

प्रेषक,

रेणुका कुमार,  
प्रमुख सचिव,  
उत्तर प्रदेश शासन।

सेवा में,

समस्त प्रमुख सचिव/सचिव,  
उत्तर प्रदेश शासन,  
लखनऊ।

समन्वय अनुभाग

लखनऊ: दिनांक: 20 अप्रैल, 2016

विषय: आई-स्पर्श स्मार्ट ग्राम योजना के सम्बन्ध में।

महोदय,

उपर्युक्त विषय पर मुझे यह कहने का निदेश हुआ है कि शासन द्वारा सम्यक् विचारोपरान्त यह निर्णय लिया गया है कि चयनित आई-स्पर्श स्मार्ट ग्रामों में ग्रामवासियों की आवश्यकताओं को पूरा करने के लिए सतत मूलभूत तथा आधुनिक समाधान उपलब्ध कराते हुए उनके जीवन-यापन में गुणात्मक सुधार लाकर सम्बन्धित ग्राम के मानव विकास सूचकांक (Human Development Index) में बढ़ोत्तरी लाने हेतु आधुनिक तकनीक, क्लाउडमेट स्मार्ट क्रियाकलाप तथा डिजिटल एप्लीकेशन्स का प्रयोग मुख्य रूप से करते हुये ग्रामीण समुदाय की सामूहिक शक्ति (collective strength) तथा राज्य सरकार के प्रयासों के सहयोग एवं सिनर्जी (synergy) से किया जाय।

2. योजना का क्रियान्वयन-

इस योजना का क्रियान्वयन, समन्वय विभाग, उत्तर प्रदेश शासन के अन्तर्गत यू.पी. डॉस्प द्वारा मिशन-मोड में किया जायेगा। आई-स्पर्श स्मार्ट ग्राम योजना मिशन, यू.पी. डॉस्प के अन्तर्गत स्थापित किया जायेगा एवं यू.पी. डॉस्प के परियोजना समन्वयक (प्रोजेक्ट को-ऑर्डिनेटर) इसके मिशन डायरेक्टर



होंगे। आई-स्पर्श स्मार्ट ग्राम योजना का अनुमोदन, कार्यान्वयन एवं अनुश्रवण निम्नानुसार समितियों द्वारा किया जायेगा:-

2.1 ग्राम स्तरीय क्रियान्वयन समिति:-

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|--------------------------|---|
| 01. उप जिलाधिकारी,       | अध्यक्ष,  |
| 02. खण्ड विकास अधिकारी,  | उपाध्यक्ष,  |
| 03. सहायक विकास अधिकारी, | सदस्य सचिव  |
| 04. अन्य सदस्य           | ग्राम प्रधान, ग्राम पंचायत अधिकारी<br>पंचायत विकास अधिकारी,<br>सहायक विकास अधिकारी (कृषि),<br>अध्यक्ष द्वारा नामित सम्बन्धित ग्राम<br>का एक प्रगतिशील कृषक,<br>प्रधान अध्यापक, एवं ए.एन.एम.<br>/ हेल्थ सब सेन्टर का हेड, ।<br>(समिति में कम से एक-तिहाई<br>अथवा उपलब्धता के अनुसार<br>महिलाओं का प्रतिनिधित्व हो) |

ग्राम स्तरीय समिति द्वारा योजना का प्रस्ताव बनाकर जिला स्तरीय समिति से अनुमोदन होने के पश्चात् स्वीकृति हेतु राज्य स्तरीय समिति को प्रेषित किया जायेगा। मुख्य विकास अधिकारी यह सुनिश्चित करेंगे कि सम्बन्धित आई-स्पर्श स्मार्ट ग्राम की योजना, उसका क्रियान्वयन एवं अनुश्रवण उनके स्तर से नियमित रूप से किया जाय एवं योजना को समय से तैयार कर जिला स्तरीय अनुमोदन एवं अनुश्रवण समिति को प्रेषित किया जाये। ग्राम्य स्तरीय समिति को मुख्य विकास अधिकारी द्वारा समुचित मार्ग दर्शन प्रदान किया जायेगा।

2.2 जिला स्तरीय अनुमोदन एवं अनुश्रवण समिति-

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|---------------------------------------|------------|
| 1. जिलाधिकारी                         | अध्यक्ष    |
| 2. मुख्य विकास अधिकारी                | सदस्य सचिव |
| 3. सभी विभागों के जनपद स्तरीय अधिकारी | सदस्य      |





जिलाधिकारी यदि चाहें तो समिति में विशेषज्ञों को co-opt अथवा सम्मिलित कर सकते हैं। जिला स्तरीय समिति द्वारा निर्धारित समय सारिणी के अनुसार परीक्षण कर योजना अपनी संस्तुतियों सहित राज्य स्तरीय समिति के अनुमोदनार्थ आई-स्पर्श मिशन निदेशक, यू0पी0 डास्प पिकप भवन, विभूति खण्ड गोमती नगर लखनऊ को प्रेषित किया जायेगा।

### 2.3 राज्य स्तरीय समिति:-

राज्य स्तरीय अनुमोदन एवं अनुश्रवण समिति

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|---|------------|
| 1. मुख्य सचिव   | अध्यक्ष    |
| 2. कृषि उत्पादन आयुक्त                                    | उपाध्यक्ष  |
| 3. प्रमुख सचिव, समन्वय एवं परियोजना समन्वयक, यू.पी. डॉस्प | सदस्य सचिव |
| 4. प्रमुख सचिव, नियोजन                                    | सदस्य      |
| 5. प्रमुख सचिव, वित्त                                     | सदस्य      |
| 6. प्रमुख सचिव, समस्त कार्यदायी विभाग                     | सदस्य      |

उक्त समिति द्वारा विभिन्न जनपदों से प्राप्त परियोजनाओं का तकनीकी, वित्तीय तथा क्षेत्रीय उपयोगिता के आधार पर मूल्यांकन कर स्वीकृति प्रदान की जायेगी।

3. योजना हेतु बजट का प्राविधान- वर्ष 2016-17 में प्रश्नगत योजना के लिए कुल तीन सौ करोड़ रुपये का बजट प्राविधान किया गया है, जिसमें बीस प्रतिशत धनराशि राज्य स्तरीय आई-स्पर्श स्मार्ट ग्राम योजना मिशन के स्तर पर रखी जायेगी, जो राज्य स्तरीय समिति के अनुमोदन के पश्चात् विभिन्न उन योजनाओं में खर्च की जायेगी, जिनके लिए अधिक धनराशि की आवश्यकता है अथवा जो अपने आप में अभिनव कार्य (innovative) हों, एक प्रतिशत की धनराशि कन्टीजेंसी फण्ड के रूप में यू.पी.डॉस्प के स्तर पर रखी जायेगी जो यू.पी.डॉस्प तथा जिलों के प्रशासनिक खर्चों तथा आई-स्पर्श स्मार्ट ग्राम के लिए डी.पी.आर. इत्यादि बनाने में प्रयोग की जायेगी।

