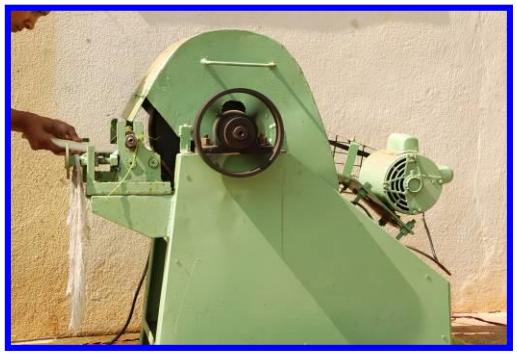
CENTRAL TOBACCO RESEARCH INSTITUTE,
RAJAHMUNDRY – 533 105

1. Technologies Developed and Commercialized

Proforma for technologies developed for Farm Mechanization, Post-harvest and processing and Renewable energy sources.

Sl. No	Item	Details
1.	Name of machines/implements/devise/ technology/ process	Banana Fiber Extractor
2.	Specifications and salient technical features (principle of operation, suitability to different crops/commodities, power and labour requirement, how it is an improvement over the existing systems, safety factors incorporated etc.)	The Banana Fiber Extractor machine mainly consists of a roller drum on which M.S. blunt blades are embedded all around at regular intervals. The drive from 1 hp single phase electric motor rotates the roller drum at 950 rpm. A counter weight is also arranged on the dome-shaped cover provided on the roller drum to prevent the spillage of fibre waste during the operation as a safety measure. A guiding rod is arranged in front of the adjustable reading point which is in turn fixed on the rigid frame to guide the sheaths in to the roller drum chamber. A guard is also provided to cover the pulleys as a precaution.
3.	Performance results (efficiency, capacity of operation, losses etc.)	**BFE** is portable and operates with single phase 1 HP electric motor. Extracts 15-20 kg dry fibre / 8 hrs Easy to handle even by women About 100 stems can be processed in 8-10 hrs period About 150 gm of fibre can be extracted from a single pseudostem (20-30 kg)
4.	Cost (initial investment and operating cost in Rs./h and Rs./unit output)	Machine cost : ` 50,000/- Production cost ranges from ~ ` 25 to 45 per kg; Cost of fibre : ` 80-100 per kg
5.	How the new technology will impact the income of the farmers and its benefits over conventional system in terms of savings on cost of operation, inputs, timeliness and other pertinent information	Productivity per day Manual : 500-600g/8hrs/person Machine : 15-20 kg dry fibre / 8 hrs Earning profit per day : ` 300- 500/day
6.	Social/environmental/ other benefits	

7.	Status of commercialization / IPO rights etc.	Appl.No.397/CHE/2008. Patent approval is awaited.
8.	If commercialized, name and addresses of the firms/entrepreneur to whom the technology has been transferred	M/s. Raki Industries, 2-540, Pithapuram Road, Ramanayya Peta, Kakinada-533 005 M/s. A.P. State Agro Industries Development Corporation , Hyderabad-500 004
9.	Special facilities required (for example confirming to the norms of Food Safety and Standards Authority of India (FSSAI) or other standards)	N.A.
10.	Photographs in operation with proper lighting, light background and only operator to appear if required	
11.	Contact details of person to whom technology and further details can be held (information on the postal address, email, telephone, fax etc.)	DIRECTOR, CENTRAL TOBACCO RESEARCH INSTITUTE RAJAHMUNDRY - 533 105 Phone No; 0883-2449871-4 FAX: 0883-2410555 Programme Coordinator, KVK-CTRI Kalavacharla 533294 Ph.No.0883- 2007633 Website: ctri.org.in E-mail: kvkrjy@yahoo.com; kvkctri@gmail.com
12.	Source of availability	Central Tobacco Research Institute, Rajahmundry- 533105

Technologies developed for Farm Mechanization, Post harvest and processing and Renewable energy sources.

Sl. No	Item	Details
1.	Name of machines/implements/ devise/technology/ process	**Palmyrah Fibre Separator**
2.	Specifications and salient technical features (principle of operation, suitability to different crops/ commodities, power and labour requirement, how it is an improvement over the existing systems, safety factors incorporated etc.)	Palmyrah Fibre Separator (PFS) mainly consists of a hollow drum on which nail-mounted wooden strips are embedded all around the periphery. The drum is mounted on a rigid frame and rotates on a shaft supported by the ball bearings at each end. The drive from the 1 hp single phase electric motor pulley is transmitted through a 'V' belt to a pulley which rotates the drum at 360 rpm. A counter weight is also arranged on the other end of the drum to balance the vibrations and centrifugal forces. A dome-shaped cover is provided on the drum to prevent the spillage of fibre waste during the operation and also as a safety measure. A guiding rod is fixed on the adjustable feeding plate, which is in turn fixed on the rigid frame to guide the fronds into the drum chamber. An adjustable feeding plate is provided to compensate the wear and tear of nails. Pulley guards are also incorporated in the new machine for additional safety. This machine utilizes the impact force by rotating drum and combing action by nails to process the fronds and converting them into fibre within a short time.
3.	Performance results (efficiency, capacity of operation, losses etc.)	It is a portable device and extracts 50-60 kg dry fibre in 8 hours. Market price ranges from ~ 25-30/ kg of fibre
4.	Cost (initial investment and operating cost in Rs./h and Rs./unit output)	The machine costs ~ `35,000/-
5.	How the new technology will impact	The net income of family increased to ~ `

	the income of the farmers and its benefits over conventional system in terms of savings on cost of operation, inputs, timeliness and other pertinent information	500 per day
6.	Social/environmental/ other benefits	-
7.	Status of commercialization / IPO rights etc.	Patent No: 225733, Granted
8.	If commercialized, name and addresses of the firms/entrepreneur to whom the technology has been transferred	M/s. Sri Vijaya Lakshmi Engineering Works, #4-340/19, Alwar Nagar, Lala cheruvu, Rajahmundry, A.P.
9.	Special facilities required (for example confirming to the norms of Food Safety and Standards Authority of India (FSSAI) or other standards)	N.A.
10.	Photographs in operation with proper lighting, light background and only operator to appear if required	 Palmyrah Fibre Separator
11.	Contact details of person to whom technology and further details can be held (information on the postal address, email, telephone, fax etc.)	DIRECTOR, CENTRAL TOBACCO RESEARCH INSTITUTE RAJAHMUNDRY - 533 105 Phone No; 0883-2449871-4 FAX: 0883-2410555 Programme Coordinator, KVK-CTRI Kalavachar-la533294 Ph.No.0883- 2007633 Website: ctri.org.in E-mail: kvkrjy@yahoo.com; kvkctri@gmail.com
12.	Source of availability	Central Tobacco Research Institute, Rajahmundry- 533105

Technologies developed for Farm Mechanization, Post-harvest and processing and Renewable energy sources

Sl. No	Item	Details
1.	Name of machines/implements/ devise/technology/process	Process for Recovery of Pure Solanesol and Nicotine from Tobacco
2.	Specifications and salient technical features (principle of operation, suitability to different crops/commodities, power and labour requirement, how it is an improvement over the existing systems, safety factors incorporated etc.)	The integrated approach adopted envisages sequential extraction of nicotine and solanesol from the same raw material. Patent No. 211204 dated 19.10.2007 was granted for the invention, "Process for purification of solanesol (95 + %) from crude/enriched extracts of tobacco green leaf/tobacco cured leaf/tobacco waste". The main advantages of the solanesol recovery process are: 1. Extraction with a polar solvent and subsequent enrichment by cooling makes further purification easy as solanesol of purity more than 95% obtained in the process can be utilized in drug development. 2. Economic viability of the present process is enhanced by the adsorbent used, substantial reduction in adsorbent requirement, as compared to conventional column chromatography, single solvent employed to elute the compound, as against solvent mixtures reported in the literature and regeneration of the adsorbent for reuse, thus, avoiding cost-intensive techniques like centrifugal liquid partition chromatography, molecular distillation, ultrafiltration followed by membrane evaporation, gel-permeation chromatography etc. 3. Adoptability for processing tobacco green leaf or cured leaf or waste or crude extracts for extraction of pure solanesol, thus enlarging the raw material base. The main advantages of the nicotine recovery process are:

