

Research project funded under ISOPOM

S. No.	Name of Project	Implementing Agency	Duration of Project	Total Cost of Project (Rs in Lakhs)	Fund Released (Rs in Lakhs)	Outcome of the Project
1	“Development and promotion of promising varieties/lines with high yield and high oil content for enhancing production and quality of groundnut oil in drought prone environments to boost the income of small and marginal groundnut farmers in India”	ICRISAT, Hyderabad	2010-2015*	577.76	577.76*	<p>Four high oil lines namely ICGV 05155, ICGV 06420, ICGV 03042 and ICGV 03043 have been developed and being tested in AVT in Zone V during Kharif 2015 after testing under AICRP-G for 2years.</p> <p>Four new high oil containing varieties viz. ICGV 07038 (DGR), ICGV 06138 & ICGV 07222 (JAU) and ICGV 03057 (RARS, Tirupati) are proposed for testing during Kharif 2015 under AICRP-G trials in second year.</p> <p>Three high oil yielding lines viz. ICGV 03042, ICGV 06424 and ICGV 07222 were evaluated in AICRP-G trials during Rabi 2014-15 at JAU, Junagarh.</p> <p>50 Farmer Participatory Varietal Selection Trials conducted during Kharif 2014 in Gujarat, AP and TN.</p> <p>QTL analysis has been done for oil content and oleic acid content. High oleate lines developed through back crossing are tested in Preliminary Evaluation Trial at ICRISAT, TNAU, RARS-Tirupati and DGR, Junagarh.</p> <p>171 entries with high oleic acid content (61-85%) and O/L ratio (3.4 to 3.9) are evaluated in two separate trials.</p> <p>199 back cross progenies are under Progeny Row Trials at TNAU. Phenotyping for oleic acid content and O/L ratio is being done during Kharif 2015. Nine promising selections were evaluated at RARS, ANGRAU and phenotyping for oleic acid content is under progress.</p> <p>NIRS technique for oil estimation and fatty acid content was calibrated and is now routinely used in breeding programme.</p> <p>Release proposal at National/State level of superior high oil containing lines will be submitted during 2015-16.</p>

*Revalidation of remaining funds of Rs 25.66 lakhs has been approved for completion of remaining work during April,2015 to December,2015.

Adaptive research project on oilseeds funded under NMOOP

S.No.	Name of Project	Implementing agency	Duration of Project	Total cost of the project (Rs. in lakhs)	Fund released (Rs. in lakhs)	Outcome of the Project
1.	Productivity enhancement of rapeseed-mustard crops through technology implementation and their refinement under farmer's field conditions in the state of Uttarakhand.	GBPUA&T, Pantnagar	2015-16 to 2016-17	35.66	13.37	Approved on 02.06.2015.
2	Block demonstrations and training of raised bed technique of soybean cultivation.	IGKVV, Raipur	2015-16 to 2016-17	30.66	14.62	Approved on 28.07.2015.
3	Integrated development of Jatropha, Karanja & Mahua.	ICAR-CAFRI, Jhansi	2015-16 to 2016-17	16.61	7.27	Approved on 17.07.2015.
4	Bridging the production gaps in potential districts of sunflower and sesame through dynamic technology transfer.	IIOR Hyderabad	2015-16 to 2016-17	57.48	-	Approved on 28.08.2015. (Administrative approval being issued)