उपरोक्त धनराशि के आवंटन में परिवर्तन करने का अधिकार राज्य स्तरीय समिति में निहित होगा।





4. भविष्य में आई-स्पर्श के स्वरूप में आवश्यकतानुसार परिवर्तन का अधिकार मा0 मुख्यमंत्री जी में निहित होगा।

5. योजना के उद्देश्यों तथा क्रियाकलापों को I-SPARSH acronym में निम्नानुसार समाहित किया गया है:-

**I-** Inclusive (Growth), Income (Enhancement), IT (Solutions)  
[चयनित ग्रामों का समग्र विकास, आय में वृद्धि तथा सूचना प्रौद्योगिकी का प्रयोग।]

**S-** Skill (Development), Social (Cohesion/Justice), Simple (Solutions)  
[कौशल विकास, सामाजिक मेल-मिलाप एवं जुड़ाव/सामाजिक न्याय, आसान समाधान।]

**P-** Participation, People, Panchayati Raj.  
[जनसामान्य एवं पंचायती राज की सहभागिता।]

**A-** Adaptation, Agriculture (Smart and Precise), Allied activities.  
[कृषि की आधुनिक एवं दक्ष तकनीकों तथा सम्बन्धित सहायक क्रियाकलापों के अनुरूप रूपान्तरण करना।]

**R-** Responsive (Governance), Resilience, Recycle.  
[उत्तरदायी शासन/प्रशासन, लचीलापन, एवं संसाधनों को पुनः उपयोग में लाने की दक्षता विकसित करना।]

**S-** Safety and Security, Sanitation, Sustainable.  
[सुरक्षा एवं स्वच्छता तथा टिकाऊपन।]

**H-** Health, Hygiene, Housing.  
[स्वास्थ्य, स्वच्छ एवं स्वस्थपरक जीवनशैली तथा आवास।]

6. योजना की अवधि : आई स्पर्श स्मार्ट ग्राम योजना को फिलहाल एक वर्ष के लिए लागू किया जायेगा, जो 01 अप्रैल, 2016 से 31 मार्च, 2017 तक प्रचलित रहेगी। योजना के परिणाम के आधार पर इसे भविष्य में विस्तारित करने पर विचार किया जायेगा।



7. आई-स्पर्श स्मार्ट ग्रामों का चयन : इस योजना के अन्तर्गत जनेश्वर मिश्र ग्राम योजना के प्रारम्भ होने (वर्ष 2012-13 से) के उपरान्त जनेश्वर मिश्र योजना के अन्तर्गत चयनित समस्त ग्राम आई-स्पर्श स्मार्ट ग्राम योजना से आच्छादित होंगे, जिनकी संख्या का निर्धारण बजट में उपलब्ध धनराशि एवं आवश्यकता के अनुरूप किया जायेगा। आई-स्पर्श ग्राम योजना से आच्छादित ग्रामों की सूची अलग से निर्गत की जायेगी।

8. योजना के अन्तर्गत किये जाने वाले कार्य तथा गतिविधियाँ : योजना के अन्तर्गत कराये जाने वाले कार्यों/गतिविधियों को चार श्रेणियों में वर्गीकृत किया जा सकता है:-

- (1) आई-स्पर्श स्मार्ट ग्रामों की आवश्यकता के अनुरूप विशिष्ट कार्य।
- (2) अभिनव कार्य (Innovative work) जो गांव की आवश्यकता के अनुरूप हो।
- (3) जनेश्वर मिश्र ग्राम योजना के अन्तर्गत कराये जाने वाले कार्य।
- (4) अन्य विभागों द्वारा प्रचलित विभिन्न योजनाओं के अन्तर्गत कराये जाने वाले कार्य।

आई-स्पर्श स्मार्ट ग्राम की योजना बनाते समय निम्नलिखित बिन्दुओं को ध्यान में रखा जाय :-

- (i) स्थानीय एवं भौगोलिक विशिष्टतायें एवं परिस्थितियाँ।
- (ii) जलवायु की स्थिति।
- (iii) प्राकृतिक संसाधन की उपलब्धता।
- (iv) जनसामान्य की आवश्यकताओं पूर्ति हेतु क्रिटिकल गैप्स।
- (v) आय वृद्धि एवं रोजगार परक।
- (vi) कौशल एवं बाजार की मांग के अनुसार मूल्य संवर्द्धन कर विपणन समन्वय सुनिश्चित करना।
- (vii) परम्परागत कृषि को अद्यतन तकनीक की सहायता से लाभपरक बनाना।





- (viii) क्षेत्रीय रूप से प्रचलित परम्परागत हस्त शिल्प को अद्यतन तकनीक के सहयोग से बेहतर डिजाइन कर विपणन व्यवस्था से जोड़ना।
- (ix) प्रोडक्टिव एसेट्स।

8.1. आई-स्पर्श स्मार्ट ग्रामों की आवश्यकता के अनुरूप विशिष्ट कार्य: ये कार्य मुख्य रूप से शिक्षा, आधुनिक तकनीक, पर्यावरण संरक्षण तथा सूचना प्रौद्योगिकी पर आधारित होंगे, ताकि ग्रामवासियों की आवश्यकता के अनुरूप उन्हें मूलभूत तथा आधुनिक सालूशन्स दिये जा सकें। इन कार्यक्रमों हेतु बालिकाओं/महिलाओं, बच्चों, वृद्धों तथा आर्थिक एवं सामाजिक रूप से पिछड़े वर्गों को प्राथमिकता दी जायेगी। इसके अन्तर्गत मुख्य रूप से निम्नानुसार कार्यक्रम लिये जायेंगे, परन्तु ग्राम की आवश्यकता के अनुरूप अन्य कार्यक्रम, जो उपरोक्त अवधारणा के अनुरूप हों, भी लिये जा सकते हैं।

