from this crop.

Straw berry Var.Interdown

Field of Straw berry Var.Interdown

Name of farmer:
Sri Ramshewak Dangi
Address: Village & P.O. -
Gidhour, Block: Gidhour,
District – Chatra, Jharkhand
Contact No.: 09430194586

INNOVATIVE COST-EFFECTIVE TUNNEL FOR VEGETABLE SEEDLING RAISING

Details of the Innovation: An innovative idea of Sri Ramshewak Dangi of Chatra district has made raising of vegetable seedling possible throughout the year against all odds of climatic variabilities. In this method a sizeable area is covered by polythene sheet of 20 micron with the support of bamboo and bamboo sticks. Height of polythene sheet in the shape of tent is erected up to 6 feet with the provision of an entrance and provision to fold the tent to allow passage of air and sunshine as and when required. This innovation is put into practice at a very low cost to enable other farmers to follow.

Practical utility of the innovation: Practical utility of the innovation: The innovative and low cost poly tunnel is effective in protecting tender seedlings of vegetables from excessive rain, hot and cold wave. It also protects the seedlings from pest and disease infestation. Conducive atmosphere provided to the seedlings enhances the germination as well as survivability percentage.

Name of farmer:
Mr. Raj Kumar Singh
Address:
Lohadanada, Jainaga,
District: Koderma, Jharkhand
Contact No.: 09955383433

NON-CONVENTIONAL CHILLI CULTIVATION PRACTICES

Details of the Innovation: Mr. Raj Kumar Singh, a farmer of Koderma district developed a different cultivation practice to ensure off-season chilli cultivation. In this method chilli plants of fruit bearing stage are uprooted from medium land during June, roots are pruned to a certain extent and re-transplanted in the upland without any time gap in between. With the moisture available in medium land, chilli plants are established without additional irrigation. In the acute dry condition, one life saving irrigation is provided. Uprooting of chilli plants is done after first phase of chilli harvesting and the plants are re-established in the well-prepared upland with rain water. This unique method has helped him harvesting off-season chilli to get higher market price.

Practical utility of the Innovation: The development method ensures utilization of cultivable lands (both medium and upland) throughout the year followed by harvesting of chilli as rabi and kharif crop. Uprooting of chilli plants from medium land during mid-June does not disturb kharif rice cultivation also. Rice field being utilized as nursery plot for matured chilli plants, labour and cost are also saved. Moreover, 90% survivability with additional two weeks production could also be realized to enable him to earn substantial profit out of off-season chilli market.

Name of farmer:
Shri Mithilesh Dangi
Address: Village & P.O. -
Dariyatu, Block: Chatra,
District – Chatra, Jharkhand
Contact No.: 09470956077

MODIFIED METHOD OF TURMERIC CULTIVATION

Details of the Innovation: In Chatra district of Jharkhand, turmeric cultivation occupies an important place in agriculture. However, traditional cultivation practice like placing turmeric rhizome in furrows does not produce sufficient and quality yield. But a different cultivation practice developed by Shri Mithilesh Dangi of this distinct has made it possible to harvest higher as well as quality produce. In this method, mother rhizome is soaked in a solution prepared with cow dung and water (1 kg cow dung dissolved in 5 litre water) for six hours before placing in the furrows. The land is thoroughly pulverized and vermicompost is added in the top soil furrows to place mother rhizome on the vermicompost-mixed soil. Vermicompost helps in retention of soil moisture for better germination of turmeric plants.

Practical utility of the innovation: Soaking of mother rhizome in the cow dung solution prevents root rot disease followed by increased germination percentage. Vermicompost helps in retaining soil moisture to enable proper plant growth. Besides increase in yield of nearly 10%, the colour and quality of turmeric also get improved for a higher market price.

Name of farmer:
Mr. Sharvan Kumar Gupta
Address:
Village: Himlong
Block: Namkum
District – Ranchi, Jharkhand
Contact No.: 09431360542

INCREASING SURVIVABILITY OF MANGO AND GUAVA SAPLING IN A FARMERS' FRIENDLY WAY

Details of the Innovation: Sapling production of mango and guava in Ranchi district of Jharkhand is a lucrative enterprise for the small and marginal farmers. But survivability of sapling raised in conventional method in both the fruit crops is a problem as only 50 to 60 percent of mango saplings and 70 percent guava saplings survive after putting into orchards. Mr. Sharvan Kumar Gupta, a nursery raiser of Ranchi district also faced same problem and orchard owner were reluctant to purchase saplings from his nursery. To find out a workable solution of this problem, Mr. Gupta tried various means and finally came up with a viable alternative. He increased the tube size of the saplings keeping three years in the plastic container as well as used only pond mud as base materials instead of soil mixed with other ingradients. This new method worked very satisfactorily and presently the survivability has increased to 95 and 90 percent for mango and guava, respectively.

Practical utility of the Innovation: Increase in tube of fruit saplings leads to proper growth of adventitious and primary root which enhances the survivability of plants. Pond mud having more water holding capacity provides water in the root zone better than other medium. Raising nursery in this method for mango and guava fruit trees has made Mr. Gupta the largest private supplier of saplings in Jharkhand.

Name of farmer:
Mr. Sharvan Kumar Gupta
Address:
Village: Himlong
Block: Namkum
District – Ranchi, Jharkhand
Contact No.: 09431360542

INNOVATIVE METHOD TO GROW FEMALE PAPAYA SEEDLINGS

Details of the Innovation: In papaya cultivation, raising of female seedling is a difficult task as male seedlings come out in large number which leads to non-bearing of fruit. An innovative method identified by Shri Sharvan Kumar Gupta of Ranchi district, Jharkhand has ensured growing of female seedling in papaya more than male seedlings. In this method, the ripen papaya is divided into three equal parts and the top portion is thrown out with the seeds. Seeds from middle portion are placed into the nursery bed to get 80-90 percent female seedling. Seeds from lower-most part of the papaya are also taken to get equal percentage of female seedlings. It is observed that seedling raised from the seeds of middle part of papaya produces round-shaped fruit whereas elongated fruits are obtained from that of lower-most part of papaya.

Practical utility of the innovation: Production of female seedling by this method is ensured which has led to large-scale nursery raising of papaya. Moreover, the method being absolutely free of cost, the nursery raisers can practice this method quite easily.

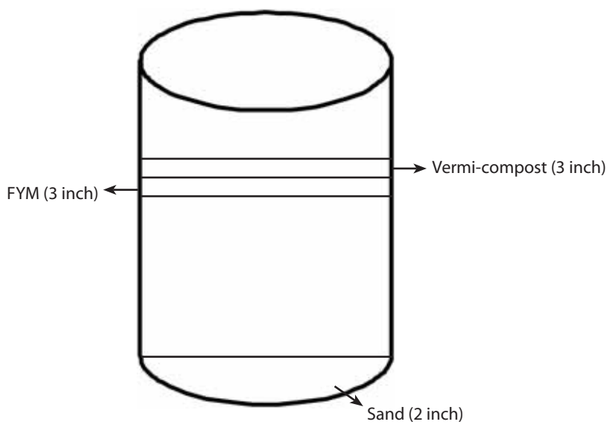
Name of farmer:
Shri Ram Chela Sah
Address: Vill.-Garke, P.O.-Kolhua,
Block-Adhaura, District – Kaimur, Bihar
Contact No.:

CULTIVATION OF KHARIF VEGETABLES IN PLASTIC BAGS – AN INNOVATIVE METHOD

Details of the Innovation : An innovative refinement of 'roof farming' in the form of cultivation of kharif vegetables in plastic bags has been done by Shri Ram Chela Sah of Kaimur district, Bihar. In this method medium is prepared with vermicompost, Farm Yard Manure, sand and soil at a definite ratio maintaining layer of ingredients (as per given figure) in the plastic bags. Vegetables like tomato, brinjal, chilli and cucurbits are cultivated in the plastic bags with staking as per requirement. Other intercultural operations are carried out to ensure vegetative and reproductive growth of the vegetables.