R&D projects on Tree Borne Oilseeds (TBOs) funded by NOVOD Board upto 2014-15*

S.No.	Name of the project	Implementing agency	Duration and date of starting of the project	Total cost of the project, if specified (Rs lakhs)	Funds released (Rs lakhs)	Outcome of the project upto 2013-14
1	National network on integrated development of Jatropha & Karanja	CRIDA, Hyderabad	2005-06 to 2014-15	70.77	49.78	Evaluated the identified genotypes of Karanja in Progeny, Zonal & National Trials. The identified promising genotypes with respect to oil content are :- National Trial : RAK-22 (31.32), TNMP-2 (36.07), TNMP-4 (35.45) Progeny Trial : Acc-13 (29.43), Acc-8 (33.9), Acc-14 (45.08) Zonal Trial : TNMC-9 (33.67), TNMP-23 (32.73), TNMP-20 (35.14) The identified promising genotypes with respect to seed yield (Qtl./ha.) are :- National Trial : RAK-22 (3.4), TNMP-2 (1.2), TNMP-4 (0.7) Progeny Trial : Acc-13 (5.4), Acc-8 (3.9), Acc-14 (3.2) Zonal Trial : TNMC-9 (5.6), TNMP-23 (2.3), TNMP-20 (1.1)
2	Collection, characterization & evaluation of plant type for mass multiplication & standardization of agro-techniques in Simarouba	ANGRAU, Hyderabad	2008-09 to 2014-15	31.51	19.59	Evaluated the genotypes of Jatropha in National Trial and reported that the genotypes namely HAUJ-37, PJA-1, Pant JCB-3, JIB-12, AJA-1, PJA-1 etc. have been found superior in plant height, collar diameter and number of branches. Similarly, the genotypes of Simarouba namely Palem-4, PDKV SG-25, HAUP-9, PDKV SG-27 etc. have been found superior in terms of plant height, collar diameter and number of branches per plant. The inter-cropping trial of maize, sunflower, finger millet and horse gram with Simarouba concluded that an additional income upto Rs.10,500/ha./year can be obtained during gestation period.
3	DNA fingerprinting and molecular characterization of Jatropha germplasm collected from diverse agroclimatic zones of India	NBPGR, New Delhi	2005-06 to 2014-15	77.41	47.36	Periodic retesting of total cryo-preserved 1341 germplasms of various TBOs viz Jatropha(767), Karanja (385), Wild apricot (287) and Simarouba (2) showed the retention of initial viability values showing successful cryostorage. The accessions of Jatropha, Karanja and Wild apricot cryopreserved for 67-70 months, 18-80 months and 70-74 months confirmed viability from 55-100%, 60-100% and 33-90%, respectively. A total of 58 genotypes of Karanja and 13 genotypes of Wild apricot have been cryo-stored during 2012-13. About 9 accessions of Mahua have been allotted IC nos. and used for DNA finger printing.
4	Design & development of post harvest equipments for TBOs viz. Jatropha, Karanja, Simarouba, Tung etc. and commercialization of developed equipments.	IIT, Delhi	2005-06 to 2014-15	79.63	45.93	Tung decorticator has been developed after some modification in Karanja decorticator. It has capacity of 35 kg/hr and 75% efficiency. The cost of the machine is Rs 1.00 lakh. Three units of Tung decorticator have been installed at Aizawl, Mizoram. The training programme has been organized for operational know-how. Besides, the other post harvest technologies namely Jatropha and Karanja fruit decorticator, seed decorticator, Jatropha oil expeller developed under R&D programme have been installed in the field which are operating successfully.
5	Processing of oilseed cakes of Jatropha, Karanja, Mahua and Neem for value addition for biofertilizers and	IIT, Delhi	2008-09 to 2014-15	37.03	22.86	IIT, Delhi has filed an Indian patent during 2013-14 pertaining to bionematicidal formulation of <i>Paecilomyces lilacinus</i> comprising of Karanja deoiled cake. For mass multiplication (scaling-up), collaborated with Delhi University for scale-up the product up to 5 -10 Kg (Tray level) and further up to