#### 8.1.1 लाभार्थीपरक

- ग्राम की पात्र छात्र एवं छात्राओं को पढ़ाई के लिए सोलर लैण्टर्न उपलब्ध कराना।
- ग्राम की पात्र छात्राओं को साईकिल उपलब्ध कराना—इसमें उन साईकिलों को प्राथमिकता दी जायेगी, जिसमें ट्यूबलेस टायर हों तथा ये विद्युत/ऊर्जा का उत्पादन भी करती हों।
- ग्राम की Reproductive आयु की महिलाओं/बालिकाओं को Sanitary Napkins उपलब्ध कराया जाना।
- ग्राम में पात्र सभी वृद्धों को परीक्षणोंपरान्त चश्में तथा श्रवण यन्त्र की सुविधा उपलब्ध कराया जाना।
- पात्र कृषकों को आधुनिक फार्म मशीनरी उपलब्ध कराया जाना (सौर ऊर्जा चालित फार्म मशीनों को प्राथमिकता)।
- पात्र युवक-युवतियों को कौशल विकास के अन्तर्गत प्रशिक्षण देकर उनको रोजगार उपलब्ध कराना।

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- दिव्यांग बच्चों को आवश्यकता के अनुरूप कृत्रिम अंग/उपकरण तथा अन्य सहायता उपलब्ध कराना एवं उनके लिए शिक्षा की व्यवस्था करना।
- अन्य कोई कार्यक्रम जो गाँव की आवश्यकता के अनुरूप हों एवं जिलास्तरीय समिति द्वारा आवश्यक समझे जायें।

#### 8.1.2 ग्रामपरक

- ग्राम में जन सुविधा केन्द्र (कॉमन सर्विस सेन्टर) की स्थापना – इसकी स्थापना पूर्व से ही उपलब्ध भवन यथा-पंचायत घर इत्यादि में की जायेगी एवं यदि यह सुविधा उपलब्ध न हो तो अतिरिक्त भवन/कक्ष का निर्माण कराकर यह सुविधा उपलब्ध करायी जायेगी। इसमें वाई-फाई/इण्टरनेट तथा कम्प्यूटर एवं फोटो कॉपियर/प्रिन्टर की सुविधा उपलब्ध रहेगी।
- विद्यालय में सोलर चालित आर०ओ० वाटर सिस्टम/वाटर ए०टी०एम० की स्थापना- इसके अतिरिक्त आवश्यकता के अनुरूप अन्य स्थानों पर भी सोलर वाटर आर०ओ० सिस्टम लगाये जा सकते हैं।
- ग्राम में सोलर स्ट्रीट लाइट की व्यवस्था/सोलर मास्ट की स्थापना करना।
- विद्यालय/कॉमन सर्विस सेन्टर में पुस्तकालय की स्थापना।
- स्मार्ट विद्यालय/कॉमन सर्विस सेन्टर में सोलर चालित प्रोजेक्शन सिस्टम तथा टेलीविजन उपलब्ध कराना/ई-शिक्षा।
- ग्राम में सार्वजनिक स्थलों पर फलदार/छायादार वृक्षारोपण तथा उपलब्ध भूमि में ग्राम्य वन (Village Forest) का विकास।
- विद्यालय में बच्चों के लिए खेलने के उपकरण तथा झूले इत्यादि की व्यवस्था- जो आवश्यकता के अनुरूप कॉमन सर्विस सेन्टर/अन्य स्थलों पर भी की जा सकती है।
- विद्यालय में बैठने के लिए आधुनिक फर्नीचर एवं शिक्षा के उपकरण उपलब्ध कराना।





- ग्रामवासियों को यातायात (बस/ऑटो परमिट) की सुविधा उपलब्ध कराना।
- ग्राम की सीदरेज व ड्रेनेज हेतु समुचित व्यवस्था तथा रेन वाटर हार्वेस्टिंग के लिए तंत्र विकसित करना।
- ग्राम दिवस तथा ग्राम्य गीत को संस्थागत रूप दिया जाना।
- इस परियोजना के अन्तर्गत चयनित ग्राम को खुले में शौच से मुक्त ग्राम (Open defecation free) बनाते हुए ग्राम में सॉलिड वेस्ट मैनेजमेण्ट/कम्पोस्ट/वर्मी कम्पोस्ट तथा बायोगैस संयंत्र (निजी/सामुदायिक) की व्यवस्था करना।
- अन्य कोई कार्यक्रम जो गाँव की आवश्यकता के अनुरूप हों एवं जिलास्तरीय समिति द्वारा आवश्यक समझे जायें।

8.2 अभिनव कार्य (Innovative work), जो गाँव की आवश्यकता के अनुरूप हों—

- ग्राम के विकास एवं ग्रामीणों के जीवन स्तर को सुधारने, रोजगार उपलब्ध कराने, ग्रामवासियों की आय में वृद्धि करने तथा उनके कौशल में वृद्धि करने के लिए कुछ ऐसी ग्रामपरक योजनायें हो सकती हैं, जिनके लिए अधिक धनराशि की आवश्यकता हो अथवा विभिन्न संस्थागत एजेंसियों के समन्वय की आवश्यकता हो। ऐसी योजनाओं के लिए प्रस्ताव पृथक से बनाकर राज्य स्तरीय समिति को प्रेषित किये जायेंगे, उदाहरणार्थ—
- (i) आई-स्पर्श योजना का एक महत्वपूर्ण बिन्दु सम्बन्धित ग्रामीणों की आय में कृषि कार्य में अभिनव एवं नवीन प्रयोग करना तथा इन प्रयोगों से उत्पादित फसलों/उत्पादों हेतु बाजार की सुगमता उपलब्ध कराने का कार्य शासन एवं स्थानीय ग्रामवासियों के सहयोग से स्वयं सहायता समूह/कृषक उत्पादक संगठन (Farmers Producer Organisation) बना कर किया जायेगा। इस हेतु अश्वगन्धा, लेमन ग्रास, पामारोजा, तुलसी, स्टेविया, बीमाबम्बू, किनोवा, चिया, रागी, कौंच बीज तथा मुस्कदाना इत्यादि जैसी व्यावसायिक फसलों को उत्पादित करने एवं इस हेतु एक सुगम बाजार की उपलब्धता सुनिश्चित कराने पर विशेष रूप से ध्यान देने की आवश्यकता है, जिससे सम्बन्धित ग्रामों के कृषकों की आय में वृद्धि के लक्ष्य को प्राप्त किया जा सके। उदाहरण के लिये





विभिन्न औषधीय एवं सगन्ध तथा कृषि उत्पाद का आर्थिकता का विवरण एवं एक मॉडल परियोजना का प्रारूप संलग्नक-1 के रूप में संलग्न है। यह विवरण मात्र उदाहरण एवं संदर्भ हेतु है तथा वास्तविक परियोजना तकनीकी, आर्थिक एवं भौगोलिक परिस्थितियों के अनुसार भिन्न भी हो सकती है। इस सम्बन्ध में यदि किसी तकनीकी विवरण अथवा समन्वय की आवश्यकता हो तो कृपया संलग्नक-2 में उल्लिखित अधिकारियों/विभागों से सम्पर्क किया जा सकता है।