Practical utility of the Innovation: The innovation is useful for the landless farmers and in the peri-urban areas. Plastic bags can be moved from one place to another in the event of heavy rainfall or scorching sunshine to prevent the crops from climatic hazards. Moreover, infestation of weed can be avoided in this method of vegetable cultivation. Occurrence of diseases is also reduced in vegetables cultivated in plastic bags.

Composition of Bag filling



Name of farmer:
Kishanu Simlai
Address: Vill. Doshghora, PO. Doshghora,
District – Hooghly, West Bengal
Contact No.: 09434515888

INDIGENOUS PRE-COOLING METHODOLOGY OF SEED POTATO BEFORE STORAGE

Details of the Innovation : Seed potatoes are generally kept open in a shed for a few days before storing in cold storage. Potatoes are not covered either with paddy straw or any other material. The practice leads to deterioration of quality in seed potato. Mr. Kishanu Simlai, a potato grower of Dashghara block, Hooghly district, West Bengal tried successfully a different method of seed potato processing before storing into cold storage. In this method, seed potatoes are heaped upto a height of 3 feet in an open shed and then covered with paddy straw for 15 days. Seed tubers are then processed properly to make it soil free. Cleaned potatoes are then treated with 3% Boric acid and Mancozeb before storing in cold storage during evening or night.

Practical utility of the Innovation: Potato is the most important cash crop of Hooghly and the district's economy largely depends on its production and marketing. But the non-availability of good quality potato seed (tuber) often forces the farmers either to go for costlier seed tuber of other states or use their deteriorated seed material for cultivation. Potato seeds are generally stored in a very cool chamber at 2.5-3.0 0C. If seeds are directly or with a very little care sent to the cold storage for storing, it may choke or its quality may reduce for low temperature. But in this innovative method, potato skin gets hardened as well as preconditioning of the seeds takes place which help seed potatoes adjusting the sudden low temperature in cold storage. And the seed quality is also maintained for next year. This methodology of pre-cooling before storage of seed potato is sustainable, eco-friendly, economically viable and widely acceptable. The technology is being popularized in the different areas of the district.

Mr. Simlai in his potato field

Pre-cooling unit - an innovation

Name of farmer:
Mrs. Sunita Kumari
Address: Tehta, Block-Makhdumpur
District – Jehanabad, Bihar
Contact No.:

VALUE ADDITION IN STRAW IN A PRODUCTIVE WAY

Details of the Innovation : Paddy straw which is either wasted or burnt can be utilized in a different way as shown by Mrs. Sunita Kumari of Jehanabad district, Bihar. Paddy straw has been used in an innovative way to prepare idol or structure of historical importance. In this method paddy straw is bundled and dip into water for 10-15 minutes. After taking out straw, water is shaken away and individual straw is ironed to get the required stiffness. Straw of Basmati rice and other improved varieties is more suitable for this purpose. After drying up, the straw is pasted in the backside of a big piece of paper. Desired design is prepared in the front side of the paper and according to the design straw is severed. Generally coloured paper is used as the background of the picture.

Practical utility of the Innovation : This innovation does not include any additional cost except human labour. Even the rotten and old straw can be used for preparing various structures. The desired shading effect is given with the help of such unusable straw. To minimize the cost further, the bark of wood can also be used in place of coloured paper. Use of such bark brings naturality and originality in the finished product to make it much more lucrative and costlier. Nearly 32 farmwomen are actively engaged in this art of picture preparation.

Name of farmer:
Sh. Lambodar Darwe
Address: Village- Ghortopi,
Block: Jarmundi
District – Dumka, Jharkhand
Contact No.: 09801311847

INVENTIVE METHOD OF WATER LIFTING FROM DRY RIVER BED FOR IRRIGATION

Details of the Innovation : It is a simple mechanical device consisting of 8-10 feet PVC pipe of 6 inch diameter. The PVC pipe is perforated with the help of red hot bicycle spoke leaving 2 feet at one end aside. Depth of water level below river sand is assessed by inserting bamboo or thick rod to calculate the length of perforated pipe to be inserted. Once the suitable spot is identified, the perforated pipe is placed through mechanical force into the sand. Flow of water is arranged from nearby source through 2-3 inch delivery pipe for removing sands from base of pipe for smooth passage of perforated pipe in to the river bed. When the perforated pipe gets inserted into river bed leaving only 2 feet above surface level, delivery pipe of 2-3 inch diameter used for removing sand from perforated pipe is removed. Now with suction pipe and 0.5 HP motor water is extracted from the bored pipe having water level of 1 foot from ground surface. This water is pumped in to a small pond situated at higher level from where villagers take out water for irrigating crops. The cost of device is only Rs.1100.00 excluding the cost of pump set. The device can continuously run for 24-36 hours irrigating about 10-15 acres of land.

Practical utility of the Innovation : This innovation is useful for those places where rivers dry up in December to January but under current of water remains available despite dry bed. A large area can be brought under cultivation by using this innovation. At present this innovation has become popular in Dumka district and near about 2000 acres of land is brought under irrigation by this method of water lifting.

Water level assessed by iron rod

Perforated pipe inserted to lift water

Inserting perforated pipe mechanically

Connecting delivery & perforated pipe

Delivery pipe inserted

Water lifting device completed

Name of farmer:
Shri Punam Chandra Murarka
Address:
Vill- Paraswar, Block- Bhandaria
District – Garhwa, Jharkhand
Contact No.:

INNOVATIVE WATER LIFTING DEVICE WITHOUT USE OF ANY ENERGY

Details of the Innovation : Shri Punam Chandra Murarka, a young farmer of Garhwa district, Jharkhand has developed a unique water lifting device without depending on any form of energy – electrical, petroleum or biological. The device is operative only on principle of gravity. In this method oozed out water from permanent and natural water storage out of river is stored in a filter of 1000 litre capacity, made up of fibre glass. The storing device i.e. the filter is of 900 kg, 4' height and 7" diameter with 16 mm thickness of outer wall. Porus sheet is placed in the filter which is kept below the perennial waterfall but above the cultivable land. To install the filter, a hole of 12' depth and 18' diameter is prepared where thick canes are placed. The left over area is filled up with stones and sand. An airtight outlet pipe also made of fibre glass is fitted in the filter to take out water in the method of siphoning. With the help of plastic pipe water can be carried up to 200 – 300 meter. A stopcock is placed in the outlet to control water flow.

Practical utility of the Innovation : In this method water can be stored and carried in the agricultural fields without any form of energy. The device is very cost effective as once it is installed, it does not need maintenance cost. It is observed that proper utilization of gravitational force can perform more than the power of 3 HP pump to lift same quantity of water and 1.5 HP pump to discharge water. In this way irrigation can be provided during rabi as well as rabi-summer season also. An area of more than 200 ha has been brought under irrigation through this device.

Name of farmer:
Mr. Gangaram
Address:
Village: Narayanpur Panchayat : Bandhdih, Block: Gamharia
District – Saraikela, Jharkhand
Contact No.:

INNOVATIVE TECHNIQUE TO IRRIGATE FARMLAND

Details of the Innovation : Vegetable cultivation in Gamharia block of Saraikela district, Jharkhand was not a common practice due to scarcity of irrigation water. Farmers used to keep their land fallow after cultivation of kharif paddy. However, an innovative thinking of Mr. Gangaram of that block has made vegetable cultivation round the year possible through assured supply of water. Mr. Gangaram has devised a low-cost mechanism to lift water from river 'Sanjay' flows nearly 500 meters away from his residence. He has dug a shallow water body of 6' diameter as feeder tank on the bank of the river above 110' to collect water. With the help of a pump (1 hp), water is lifted from river and collected in the feeder tank. Feeder tank is connected with main water collecting 'Kund' (3' diameter) in the field through plastic pipe. For effective distribution of water 9 more such 'Kund' are dug which are connected with main Kund through small pipes. Once the 'Kunds' are filled up, water is taken out with the help of bucket to irrigate vegetables.