		1. The ion-exchange resin technology adopted facilitates repeated use of the resin and the solvent used is inexpensive contributing to economic viability 2. The final product is free from kerosene smell as in the case NCL process 3. There is flexibility to produce pure nicotine or 40% Nicotine sulphate as per the demand
3.	Performance results (efficiency, capacity of operation, losses etc.)	A process was developed for the recovery of solanesol of >95% purity with an overall recovery of 72%. Ion-exchange resin technology was adopted in the process for recovery of pure nicotine or 40% nicotine sulphate.
4.	Cost (initial investment and operating cost in `/ha and `//unit output)	Bench-scale technology
5.	How the new technology will impact the income of the farmers and its benefits over conventional system in terms of savings on cost of operation, inputs, timeliness and other pertinent information	<u>Estimated Market Size</u> Solanesol and Coenzyme Q10 o It is reported that pure solanesol, whether used for synthesizing CoQ10 or used as a drug itself, will usher in "Golden Period" in the market o In the international market, solanesol sales were 4000 tonnes in 2004, 5200 tonnes in 2006 and 7500 tonnes in 2008 and the demand for pure solanesol is predicted to reach 8,000 to 10,000 tons with an expected growth rate of 15 - 20% Nicotine and value-added products o During 2007 – 2010, Nicotine Sulphate 40%, Pure Nicotine and other value-added products worth `8,15,39,298/- were exported from India o It is estimated that a potential exists for 400 tonnes/annum of Nicotine Sulphate 40% and 1.5 tonnes/annum of value-added products of nicotine viz., Nicotine alkaloid, Nicotine Free Base, Nicotine USP/EP & Nicotine POLACRILEX 20% USP.
6.	Social/environmental/ other benefits	-

7.	Status of commercialization / IPO rights etc.	Not yet commercialized, due to slump in the international market and because of the price fluctuations.
8.	If commercialized, name and addresses of the firms/entrepreneur to whom the technology has been transferred	-
9.	Special facilities required (for example confirming to the norms of Food Safety and Standards Authority of India (FSSAI) or other standards)	-
10.	Photographs in operation with proper lighting, light background and only operator to appear if required	 95% SOLANESOL  PURE NICOTINE
11.	Contact details of person to whom technology and further details can be held (information on the postal address, email, telephone, fax etc.)	DIRECTOR, CENTRAL TOBACCO RESEARCH INSTITUTE RAJAHMUNDRY - 533 105 Phone No; 0883-2449871-4 FAX: 0883-2410555 Website: ctri.org.in E-mail: ctri@sify.com
12.	Source of availability	Central Tobacco Research Institute, Rajahmundry- 533105

Varieties/hybrids/seeds/planting material/ breeds/ strains/ micro propagules/ microorganism/cell line/embryo/germplasm/fingerling/spawn etc. developed

Sl. No	Item	Details
1.	Name of varieties/hybrids/seeds/ planting material/ breeds/ strains/ micro propagules/ microorganism/cell line/ embryo/germplasm/fingerling/ spawn etc.	Siri
2.	Characteristics (suitability/recommended for the specific/different agro-climatic conditions, how it is an improvement over the existing technologies, safety/ quarantine factors incorporated etc.)	Recommended for cultivation in non-irrigated and rain-fed Northern, Central and Southern Black Soil FCV tobacco growing areas of Andhra Pradesh under conserved soil moisture condition. The varieties cultivated in the black soils are Hema and VT-1158. The yield potential of these lines is 1600-2000 kg/ha. Hence, release of Siri increases the productivity of the region due to its high yielding potential (about 2900 kg/ha).
3.	Performance results (yield, quality, level of resistance for insect/pest and diseases etc.	Yielding potential is about 2900 kg/ha
4.	Likely cost (per unit of weight/area/as applicable) and reasons for its attractiveness	`1000/- per kg seed
5.	Additional information in terms of economic benefits over conventional material/technology along with any other pertinent information	The line gives, on an average, an increase of around 600 kg/ha cured leaf yield than the existing variety. Hence, the farmer gets an additional income of `60,000/- per ha. (Assuming the price of `100/ per kg cured leaf)
6.	Social/environmental/other benefits	-
7.	Status of commercialization / IPO rights etc.	-
8.	If commercialized, name and addresses of the firms/entrepreneur to whom the technology has been transferred	-
9.	Special regulatory requirements required (for example confirming to the norms of National Biodiversity Authority or others)	-

10.	Indicative photographs with proper lighting	
11.	Contact details of person to whom technology and further details can be held (information on the postal address, email, telephone, fax etc.)	Director, Central Tobacco Research Institute, Rajahmundry -533 105, Andhra Pradesh., India . Phones: (0883) 2449871-4, Fax: 0091-883-241055.
12.	Source of availability of material/technology in future	Central Tobacco Research Institute, Rajahmundry-533105

Varieties/hybrids/seeds/planting material/ breeds/ strains/ micro propagules/ microorganism/cell line/embryo/germplasm/fingerling/spawn etc. developed

Sl. No	Item	Details
1.	Name of varieties/hybrids/seeds/planting material/ breeds/ strains/ micro propagules/ microorganism/cell line/ embryo/germplasm/fingerling/spawn etc.	Kanchan
2.	Characteristics (suitability/recommended for the specific/different agro-climatic conditions, how it is an improvement over the existing technologies, safety/ quarantine factors incorporated etc.)	Recommended for cultivation in the Northern Light Soil FCV tobacco growing regions of Andhra Pradesh under irrigated conditions and Karnataka Light Soils of Karnataka under monsoon condition. Kanchan gives around 200 kg/ha higher yield than the existing varieties in cultivation and is also tolerant to black shank and root-knot nematodes, which are problematic under NLS and KLS conditions, respectively.
3.	Performance results (yield, quality, level of resistance for insect/pest and diseases etc.	Yielding potential is about 2000 kg/ha
4.	Likely cost (per unit of weight/area/as applicable)and reasons for its attractiveness	`1000/- per kg seed
5.	Additional information in terms of economic benefits over conventional material/technology along with any other pertinent information	The line gives, on an average, an increase of around 200 kg/ha cured leaf yield than the existing variety. Hence, the farmer gets an additional income of `20,000/- per ha. (Assuming the price of Rs. 100/ per kg cured laef)
6.	Social/environmental/other benefits	-
7.	Status of commercialization / IPO rights etc.	-
8.	If commercialized, name and addresses of the firms/entrepreneur to whom the technology has been transferred	-
9.	Special regulatory requirements required (for example confirming to the norms of National Biodiversity Authority or others)	-

10.	Indicative photographs with proper lighting	 **Kanchan under NLS condition**
11.	Contact details of person to whom technology and further details can be held (information on the postal address, email, telephone, fax etc.)	Director, Central Tobacco Research Institute, Rajahmundry -533 105, Andhra Pradesh., INDIA. Phones: (0883) 2449871-4, Fax: 0091-883-**241055**.
12.	Source of availability of material/technology in future	Central Tobacco Research Institute, Rajahmundry-533105

Varieties/hybrids/seeds/planting material/ breeds/ strains/ micro propagules/ microorganism/cell line/embryo/germplasm/fingerling/spawn etc. developed

Sl. No	Item	Details
1.	Name of varieties/hybrids/seeds/planting material/ breeds/ strains/ micro propagules/ microorganism/cell line/ embryo/germplasm/fingerling/spawn etc.	Sahyadri
2.	Characteristics (suitability/recommended for the specific/different agro-climatic conditions, how it is an improvement over the existing technologies, safety/ quarantine factors incorporated etc.)	Recommended for Karnataka Light Soil region. Tolerant to nematode, moderately resistant to blank shank, tolerant to leaf eating caterpillars and tolerant to drought. The variety yields around 200 kg/ha higher yield than the existing variety, Kanchan.
3.	Performance results (yield, quality, level of resistance for insect/pest and diseases etc.	Yielding potential is about 2000 kg/ha. Tolerant to nematode, moderately resistant to blank shank, tolerant to leaf eating caterpillars and tolerant drought.
4.	Likely cost (per unit of weight/area/as applicable)and reasons for its attractiveness	`1000/- per kg seed
5.	Additional information in terms of economic benefits over conventional material/technology along with any other pertinent information	The line gives, on an average, an increase of around 200 kg/ha cured leaf yield than the existing variety. Hence, the farmer gets an additional income of `20,000/- per ha. (Assuming the price of `100/ per kg cured leaf)
6.	Social/environmental/other benefits	-
7.	Status of commercialization / IPO rights etc.	-
8.	If commercialized, name and addresses of the firms/entrepreneur to whom the technology has been transferred	-
9.	Special regulatory requirements required (for example confirming to the norms of National Biodiversity Authority or others)	-

10.	Indicative photographs with proper lighting	
11.	Contact details of person to whom technology and further details can be held (information on the postal address, email, telephone, fax etc.)	Chief Scientist, AINRP(T), ZARS, Shimoga – 577201 Karnataka. Telephone: 08182-273848 Fax: 08182-227946.
12.	Source of availability of material/technology in future	AINRP(T), ZARS, Shimoga-577201.