- (ii) ग्रामपरक विशेष प्रकार के रोजगार हेतु (डिजायन/तकनीक, प्रशिक्षण एवं विपणन) व्यवस्था करना जैसे हस्तशिल्प, कृषि व्यापार आदि।
- (iii) बैट्री चार्जिंग स्टेशन की स्थापना जहाँ सम्बन्धित ग्राम के ग्राम वासी अपने सौर ऊर्जा चालित उपकरणों को न्यूनतम शुल्क, जो बाद में राज्य स्तरीय समिति द्वारा तय किया जायेगा, दे कर चार्ज करा सकें।
- (iv) ग्रामीण बी.पी.ओ. की स्थापना।
- (v) माइक्रो ए.टी.एम.
- (vi) डिजीटल लर्निंग केन्द्रों की स्थापना।
- (vii) सामुदायिक रसोई (Community Kitchen)
- (viii) जिन चयनित ग्रामों के पास पर्यटन स्थल हों, उन ग्रामों की महिलाओं एवं युवतियों को टैक्सी चलाने के कौशल में प्रशिक्षित करना जिससे वे टैक्सी चला कर रोजगार प्राप्त कर सकें।
- (ix) सैनिटरी नैपकिन बनाने की मशीन का सम्बन्धित ग्राम में स्थापना जिससे वहां की महिलाओं को कम मूल्य पर गुणवत्तायुक्त सैनिटरी नैपकिन उपलब्ध हो सके।
- (x) सहभागी वन परियोजनायें।
- (xi) खाद्य प्रसंस्करण।
- (xii) ग्रामीण पर्यटन से सम्बन्धित कार्यक्रम एवं योजनायें।

### 8.3 जनेश्वर मिश्र योजना के अन्तर्गत कराये जाने वाले कार्य-

- शासनादेश के अनुरूप उक्त योजना के अन्तर्गत उपलब्ध धनराशि से निर्धारित मानकों के अनुरूप सभी कार्य कराये जायेंगे।





8.4 अन्य विभागों द्वारा प्रचलित विभिन्न योजनाओं के अन्तर्गत कराये जाने वाले कार्य-

- अन्य सभी विभागों के अन्तर्गत जो ग्रामपरक तथा लाभार्थीपरक योजनायें चल रही हैं, उनका शत-प्रतिशत संतृप्तीकरण आई-स्पर्श स्मार्ट ग्राम में सम्बन्धित विभाग द्वारा सुनिश्चित किया जायेगा एवं उसके लिए धनराशि तथा अन्य व्यवस्था उन्हें अपने विभागीय बजट से करनी होगी।

9. योजना का अनुश्रवण : इस परियोजना से सम्बन्धित इस शासनादेश के निर्गत होने के उपरान्त यथाशीघ्र कृषि उत्पादन आयुक्त, उत्तर प्रदेश शासन द्वारा वीडियो कॉन्फेन्सिंग के माध्यम से सम्बन्धित मण्डलायुक्तों से चर्चा कर परियोजना के क्रियान्वयन के सम्बन्ध में अग्रतर विशेष आदेश दे सकेंगे। इस परियोजना का अनुश्रवण कृषि उत्पादन आयुक्त, उत्तर प्रदेश शासन द्वारा प्रत्येक 15 दिवस पर तथा प्रमुख सचिव, समन्वय विभाग द्वारा प्रत्येक सप्ताह किया जायेगा।

10. योजना के क्रियान्वयन के सम्बन्ध में समय-सारणी : आई-स्पर्श स्मार्ट ग्राम योजना का क्रियान्वयन निम्नलिखित समय सारणी का अनुसरण करते हुये किया जायेगा :-

- (i) शासनादेश निर्गत होने की तिथि से अप्रैल, 2016 के अंत तक सम्भावित परियोजनाओं का आंकलन कर जिला स्तरीय समिति द्वारा ग्राम्य स्तरीय समिति के सहयोग से अनन्तिम कार्ययोजना एवं उसके क्रियान्वयन की रणनीति तैयार कर लिया जायेगा।
- (ii) मई के प्रथम सप्ताह में कृषि उत्पादन आयुक्त द्वारा सुझाव एवं कार्ययोजना प्राप्त होने के एक सप्ताह के अन्दर मण्डलायुक्तों एवं जिलाधिकारियों के साथ वीडियो-कॉन्फेसिंग कर सुझावों एवं कार्ययोजनाओं पर विचार विमर्श किया जायेगा।
- (iii) इसके उपरान्त अगले एक सप्ताह में मण्डल स्तर पर कार्यशालायें आयोजित कर कार्ययोजना को स्थिर किया जायेगा। मण्डल स्तरीय की कार्यशालाओं की समय-सारणी अलग से निर्गत की जायेगी। इस कार्यशाला में मुख्य विकास अधिकारी द्वारा अपने जनपद की कार्ययोजना का प्रस्तुतीकरण किया जायेगा, जो अधिकतम 10 मिनट की अवधि का होगा। यह प्रस्तुतीकरण अभिनव, स्थायी आय वृद्धि एवं सुनिश्चित विपणन लिंकेजेज से युक्त होगा। कार्यशाला में परियोजना के क्रियान्वयन एवं अनुश्रवण व्यवस्था का भी प्रस्तुतीकरण किया जायेगा।

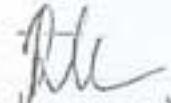




- (iv) मई के अन्त तक समस्त कार्यशालायें पूर्ण कर ली जायेंगी तथा सम्बन्धित प्रस्ताव राज्य स्तरीय समिति को प्रेषित कर दिया जायेगा।
- (v) मण्डल स्तरीय कार्यशाला के एक सप्ताह के उपरान्त जिला स्तरीय समिति ग्राम्य स्तरीय समिति से प्रस्ताव प्राप्त कर उस पर विचार एवं परीक्षण करते हुए अपनी संस्तुति/संशोधन/परिवर्द्धन के साथ आई-स्पर्श मिशन निदेशक को उपलब्ध करायेंगे, जो उसे राज्य स्तरीय समिति के समक्ष अनुमोदन हेतु प्रस्तुत करेगी।
- (vi) उपरोक्तानुसार कार्ययोजना की राज्य स्तरीय समिति से स्वीकृति के उपरान्त जनपदवार परियोजनाओं की धनराशि का आवंटन किया जायेगा।