	biopesticides with large scale multiplication and demonstration on farmer's field					100-250 Kg. Two training programs (one at Farrukhnagar, Haryana and other at Pilibhit (U.P.) have been conducted on awareness of utilizing non-edible oil cakes as biopesticides and organic manures benefiting 25 farmers at each place. The field experiments are being conducted at Pilibhit (U.P.), Farrukhnagar and Mubarakpur (Haryana), Pratappgarh (U.P.) and Micromodel Complex, IIT Delhi.
6	National network on integrated development of Wild apricot	CSKHPKV, Palampur	2005-06 to 2014-15	46.51	20.71	The centre has developed best propagation technique and media on seed germination and seedling growth as soil+sand+FYM in a ratio 1:1:1. The selected CPTs were having fruit yield ranging from 45 to 160 kg/tree. The centre has reported that the commercial method of propagation in wild apricot is tongue grafting. Mound layering does increase the number of plants, however, this technique cannot be used for large scale multiplication of plus trees. 70% success in green wood grafting has been obtained, which is applicable if one misses the season for tongue grafting. The centre identified some potential genotypes namely Sh-18, Ku-04, Ku-06, Ku-08, Ku-12, Bd-04 etc. About 1450 Plus Trees have been developed using above technique and planted on farmer's field at Mountain Agriculture Research Station, Leh, J&K.
7	National network on integrated development of Wild apricot	SKUA&T, Sri nagar	2005-06 to 2014-15	48.5	30.46	The centre has reported that the progeny evaluation of 26 CPTs of Wild apricot having oil content range of 45.5% to 54.2% is being undertaken. Wild apricot being slow in growth, data on only growth characteristics have been recorded. The CPT No. 98 has attained maximum plant height. The progeny of collection S-4 from Budgam planted in 2006 recorded 8.5 kg. fruit yield per tree was highest during 2012. This genotype is also having high oil content of more than 50% consistently for the last 3 years. Besides, the genotypes namely S-12, S-13, S-15, S-16 and S-17 have also been found with 50% oil content consistently in 3 years (upto 2012).
8	Collection, clone multiplication, conservation and biochemical profiling of Kokum (<i>Garcinia indica</i>)	NBPGR-RS, Thrissur	2008-09 to 2014-15	28.56	10.72	The germplasm collections namely IC 342303-2 (3741 fruits), IC 342297-1 (1291 fruits), IC 342301-2 (1244) & IC 136682-2 (1243 fruits) out yielded the check (1196 fruits per tree). The fruit yield was highest in genotype IC 342303-2 with 86.9 kg. followed by IC 342319-2 with 37.4 kg. The variation in oil content in kernel ranged from 33.82 to 47.1%(IC 342327-1). Appropriate vegetative propagation technique has been standardized. The centre has been advised to develop 1 ha. plantation of registered genotypes IC 136687-3; INGR No. 04063 using standardized propagation technique.
9	National network on integrated development of Jatropha	JNKVV, Jabalpur	2005-06 to 2014-15	42.21	20.75	The centre has identified CPTs of Jatropha having highest oil content of 42%. It has been reported that genotype NBJ-9 has been performing consistently during last three years. Besides, TFRI-07, NRCJ-7, NRCJ-89 and NDJC-1 have been identified the best performing genotypes in National Trial in terms of capsule yield. The genetic variability for various morphological traits observed in trials concluded that JJ-36-4 has been identified as potential stock from inter-specific hybrids. The use of Benzyl adenine can improve yield by increasing female inflorescence.
10	National network on integrated development of Karanja	JNKVV, Jabalpur	2005-06 to 2014-15	37.74	21.33	A total of 62 Candidate Plus Trees (CPTs) have been evaluated in progeny trial with highest oil content of 41.8% in Maihar-1 and highest seed yield of 0.56 kg./tree in 7 th year. In provenance trial, the maximum kernel oil content of 41.6% was recorded in provenance JNK-35 whereas JNK-12 recorded highest seed yield of 228 kg./ha. The highest pod yield of 172.8 kg./ha. was recorded in TN&MP-36. The oil content of 3 accessions which started fruiting at the age of