Practical utility of the Innovation : This low-cost innovation has brought boom in vegetable cultivation in the entire village. Through his device, water lifting is economized followed by need-based application of irrigation water in the vegetables. Fallow land of the village has been brought under vegetable cultivation and nearly 30 farmers are earning more than Rs.1.0 lakh from vegetable cultivation.

Name of farmer:
Binay Krishna Dey
Address:
Vill.- Kumarthuba, Habra
District – North 24 Parganas
Contact No.: 03216 211078

INNOVATIVE MODIFICATION OF ROTAVATOR FOR EFFICIENT OPERATION

Details of the Innovation : Modification/improvement of rotavator in the name of 'Tornedo' by Shri Binay Krishna Dey, a farmer-cum-mechanic-cum-tractor driver of North 24 Pgs. District, West Bengal has made agricultural operation efficient and low-cost affair. In the modified rotavator, chain system is developed with both side power tiller. A complete vivel set of 8 pinions is used in this rotavator which results into less friction, less power to drive, reduction of fuel consumption and enhancement in durability of the implements.

Practical utility of the Innovation : Decreased use of large tractor in a district like North 24 Parganas of West Bengal with intensive agriculture in practice, the farmers had to go for power tiller for agricultural operation. However, the efficiency in operation was lacking. Modified rotavator has brought back the efficient tillage. As the pulling power tiller runs with ease and reduced load, consumption of fuel is also substantially reduced making the tillage operation a low-cost practice.

Name of farmer:
Binay Krishna Dey
Address:
Vill.- Kumarthuba, Habra
District – North 24 Parganas
Contact No.: 03216 211078

BROKEN RICE SEPARATING MACHINE – A RICE-MILL FRIENDLY INNOVATION

Details of the Innovation : In rural Bengal, huge quantity of rice bran is used for parboiling of rice in rice mill boiler and at the household level. In rice mills, paddy husks are fed manually in the boiler leading to respiratory trouble of the labour concerned. It results into burning/loss of large quantity of broken rice round the year which otherwise could have been used as food material. Development of a separating machine by Shri Binay Kumar Dey, a farmer of North 24 Pgs. district of West Bengal has solved this problem to a considerable extent. The developed machine operates by a 2 HP motor fitted with a hopper and a shaft that regulate the quantity of husk to be supplied. A blower is fitted in a two-side open chamber (front and back) that allows the air to pass with husk between two plates fitted in front of chamber from where husk comes out and the broken rice is deposited in the base for its collection through a sloping tray.

Practical utility of the Innovation : Combination of feeding hopper, air sucking and throwing device (with the help of exhaust fan) in a metallic body has enabled the mill owners to save large quantity of broken rice during parboiling operation. Automation in feeding of fuel has also prevented the labourers from respiratory-related problems. The entire operation has become quite smooth without involvement of any additional manpower as well as incurring much expenditure.

Name of farmer:
Binay Krishna Dey
Address:
Vill.- Kumarthuba, Habra
District – North 24 Parganas
Contact No.: 03216 211078

LOW COST TURMERIC GRINDER – A WORKABLE DESIGN

Details of the Innovation : A low cost turmeric grinder designed by Shri Binay Kumar Dey of North 24 Parganas district of West Bengal has become handy for the small scale spices making enterprise. It is a new type of turmeric grinder operated through 5 HP motor having six blades with speed of 600 rpm. The blades slice the dry turmeric into power like tiny pieces. The grinder has two chambers – one for slicing turmeric and another for accumulating turmeric powder. A speed-adjustable blower is fitted between the chambers for transfer of turmeric powder from one chamber to another and put the small pieces of turmeric into the grinding chamber again.

Practical utility of the Innovation : North 24 Pgs. district of West Bengal is known for its potential in relation to production and marketing of spices powder, turmeric being one of the most important one. Grinding of turmeric at household level generally is done by "Atta Chakki" which generates substantial amount of heat. It deteriorates the quality of powder and sometimes large particles are mixed with powder due to defective or broken sieve. The developed grinder has helped in improving the quality of powder, producing more quantity and reducing drudgery in grinding operation.

Name of farmer:
Shri Sanjay Kumar
Address:
District – Palamu, Jharkhand
Contact No.:

LOCAL MADE WEEDER WITH HIGHER EFFICIENCY

Details of the Innovation : Shri Sanjay Kumar of Palamu district, Jharkhand has developed a weeder which is very effective in removing field grass. This weeding tool is of 1' thickness and made up of hard iron. Both the edges of the weeder are sharpened for easy operation. The iron blade is fitted to a vertical wooden handle at an angle of 130O. The length of the handle can be adjusted as per the height of farmer/ farmwoman.

Practical utility of the Innovation : This weeder is highly suitable for weeding in a standing position without putting pressure on waist. In addition, grasses like parthenium and nuthagrass (nut grass) can be cleaned from the field without body contact resulting into relief from irritation as well as skin diseases. Compared to traditional sickle, it is more effective as it can be operated like the pendulum of clock. Farmers of three villages are using this weeder.

Name of farmer:
Shri Narendra Kumar Singh
Address:
Vill.- Chakjalal, Block- Pandarak
District – Patna, Bihar
Contact No.:

ZERO TILL DRILL FOR VERSATILE USE

Details of the Innovation : Sowing of seeds with the help of zero till seed cum fertilizer drill carried out in Patna district encounters problem of soil and fertilizer trapping as well as chocking of delivery tube resulting into poor efficiency of the machine. The furrow opener of zero till drill is of inverted T type and designed in such a way that it simply scratches the soil surface for better seed and fertilizer placement in unprepared land. However, while using this machine in prepared land the problem of chocking of seed and fertilizer delivery tube arises. A simple modification done by Shri Narendra Kumar Singh of Patna, Bihar has helped the farmers overcoming this problem. In the modified tool, two holes are made on each shovel of ZTD to fasten another part over it. Two point shovels is fitted on the present furrow opener of ZTD with the help of nut and bolt and partial modification.

Practical utility of the Innovation : The modification has made the machine equally effective both for ploughed and unploughed land. In ploughed field in particular the machine is successfully sowing the seeds. There is no complaint of chocking of soil in the tube. In the case of sowing wheat without tillage, the fitted shovel can be removed and used. This modified machine has been well accepted by the farmers of this district.

INVERTED T FURROW OPENER

Name of farmer:
Sri Nilratan Kole
Address: Deulpara,
Bhanderhati, Dhaniakhali Block
District – Hooghly, West Bengal
Contact No.: 8900011191

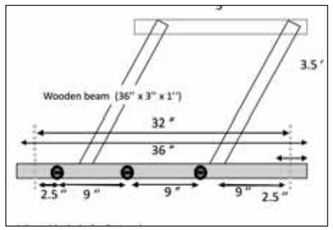
LABOUR SAVING POTATO PLANTING AND HARVESTING METHODOLOGY WITH A HAND MADE INSTRUMENT

Details of the Innovation : A handmade instrument was developed by Sri Nilratan Koley of Bhandarhati, Dhaniakhali, Hooghly with 32 inch hardy wooden beam and 4 iron shares. Instead of traditional single row planting he used to cultivate potato in paired row system with 27 inch bed where potatoes are placed in line made by the instrument with plant to plant spacing of 9 inch in the zigzag pattern. This instrument was used for making furrow for potato planting soon after land preparation, by adjusting the spacing it was again used for preparing irrigation cum drainage channel and at the time of harvesting it was driven by power tiller for exposing the soil. It was observed that by using this simple multipurpose instrument he got more profit in terms of higher yield and reduced cost of cultivation.