उपरोक्त उल्लिखित समस्त कार्य समयबद्ध रूप से शीर्ष प्राथमिकता देते हुये इस भांति सम्पादित किये जायेंगे कि इन्हें दिनांक 07 जून, 2016 तक पूर्ण कर लिया जाय।

भवदीय,

  
(रेणुका कुमार)  
प्रमुख सचिव।

संख्या-473(1)/74-2016- /2016, तददिनांक।

- प्रतिलिपि निम्नलिखित को सूचना एवं आवश्यक कार्यवाही हेतु प्रेषित :-
1. प्रमुख सचिव, मा0 मुख्य मंत्री जी, उत्तर प्रदेश शासन।
  2. मुख्य सचिव, उत्तर प्रदेश शासन।
  3. कृषि उत्पादन आयुक्त, उत्तर प्रदेश शासन।
  4. परियोजना समन्वयक, यू.पी.डॉस्प/मिशन डायरेक्टर, आई-स्पर्श स्मार्ट ग्राम मिशन, चतुर्थ तल, पिकप भवन, गोमती नगर, लखनऊ।
  5. समस्त विभागाध्यक्ष, उत्तर प्रदेश।
  6. समस्त मण्डलायुक्त एवं जिलाधिकारी, उत्तर प्रदेश।

आज्ञा से,  
  
(सुशील कुमार पाण्डेय)  
संयुक्त सचिव।



औषधीय, सगन्ध एवं अन्य जलवायु अनुरूप कृषि/फसलों का आर्थिक विश्लेषण  
एवं मॉडल परियोजना

**ECONOMICS OF ASHWAGANDHA CULTIVATION IN MARGINAL LAND**

**1. Introduction :**

Ashwagandha or Asgand (*Withania somnifera*), also known as Indian ginseng is a native medicinal plant grown all over north-western and central India. It is an important ancient plant, the roots of which have been deployed in Indian traditional systems of medicine, ayurveda and unani. It is an erect growing, branching shrub with a normal height of 1.50m. It grows well in dry and sub-tropical regions. Ashwagandha is a hardy and drought tolerant plant. Madhya Pradesh, Gujarat, Haryana, Maharashtra, Punjab, Rajasthan and Uttar Pradesh are the main producing states of this crop in the country. In Madhya Pradesh alone it is cultivated in more than 5000 ha. The estimated production of its roots in India is more than 1500 MT, while the annual requirement is about 9000 MT, necessitating increase in its cultivation and higher production. Bundelkhand region on the State of U.P. is most suitable area for its cultivation. It will facilitate additional income to the farmers even in scanty rain/ rain shadow conditions, which are very common in this region. In the first phase, we have planned it in some selected villages in some selected blocks of all the four districts of Chitrakoot division.

**2. Medicinal properties and use :**

Ashwagandha is considered to be one of the excellent rejuvenating agents in Ayurveda. Its roots, seeds and leaves are used in Ayurvedic and Unani medicines. Ashwagandha is mentioned as an important drug in ancient Ayurvedic literature. Several types of alkaloids are found in this plant, out of which 'Withanine' and 'Somniferine' are important. Leaves contain withanolides, glycosides, glucose, five unidentified alkaloids (0.09%) and many free amino acids. The pharmacological activity of the roots is attributed to the alkaloids. The total alkaloid content in roots of the Indian types has been reported to vary between 0.13 and 0.31 per cent.

Withaferine-A has been receiving good deal of attention because of its antibiotic and anti tumor activities. It is used for curing carbuncles in the indigenous system of medicine the paste prepared out of its leaves is used for curing inflammation of tubercular glands and that of its roots for curing skin diseases, bronchitis and ulcers.

In Rajasthan, M.P. and U.P., roots are used mainly for curing rheumatism and dyspepsia; in Punjab they are used to relieve joint pain and in Sind for abortion. In some areas warm leaves are also used for providing comfort during eye diseases. However, roots are mostly used for curing general and sexual weakness in human beings.





Fruits and seeds are diuretic in nature. Leaves are reported to possess anthelmintic and febrifuge properties. An infusion of leaves is given in fevers.

For the treatment of piles, a decoction of the leaves is used both internally and externally. Externally, leaves are used for fomentation in the case of sore eyes, boils and swellings in limbs.

As an insecticide, it is useful for killing lice infesting the body. An ointment prepared by boiling the leaves is useful for bed sores and wounds. The fresh leaf juice is also applied for anthrax pustules.

### **3. Package of Practices:**

#### **3.1 Climate:**

It is grown as late rainy season (kharif) crop. The semitropical areas receiving 500 to 750 mm rainfall are suitable for its cultivation as rain-fed crop. If one or two winter rains are received, the root development improves. The crop requires relatively dry season during its growing period. It can tolerate a temperature range of 20<sup>0</sup>C to 38<sup>0</sup>C and even low temperature as low as 10<sup>0</sup>C. The plant grows from sea level to an altitude of 1500 meter above sea level.

#### **3.2 Soil :**

Ashwagandha grows well in sandy loam or light red soil with good drainage having pH in the range of 7.5 to 8.0.

#### **3.3 Varieties :**

Jawaharlal Nehru Krishi Vishwavidyalay, Madhya Pradesh has released one high alkaloid variety "Jawahar" which is short in stature and most amenable for high density planting. The variety yields in 180 days with a total withanolide content of 0.30 per cent in dry roots. CIMAP is also launching a new variety in coming February. So, we may also try it also otherwise "Jawahar" variety is proven and some lead farmers are already cultivation it in the region.

#### **3.4 Nursery :**

Ashwagandha is propagated by seeds. Fresh seeds are sown in well prepared nursery beds. Although it can be sown by broadcast method in the main field, transplanting method is preferred for better quality and export purpose. For export, a well maintained nursery is a prerequisite. The nursery bed, usually raised from ground level is prepared by thorough mixing with compost and sand. About 5kg of seeds are required for planting in 1 ha of the main field. Nursery is raised in the month of June - July. Seeds are sown just before the onset of monsoon and covered thinly using sand. The seeds germinate in five to seven days. About 35 day old seedlings are transplanted in the main field.

#### **3.5 Field preparation :**

Two to three ploughing and dicing and/ or harrowing should be done before rains for bringing the soil to a fine tilt. Farm yard manure is applied, mixed and then the field is leveled.