Proforma for varieties/hybrids/seeds/planting material/ breeds/ strains/ micro propagules/ microorganism/cell line/embryo/germplasm/fingerling/spawn etc. developed

Sl. No	Item	Details
1.	Name of varieties/hybrids/seeds/ planting material/ breeds/ strains/ micro propagules/ microorganism/cell line/ embryo/ germplasm/fingerling/spawn etc.	Abirami
2.	Characteristics (suitability/recommended for the specific/different agro-climatic conditions, how it is an improvement over the existing technologies, safety/ quarantine factors incorporated etc.)	Suitable for chewing tobacco growing areas (irrigated garden land conditions) of Southern, Central and Western zones of Tamil Nadu. Abirami yields around 500 kg/ha higher yield than the check variety, Bhagyalakshmi and also contains highest solanesol content (2.61%).
3.	Performance results (yield, quality, level of resistance for insect/pest and diseases etc.	Yielding potential is about 4000 kg/ha
4.	Likely cost (per unit of weight/area/as applicable)and reasons for its attractiveness	`1000 /- per kg seed
5.	Additional information in terms of economic benefits over conventional material/technology along with any other pertinent information	The line gives, on an average, an increase of around 500 kg/ha cured leaf yield than the existing variety. Hence, the farmer gets an additional income of `30,000/- per ha. (Assuming the price of `60/ per kg cured leaf)
6.	Social/environmental/other benefits	-
7.	Status of commercialization / IPO rights etc.	-
8.	If commercialized, name and addresses of the firms/entrepreneur to whom the technology has been transferred	-
9.	Special regulatory requirements required (for example confirming to the norms of National Biodiversity Authority or others)	-

10.	Indicative photographs with proper lighting	
11.	Contact details of person to whom technology and further details can be held (information on the postal address, email, telephone, fax etc.)	Director, Central Tobacco Research Institute, Rajahmundry -533 105, Andhra Pradesh., India. Phones: (0883) 2449871-4, Fax: 0091-883-**241055.**
12.	Source of availability of material/technology in future	Central Tobacco Research Institute, Rajahmundry-533105

Varieties/hybrids/seeds/planting material/ breeds/ strains/ micro propagules/ microorganism/cell line/embryo/germplasm/fingerling/spawn etc. developed

Sl. No	Item	Details
1.	Name of varieties/hybrids/seeds/planting material/ breeds/ strains/ micro propagules/ microorganism/cell line/ embryo/germplasm/fingerling/spawn etc.	Torsa
2.	Characteristics (suitability/recommended for the specific/different agro-climatic conditions, how it is an improvement over the existing technologies, safety/ quarantine factors incorporated etc.)	Recommended for silty/sandy loam soil region in ***Motihari*** tobacco tract of Cooch Behar District of West Bengal Torsa yields around 500 kg/ha higher yield than the existing variety DD-437 in cultivation.
3.	Performance results (yield, quality, level of resistance for insect/pest and diseases etc.	Yielding potential is about 2200 kg/ha
4.	Likely cost (per unit of weight/area/as applicable)and reasons for its attractiveness	`1000 /- per kg seed
5.	Additional information in terms of economic benefits over conventional material/technology along with any other pertinent information	The line gives, on an average, an increase of around 500 kg/ha cured leaf yield than the existing variety. Hence, the farmer gets an additional income of `25,000/- per ha. (Assuming the price of `50/ per kg cured leaf)
6.	Social/environmental/other benefits	-
7.	Status of commercialization / IPO rights etc.	-
8.	If commercialized, name and addresses of the firms/entrepreneur to whom the technology has been transferred	-
9.	Special regulatory requirements required (for example confirming to the norms of National Biodiversity Authority or others)	-
10.	Indicative photographs with proper lighting	

11.	Contact details of person to whom technology and further details can be held (information on the postal address, email, telephone, fax etc.)	Director, Central Tobacco Research Institute, Rajahmundry -533 105, Andhra Pradesh., INDIA. Phones: (0883) 2449871-4, Fax: 0091-883-**241055.**
12.	Source of availability of material/technology in future	Central Tobacco Research Institute, Rajahmundry-533105

Varieties/hybrids/seeds/planting material/ breeds/ strains/ micro propagules/ microorganism/cell line/embryo/germplasm/fingerling/spawn etc. developed

Sl. No	Item	Details
1.	Name of varieties/hybrids/seeds/planting material/ breeds/ strains/ micro propagules/ microorganism/cell line/ embryo/germplasm/fingerling/spawn etc.	Manasi
2.	Characteristics (suitability/recommended for the specific/different agro-climatic conditions, how it is an improvement over the existing technologies, safety/ quarantine factors incorporated etc.)	Sandy alluvial soil region in ***Jati*** tobacco tract of Cooch Bihar district, West Bengal. Manasi is tolerant to frog-eye spot, black shank, root-knot, hollow stalk and brown spot diseases. Manasi yields around 200 kg/ha higher yield than the existing variety, Chama which is in cultivation.
3.	Performance results (yield, quality, level of resistance for insect/pest and diseases etc.	Yielding potential is about 1700 kg/ha. Tolerant to frog-eye spot, black shank, root-knot, hollow stalk and brown spot diseases
4.	Likely cost (per unit of weight/area/as applicable)and reasons for its attractiveness	`1000/- per kg seed
5.	Additional information in terms of economic benefits over conventional material/technology along with any other pertinent information	The line gives, on an average, an increase of around 200 kg/ha cured leaf yield than the existing variety. Hence, the farmer gets an additional income of `14,000/- per ha. (Assuming the price of `70/ per kg cured leaf)
6.	Social/environmental/other benefits	-
7.	Status of commercialization / IPO rights etc.	-
8.	If commercialized, name and addresses of the firms/entrepreneur to whom the technology has been transferred	-
9.	Special regulatory requirements required (for example confirming to the norms of National Biodiversity Authority or others)	-

10.	Indicative photographs with proper lighting	
11.	Contact details of person to whom technology and further details can be held (information on the postal address, email, telephone, fax etc.)	Director, Central Tobacco Research Institute, Rajahmundry -533 105, Andhra Pradesh., India. Phones: (0883) 2449871-4, Fax: 0091-883-**241055**..
12.	Source of availability of material/technology in future	Central Tobacco Research Institute, Rajahmundry-533105

Varieties/hybrids/seeds/planting material/ breeds/ strains/ micro propagules/ microorganism/cell line/embryo/germplasm/fingerling/spawn etc. developed

Sl. No	Item	Details
1.	Name of varieties/hybrids/seeds/planting material/ breeds/ strains/ micro propagules/ microorganism/cell line/ embryo/germplasm/fingerling/spawn etc.	ABT-10
2.	Characteristics (suitability/recommended for the specific/different agro-climatic conditions, how it is an improvement over the existing technologies, safety/ quarantine factors incorporated etc.)	Recommended for the Root-knot prone irrigated bidi tobacco growing areas of Anand, Kheda, Vadodara and Panchmahals districts of Gujarat. On an average ABT-10 gives 31 and 6 per cent higher yield than existing varieties A-119 and GT-5, respectively under irrigated conditions. It is comparable to A-119 and GT-5 in chemical constituents. ABT-10 is highly resistant (immune) to root-knot disease. ABT-10 is thick bodied and shows better smoke taste than GT-5. It also has shy suckering habit.
3.	Performance results (yield, quality, level of resistance for insect/pest and diseases etc.	Yield potential is about 3500 kg/ha. It is highly resistant (immune) to root-knot disease in controlled, sick plot and field conditions.
4.	Likely cost (per unit of weight/area/as applicable)and reasons for its attractiveness	`1000/- per kg seed
5.	Additional information in terms of economic benefits over conventional material/technology along with any other pertinent information	The line gives, on an average, an increase of around 700 kg/ha cured leaf yield than the existing variety. Hence, the farmer gets an additional income of `17,500/- per ha. (Assuming the price of `25/ per kg cured leaf)
6.	Social/environmental/other benefits	-
7.	Status of commercialization / IPO rights etc.	-
8.	If commercialized, name and addresses of the firms/entrepreneur to whom the technology has been transferred	-
9.	Special regulatory requirements required (for example confirming to the norms of National Biodiversity Authority or others)	-

10.	Indicative photographs with proper lighting	
11.	Contact details of person to whom technology and further details can be held (information on the postal address, email, telephone, fax etc.)	Unit Head, Bidi Tobacco Research Station, Anand Agricultural University, Anand – 388110, Gujarath. Telephone: 02692-262061, Fax: 02692-261520.
12.	Source of availability of material/technology in future	Bidi Tobacco Research Station, Anand Agricultural University, Anand-388110.