Practical utility of the Innovation : This innovative farm equipment is made of 32 inch wooden beam with four adjustable holes for fitting of different sized iron share for different operations. During planting, two big size (9" x 5") shares are fitted in two middle holes which function as making furrow for planting potato seed tuber and the other two small shares (7" x 3") are placed in two outer holes which are mainly used as a marker of irrigation channel. Two big size shares are again fitted in two outer holes 1 or 2 days after planting for making irrigation channel. Both these operations are managed manually. At the time of harvesting again this instrument is used for exposing the soil. In that case the two big size shares are fitted in the two middle holes of the wooden beam and these will be operated by power tiller after fixing it behind with an iron clump.

The modified instrument has the following advantages over traditional instrument:

- More profit with less input.
- Seed requirement is less
- This practice is labour saving and water saving.
- Intercultural operations like earthing-up, top dressing of fertilizer, spraying of pesticides can be done in better way.
- At the time of harvesting to expose the soil power tiller can be used which is not possible in traditional practice because the spacing in between two bed is same here (32") with the spacing between two wheels of power tiller but not same in common method (19").
- Higher production
- With the innovative instrument, introduced by the farmer himself, can save labour upto 38 % and increase net profit up to 28% more over to traditional method of cultivation.



Economics:

	Farmers' Innovation	Traditional Practice
Total cost of cultivation (Rs ha^{-1})	81,450.00	96,975.00
Yield (q ha^{-1})	37.50	33.75
Total Income (Rs ha^{-1})	172,500.00	155,250.00
Net Profit	81,277.50	58,275.00
B:C ratio	2.12	1.60

Name of farmer:
Smt. Pratima Mondal
Address:
Village: Srikrishnapur
Amtala, Dist.: South 24 Parganas, West Bengal
Contact No.:

PUFFED PADDY CLEANING MACHINE

Details of the Innovation : This modified machine runs on 1 HP electric motor. Unclean puffed paddy is poured into the funnel of the machine which is larger than the traditional paddy husking machine. The unclean puffed paddy is then allowed from the funnel to one end of a rotating wooden shaft which is 195 cm. long and 8 cm in diameter. A spiral rubber band (car window glass holder) has been fixed upon the wooden shaft. The spiral is so fitted that for one circle of rotation it becomes 10 cm wide. A drum of galvanized iron wire net having 2 mm. mesh size is fitted over the rotating shaft. The diameter of this drum is 17.5 cm. This drum acts as sieve. More output is obtained within a short period, thus improving productivity of the puffed paddy industry.

Practical utility of the Innovation : The principle of paddy husking machine (holler) has been utilized to prepare the innovative puffed paddy cleaning machine. It reduces drudgery and there are no health hazards during operation. It takes 80 minutes to clean 200 Kg of unclean puffed paddy for production of 135 Kg of cleaned puffed rice where as 1 man day is required in traditional method. The present invention involves only Rs. 42 for electricity and depreciation cost. This machine cleans puffed paddy in a quick and cost effective manner. It reduces huge strain on biceps and triceps, minor and even major wounds on hands and dust allergy which occur during traditional operation

Name of farmer:
Sri Nandlal Viswkarma
Address: Village: Amra talab, Bikramgan
District – Rohtas, Bihar
Contact No.: 07870992048

PADDY-HUSK BASED STEAM ENGINE

Details of the Innovation: A small farmer and dropout labour of Indian Railways Sri Nandlal Viswkarma of Amra village of Rohtas district has fabricated a steam engine which can run on paddy husk on self sustainable basis in rice milling. The capacity of engine varies from 20 HP to 80 HP as per requirement of the rice mill. The input of paddy husk is nearly 80 % of the output of milling operation. Considering 225 gm/kw/hr specific fuel consumption of a diesel engine and 30% thermal efficiency of developed engine, a saving of about Rs.52/hr as fuel cost is estimated for an engine of 20 HP capacity. This engine is cost saving followed by capable to produce sufficient electricity.

For producing of 20 HP power a boiler of size 10'x 3' which can generate a pressure of 75 pound /square inch is enough. He has developed control panel and other parts of machine are assembled with locally available spares of diesel engine.

Practical utility of the Innovation :

1. The fuel of the engine is renewable (Paddy husk) and available in plenty in the district.
2. Lubricating oil requirement is less as compared to the diesel engine of same capacity.
3. Husk requirement is about 80% of husk generated by milling i.e. self sufficient unit.
4. Due to fabrication of head panel (the main innovation of the farmer) the versatility and power generation per unit of input material increased.
5. In the era of petrol / diesel engine he revives the steam engine with modification in control unit.
6. Crop residues are prevented from burning avoiding soil and environmental hazard. Instead crop residues can be used for power generation by the same engine with slight modification in boiler unit.

Name of farmer:
Mr. Sirajul Aslam Shah
Address:
Vill.-Vior, P.O.-Vikahar, P.S. Tapan,
District – Dakshin Dinajpur,
West Bengal
Contact No.:

COMBINING HARVESTER WITH GRAIN COLLECTION UNIT IN AN EFFECTIVE WAY

Details of the Innovation: Heavy duty large size combined harvester has not become very popular in Dakshin Dinajpur district owing to its high cost (Rs.16.0 lakh) and greater suitability towards large holdings. Moreover, in heavy duty combined harvester, breakage percentage of grain (mainly rice) is also high which small farmers cannot afford. Hence, modification/fabrication of suitable harvester particularly for small holders was felt necessary by Mr. Sirajul Aslam Shah, a 64-year old farmer of that district. After critically observing/understanding the operational mechanism of combined harvester, he thought of developing a small and farmer-friendly combined harvester through necessary modification in his Mutsubishi power tiller to make it suitable for both the purposes. The Mitsubishi power tiller was used as the engine of modified harvester without its tiller parts. Other necessary spare parts were manufactured by him only. He shifted the engine of power tiller to the back of the modified machine and fitted below the handle. Arrangement for threshing of grain was also made in the backside of the power tiller. Cultivator gear kept outside served as the main gear to operate harvester. Paddy is collected in gunny or plastic bag automatically.

Practical utility of the Innovation : In conventional combined harvester, paddy grains are lifted with a filter for collection which causes breakage of grains. In modified harvester conveyer belt fixed with series of plates effectively lifts paddy grains without any breakage. In addition, the machine can be operated by walking which has reduced the physical stress experienced in traditional machine to work in sitting posture. The harvester being small in size is more suitable for small holdings and can be used for paddy, wheat and mustard.

The specification of the modified combined harvester is given below.

Specifications:

Capacity	
Boro paddy	: 17-18 decimal/hr.
Aman paddy	: 1 bigha (33 decimal)/hr.
Characteristics	: Full feed threshing, cage wheel compatibility working operation, suitable for fragmented holding
Fuel consumption	: 800 ml/hr. diesel
Length x Width x Height	: 11'10" x 5' x 5'7"
Effective cutting length	: 4'
Structural weight	: 450 kg
Engine	: 12 H.P.
Rate of broken rice	: Nil
Rate of loss	: 1%
Crops to be harvested	: Paddy, Wheat, Mustard
Unit Price	: Rs. 2.0 lakh

Name of farmer:
Sh. Subodh Choudhary
Address:
Village-Diara, Block-Godda
District – Godda, Jharkhand
Contact No.:

NIPPING IN GRAM MECHANIZED THROUGH MODIFIED SHEAR

Details of the Innovation: Nipping in gram is done to enhance the branching which leads to higher productivity. It is found that nipping in gram at 45 days of germination in a uniform manner could increase the yield 1.5 times with higher benefit cost ratio (2.1). Though nipping is a common practice among the pulse growers of Godda district, Jharkhand, shortage of labour at the required time often prevents the farmers from carrying out this cultural operation in right time. Moreover, mechanical nipping is tideous and time consuming also. Shear, a farm tools used for nipping alongwith hand-nipping also does not reduce labour requirement significantly nor very drudgery friendly. Hence, modification in the conventional shear was felt necessary by Sh. Subodh Choudhary of Diara village, Godda to increase work efficiency, ensure timely nipping and reduce labour requirement. Modification in terms of wielding two small sized aluminum sheets having folded margin with both the blades of hedge or any small shear was done to make the modified shear more effective in uniform pruning.