						7 th year (2012-13) ranged from 37-38.6%.
11	National network on integrated development of Karanja	MPKV, Rahuri	2005-06 to 2014-15	66.58	40.14	RAK-27, RAK-23, RAK-28, RAK-4, RAK-14 & RAK-50 have been identified as best genotypes based on growth parameters in Progeny Trial. RAK-89, TNMP-20, 23, 27, PAVL-AKL etc. have been identified as best genotype based on growth parameters in Zonal Trial. RAK-60, 6, 103, TNMP-6, 21 & 1 have been identified as best genotype based on growth parameters in National Trial. The centre has identified above genotypes for registration/release.
12	Germplasm collection, evaluation and mass multiplication on TBOs (Jatropha, Karanja & Kokum) of Konkan region of Maharashtra and Goa	Dr BSKKV, Dapoli	2008-09 to 2014-15	35.91	17.93	The CPTs of Karanja i.e. KKVPP-17 had the highest oil content of 42%. Other genotypes identified possessing high oil content are KKVPP-03 (38.41), KKVPP-07 (38.22), KKVPP-08 (38.40), KKVPP-09 (36.40), KKVPP-10 (35.74), KKVPP-11 (37.52), KKVPP-16 (37.49), KKVPP-18 (36.56), KKVPP-20 (36.08). The genotypes namely KKVPP-02 (0.79), KKVPP-04 (0.58), KKVPP-07 (0.58), KKVPP-09 (0.61), KKVPP-12 (0.70), KKVPP-13 (1.15) and KKVPP-16 (0.40) have been identified as potential genotypes with high seed yield. The centre has also identified genotypes of Kokum namely KKVGI-06 (52.73), KKVGI-11 (49.41), KKVGI-13 (45.67, KKVGI-26 (44.88), KKVGI-29 (44.86) and KKVGI-36 (52.24) having high oil content. These genotypes have been identified for registration/release for plantation.
13	National Network on integrated development of Karanja	Dr PDKV, Akola	2005-06 to 2014-15	62.59	35.72	The centre has reported highest oil content of 46.42% in the genotype PNK-33 followed by 40.14% in PNK-29. The highest oil content in Zonal Trial was recorded in PKV-PRW (40.08%) and PKVAKL (35.82%).
14	National network on integrated development of Jatropha	ICAR, RCNEH, Manipur	2005-06 to 2014-15	40.76	20.99	The centre has reported that the genotypes MNJ-001 (40.77), MNJ-002 (40.87), MNJ-005 (40.28), MNJ-006 (40.34), MNJ-017 (42.89), TFRI-01 (49.20), TFRI-02 (43.32), TFRI-03(42.36), JIP-02 (42.20), JIP-13 (42.86), JIP-15 (44.12), JIP-17 (43.89) posses high oil content (%) and the genotypes MNJ-002 (15.20), MNJ-002 (22.50), MNJ-005 (14.41), JIP-13 (22.83), JIP-17 (25.67) have been found as high seed yield (q/ha) producing type.
15	National network on integrated development of Jatropha	MPUA&T, Udaipur	2005-06 to 2014-15	39.88	25.01	The centre has reported that PJ-Sel-1 and TFRI-1 have been identified with oil content 33.6% and 33.2%, respectively in National Trial. The selections PJ Sel.1, TNMC-2 and TFRI-1 have been identified as best genotypes in National Trial in terms of seed yield. It is reported that highest seed yield of 7.7 q/ha in MPCUD-55 followed by 7.6 q/ha in MPCUD-44 and both with oil content of >33% inn both the genotypes in Progeny Trial have been found. The centre has reported that the planting of Jatropha at 3 m x 2 m spacing with pruning recorded significantly higher seed yield of 8.85 qtl./ha. over 3m x 3m spacing with pruning and unpruning treatments. The genotype NBJ-9 produced highest seed yield of 7.8 qtl/ha. in 5 th year of plantation.
16	National network on integrated development of Jatropha & Karanja	TNAU, Mettupalayam	2005-06 to 2014-15	79.78	41.05	The National Trial consisting of 16 genotypes was conducted and the genotype Jabalpur was found best for number of fruiting branches/plant and seed yield (kg/ha) with 1.13 tonne/ha. average seed yield and 30.46% oil content. Five high yielding Jatropha hybrids namely CJH 3, 5, 9, 12 & 13 have been found best out of total 30 inter-specific hybrids. The second generation hybrid of CJH-12 & 13 under irrigated condition has been raised and release of hybrid derivatives in next 1-2 years is expected. A total of 20 acre of Hybrids Trials is being maintained. The centre reported that a dwarf hybrid CJH-12 started fruiting in six months with yield potential of 3.5 tonne/ha. The hybrid clones CJH-3, 5, 9 12 & 13 has to be tested in atleast five locations as per the requirement of Varietal Release Committee.