II. Technologies ready for commercialization

Technologies developed for Farm Mechanization, Post harvest and processing and Renewable energy sources. (Technologies in pipeline)

Sl. No	Item	Details
1.	Name of machines/implements/devise/ technology/ process	Preparation of Bio-degradable, Eco-friendly Cups/ Plates from Bamboo Sheaths
2.	Specifications and salient technical features (principle of operation, suitability to different crops/commodities, power and labour requirement, how it is an improvement over the existing systems, safety factors incorporated etc.)	 In certain varieties of bamboo , sheaths (bracts) are formed at each node. The size of the sheaths ranges from 14"length to 3" width depending upon the variety and age of the plant. Presently, these sheaths are being dumped as waste in bamboo areas. Value addition to these sheaths by making them into eco-friendly plates and cups using a suitable mechanical device will help in income generation and also helps in reducing environmental pollution by decreasing the use of plastics, thermo Cole cups, plates etc., A suitable pressing device was identified and suitable method was standardized using the raw material for cups preparation. Cups of 3-4" diameter with gold shining were prepared by using either pedal or hand operated devices. Similarly 5" dia plates were also prepared using the said devices without adding any supporting materials like craft paper, lamination paper or adhesives in both the cases.
3.	Performance results (efficiency, capacity of operation, losses etc.)	The device is very easy to operate and 2000 cups can be prepared /day by two

		persons. An amount of `400/- can be obtained as an income /person/day.
4.	Cost (initial investment and operating cost in Rs./h and Rs./unit output)	Machine cost : ~ `15,000/- Production cost ranges from ~ ` 0.20 Ps/cup
5.	How the new technology will impact the income of the farmers and its benefits over conventional system in terms of savings on cost of operation, inputs, timeliness and other pertinent information	This activity best suits as an income generation programme for the benefit of rural and tribal women in north eastern states also where bamboo is grown extensively. Net income = ` 400/- per day
6.	Social/environmental/ other benefits	The bamboo cup-making is eco-friendly and improves the income of the rural people and reduces the plastic use.
7.	Status of commercialization / IPO rights etc.	-----
8.	If commercialized, name and addresses of the firms/entrepreneur to whom the technology has been transferred	Self help groups and Voluntary Organisations
9.	Special facilities required (for example confirming to the norms of Food Safety and Standards Authority of India (FSSAI) or other standards)	Nil
10.	Photographs in operation with proper lighting, light background and only operator to appear if required	
11.	Contact details of person to whom technology and further details can be held (information on the postal address, email, telephone, fax etc.)	Director, Central Tobacco Research Institute, Rajahmundry -533 105, Andhra Pradesh., India . Phones: (0883) 2449871-4, Fax: 0091-883-**241055**. Programme Co-ordinator, KVK-CTRI Kalavacharla 533294 Ph.No.0883- 2007633 Website: ctri.org.in E-mail: kvkrjy@yahoo.com; kvkctri@gmail.com
12.	Source of availability	Director, Central Tobacco Research Institute, Rajahmundry- 533105

Technologies developed for Farm Mechanization, Post-harvest and processing and Renewable energy sources. (Technologies in pipeline)

Sl. No	Item	Details
1.	Name of machines/implements/devise/ technology/process	Bamboo Slicer Cum Incense Stick Maker
2.	Specifications and salient technical features (principle of operation, suitability to different crops/commodities, power and labour requirement, how it is an improvement over the existing systems, safety factors incorporated etc.)	Bamboo occupies an important place among the bio-resources of the forests of India.. Bamboo is only raw material for incense stick making being used in agarbatti industry. At present agarbatti industries in Andhra Pradesh are importing incense stick from North Eastern Hilly Region @ `24,000/- per tonne. Value addition to bamboo through incense stick making is an important income generation activity for the benefit of tribal women groups in agency areas of East and West Godavari districts of AP. The incense stick making activity by manual method is a cumbersome process involves drudgery with less out put. Keeping in view all the above facts the Krishi Vigyan Kendra of Central Tobacco Research Institute, Rajahmundry working under the aegis of Indian Council of Agricultural Research, New Delhi has designed and developed a low cost portable device **Bamboo Slicer Cum Incense Stick Maker** for making of incense sticks with bamboo. **Machine Description:** It is a simple hand operated machine weighing 30 kg. The machine consists of a rigid frame on which a cartridge moves freely across entire length of the plate by simple liver operation. A powerful adjustable high speed stainless steel blade is fixed over the plate. The cartridge crosses the blade point in its operation. **Working Process:** Initially 8-10 inches sized bamboo stems are to be kept in the cartridge and locked. The handle provided at side of the machine will be moved by hand, accordingly the cartridge containing the bamboo stems crosses the blade over the plate and bamboo will be cut into slices. The bamboo slices will be collected in tray at the bottom of the machine.

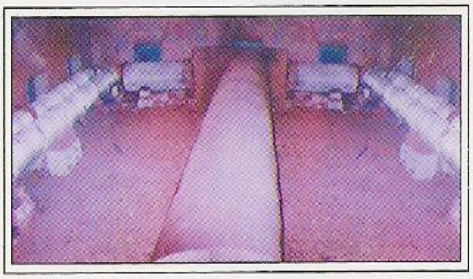
3.	Performance results (efficiency, capacity of operation, losses etc.)	Manual : 2 Kg/day Machine: 8 kg/day. Profit Rs 150/day
4.	Cost (initial investment and operating cost in `/h and `./unit output)	Rs 8000/-
5.	How the new technology will impact the income of the farmers and its benefits over conventional system in terms of savings on cost of operation, inputs, timeliness and other pertinent information	The new technology is a value addition to Bamboo. It is an house hold activity. An additional income of Rs 150/day can be generated.
6.	Social/environmental/ other benefits	Additional income can be generated by the rural people individually and also by self help groups.
7.	Status of commercialization / IPO rights etc.	-----
8.	If commercialized, name and addresses of the firms/entrepreneur to whom the technology has been transferred	Self help groups and Voluntary Organisations
9.	Special facilities required (for example confirming to the norms of Food Safety and Standards Authority of India (FSSAI) or other standards)	NIL
10.	Photographs in operation with proper lighting, light background and only operator to appear if required	
11.	Contact details of person to whom technology and further details can be held (information on the postal address, email, telephone, fax etc.)	Director, Central Tobacco Research Institute, Rajahmundry -533 105, Andhra Pradesh., India. Phones: (0883) 2449871-4, Fax: 0091-883-**241055**. Programme Co-ordinator, KVK-CTRI Kalavacharla 533294 Ph.No.0883- 2007633 Website: ctri.org.in E-mail: kvkrjy@yahoo.com; kvkctri@gmail.com
12.	Source of availability	Director, Central Tobacco Research Institute, Rajahmundry- 533105

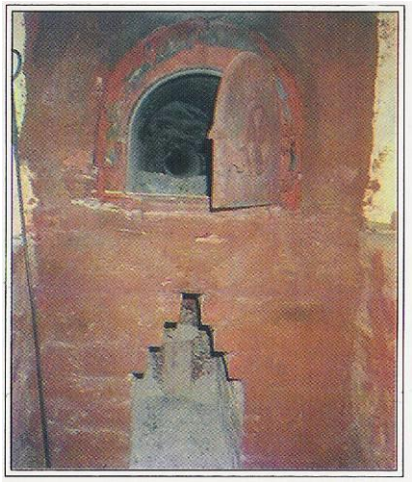
Technologies developed for Farm Mechanization, Post-harvest and processing and Renewable energy sources. (Technologies in pipeline)