Practical utility of the Innovation : Besides uniform pruning and facilitating higher productivity, the modified shear also reduces drudgery in farm operation. As it includes mechanization to some extent, labour requirement is also reduced. In addition, modification being a very low cost affair, poor farmers can also opt for this instrument.

Name of farmer:
Yaser Molla
Address: Vill. – Serhangampur,
P.O. – Nimpith Ashram
District – South 24 Parganas,
West Bengal
Contact No.: 9609087685

LOW-COST MODIFIED FOOT SPRAYER

Details of the Innovation: Hand sprayers like the traditional piston sprayer as well as modern back-pack sprayers like the Knap-sack sprayer, both are tedious in operation and causes severe hand and back pain among the users. For spraying over a smaller area, the physical labour can be minimized by using the foot sprayer, but its cost (@ Rs. 3600-4200/-) is a limiting factor to the resource poor farmers. Though the farmers know that the spray quality is better in Knap-sack sprayer (Rs. 1300-1800/-), the farmers of this region find the piston sprayer (Rs. 450/-) more affordable for them. To bridge the gap between cost factor and ease in operation, Mr. Yaser Molla, a rural youth from Nimpith, found a perfect mixture of the traditional piston sprayer and the foot sprayer. He developed and attached a frame, fitted with a paddle, to the traditional piston pump in such a way that the sprayer can be operated by the feet only. This small modification cost him an extra Rs. 600/- over the price of a piston sprayer. But now, with Rs. 1050/-, he can operate the same piston sprayer by feet and also need not carry the tank over his back.

Practical utility of the innovation: Modified piston sprayer though costlier than traditional piston sprayer, it provides certain advantages like higher rate of discharge, suitable for small holdings particularly for vegetables and fruit cultivation and drudgery is reduced to a great extent. In this sprayer, there is no need to either exert pressure by hands or carry liquid pesticide on the back. Entire spraying operation is carried out with the help of feet only providing relief to the farmers.

Details of comparative performance of four different kinds of sprayers are given below:

Comparative performance

Piston sprayer	Knap-sack sprayer	Foot sprayer	Modified piston sprayer
Costs Rs. 450/-	Costs Rs. 1300-1800/-	Costs Rs. 3600-4200/-	Costs Rs. 1050/-
Pesticide kept in a separate bucket	Pesticide kept in a tank and the load is carried at the back	Pesticide kept in a separate bucket	Pesticide kept in a separate bucket.
Pressure applied by hand to draw the pesticide and then spray over the crop	Pressure applied by hand to operate the sprayer	Pressure applied by the feet to operate the sprayer	Pressure applied by the feet to operate the sprayer
Causes pain in both hand and in back	Causes pain in both hand and in back	Only foot pain	Only foot pain
Discharge rate: 20 L/hr	Discharge rate: 30 L/hr	Discharge rate: 50 L/hr	Discharge rate: 35 L/hr

Name of farmer:
Vidyasagar Mahato
Address:
Vill: Rajapara, PO. Ergoda
District – Paschim Medinipur,
West Bengal
Contact No.: 09933564065

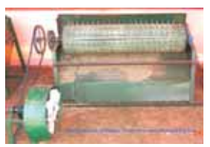
PADDY THRESHER AND WINNOWING FAN COMBINED IN AN INVENTIVE WAY

Details of the Innovation: Idea of threshing and winnowing of paddy in drudgery friendly way was mooted by Shri Vidyasagar Mahato, a farmer of west Midnapore district, West Bengal.The machine consists of a threshing cylinder, fan arrangement, driving mechanism, supporting frame and cover. A single phased 220V, 1 H.P, 1450rpm electric motor is adapted as prime mover for Rasp bar Drum as well as Winnowing Fan with 2.5" dia V-Pulley. To achieve the cylinder speed about 300 rpm+10rpm, 8" dia V-pulley as driven pulley,12" dia V-pulley as driver pulley for 3" dia driven pulley for fan are fitted in order to get nearly 2000 rpm velocity of 16" dia PVC Fan . Sufficient space for feeding the paddy straw is provided for easy operation by two men at a time. The main part of the machine is wooden cylinder with wire loop all round its periphery/circumference. The cylinder is pivoted on two ball bearings on the frame. Threshing of paddy crop is done by holding the paddy against the wire loop of revolving cylinders. The grains are easily shattered out. Due to centrifugal forces, the grains are thrown away from operators in projected area of air blown by fan.

Practical utility of the Innovation : A thresher with electric motor and inclusion of winnowing operation simultaneously reduces drudgery as well as output cost. In addition, very little wastage is observed during threshing both in grains and paddy straw as there is no looping of paddy straws. Shri Mahato has succeeded to develop another three paddy threshers with winnowing fan for its sale in the market. Presently he is in the process of patenting his machine with the help of KVK and district administration.

Comparative advantage of modified thresher with winnower is given below:

S. N.	Modified Paddy Thresher	Conventional Paddy Thresher
1.	Threshing and Winnowing at time 2 MD @Rs.136/MD Rs.272.00	Threshing 2 MD @Rs.136/MD Rs.272.00
2	Threshing output=2560 Anthi=8 qt	Threshing output=1280 Anthi=4 Qt
3	Motor Energy terrif 6 unit @ Rs.6/Unit Rs.30.00	Winnowing1MD @ Rs.136/Md Rs.136.00
4	Total Cost for threshing and winnowing=Rs.302.00/8 qt	Total Cost for threshing and winnowing=Rs.408.00/4 qt
5.	Unit cost for Threshing & Winnowing Rs.37.75/qt	Unit cost for Threshing & Winnowing Rs.102/qt
6.	Purchase Cost Rs. 9500-Rs.10000	Rs.4200
7.	Saving over conventional thresher Rs.64.25/Qt	



Name of farmer:
Smt. Purnima Devi
Address:
Village – Heth Adar; Block –
Ghaghra
District – Gumla, Jharkhand
Contact No.:

RE-USE OF MUSHROOM BED FOR VERMICOMPOSTING

Details of the Innovation: Mushroom production at household level by the farm-women is a common practice in Gumla district of Jharkhand. However, re-using the mushroom beds for other purposes was never thought of except by Smt. Purnima Devi of that district. Instead of destroying the mushroom bundles and drying it for fuel, she decided to use the abandoned mushroom beds for vermicompost production. The idea helped her reducing the dependence on other waste materials to prepare vermicompost pit substantially. Addition of mushroom beds also increased quality production of vermicompost for higher market return.

Practical utility of the Innovation : Alongside reducing the labour and cost of vermicompost production, abandoned mushroom beds also helped in improving the quality of vermicompost. As mushroom beds are easily available in the village, less effort is needed in collecting and putting into vermicompost unit. The beds are decomposed easily also to encourage the growth and activities of worms.

Name of farmer:
Mr. Krishna Kumar Tiwari
Address:
Village & Post: Ukhara,
Block: Bokhara,
District – Sitamarhi, Bihar
Contact No.: 09431499917

EFFICIENCY ENHANCEMENT OF WORMS IN A DIFFERENT WAY

Details of the Innovation: Application of vermicompost in crop and vegetable cultivation has become a common practice among farmers of Sitamarhi, Bihar. However, gap between production and requirement often forces the farmers to apply much lower quantity of vermicompost than the recommended one. In view of enhancing the production of vermicompost without any additional expenditure, Mr. Krishna Kumar Tiwari of Sitamarhi district developed a method for its successful implementation. In this method, 10-12 kg fresh leaves of Neem is added in the vermicompost pit and mixed thoroughly to allow the leaves to get decomposed. Water is added in the pit at a regular interval to avoid drying of leaves before decomposition. A decomposed green leaf of Neem enhances the working efficiency of worms.