#### **3.6 Transplanting :**





After the manure is incorporated in the soil, ridges are prepared at 60 cm spacing. Healthy seedlings are planted at 30 cm spacing. In some places, 60 cm x 60 cm or 45 cm x 30 cm spacing are also followed. However, a spacing of 60 cm x 30 cm with a plant population of about 55000 seedlings per ha is considered optimum.

**3.7 Seed rate and sowing method :**

A seed rate of 10 to 12 kg per ha is sufficient for broadcasting method. They can be sown in lines also. Line to line method is preferred as it increases root production and helps in performing intercultural operations smoothly. The seeds are usually sown about 1 to 3 cm deep. Seeds should be covered with light soil in both the methods. Line to line distance of 20 to 25 cm and plant to plant distance of 8 to 10 cm should be maintained. The spacing / distance can be altered according to soil fertility. In marginal soils, generally the population maintained is high.

**3.8 Seed treatment :**

To protect the seedlings from the seed borne diseases, seeds should be treated before sowing with Thiram or Dithane M 45 (Indofil M45) at the rate of 3 g/kg seed or other organic compounds like BEEJAMRIT etc.

**3.9 Thinning and weeding :**

Grown up seedlings raised by broadcasting method or sown in line in furrows should be thinned by hand 25 to 30 days after sowing to maintain a plant population of about 30 to 60 plants per sq.m. the plant density to be maintained finally may depend on the nature and fertility of the soil. If fertilizers are applied, the population should preferably be kept at lower level. Generally two weeding are required to keep the field free from weeds, the first within 20-25 days of sowing and the other after 20-25 days of first weeding.

**3.10 Manures and fertilizers :**

The crop does not require heavy doses of manures and fertilizers. Farmers rarely give inorganic fertilizers. The crop responds well to organic manure / compost/ vermin-compost. Application of 10 MT FYM or 1 MT vermin-compost per ha is recommended. Application of 15 kg of Nitrogen and 15 kg of Phosphorus per ha is beneficial for higher production in average fertile soils. Application of 40 kg of N and P per ha are sufficient to produce high root yield in low fertile soils.

**3.11 Irrigation :**

Excessive rainfall or water is harmful for this crop. Light shower after transplantation ensures better establishment of seedlings. Life saving irrigation may be provided, if required. Under irrigated conditions, the crop can be irrigated once in 10 days for better results and higher root yield.

**3.12 Pests and diseases :**





No serious pest is reported in this crop. Whenever the crop is damaged by insects, two or three sprays of rogor or nuvan should be applied @ 0.6%. A combination of 0.5% malathion and 0.1% - 0.3% kelthane as foliar spray at 10-15 days interval was found highly useful against aphids, mites and insect attack. Diseases like seedling rot and blight are observed. Seedling mortality becomes severe under high temperature and humid conditions. Incidence of disease can be minimized by use of disease free seeds and by giving proper seed treatment before sowing as stated earlier. Neem cake also can be applied. It will save root damage caused by nematodes and insects. Further, adoption of crop rotation, timely sowing and maintaining proper soil drainage will also protect the crop.

### 3.13 Harvesting and yield :

Maturity of the crop is indicated by drying of lower leaves and yellow-red berries. Flowering and bearing of fruits start from December onwards. The crop is harvested for roots by digging in January to March i.e. 150 to 180 days after sowing. There should be sufficient moisture in the soil at the time of digging. Roots are dug out or ploughed using power tiller or a country plough. Ashwagandha gives 3 to 5 qtl of dry roots and 50 to 75 kg of seeds/ ha in well managed fields. The dry root yield goes up to 6.5 to 7.0 q/ha under scientific crop management. There are instances where farmers have achieved root yields as high as 1 MT/ ha. Commercially, roots of 6 to 15 mm diameter and 7 to 10 cm length are preferred. Alkaloid percentage in roots ranges from 0.13 to 0.31%.

### 3.14 Post-harvest handling :

The roots are separated from the aerial portion by cutting the stem 1 to 2 cm above the ground. After digging, the roots are washed, cut into 7 to 10 cm small pieces and dried in sun or shade. Roots should be dried to 10-12 % moisture content. Root pieces can be graded in following 3-4 grades as per its length and thickness:

- a. **Grade root:** Root pieces up to 7 cm and diameter 1.0-1.5 cm, solid, bright and pure white.
- b. **Grade root:** Root pieces up to 5 cm and diameter 1 cm, bright and white.
- c. **Grade root:** Root pieces up to 3-4 cm in length, diameter less than 1 cm, solid, side branches.

**Lower Grade:** Small root pieces, semi-solid, very thick, yellowish, and chopped.

The superior grade has stout and long roots which fetches premium price. To avoid moisture and fungal attack on the dried roots, it should be stored in tin containers. Berries are hand plucked separately. They are dried and crushed to take out the seeds.

## 4. Marketing:





The Neemuch and Mandsaur markets of Madhya Pradesh are popular world over for Ashwagandha. Importers, buyers within the country, processors, traditional practitioners, Ayurvedic and Siddha drug manufacturers visit these markets for procurement of Ashwagandha roots every year. The annual domestic demand for Ashwagandha roots as stated earlier is about 9000 MT. As the production is much less (around 1500 tonnes) in India, the internal market itself is having high potential.

5. **Financial aspects:**

5.1 **Sale price:**

The sale price of dried roots and seeds has been considered at Rs. 85 to Rs.150 /kg and Rs. 80 to Rs. 100/kg respectively.

5.2 **Cost of Cultivation:**

The cost of cultivation of 1 acre Ashwagandha (under transplanted conditions) is estimated at Rs. 16743/-. The details are presented in Annexure -I. The economics of cultivation of Ashwagandha is given in Annexure – II & Annexure – III

**Annexure –I**

<b>Cost of Cultivation – Ashwagandha</b>		
<b>Sl. No.</b>	<b>Materials</b>	<b>Amount in Rs.</b>
	<b>A. Materials.</b>	
1.	Seeds	2400.00
2.	Farm yard Manure (FYM)	2500.00
3.	Fertilizers (15 kg. N + 15 kg. P/Acre)	540.00
4.	Seed treatment chemicals	200.00
5.	Plant protection organic inputs	500.00
6.	Diesel for Irrigation	825.00
	<b>Sub Total (A)</b>	<b>6965.00</b>
	<b>B. Operations.</b>	
1.	Land preparation – Tractor ploughing, discing	1600.00
2.	Making of ridges and furrows	522.00
3.	Transplanting (Sowing)	1392.00
4.	Application of manures and fertilizers	348.00
5.	Plant protection	174.00
6.	Irrigation	522.00
7.	Wedding (Labour)	1740.00
8.	Harvesting berries and post harvest handling	3480.00
	<b>Sub Total (B)</b>	<b>9778.00</b>
	<b>Grand Total (A+ B)</b>	<b>16743.00</b>
	<b>Means of Finance</b>	
A.	Farmer Contribution (20% of total cost)	3348.60
B.	I Sparsh Contribution (80% of total cost)	13394.40