Sl. No	Item	Details
1.	Name of the technology	Tray seedling production for enhancement of yield and quality
2.	Specifications and salient technical features (principle of operation, suitability to different crops/commodities, power and labour requirement, how it is an improvement over the existing systems, safety factors incorporated etc.)	In tobacco, usually nursery is sown on raised seed bed. After sixty days the seedlings are pulled and transplanted in the main field. During the pulling the seedling face the transplantation shock and there will be gap filling in the main field to an extent of 5-25%. Because of gap fillings the crop growth is not uniform, as a result there will be yield loss and also the quality deterioration. Seedlings produced in portrays with coir pith as a medium are healthy with profuse root system, good establishment and low gap fillings.
3.	Performance results (efficiency, capacity of operation, losses etc.)	Tray seedlings were evaluated under rainfed conditions in Black soils and also under irrigated conditions in Alfisols. Under rainfed conditions the yield improvement was to an extent of 40% and under irrigated conditions the yield improvement was 17%
4.	Cost (initial investment and operating cost in Rs./h and Rs./unit output)	------
5.	How the new technology will impact the income of the farmers and its benefits over conventional system in terms of savings on cost of operation, inputs, timeliness and other pertinent information	Because of improvement in yield the farmer will get higher net returns.
6.	Social/environmental/ other benefits	Seed quantity used will be reduced
7.	Status of commercialization / IPO rights etc.	The technology will be transferred to farmers
8.	If commercialized, name and addresses of the firms/entrepreneur to whom the technology has been transferred	During 2012-13 bulk evaluation trials will be conducted in different Zones. Tray seedlings are already popular in Karnataka. Transfer of technology will be done in collaboration with tobacco board
9.	Special facilities required (for example confirming to the norms of Food Safety	--

	and Standards Authority of India (FSSAI) or other standards)	
10.	Photographs in operation with proper lighting, light background and only operator to appear if required	
11.	Contact details of person to whom technology and further details can be held (information on the postal address, email, telephone, fax etc.)	Director, Central Tobacco Research Institute, Rajahmundry -533 105, Andhra Pradesh., INDIA. Phones: (0883) 2449871-4, Fax: 0091-883-**241055**. Website: ctri.org.in E-mail: kvkrjy@yahoo.com; kvkctri@gmail.com
12.	Source of availability	Director, Central Tobacco Research Institute, Rajahmundry- 533105

Technologies developed for Farm Mechanization, Post-harvest and processing and Renewable energy sources. (Technologies in pipeline)

Sl. No	Item	Details
1.	Name of the technology	Integrated Barn Technology for energy saving in curing
2.	Specifications and salient technical features (principle of operation, suitability to different crops/commodities, power and labour requirement, how it is an improvement over the existing systems, safety factors incorporated etc.)	Integrated barn ***viz.***, low profile barn+ Ventury furnace + with modified ceiling insulation was developed for energy saving compared to conventional barn.
3.	Performance results (efficiency, capacity of operation, losses etc.)	An amount of 2.43kg wood is consumed/ kg cured leaf in integrated barn as against 3.68 kg wood/kg cured leaf in conventional system. By integrated barn 51% fuel can be saved.
4.	Cost (initial investment and operating cost in Rs./h and Rs./unit output)	Additional cost of `9500-11000/- is required for integrated barn which can be recovered in 10-12 curings.
5.	How the new technology will impact the income of the farmers and its benefits over conventional system in terms of savings on cost of operation, inputs, timeliness and other pertinent information	Fuel consumption for curing of tobacco is reduced by 51%.
6.	Social/environmental/ other benefits	Deforestation can be reduced.
7.	Status of commercialization / IPO rights etc.	
8.	If commercialized, name and addresses of the firms/entrepreneur to whom the technology has been transferred	-----
9.	Special facilities required (for example confirming to the norms of Food Safety and Standards Authority of India (FSSAI) or other standards)	---------
10.	Photographs in operation with proper lighting, light background and only operator to appear if required	 Modified flue system

		 **Ventury Furce**
11.	Contact details of person to whom technology and further details can be held (information on the postal address, email, telephone, fax etc.)	Director, Central Tobacco Research Institute, Rajahmundry -533 105, Andhra Pradesh., INDIA. Phones: (0883) 2449871-4, Fax: 0091-**883-241055.** Website: ctri.org.in E-mail: kvkrjy@yahoo.com; kvkctri@gmail.com
12.	Source of availability	Director, Central Tobacco Research Institute, Rajahmundry- 533105

Varieties/hybrids/seeds/planting material/ breeds/ strains/ micro propagules/ microorganism/cell line/embryo/germplasm/fingerling/spawn etc. developed

Sl. No	Item	Details
1.	Name of varieties/hybrids/seeds/ planting material/ breeds/ strains/ micro propagules/ microorganism/ cell line/embryo/germplasm/ fingerling/spawn etc.	JS-117
2.	Characteristics (suitability/recommended for the specific/different agro-climatic conditions, how it is an improvement over the existing technologies, safety/ quarantine factors incorporated etc.)	JS-117 is suitable to FCV tobacco growing areas of northern light soil of Andhra Pradesh. It is a low tar yielding (20 mg/cigarette) line with around 10% higher yield than the ruling cultivar, Kanchan.
3.	Performance results (yield, quality, level of resistance for insect/pest and diseases etc.	Yield: 2300 kg/ha
4.	Likely cost (per unit of weight/area/as applicable)and reasons for its attractiveness	-
5.	Additional information in terms of economic benefits over conventional material/technology along with any other pertinent information	The line gives, on an average, an increase of around 200 kg/ha cured leaf yield than the existing variety. Hence, the farmer gets an additional income of `20,000/- per ha. (Assuming the price of ` 100/ per kg cured leaf)
6.	Social/environmental/other benefits	As the tar levels are low, it will help to develop less harmful cigarettes at low cost and with minimum chemical additives.
7.	Status of commercialization / IPO rights etc.	Yet to be registered
8.	If commercialized, name and addresses of the firms/entrepreneur to whom the technology has been transferred	-
9.	Special regulatory requirements required (for example confirming to the norms of National Biodiversity Authority or others)	-

10.	Indicative photographs with proper lighting (image size not exceeding 500kb, 300dpi, 24bit colour, jpeg format)	
11.	Contact details of person to whom technology and further details can be held (information on the postal address, email, telephone, fax etc.)	Director, Central Tobacco Research Institute, Rajahmundry -533 105, Andhra Pradesh., INDIA. Phones: (0883) 2449871-4, Fax: 0091-883-**241055**.
12.	Source of availability of material/technology in future	Central Tobacco Research Institute, Rajahmundry-533 105

Varieties/hybrids/seeds/planting material/ breeds/ strains/ micro propagules/ microorganism/cell line/embryo/germplasm/fingerling/spawn etc. developed

Sl. No	Item	Details
1.	Name of varieties/hybrids/seeds/planting material/ breeds/ strains/ micro propagules/ microorganism/cell line/embryo/ germplasm/ fingerling/spawn etc.	TBST-2
2.	Characteristics (suitability/recommended for the specific/different agro-climatic conditions, how it is an improvement over the existing technologies, safety/ quarantine factors incorporated etc.)	A high yielding and TMV resistant line suitable to black soils of Andhra Pradesh. The line gives, on an average, an increase of around 200 kg/ha cured leaf yield than the existing variety, Siri.
3.	Performance results (yield, quality, level of resistance for insect/pest and diseases etc.	Yield: 2800 kg/ha; resistant to TMV
4.	Likely cost (per unit of weight/area/as applicable)and reasons for its attractiveness	-
5.	Additional information in terms of economic benefits over conventional material/technology along with any other pertinent information	The line gives, on an average, an increase of around 200 kg/ha cured leaf yield than the existing variety. Hence, the farmer gets an additional income of `20,000/- per ha. (Assuming the price of `100/ per kg cured leaf)
6.	Social/environmental/other benefits	-
7.	Status of commercialization / IPO rights etc.	Yet to be registered
8.	If commercialized, name and addresses of the firms/entrepreneur to whom the technology has been transferred	-
9.	Special regulatory requirements required (for example confirming to the norms of National Biodiversity Authority or others)	-
10.	Indicative photographs with proper lighting (image size not exceeding 500kb, 300dpi, 24bit colour, jpeg format)	
11.	Contact details of person to whom technology and further details can be held (information on the postal address, email, telephone, fax etc.)	Director, Central Tobacco Research Institute, Rajahmundry -533 105, Andhra Pradesh., INDIA. Phones: (0883) 2449871-4, Fax: 0091-883-**241055.**
12.	Source of availability of material/technology in future	Central Tobacco Research Institute, Rajahmundry-533105

Varieties/hybrids/seeds/planting material/ breeds/ strains/ micro propagules/ microorganism/cell line/embryo/germplasm/fingerling/spawn etc. developed