Practical utility of the Innovation : Addition of fresh Neem leaves in vermicompost pits enhances the population of worms to the extent of 25 per cent followed by increase in compost production of 15 per cent. Tolerance of worms towards low temperature is also increased to ensure round the year working efficiency of worms. Neem leaf decomposed vermicompost also helps in increasing yield of Toria as well as improving grain quality. Insect-pest infestation in brinjal is also reduced with application of vermicompost specially after pruning operation.

Name of farmer:
Mrs. Punam Devi
Address:
W/O Jagarnath Oraon,
Village Tumba, Block: Sadar,
District – Hazaribag, Jharkhand
Contact No.:

HEAT STRESS MANAGEMENT IN PIG WITH SOIL – AN INNOVATIVE PRACTICE

Details of the Innovation: Heat stress has a direct bearing on growth and productivity of pigs in terms of, reproductive efficiency, blindness in new born piglets milk production as well as high mortality. The most comfortable range of temperature for pig is 25-30o C and humidity up to 50 per cent. Heat stress is induced in pigs with rise in temperature which retards the growth in body weight. Rise in temperature from April onwards is a common phenomena in Hazaribag district of Jharkhand which affects pig rearing practices at household level. As conventional heat stress management is an expensive affair, resource poor farmers hardly can afford it. Mrs. Punam Devi of this district has come out with a noble idea to avoid this problem. In her pucca pig shed, she has covered the concrete/cemented floor with 2 inches thick soil in the month of April for three consecutive months up to onset of monsoon. This has resulted into lowering of heat stress in pigs as soil layer acts as thermostat, maintains ambient temperature by checking radiation of heat. The soil is removed after three months to avoid skin disease in pigs

Practical utility of the Innovation : Lowering of heat stress through soil layer increases the body weight of new born piglets, enhances milk production, stops premature furrowing, prevents birth of blind piglets and mortality. The method being fully cost-effective can be practiced by all the resource poor farmers.

Name of farmer:
Pashupati Mahato
Address: Vill- Bhadsa,
P.O-Chitora,Block- Purulia-I
District – Purulia, West Bengal
Contact No.: 09832244157

ALTERNATE USE OF ALOEVERA IN GOAT FARMING

Details of the Innovation: Use of Aloevera for human skin nourishment is well recognized. It also constitutes a number of Ayurvedic medicines. However, use of Aloevera as dewormer in livestock is not very common practice. Pashupati Mahato, a farmer of Purulia district thought differently to apply Aloevera in goat rearing over conventional medication. In this process edible mucilage is collected from tender as well as fresh Aloevera leaf and mixed with jaggery. Mixture composed of 40 gm of edible mucilage combined with 50 ml Jaggery. It is administered once orally in empty stomach for consecutive 3 days followed by 21 days interval irrespective of age and stage of pregnancy.

Practical utility of the Innovation : Oral administration of edible mucilage of Aloevera reduces fecal worm load and increases body weight by checking malnutrition of goat. New-born kid mortality rate is also reduced. Meat quality and palatability is enhanced Skin quality and texture is improved subsequently. This practice reduces cost of medicine (de-wormer) and increase demand of meat in the market due to visible quality of goat. Farmers of surrounding villages are adopting this unique practice to earn substantial profit from goat rearing.

Oral administration of mucilage of Aloe-vera

Farmer in his Aloe-vera field in his backyard

Name of farmer:
Shri Chandra Narayan Bairagya
Address:
Memari 1
District – Burdwan, West Bengal
Contact No.: 09474643067

MODIFICATION OF EXISTING HATCHERY IN A UNIQUE WAY

Details of the Innovation : Availability of quality fingerlings at proper time often poses a problem of the fish farmers in Burdwan district of West Bengal. Though a number of existing/Chinese model of hatchery is available in the district, the mortality of the fingerlings has been observed as high as 15-20%. In addition establishment of Chinese hatchery with given specification accounts for much higher cost which is not affordable for small fish farmers. A modification made by Shri Chandra Narayan Bairagya of this district has not only reduced the mortality to 2-3%, but also enhanced the production of fish fingerlings to the tune of three times compared to Chinese hatchery. In this modification a chamber of 10′ diameter and 4′ height cemented construction is prepared with a central platform (6′ dia x 6″ peripheral height and 1.5″ central height) to enable female fish to reach the shallower portion of the central platform to lay eggs. To ensure flow of fresh water with adequate oxygen across the hatchery, four horizontal and four vertical water inlets (perforated) are fitted outside the central platform. Nylon nets are used as separator between eggs and spawn before it is reared in the main hatchery pond. The tendency of female fish to lay eggs in the shallow water from deep water is exploited in this structure. In place of three chambers found in Chinese hatchery, in the modified hatchery two chambers are sufficient to produce more number of fingerlings at a much lower cost.

Practical utility of the Innovation : This modified hatchery needs only Rs.40,000 - 45,000 to construct as against the market price of Rs.2-5 lakh of Chinese hatchery. Moreover, flexibility has been kept to prepare two chambers either by plastic or fiber glass to reduce the cost further. A production of fingerlings has been recorded almost three times higher (1 million) which enables the farmers to sale fingerlings in the market for additional income. With this modification supply of fingerlings has been ensured to at least 5 blocks of the district.

Name of farmer:
Shri Moinuddin Sk.
Address: Vill- Dahapara, P.O.-Dahapara, Block- Murshidabad-Jiaganj,District – Murshidabad, West Bengal
Contact No.: 09732807448

UNCONVENTIONAL USE OF MILK IN SPAWN PRODUCTION

Details of the Innovation : Rearing of spawn of the fish species Lobeo bata in the traditional method leads to higher mortality, longer duration to reach fry stage and stunted growth of fish. An innovative method developed by Shri Moinuddin SK. of Murshidabad district of West Bengal has helped the fish farmers of the district in increasing the profit many folds. In this method, an emulsion is produced by mixing 5-6 pieces of Lifebuoy soap (100 gm each) into 2-3 litres of warm water. Thoroughly mixed soap emulsion is poured into nursery pond of 0.33 acre water area. Mixing of emulsion into nursery pond water is done 72 hours before release of spawn into nursery pond. Again 1 kg of Amul milk powder is dissolved in 5 litres of warm water, added into 75 litres of fresh water and mixed thoroughly to prepare a uniform milk solution. Milk solution is then sprayed in the same nursery pond two hours before release of fish spawn. T

Practical utility of the Innovation : Soap emulsion kills the harmful insects in the nursery pond and milk acts as balanced food for spawn at the initial stage. Milk is also used by phytoplankton and zoo-plankton in the nursery pond for its growth as well as to maintain primary productivity of the pond. The media also creates favourable environment for the mosquito to lay eggs which are good source of protein for spawn. Spawn reach fry stage within 10-12 days compared to 15-20 days in traditional rearing practices with better growth. More importantly, mortality rate is reduced to 10-15 per cent against 25-30 percent in normal rearing practices.