						The centre has identified 50 genotypes of Karanja out of which 21 genotypes are involved in Progeny Trial. TNMP-12, 18, 3, 1, 52 (4) have been identified as superior genotypes. During 8 years trial, the seed yield of half to one kg/tree has been obtained.
17	Collection, evaluation and genetic improvement of Mahua for high yield, oil content as well as superior oil quality	FCRI, Mettupalayam	2010-11 to 2014-15	20.73	10.24	A total of 30 seed sources i.e. 29 from TN and 1 from Chhattisgarh were evaluated for yield and yield attributing characteristics. The percent of oil content of the various seed sources ranged from 27-48%. The highest oil percent was recorded in TNML-12. The characterization of CPTs through biochemical and molecular marker techniques as well as standardization of macro-propagation techniques for the production of genetically superior planting stocks is under progress.
18	National network on integrated development of Jatropha & Karanja	NRCFA, Jhansi	2005-06 to 2014-15	75.74	51.10	The centre has identified high oil content genotypes of Jatropha viz. NRCJ-32 (40.31%), NRCJ-159 (38.90%), NRCJ-35 (37.45%), NRCJ-31 (36.77%), NRCJ-62 (36.60%), NRCJ-63 (35.80%), NRCJ-60 (35.34%), NRCJ-124 (34.90%). The genotypes which possess high seed yield (q/ha) are NRCJ-111 (2.00), NRCJ-128 (1.27), NRCJ-158 (1.18), NRCJ-42 (1.46), NRCJ-70 (1.01), NRCJ-75 (0.26), NRCJ-2 (0.47), NRCJ-89 (0.64) and NRCJ-68 (1.00). Similarly, in Karanja, high oil content(%) genotypes are NRCP-7 (37.90), NRCP-13 (37.87), NRCP-6 (37.73), NRCP-21 (37.07), NRCP-24 (36.80), NRCP-20 (36.70), and NRCP-26 (36.30). Some of these genotypes will be recommended for plantation on large scale.
19	Germplasm collection, evaluation and development of varieties of Mahua (<i>Bassia latifolia</i>) to increase the oil content yield and oil quality	NDUAT, Faizabad	2010-11 to 2014-15	22.77	9.56	The identified 10 Mahua Candidate Plus Trees (CPTs) have been evaluated in the Progeny Trial. The centre has reported that the highest oil content was found in the CPT namely NDMC-5 (48.77%) followed by NDMC-6 (48.55%). However, the highest average flower yield (Kg./plant) was reported in NDMC-2 (90-93 kg./plant) followed by NDMC-1 (80-90 kg./plant). The centre has also done quality analysis i.e. acidity (%) and sucrose (%) of Mahua flowers.
20	Development of value added products from leaves & oilcakes of Jatropha, Karanja, Neem & Mahua using as a substrate for mass multiplication of <i>Trichoderma</i> spp.	SVBPUA&T, Meerut	2008-09 to 2014-15	29.61	16.61	<i>Trichoderma</i> spp. are fungal antagonists which act through micro-parasitism mainly on soil borne plant pathogens. Use of oil cakes and leaves of Jatropha, Neem and Mahua as substrate may be exploited for mass multiplication of <i>Trichoderma</i> spp. Neem cake was able to support the population dynamics of <i>Trichoderma harzianum</i> upto 105 days, whereas Jatropha, Mahua and Karanja cakes could support the longevity upto 90 days only. Addition of sucrose to the de-oiled cakes of Neem, Jatropha and Mahua were able to enhance the longevity upto 120 days. Among the three nitrogen sources, calcium nitrate was found to be the best in enhancing the population dynamics and longevity, whereas, among three, vitamins, thiamin was found to be the best followed by inositol and biotin. Application of <i>T. harzianum</i> grown on different cakes, FYM and vermicompost enhanced the plant height, greenness and fruit yield. Application of <i>T. harzianum</i> grown on these cakes to soil was also able to induce the systemic resistance in plants against foliar diseases. There has been encouraging results of using above TBO cakes in <i>Trichoderma</i> spp. colony farmation.
21	National network on integrated development of Wild apricot & Cheura	GBPUA&T, Pantnagar	2005-06 to 2014-15	72.41	39.83	The centre has identified the genotype T-24 with 50.98% oil content suitable for release/registration. More than 600 seedlings of Wild apricot collected from different regions of Uttarakhand have been maintained for genetic/quantitative studies. More than 200 seedlings of Cheura were distributed to the farmers for