Sl. No	Item	Details
1.	Name of varieties/hybrids/seeds/planting material/ breeds/ strains/ micro propagules/ microorganism/cell line/embryo/ germplasm/ fingerling/spawn etc.	CH-1
2.	Characteristics (suitability/recommended for the specific/different agro-climatic conditions, how it is an improvement over the existing technologies, safety/ quarantine factors incorporated etc.)	A high yielding (2500 to 2900 kg/ha) FCV tobacco hybrid suitable to northern light soil FCV tobacco growing areas of Andhra Pradesh. In Smoke analysis of cigarettes, the hybrid CH-1 was rated higher than control. CH-1 recorded significantly higher levels of neutral volatile compounds responsible for smoke flavour than the check variety, Kanchan.
3.	Performance results (yield, quality, level of resistance for insect/pest and diseases etc.	The hybrid CH-1 has a cured leaf yield potential of 2500 to 2900 kg/ha in Northern Light soils
4.	Likely cost (per unit of weight/area/as applicable)and reasons for its attractiveness	-
5.	Additional information in terms of economic benefits over conventional material/technology along with any other pertinent information	The hybrid gives, on an average, an increase of around 700 kg/ha cured leaf yield than the existing variety. Hence, the farmer gets an additional income of `70,000/- per ha. (Assuming the price of `100/ per kg cured leaf)
6.	Social/environmental/other benefits	-
7.	Status of commercialization / IPO rights etc.	Yet to be registered
8.	If commercialized, name and addresses of the firms/entrepreneur to whom the technology has been transferred	-
9.	Special regulatory requirements required (for example confirming to the norms of National Biodiversity Authority or others)	-

10.	Indicative photographs with proper lighting (image size not exceeding 500kb, 300dpi, 24bit colour, jpeg format)	
11.	Contact details of person to whom technology and further details can be held (information on the postal address, email, telephone, fax etc.)	**Director, Central Tobacco Research Institute, Rajahmundry -533 105, Andhra Pradesh., INDIA.** **Phones: (0883) 2449871-4,** **Fax: 0091-883-241055..** **The Chief Scientist,** **M/s. ITC Ltd., ILTD** **Agri Business Division,** **Morampudi Road,** **Rajahmundry – 533 103** **Phone No.:0883 2467440** **Fax: 0883 2468738**
12.	Source of availability of material/technology in future	Central Tobacco Research Institute, Rajahmundry-533105

Varieties/hybrids/seeds/planting material/ breeds/ strains/ micro propagules/ microorganism/cell line/embryo/germplasm/fingerling/spawn etc. developed

Sl. No	Item	Details
1.	Name of varieties/hybrids/seeds/ planting material/ breeds/ strains/ micro propagules/ microorganism/ cell line/embryo/germplasm/ fingerling/spawn etc.	CH-3
2.	Characteristics (suitability/recommended for the specific/different agro-climatic conditions, how it is an improvement over the existing technologies, safety/ quarantine factors incorporated etc.)	A high yielding (2500 to 2900 kg/ha) FCV tobacco hybrid suitable to Karnataka light soil FCV tobacco growing areas. In Smoke analysis of cigarettes, the hybrid CH-3 was rated higher than control. CH-3 recorded significantly higher values of flavour causing neutral volatile compounds than the check variety, Kanchan.
3.	Performance results (yield, quality, level of resistance for insect/pest and diseases etc.	The hybrid CH-3 has a cured leaf yield potential of 2500 to 2900 kg/ha in Northern Light soils
4.	Likely cost (per unit of weight/area/as applicable)and reasons for its attractiveness	-
5.	Additional information in terms of economic benefits over conventional material/technology along with any other pertinent information	The hybrid gives, on an average, an increase of around 700 kg/ha cured leaf yield than the existing variety. Hence, the farmer gets an additional income of `70,000/- per ha. (Assuming the price of ` 100/ per kg cured leaf)
6.	Social/environmental/other benefits	-
7.	Status of commercialization / IPO rights etc.	Yet to be registered
8.	If commercialized, name and addresses of the firms/entrepreneur to whom the technology has been transferred	-
9.	Special regulatory requirements required (for example confirming to the norms of National Biodiversity Authority or others)	-

10.	Indicative photographs with proper lighting (image size not exceeding 500kb, 300dpi, 24bit colour, jpeg format)	
11.	Contact details of person to whom technology and further details can be held (information on the postal address, email, telephone, fax etc.)	**Director, Central Tobacco Research Institute, Rajahmundry -533 105, Andhra Pradesh., India.** **Phones: (0883) 2449871-4,** **Fax: 0091-883-241055..**
12.	Source of availability of material/technology in future	Central Tobacco Research Institute, Rajahmundry-533105

Varieties/hybrids/seeds/planting material/ breeds/ strains/ micro propagules/ microorganism/cell line/embryo/germplasm/fingerling/spawn etc. developed

Sl. No	Item	Details
1.	Name of varieties/hybrids/seeds/planting material/ breeds/ strains/ micro propagules/ microorganism/cell line/embryo/germplasm/fingerling/spawn etc.	FCH-222 High degree of tolerance to *Fusarium* wilt disease
2.	Characteristics (suitability/recommended for the specific/different agro-climatic conditions, how it is an improvement over the existing technologies, safety/ quarantine factors incorporated etc.)	A high yielding (2700 kg/ha) and ***Fusarium*** wilt tolerant FCV tobacco line suitable to Karnataka light soil areas. FCH 222 gives, on an average, an increase of around 500 kg/ha cured leaf yield than the existing variety, Kanchan.
3.	Performance results (yield, quality, level of resistance for insect/pest and diseases etc.	The cured leaf yield potential of FCH-222 is around 2700 kg/ha. The line is tolerant to ***Fusarium*** wilt disease.
4.	Likely cost (per unit of weight/area/as applicable)and reasons for its attractiveness	-
5.	Additional information in terms of economic benefits over conventional material/technology along with any other pertinent information	The hybrid gives, on an average, an increase of around 500 kg/ha cured leaf yield than the existing variety. Hence, the farmer gets an additional income of `50,000/- per ha. (Assuming the price of `100/ per kg cured leaf)
6.	Social/environmental/other benefits	-
7.	Status of commercialization / IPO rights etc.	Yet to be registered
8.	If commercialized, name and addresses of the firms/entrepreneur to whom the technology has been transferred	-
9.	Special regulatory requirements required (for example confirming to the norms of National Biodiversity Authority or others)	-
10.	Indicative photographs with proper lighting (image size not exceeding 500kb, 300dpi, 24bit colour, jpeg format)	

11.	Contact details of person to whom technology and further details can be held (information on the postal address, email, telephone, fax etc.)	Director, Central Tobacco Research Institute, Rajahmundry -533 105, Andhra Pradesh., INDIA. Phones: (0883) 2449871-4, Fax: 0091-**883-241055.** The Head, CTRI Research Station, Hunsur – 571 105 Karnataka Phones: 08222 – 252030 Fax: 08222 - 250723
12.	Source of availability of material/technology in future	Central Tobacco Research Institute, Rajahmundry-533105

Varieties/hybrids/seeds/planting material/ breeds/ strains/ micro propagules/ microorganism/cell line/embryo/germplasm/fingerling/spawn etc. developed

Sl. No	Item	Details
1.	Name of varieties/hybrids/seeds/planting material/ breeds/ strains/ micro propagules/ microorganism/cell line/embryo/germplasm/fingerling/spawn etc.	VDH-3
2.	Characteristics (suitability/recommended for the specific/different agro-climatic conditions, how it is an improvement over the existing technologies, safety/ quarantine factors incorporated etc.)	A high yielding (4000 kg/ha) chewing tobacco hybrid identified for Tamil Nadu area. The hybrid gives, on an average, an increase of around 300 kg/ha cured leaf yield than the existing variety, Abirami
3.	Performance results (yield, quality, level of resistance for insect/pest and diseases etc.	The line has a cured leaf yield potential of 4000 kg/ha
4.	Likely cost (per unit of weight/area/as applicable)and reasons for its attractiveness	-
5.	Additional information in terms of economic benefits over conventional material/technology along with any other pertinent information	The hybrid gives, on an average, an increase of around 300 kg/ha cured leaf yield than the existing variety. Hence, the farmer gets an additional income of `18,000/- per ha. (Assuming the price of ` 60/ per kg cured leaf)
6.	Social/environmental/other benefits	-
7.	Status of commercialization / IPO rights etc.	Yet to be registered
8.	If commercialized, name and addresses of the firms/entrepreneur to whom the technology has been transferred	-
9.	Special regulatory requirements required (for example confirming to the norms of National Biodiversity Authority or others)	-
10.	Indicative photographs with proper lighting (image size not exceeding 500kb, 300dpi, 24bit colour, jpeg format)	 VDH-3

11.	Contact details of person to whom technology and further details can be held (information on the postal address, email, telephone, fax etc.)	Director, Central Tobacco Research Institute, Rajahmundry -533 105, Andhra Pradesh., INDIA. Phones: (0883) 2449871-4, Fax: 0091-883-**241055.** The Head, CTRI Research Station, Vedasandur – 624 710 Tamil Nadu Phones: 04551 - 260243 Fax: 04551 - 260243
12.	Source of availability of material/technology in future	Central Tobacco Research Institute, Rajahmundry-533105