Annexure -II

Techno Economic Parameters – Ashwagandha		
<b>I. Technical Parameters:</b>		
1.	Variety	Jawahar
2.	Spacing (cm)	60x30
3.	Planting material	Seeds
4.	Seed Rate (kg/Acre)	400.00
5.	Plant population (plants/Acre)	22000
6.	Seed treatment chemicals (g/Acre)	500
7.	Manure and fertilizer	
	FYM (t/Acre)	0.25
	N (kg/Acre)	15
	P (kg/Acre)	15
8.	Labour requirement (mandays)	47
i.	Land preparation- Tractor ploughing, discing (hours)	4
ii.	Making of ridges and furrows	3
iii.	Transplanting (Sowing)	8
iv.	Application of manures and fertilizers	2
v.	Plant protection	1
vi.	Wedding (labour)	10
vii.	Irrigation	3
viii.	Harvesting berries and post harvest handling	20
9.	Yield (kg/Acre)	
	Dried roots ( Quintal per acre)	3
	Seeds ( Kg per acre)	20
<b>II. Economic Parameters:</b>		
1.	Value of seed (Rs./kg)	2000
2.	Seed treatment inputs	
3.	Manure and fertilizer	
	FYM (Rs./t)	10
	N (Rs./kg)	18
	P (Rs./kg)	18
4.	Tractor hiring charges (Rs./hour)	400
5.	Labour wages (Rs./man day)	174
6.	Sale Price – Dried Roots (Rs./kg)	125
7.	Sale Price-Seeds (Rs./kg)	100





### Annexure -III

Economics - Ashwagandha		
<b>A. Income:</b>		
1.	Dry roots	37500.00
2.	Seeds	2000.00
	<b>Total :</b>	<b>39500.00</b>
<b>B. Expenditure:</b>		
1	Production expenses	16743.00
	<b>Total :</b>	<b>16743.00</b>
	<b>C. Net Income (A - B)</b>	<b>22757.00</b>

### **Cultivation of Lemongrass**

#### **Name of Plant :**

Scientific Name *Cymbopogon flexuosus* (Steud.) Wats (Family Poaceae)

Local Name : Lili Chaa (Gujrati). Maiji gehlu (Kanada, Telegu), patichacha (Marathi), Guhyobeej (Sanskrit), Karpoor pullu (Tamil)

#### **Plant to employed in aromatic oil extraction:**

Green vegetative parts, mostly leaves are used for hydro-distillation of essential oil.

#### **Characteristics of the plant:**

The plant is monocot belonging to grass family having no proper stem, However, leaf sheaths of several leaves form a strong tubular structure up to 10-25 cm from the ground level. Plant height varies from 1.5 to 2.5 m. Leaf sheath glabrous, hairy at the junction of the blade, blade about 1 m long, 1.5 cm wide. Linear sessile spikelets are 4.5-5.0 mm long. Upper glumes are boat shaped and lower glumes are nerved.

The leaves yield 0.5-0.9% oil depending upon the cultivars, Major constituent of the oil is citral (75-85%)

#### **Major production areas:**

The particular species is indigenous to India. The crop can be grown in tropical to semi-arid regions. Commercially, the crop has been successfully grown in the north Indian plains, Kerala, Assam, West Bengal, etc.

#### **Characteristics of strain(s) for cultivation:**

Three different species of *Cymbopogon* viz. *C. Flexuosus* (Steud.) Wats, *C. citrantus* Stapf and *C. Pendulus* are called as East Indian, West Indian and North Indian Lemongrass,





respectively. All of them are grouped under the common name lemongrass because of the characteristic lemon like odour of their essential oil due to high citral content (75-85%) C. Flexuosus, also known as Malabar or Cochin grass, is indigenous to India, C. Citrates is mostly cultivated in West Indies, Guatemala, Brazil, etc. Essential oil from the third species differ from the other two in lower solubility in 70% alcohol. This is due to presence of myrcene, which readily polymerises on exposure to air and light.

Several cultivars viz. Sugandhi (OD 19), Pragati (LS48), Praman (Clone 29), PRL 16, CKP 25, Krishna, Cauvery, Chiraharit, Jama Rosa, etc. have been released from different institutes.

#### **Cultivation methods:**

##### **Propagation :**

The crop is propagated through seed or slips.

##### **Soil condition:**

The crop is traditionally grown in the poor lateritic soil of hilly regions of Kerala. However, growth and yield increase in good sandy-loam and loam soils. It can not withstand water logging. It can be grown in soils having acidic to alkaline pH. Leaf yield, oil content and citral content increase with increase in pH from 4.8 to 7.5. It is also successfully grown in sodic soil having 9.8 pH and exchangeable sodium of 55%. The crop is found to grow in saline soil having electrical conductivity of 10 dSm without much loss in herbage and oil yields.

##### **Climate :**

The crop is well suited for warm humid climate traditionally, it is grown in the areas receiving well-distributed high rainfall. However, it can be grown in semi-arid regions with irrigations. Oil content in leaves and citral content in oil is reduced in high rainfall areas though leaf yield increase. Low winter temperature inhibits the growth of this crop. Hence, leaf yield reduces in the areas having long winter season.

##### **Planting time:**

The crop can be planted after winter (February-March) or during rainy season (June-July). Planting after winter is possible in the areas having assured irrigation. This also helps in minimizing the weed competition compared to rainy season planting.

##### **Preparation of Planting material:**

In Kerala, the crop is propagated through seeds. However, in other parts of the country, propagation through slips is practiced.

Direct seeding does not give good stand hence not recommended. To raise the nursery, land is ploughed repeatedly to produce fine tilth. Nursery area of 1/10<sup>th</sup> that of main land is sufficient. Raised beds of 1-1.5 m wide of convenient length are prepared. Seeds at 3-4kg per hectare are uniformly applied over the beds and covered with a thin layer of soil. Adequate soil moisture is maintained by watering. Seeds germinate with 5-6 days and seedlings get ready for transplanting at the age of 50-60 days.





For planting of slips, clumps are trimmed from 20-25 cm above ground and dug out without injuring the roots. The individual slips or a group of 2-3 slips having enough healthy root system are separated just before planting. This minimises drying loss of the roots.