Name of farmer:
Beraful Bibi
Address:
District – Uttar Dinajpur
Contact No.:

LOW COST DUCK HOUSE ENHANCED PROFITABILITY

Details of the Innovation : Poultry and ducks are integral part of the subsistence farming. Almost each and every household rears ducks and poultry birds for household nutritional security and income generation. But in many cases permanent housing for duck and poultry is not affordable due to lack of space and financial reasons. A very low cost duck/poultry house fabricated by Beraful Bibi of Uttar Dinajpur district, West Bengal has become a boon for the farmers. The house (2.5'x4.0') prepared with clay mud and straw can shelter 8 to 10 birds and protect them from heat and cold due to thermo regulatory capacity of the walls of the shed. Few small holes are kept in each wall which helps in better aeration inside the room. A small inbuilt food pocket is kept inside the wall just beneath the entrance. A thatched roof is prepared with locally available materials in the shape of a triangle to protect the birds from rain during night. In the case of attack by wild animals, a fencing of wire is prepared with a small wooden gate.

Practical utility of the Innovation : As the construction of duck house involves very little cost, every household can afford to have it in the adjacent to their dwelling. The birds remain safe in all the season and egg laying birds/ducks can be hold back in the duck house to get the laid eggs. Feed can also be provided at a particular interval to maintain the body weight of the birds. Above all, more return can be obtained from rearing of birds/ ducks in such houses.

Name of farmer:
Sri Jitendranath Das
Address:
Vill- Ergoda, P.O. Ergoda,
District – Paschim Medinipur,
West Bengal
Contact No.: 08372964284

INDIGENOUS LIGHT TRAP ENHANCED FINGERLING PRODUCTION

Details of the Innovation : Eradication of predatory insect in Nursery & Rearing pond is a recommended practice. In general, cheap detergent powder is dissolved in warm water or diesel and vegetable oil is added to it @ 1: 3 ratio. This detergent & oil emulsion is sprayed over the water area one or two days before stocking. Sri Jitendranath Das, a fish farmer of West Midnapore district of West Bengal observed that flying insect like Lithocerus species, Dytiscus species, Ranatra species are coming back in the nursery or rearing pond from surrounding ponds within 6 – 7 days after stocking to kill lots of fry and advance fry. To overcome this problem he developed a light trap to control the predators. He made a 3 ft diameter metal ring with 6 inch width plain sheet. He fitted this device in rearing pond with 3 bamboo pole in such a manner that half of it remains under water and other half above water surface. With the help of rope he placed one 100 wt bulb or a lantern in the middle above 3 ft of the ring. Then he poured burnt lubricant oil in the ring. As the ring is sunken 3 inch below the water surface, there is no chance of spreading of the lubricant over the water body to pollute it. Every morning he used to scoop out the dead insects along with the lubricant with the help of a piece of course cotton cloth.

Practical utility of the Innovation : By using 3 – 4 numbers of these trap in an acre of water body for consecutive 4 days it has been possible to control predatory insects in rearing pond. The production of fingerling has also increased from 80 – 85 kg/ 0.33 ha of water area to 150 kgs of fingerlings of IMC worth Rs. 30000/-.

Name of farmer:
Mr. Joydeb Mahato
Address:
Village: Jhalda
District – Purulia, West Bengal
Contact No.: 09932138348
Email : joydeb.lac@gmail.com

LAC BASED ENTREPRENEURSHIP DEVELOPMENT IN A DIVERSE MANNER

Details of the Innovation : Lac was never considered as a potential enterprise by Shri Joydeb Mahto of Purulia district, West Bengal. Though lac cultivation was not uncommon among the tribal in which Mr. Mahto belongs, incidence of large scale infestation of pest and diseases forced the tribal to abandon lac cultivation. However, Mr. Mahto decided to go for lac cultivation on Kusum and Palas trees against existing odds. Receiving initial knowledge and encouragement from KVK Purulia, Shri Mahto approached IINRG, Ranchi of his own to get specific training on insect pest management in lac cultivation. The knowledge, skill and confidence motivated him to increase number of trees from 250 palas to 2500 and 9 kusum to 19 followed by 32 ber trees. Lac on Semialata is also produced by him. Training on nutrient management, brood lac management, insect pest management as well as processing and marketing further strengthened his zeal to go for commercial lac cultivation. Sensing the possibility of earning substantial profit, he decided to involve resource poor jungle dwellers in this enterprise. He arranged training for the tribal and provided technical and material help towards entrepreneurship development among them. In the course of entrepreneurship development he made available all the inputs like brood lac, 60 mesh nylon bags, insecticide, fungicide and other technical know-how. Once the resource poor tribal farmers produced lac, brood lac and stick lac were repaid back to Mr. Mahto in the same rate of received input. For landless rural youths, Mr. Mahto has appointed more than 1500 youths, trained them and put them into the service of making brood lac available to other tribal, looking after lac production and providing technical support. He has also formed ten SHGs to make them engaged in producing decorative items like bangles, lac coated pen stand, candle stand etc.

Practical utility of the Innovation : The efforts put forth by Mr. Mahto have made him a successful lac based entrepreneur followed by development of a number of tribal entrepreneurs. His involvement in the entire process has provided employment opportunity to more than 1500 rural youths and 110 tribal women of the district. He has been recognized as the most trusted brood lac supplier to different parts of Purulia, Jharkhand, Uttar Pradesh, Madhya Pradesh, Odisha, Andhra Pradesh, Maharastra and Karnataka. His present annual income is more than Rs.25, 00,000 and total lac based turn over in the area is around Rs.6.0 crore. He has become a role model for the entire tribal community of Purulia district. Besides working as Master Trainer for KVK Purulia he is associated with a number of State Departments, State Agricultural Universities, ICAR Institutes NABARD, RKM Narendrapur and others.

Name of farmer:
Vijay Bahadur Singh
Address:
Village: Sabeyan, Rajandih
District – Rohtas, Bihar
Contact No.: 08002119937

FENCING NET TO PROTECT CROPS FROM NEELGAI MENACE

Details of the Innovation : Damage to crops caused by Neelgai or Blue bull is a matter of great concern not only to the farmers but also Bihar Government. Farmers used to incur heavy losses throughout the year because of the free-entry and attack of flocks of Neelgai. As the Government rules do not allow to go for killing of Neelgai, major cereals, pulses, orchards and vegetable gardens are heavily damaged due to the menace of this wild animal.

Sri Vijay Bahadur Singh, an innovative farmer of Sabeya village, Rajpur block, Rohtas district has found out an innovative way to restrict the entry of Neelgai in crop-land to safeguard the interest of the farmers of the area. He has developed fencing net made of para twist thread with a total cost of nearly Rs.18,000/- including labour component. Altogether 132 pieces of bamboo are required to cover 1 ha of crop land through this para twist net. The net is tied with erected bamboo placed at a fixed interval as tight as possible so that in the process of overcoming the net, the animals are trapped. Moreover, knots in the net are made (in square shape) in such a way that leg of Neelgai can very well entrap to prevent Neelgai from running away. Once the Neelgai is trapped, its effort to get rid of the trap makes more difficult to come out. Comparison to barbed wire or concrete wall, this unique net is much safer for the Neelgai as well as harder to jump over. The trapped Neelgai can be released from the net by tearing parts of the net. The villagers prefer to free the wild animals as religious ritual does not permit them to make any harm to the animals. The net has created havoc in the minds of these animals and they are no more daring to enter into the crop lands in the entire area. It has been successfully implemented in different blocks of Rohtas district also.

Now this innovative idea of Sri Bijay Bahadur Singh has spread into other blocks of the district. Approximately 100 ha of farm-land of Sabeya village and adjoining areas having high density orchards of mango and guava, vegetables gardens and field crops have been fenced and protected. The farmers of Bhojpur, Aurangabad and East Champaran are also using this net to get rid of blue bull menace.

This protected fencing net is a simple & low cost technology and is very cheaper than the traditional fencing methods usually used by the farmers and the extent of control is 100 %.

An economic analysis of the fencing adopted by different methods indicates that this Para twist net works well up to 8-10 years against bamboo fencing for 3 years and barbed wire for 12 years. As installation of this device needs only bamboo, labour and thread, it is much cheaper than that of barbed wire and bamboo fencing.

The details are given in the following table.