Varieties/hybrids/seeds/planting material/ breeds/ strains/ micro propagules/ microorganism/cell line/embryo/germplasm/fingerling/spawn etc. developed

Sl. No	Item	Details
1.	Name of varieties/hybrids/seeds/ planting material/ breeds/ strains/ micro propagules/ microorganism/cell line/embryo/germplasm/fingerling/spawn etc.	Tungabhadra
2.	Characteristics (suitability/recommended for the specific/different agro-climatic conditions, how it is an improvement over the existing technologies, safety/ quarantine factors incorporated etc.)	A high yielding (800 kg/ha) oriental tobacco line identified for cultivation in low rainfall tracts of Karnataka and Andhra Pradesh in poor and marginal soils under rainfed conditions.
3.	Performance results (yield, quality, level of resistance for insect/pest and diseases etc.	Cured leaf yield potential of Tungabhadra is around 800 kg/ha
4.	Likely cost (per unit of weight/area/as applicable)and reasons for its attractiveness	-
5.	Additional information in terms of economic benefits over conventional material/technology along with any other pertinent information	The line, on an average, showed an increase of around 200 kg/ha cured leaf yield than the existing variety. Hence, the farmer gets an additional income of `10,000/- per ha. (Assuming the price of `50/ per kg cured leaf)
6.	Social/environmental/other benefits	-
7.	Status of commercialization / IPO rights etc.	Yet to be registered

8.	If commercialized, name and addresses of the firms/entrepreneur to whom the technology has been transferred	-
9.	Special regulatory requirements required (for example confirming to the norms of National Biodiversity Authority or others)	-
10.	Indicative photographs with proper lighting	
11.	Contact details of person to whom technology and further details can be held (information on the postal address, email, telephone, fax etc.)	**Director, Central Tobacco Research Institute, Rajahmundry -533 105, Andhra Pradesh., India.** **Phones: (0883) 2449871-4,** **Fax: 0091-883-2448341.** **M/s VST Industries Ltd.,** **4-5-35, Vidyanagar 1st Lane,** **Guntur – 522 007.** **Phones: 0863 - 2350478** **Fax: 0863 - 2351027**
12.	Source of availability of material/technology in future	Central Tobacco Research Institute, Rajahmundry-533105

Varieties/hybrids/seeds/planting material/ breeds/ strains/ micro propagules/ microorganism/cell line/embryo/germplasm/fingerling/spawn etc. developed

Sl. No	Item	Details
1.	Name of varieties/hybrids/seeds/planting material/ breeds/ strains/ micro propagules/ microorganism/cell line/ embryo/germplasm/fingerling/spawn etc.	DJ-1
2.	Characteristics (suitability/recommended for the specific/different agro-climatic conditions, how it is an improvement over the existing technologies, safety/ quarantine factors incorporated etc.)	A high yielding (1400 kg/ha) *Jati* tobacco line suitable to *Jati* tobacco growing areas of West Bengal. It gives 48% higher cured leaf yield than the existing cultivar, DJ-1
3.	Performance results (yield, quality, level of resistance for insect/pest and diseases etc.	The cured leaf yield potential of DJ-1 is 1400 kg/ha
4.	Likely cost (per unit of weight/area/as applicable)and reasons for its attractiveness	-
5.	Additional information in terms of economic benefits over conventional material/technology along with any other pertinent information	The hybrid gives, on an average, an increase of around 500 kg/ha cured leaf yield than the existing variety. Hence, the farmer gets an additional income of `30,000/- per ha. (Assuming the price of ` 60/ per kg cured leaf)
6.	Social/environmental/other benefits	-
7.	Status of commercialization / IPO rights etc.	Yet to be registered
8.	If commercialized, name and addresses of the firms/entrepreneur to whom the technology has been transferred	-
9.	Special regulatory requirements required (for example confirming to the norms of National Biodiversity Authority or others)	-
10.	Indicative photographs with proper lighting	

11.	Contact details of person to whom technology and further details can be held (information on the postal address, email, telephone, fax etc.)	**Director, Central Tobacco Research Institute, Rajahmundry -533 105, Andhra Pradesh., INDIA.** **Phones: (0883) 2449871-4,** **Fax: 883-241055.** **The Head,** **CTRI Research Station,** **Dinhata –** **West Bengal736 135** **Phone: 03581 - 255008** **Fax: 03581 - 255763**
12.	Source of availability of material/technology in future	Central Tobacco Research Institute, Rajahmundry-533105

Varieties/hybrids/seeds/planting material/ breeds/ strains/ micro propagules/ microorganism/cell line/embryo/germplasm/fingerling/spawn etc. developed

Sl. No	Item	Details
1.	Name of varieties/hybrids/seeds/planting material/ breeds/ strains/ micro propagules/ microorganism/cell line/ embryo/germplasm/fingerling/spawn etc.	NBD-119
2.	Characteristics (suitability/recommended for the specific/different agro-climatic conditions, how it is an improvement over the existing technologies, safety/ quarantine factors incorporated etc.)	A high yielding (3500 kg/ha) *Bidi* tobacco line identified for black cotton soils under rainfed conditions of Karnool district of AP. The line gives, on an average, an increase of around 500 kg/ha cured leaf yield than the existing variety, A-119.
3.	Performance results (yield, quality, level of resistance for insect/pest and diseases etc.	Cured leaf yield is around 3500 kg/ha
4.	Likely cost (per unit of weight/area/as applicable)and reasons for its attractiveness	-
5.	Additional information in terms of economic benefits over conventional material/technology along with any other pertinent information	NBD-119 gives, on an average, an increase of around 500 kg/ha cured leaf yield than the existing variety. Hence, the farmer gets an additional income of `12,500/- per ha. (Assuming the price of ` 25/ per kg cured leaf)
6.	Social/environmental/other benefits	-
7.	Status of commercialization / IPO rights etc.	Yet to be registered
8.	If commercialized, name and addresses of the firms/entrepreneur to whom the technology has been transferred	-
9.	Special regulatory requirements required (for example confirming to the norms of National Biodiversity Authority or others)	-
10.	Indicative photographs with proper lighting (image size not exceeding 500kb, 300dpi, 24bit colour, jpeg format)	 NBD-119

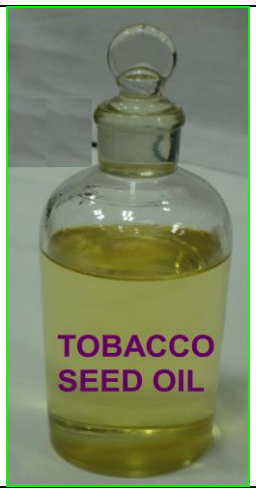
11.	Contact details of person to whom technology and further details can be held (information on the postal address, email, telephone, fax etc.)	Associate Director of Research, Regional Agricultural Research Station, Nandyal-518502, AP Ph 08514-242296; 08514-248264
12.	Source of availability of material/technology in future	Regional Agricultural Research Station, Nandyal-518502, AP

III. Technologies in the pipeline:

Proforma for technologies developed for Farm Mechanization, Post harvest and processing and Renewable energy sources. (Technologies in pipeline)

Sl. No	Item	Details
1.	Name of the technology	Development of extraction and refining techniques for oil from tobacco seed
2.	Specifications and salient technical features (principle of operation, suitability to different crops/commodities, power and labour requirement, how it is an improvement over the existing systems, safety factors incorporated etc.)	Tobacco seed is an excellent source of oil. The work done so far at CTRI has brought out tremendous scope for exploiting the crop for extraction of oil. The tiny tobacco seed contains 35 per cent oil and the oil is classified as linoleic oil, as it is the major fatty acid (66 – 76%). The tobacco seed oil is comparable to sunflower oil and is superior to groundnut oil. Another important feature of tobacco seed oil is that it also contains 1.50% of Ω-3-fatty acid which is an essential fatty acid for human body. Refined tobacco seed oil has already been in use as edible oil in countries like Bulgaria, Turkey, Tunisia and Greece. In India, however, the tobacco seed oil is not being used for edible purpose but finds extensive use in paints, varnishes, lubricants and soap industries. At present, tobacco is grown on ~0.45 million ha in the country.
3.	Performance results (efficiency, capacity of operation, losses etc.)	It is estimated that ~0.45 million tonnes of seed would be available (@1000 kg seed/ha) if the crop is grown exclusively for oil extraction purpose that amounts to 1,35,000 tonnes of seed

		oil (0.45 M tonnes x 30%). Since, tobacco is mainly grown for leaf yield and quality is of paramount importance, selected lands for quality leaf production may be retained and the rest of the area could be diverted to seed oil production. This would augment the country's edible oil pool and lessen the burden on National exchequer for importing edible oil. Even if 50% of the area (0.22 M ha) under tobacco production is ear-marked for seed production, the quantum of oil that can be added to the national pool would be around 67,500 tonnes which is substantial.
4.	Cost (initial investment and operating cost in Rs./h and Rs./unit output)	------
5.	How the new technology will impact the income of the farmers and its benefits over conventional system in terms of savings on cost of operation, inputs, timeliness and other pertinent information	An additional income of 2500/- can be obtained from the sale of raw seed for oil purpose in FCV tobacco. In Non-FCV tobacco the income will be around 25000/ha.
6.	Social/environmental/ other benefits	Toxicological studies on human beings is yet to be conducted.
7.	Status of commercialization / IPO rights etc.	-
8.	If commercialized, name and addresses of the firms/entrepreneur to whom the technology has been transferred	Technologies is ready for extraction and purification. Bench scale technology will be established in 2012-13. After that technology will be transferred.
9.	Special facilities required (for example confirming to the norms of Food Safety and Standards Authority of India (FSSAI) or other standards)	Toxicological studies on human beings is yet to be conducted