						popularization. The evaluation of selected genotype in trials is continuing for selection of the best genotype to be released as variety.
22	National network on integrated development of Jatropha	GBPUA&T, Pantnagar	2005-06 to 2014-15	41.8	30.41	The centre has identified genotypes i.e. IGAU, Raipur, Pant J. sel.-2, NBJ-1, JA-9, CRJ 29, TFRI 7 & TFRI-1 with highest seed yield. The composting of leaf and oil cake has been developed. The genotype TNMC-7 and Sagar showed highest oil content of 36.6% and 34.06%, respectively. The centre has reported IGAU, Raipur, Pant J.Sel-2 and TFRI-1 as best genotypes on the basis of seed yield for promotion on commercial level. Jatropha seed decorticator with 3 Qtl./hr. capacity has been designed and manufactured at the centre.
23	National network on integrated development of Wild apricot & Cheura	Kumaun University, Nainital	2005-06 to 2014-15	73.84	58.30	The genotypes of wild apricot namely Bhowali (51.23), Dultidhar (47.78), Jyotidhar (47.60), Jyotidhar (48.70), Nainital (45.81), Nainital (47.20) have been identified with high oil content (%) and the genotypes namely Bhowali (0.14), Bhowali (0.15), Dultidhar (0.13), Jyotidhar (0.10), Nainital (0.09), Nainital (0.09) are identified with high seed yield (q/ha) in trials. The genotypes of Cheura namely Duhani (61.36), Rameshwar (64.26), Rameshwar (51.56), Dhingalgaon (62.65), Hupli (58.64), Hupli (58.82), Matola (62.65), Rameshwar (49.75) and Dhingra (51.05) possess high oil content (%).
24	Germplasm collection, evaluation and planting of Karanja for improved productivity and higher oil content	FRI, Dehradun	2008-09 to 2014-15	45.47	33.41	FRI has 95 Candidate Plus Trees (CPTs) of Karanja as well as 24 progenies/genotypes of Jatropha and observed highest oil content of 41.43% in Karanja and 35% in Jatropha. FRI has established Gene Bank as per assigned objectives and has conducted DNA fingerprinting and genetic diversity analysis at molecular level
25	Collection, characterization & selection of superior plant type for mass multiplication & development of HYV/hybrid variety of <i>Jatropha curcas</i> for better yield & oil content for North Bengal and Assam	UBKV, Cooch Behar	2008-09 to 2014-15	29.06	21.01	The centre has reported that four genotypes i.e. TNAU (34.08%), HAUJ-37 (33.53%), PJ-1 (31.4%) and JCP-4 (30.6%) were found superior in National Trial-IV on the basis of oil percentage. Nine superior genotypes have been cryo-preserved at NBPGR, New Delhi and IC nos. have been allotted. Besides, 20 genotypes of different accessions are maintained under irrigated condition. On the basis of oil content, some superior genotypes with high oil content namely UBKV J-23 (38.6%), UBKV J-3 (38.2%), UBKV J-4 (36%), UBKV J-98 (36%), UBKV J-80 (35%) etc. have been identified.
26	Biotechnology-based value-addition of leaves, oilseeds, and cakes of Neem & Jatropha	IIT, Kharagpur	2008-09 to 2014-15	28.15	21.12	A library of purified fractions rich in quercetin, quercetin glucoside and chlorogenic acid from Neem leaf, and quercetin glucoside, quercetin & ferulic acid from Jatropha leaf have been made. Two hydrogels were given volunteer trial in the last one year and found promising for skin rash, acne etc. Jatropha hydrogel helped stopping fowl mouth. Based on volunteer trial, the Metabolites content in gel was raged and it helped in removing acne scar by Neem gel. M/s. Tierra Seed, Hyderabad has consulted to be collaborated for further scaling up of the programme.

* All TBO projects under NOVOD Board have been discontinued w.e.f. 2015-16.