Comparative analysis of three fencing methods

Sl. No.	Particulars	Cost of fencing (Rs/ha)		
		Innovative Net	Barbed wire	Bamboo fencing
1	Para twist Net (31 kgs @ 200/kg)	6200.00	-	-
2	Bamboo- 132 pcs @ 40/pc	5280.00	-	-
3	Para twist thread 10 kg @ Rs 160/kg	1600.00	-	-
4	Labour cost (30) @ Rs 152/labour	4560.00	-	-
5	Total Cost	17,640.00	-	-
6	Cement pillars (8”) 110 pcs Rs 400/pillars	-	44,000.00	-
7	7- coils of Barbed wire, 469 kgs @ Rs 70/kg	-	32,830.00	-
8	Thick wire 30 kg @ Rs 60/kg	-	1,800.00	-
9	Labour cost (60) @ Rs 144/labour	-	8,640.00	-
10	Bamboo (8’) 220 pcs @ Rs. 40/pc	-	-	8800.00
11	Bamboo (24’) 275 pcs @ Rs 100 /pc	-	-	27500.00
12	Iron nails (2.5”) 30 kg @ Rs 80/kg	-	-	2400.00
13	Irons wires 7 kgs @ Rs 80/kg	-	-	560.00
14	Labour cost (75) @ Rs 144/labour	-	-	10,800.00
	Total Cost	**35,280**	**87,270.00**	**50,060.00**
	Durability	8 – 10 years	12 years	3 years





Name of farmer:
Smt. Madhu Patel
Address: Vill - Gajendrabigha,
Post- Hilsa, Block- Hilsa
District – Nalanda, Bihar
Contact No.: 09386301605

ENTREPRENEURSHIP THROUGH MUSHROOM FARMING

Details of the Innovation : Smt. Madhu Patel belongs to a very simple family of Nalanda district and married with poor farmer. They were mainly cultivating medicinal and aromatic plants in the village. But, due to severe flood the medicinal and aromatic plants were completely damaged. She took initiative for production of mushroom with her husband to regain the economic status of her family. She attended training at KVK and ATMA Nalanda for knowing the scientific methods of the mushroom production. KVK Nalanda and NRC Solan on mushroom production. Subsequently, she started production of mushroom at large scale but there was a scarcity of mushroom spawn availability in the district. She established a mushroom spawn laboratory at Rajgir. Around 100 kg spawn is produced daily from her laboratory. Major amount of spawn and mushroom produced in the laboratory were procured by the government and provided to the different self help groups of the district. Presently her earning is approximately Rs. 1.50 - 1.75 lakh per year from this enterprise. She has taken up women empowerment imitative also for which Smt. Patel is having around 10000 numbers of SHGs and all the members are now engaged to cultivate mushroom. A programme namely "Ujjawal Bihar" is run by Smt. Patel which encourages farmers particularly women farmers for mushroom cultivation.

Name of farmer:
Mr. Sharvan Kumar Gupta
Address:
Village: Himlong
Block: Namkum
District – Ranchi, Jharkhand
Contact No.: 09431360542

WOMEN EMPOWERMENT IN A DIVERSE WAY

Details of the Innovation : Initially to sustain her family Smt. Jaya Devi ventured into household dairy activities with just two cows. To seek advice about the rearing practice, she often visited KVK which helped her know about different agricultural practices including HYV of crops, crossbreed cow, goat rearing practices, value addition and others. The most important area she became acquainted with was formation and nurturing of self-help group to involve women into income earning activities. Undergoing both formal and informal training at KVK Munger and other organization on 'SHG and women empowerment', she could understand the benefit of unified efforts to bring poor and hapless women out of existing social atrocities, evils, taboos through arranging alternate employment in a group approach. While taking her ideas to tribal women in particular, she received positive response from the women folk to give group activity a try. To begin with, she herself formed self-help group of the poorest women of her village and encouraged the members to undergo training at KVK to adopt improved cultivation as well as animal rearing practices. She contacted NABARD, CRADALE and Notre Dame Health Centre, an NGO working in the district to provide minimum health care facility to the poor women for taking up all-round development activities. She catalyzed 30 SHGs and 6 watersheds with the financial support of NABARD and technical guidance of KVK to cover an area of 5000 ha under improved agricultural practices and plantation of 25000 fruit trees (sapling). Her effort was instrumental in forming 285 SHGs in the district which was recognized through electing her President of SHG Federation. She formed 5 sub-committees to address the various issues of community particularly to the tribal farmers and farmwomen. Being the president of sub-committee, Sampark of SHG Federation, she ventured into contacts with other stake holders of the region like ATMA and line departments of local administration.






Her efforts to ensure better quality of life to disadvantaged rural families of the area through sustainable agricultural technologies coupled with NABARD sponsored watershed management projects brought a paradigm shift in agriculture practices in the area. The locality is responding her efforts and participating in soil and water conservation measures and adopting tree (horti-silvi-plantation) based agriculture practices along with poultry and goatary farming. The community is fighting against all social menace with strong determination under her leadership

The catch line of Jaya Devi is: Daan Se Parlok Sudharta hai, Shramdaan se ye lok. Mitti Pani hi jeevan hai rok sake to rok.Practical utility of the Innovation : Under her leadership 5000 hectare of DharaharaKol's barren land has been converted into green land. There have been over 75 Ahars, 50 ponds and many Gabion bunds and other water harvesting and water conservation structures. Her efforts have been recognized in 5th Edition of Real Hero Award by CNN-IBN & Reliance Foundation in March 2012.Income level of the community has increased more than 2.5 times in the last five years. Her efforts and voluntary contributions in this direction is well recognized through various awards and recognitions like Fellowship from Jamsedji Tata National Virtual Academy, MS Swaminathan Research Foundation, National Youth Award for **Rain Water harvesting and Environment Protection**, Ministry of Youth Affairs and Sports, GOI.

Name of farmer:
Sk. Sirajuddin
Address: Chopra
District – Dist. Uttar Dinajpur,
West Bengal
Contact No.:

LOW COST RAT TRAP

Details of the Innovation : This is a very low cost rat trap fabricated by Sk. Sirajuddin using locally available indigenous materials. To make this trap, a small (1.5 feet) piece of hollow bamboo blocked at one end by internode and open at the other side is selected.. A small hole is kept just behind the blocked end of the bamboo to place bait for the rat. Another piece of bamboo less in diameter pushed inside the hollow chamber of the previous one. The bamboo inside the channel of another bamboo acts as a hammer and is very tightly tied with piece of elastic (used cycle tube). Once the rat touches the bait the tension of the hammer is released and it hits the rat vigorously against the blocked end of the hollow bamboo and kills the rat. The fabricated device is very much effective, low cost and above all eco friendly.

Practical utility of the Innovation: The trap can be placed anywhere in the house or field to attract rats with the help of bait. The trap is suitable for killing all types of rat species commonly found in the houses and fields.

Name of farmer:
Shri Brajesh Tiwari
Address: Vill- Karuakala,
Block- Garhwa
District – Garhwa, Jharkhand
Contact No.:

NEW VARIETY OF BALSUM FLOWER

Details of the Innovation: Brajesh Tiwari developed the interest of gardening since his childhood. His interest towards floriculture and horticulture developed day by day which extended area wise from 1 kattha to 7 kattha. His endeavour was boosted by the KVK scientists and State Government Officials. He was encouraged and honoured by DC Garhwa in respect of one poly house and a vermicompost unit.

Practical utility of the Innovation : By getting influenced with rule of Principal of Inheritance and Variation by Gregor Mendal, he tried an experiment on Balsum plant. He pollinated a flower with three different color flowers of different plants of Balsum. He dispersed the pollens of rose flower on that experimental flower to add fragrance. The offspring of the experimental plant, most of the flowers observed were same as the parent but few flowers appeared with different colour with a mild fragrance.