10.	Photographs in operation with proper lighting, light background and only operator to appear if required (image size not exceeding 500kb, 300dpi, 24bit colour, jpeg format)	
11.	Contact details of person to whom technology and further details can be held (information on the postal address, email, telephone, fax etc.)	Director, Central Tobacco Research Institute, Rajahmundry- 533105 2449871-4, Fax: 0091-883-241055.. Website: ctri.org.in E-mail: ctri@sify.com
12.	Source of availability	Director, Central Tobacco Research Institute, Rajahmundry- 533105

Proforma for technologies developed for Farm Mechanization, Post harvest and processing and Renewable energy sources. (Technologies in pipeline)

Sl. No	Item	Details
1.	Name of the technology	Bale Pressing Machine to reduce the drudgery in tobacco baling.
2.	Specifications and salient technical features (principle of operation, suitability to different crops/ commodities, power and labour requirement, how it is an improvement over the existing systems, safety factors incorporated etc.)	In general tobacco baling is done manually after the grading. It is a labour consuming process and involves drudgery. Baling of graded cured leaf through bale pressing machine reduces the labour and improves the efficiency.
3.	Performance results (efficiency, capacity of operation, losses etc.)	Rs 300/- per bale in manual process. Rs 200/bale with bale pressing machine
4.	Cost (initial investment and operating cost in Rs./h and Rs./unit output)	-----

5.	How the new technology will impact the income of the farmers and its benefits over conventional system in terms of savings on cost of operation, inputs, timeliness and other pertinent information	Bale pressing machine saves Rs 100/bale. Farmer will get an additional income of 1500-2000/ha
6.	Social/environmental/ other benefits	Bale pressing machine reduces the drudgery
7.	Status of commercialization / IPO rights etc.	
8.	If commercialized, name and addresses of the firms/entrepreneur to whom the technology has been transferred	During 2012-13 some refinements are suggested for improving its efficiency which will be carried out and evaluated.
9.	Special facilities required (for example confirming to the norms of Food Safety and Standards Authority of India (FSSAI) or other standards)	---------
10.	Photographs in operation with proper lighting, light background and only operator to appear if required (image size not exceeding 500kb, 300dpi, 24bit colour, jpeg format)	**Modifications in the Bale Pressing and Packing Machine** •Fixed digital weigh machine to Know applying load.  Bale Pressing machine
11.	Contact details of person to whom technology and further details can be held (information on the postal address, email, telephone, fax etc.)	Director, Central Tobacco Research Institute, Rajahmundry -533 105, Andhra Pradesh., INDIA. Phones: (0883) 2449871-4, Fax: 0091-883-**241055.** **Website: www.ctri.org.in** **E-mail:ctri@sify.com**
12.	Source of availability	Director, Central Tobacco Research Institute, Rajahmundry- 533105

Technologies developed for Farm Mechanization, Post harvest and processing and Renewable energy sources. (Technologies in pipeline)

Sl. No	Item	Details
1.	Name of the technology	Compressed Agri by - Product briquettes for curing FCV tobacco.
2.	Specifications and salient technical features (principle of operation, suitability to different crops/commodities, power and labour requirement, how it is an improvement over the existing systems, safety factors incorporated etc.)	FCV tobacco is cultivated in an area of 2.0 lakh ha. After harvesting FCV tobacco is cured in Barns with wood as fuel. For curing 1 kg cured leaf 3.5-4.0 kg wood is necessary. Cutting of trees for curing lead to deforestation. Hence, to minimize the use of wood, briquettes made up of coirpith and saw dust are used as fuel. Coir pith is available in East Godavari and West Godavari districts as a bye-product of coir Industry.
3.	Performance results (efficiency, capacity of operation, losses etc.)	An amount of 4.29 kg briquettes are used as against 5.15 kg wood per kg of cured leaf.
4.	Cost (initial investment and operating cost in Rs./h and Rs./unit output)	Rs 19.2/kg cured leaf for briquettes and Rs 17.5 /kg cured leaf for wood
5.	How the new technology will impact the income of the farmers and its benefits over conventional system in terms of savings on cost of operation, inputs, timeliness and other pertinent information	Farmers will have an alternative source for fuel. Scarcity of wood can be met with briquettes.
6.	Social/environmental/ other benefits	Deforestation can be avoided.
7.	Status of commercialization / IPO rights etc.	
8.	If commercialized, name and addresses of the firms/entrepreneur to whom the technology has been transferred	-----
9.	Special facilities required (for example confirming to the norms of Food Safety and Standards Authority of India (FSSAI) or other standards)	---------

10.	Photographs in operation with proper lighting, light background and only operator to appear if required (image size not exceeding 500kb, 300dpi, 24bit colour, jpeg format)	
11.	Contact details of person to whom technology and further details can be held (information on the postal address, email, telephone, fax etc.)	Director, Central Tobacco Research Institute, Rajahmundry -533 105, Andhra Pradesh., INDIA. Phones: (0883) 2449871-4, Fax: 0091-883-**241055.** **Website: www.ctri.org.in** **E-mail:ctri@sify.com**
12.	Source of availability	Director, Central Tobacco Research Institute, Rajahmundry- 533105

High yielding cultivars in the pipe line

High yielding burley line,YB-4; Natu line, 45-90; FCV lines, A13, NLST-2, Tobios-2; FCV hybrid, NLSH-1 are in the advanced stages of testing and found to be promising in AINRPT and bulk trials. These lines after confirming their superiority in the on-farm trials will be proposed for release.

IV. Futuristic technologies

1. High yielding tobacco lines identified

Bidi tobacco line, SB-154 and Hookah tobacco entries, SK-413 and LR-64 at Araul; FCV line NLST-3 at Jeelugumilli & Kandukur; FCV hybrid, SH-1 at Kandukur; Rustica line LR 58 at Ladol; and Bidi tobacco, line ABD 117 at Nandyal found promising for leaf yields at different AINRPT centres. These lines will be assessed in bulk and on-farm trials and promising among them will be proposed for release.

2. Isolation of flavouful/ aromatic compound and bio-pesticides

Surfaces of tobacco leaf contains trichomes which secrete a number of compounds including diterpenes (subdivided into duvanes and labdanoids) and sucrose esters (SE) make up major portion of the leaf surface chemicals comprises the major aroma forming components in that tobacco type. Among the labdanoids, *cis*-abienol is a major component that plays a vital role in influencing flavor of the smoke. Oxidative breakdown of *cis*-abienol results in attractive flavor properties and imparts a cedar-like aroma to the smoke and it has plant growth regulating properties. It was established that the ability to produce *cis*-abienol is governed by a single dominant gene designated as *Abl*. The other vital component in tobacco trichome exudates is a group of six SE isomers that differ one from the other by one carbon unit. Oriental tobaccos contain β-methyl valeric acid-containing SEs that impart them with a characteristic aroma and smoke flavor. The ability to produce β-methyl valeric acid-containing SEs in tobacco was reported to be governed by a single dominant gene designated as *BMVSE*. It was reported that SEs are also associated with aphid resistance in tobacco and possibly resistance against the fungus that causes the blue mold disease of tobacco. In addition to the above mentioned characteristics, SEs have been documented to have an inhibiting effect on cancer development in mouse skin. Synthetic SEs, have explored the possibility of using as insecticides and found to be effective against whiteflies and aphids. Due to the importance of trichome constituents as part of tobacco product aroma, and also because of their contribution to chemical defense systems, alteration of trichome metabolism could be a good strategy to improve tobacco quality and enhance the resistance to insects and disease. Efforts to transfer the genes responsible aroma will be attempted.