Planting: In north-eastern hilly regions, close planting (30x30cm) is done while wide spacing (45x60, 50x60, 60x60 cm) is practised in northern plains. To avoid water logging, planting may be done on ridges in areas receiving high rainfall. Seedlings/slips are planted firmly in the soil but not deep in the soil.

#### **Crop Nutrition:**

Lemongrass responds well to the applied nutrients. In general, 100 kg nitrogen (217 kg urea), 30 kg phosphorous (187 kg single super phosphate) and 40 kg potash (68 kg muriate of potash) are applied for 1 ha land. Phosphorous and potash are applied as basal with one fourth of nitrogen. Rest of the nitrogen is applied in three equal split doses (after each harvesting). To avoid chlorosis, a mixture of 0.25% FeSO and 0.25% citric acid is sprayed 3-4 times at an interval of 7-10 days. However, now-a-days requirement of organically grown material is increasing, therefore, it can be cultivated with organic inputs only as per the norms of organic cultivation.

#### **Irrigation:**

Is generally grown as rain fed crop and no irrigation is required in the areas receiving well-distributed rainfall. However 2-3 irrigations during hot summer months and one irrigation after each harvest can be applied to get higher yield.

#### **Intercultural operation:**

Keeping the crop weed free during early establishment is essential to get good harvest. One or two times weeding after planting and one more weeding within 30 days after first harvest are recommended. Once the crop covers the land area, usually weed growth is reduced.

#### **Diseases and pests:**

Diseases like leaf blight (*Curvulara* spp. *Dreschlera* spp. And *Colletotrichum graminicola*) rust (*Puccinia nakanishiki*), smut (*Tolyposporium christensenii*) and grassy shoot (*Balansia sclerotic*) are noticed in this crop. However, none of them cause much damage to the crop. Among the insect pests, stem boring caterpillar of *Chilotrea*, scale insect (*Duplachinoaspus divergens*), white fly (*Tetralaurodes semilunaria*) and spittle bug (*Cloira hipuctata*) are important. Like diseases, the crop is not much damaged by the insects. However, if infestation of pests becomes serious, botanical pesticides may be applied.

#### **Harvesting:**

Harvesting of tender crop is not advisable as oil and citral content remain in the lower side. Over mature and dried leaves also do not yield good oil. Under good rainfall areas first harvesting can be done at 3-4 months after transplanting. Thereafter, the crop can be harvested at a regular interval of 55-60 days. A total of 3-4 harvests in the first year and 4-5





in subsequent years are possible. Crop is harvested with sickle at 10-15 cm above ground level. Harvesting should not be scheduled at rain. Oil yield is increased with the age reaching maximum at third to fourth year. Citral content of oil also increases with age of the crop. A well-maintained cultivation can provide economic return up to years. Flowering shoots need to be removed to reduce biological degeneration.

**Processing:**

Oil in the herbage is distilled by hydro-distillation. Depending upon the distillation unit, complete distillation takes 3-6 hours. Chopping the grass before loading in the still for distillation allows packing of 40-45% more material and about 10% increase in oil yield with saving of fuel. Anhydrous sodium sulphate may be added in the oil and should be allowed to stand overnight and filtered to remove moisture and insoluble particles. To clean the dark colored oil steam rectification can be done. Oil should be stored in glass bottles or container made of stainless steel, GI, aluminum, etc depending upon the quantity.

**Expected Yield:**

Fresh herbage yield of about 220-250 kg/ha may be obtained from second year onwards from an irrigated crop.

**Financial aspects:**

**1.1 Sale price:**

The sale price of Lemongrass Oil has been considered at Rs. 750 to Rs.850 /kg respectively.

**1.2 Cost of Cultivation:**

The cost of cultivation of 1 Acre Lemongrass (under transplanted conditions) is estimated at Rs. 31712/-. The details are presented in Annexure -I. The economics of cultivation of Lemongrass is given in Annexure – II & Annexure – III, IV, V.

**Annexure –I**

Cost of Cultivation – Lemongrass		
Sl. No.	Materials	Amount in Rs.
	<b>A. Materials.</b>	
1.	Slips	12000.00
2.	Farm yard Manure (FYM)	2000.00
3.	Fertilizers (N+P+K/Acre)	1800.00
4.	Seed treatment chemicals	200.00
5.	Plant protection organic inputs	500.00
6.	Diesel for Irrigation	1650.00
	<b>Sub Total (A)</b>	<b>18150.00</b>
	<b>B. Operations.</b>	
1.	Land preparation–Tractor ploughing, discing	1600.00
2.	Making of ridges and furrows (Labour)	522.00
3.	Transplanting (Labour)	2610.00



4.	Application of manures and fertilizers (Labour)	522.00
5.	Plant protection (Labour)	174.00
6.	Irrigation (Labour)	1044.00
7.	Weeding(Labour)	3480.00
8.	Harvesting, Distillation (Labour)	2610.00
9.	Distillation Unit Charges	1000.00
	<b>Sub Total (B)</b>	<b>13562.00</b>
	<b>Grand Total (A+ B)</b>	<b>31712.00</b>
	<b>Means of Finance</b>	
A.	Farmer Contribution (20% of total cost)	6342.40
B.	1 Sparsh Contribution (80% of total cost)	25369.60

**Annexure -II**

<b>Techno Economic Parameters – Lemongrass</b>		
<b>I. Technical Parameters:</b>		
1.	Variety	Krishna
2.	Spacing (cm)	60x60, 60x45
3.	Planting material	Slips
4.	Seed Rate (kg/Acre)	0.80
5.	Plant population (plants/Acre)	12000-15000
6.	Seed treatment Organic Inputs (g/Acre)	500
7.	Diesel (ltr./Acre)	30
8.	Diesel (Rate/ltr.)	55
9.	Manure and fertilizer FYM (t/Acre) NPK (Pkt/Acre)	0.20 02 63
10.	Labour requirement (man days)	4
i.	Land preparation-Tractor ploughing, discing (hours)	3
ii.	Making of ridges and furrows	15
iii.	Transplanting	3
iv.	Application of manures and fertilizers	1
v.	Plant protection	6
vi.	Irrigation	20
vii.	Weeding	15
viii.	Harvesting berries and post harvest handling (3-4time)	200
ix.	Distillation Unit Charges/time (1 <sup>st</sup> year)	
11.	Yield (kg/Acre)	80
	Oil ( Kg per acre)	
	Slips(per acre)	
<b>II. Economic Parameters:</b>		
1.	Cost of Slips (Rs./kg)	12000
2.	Slips treatment chemicals	200

*(Signature)*



3.	Manure and fertilizer FYM (Rs./kg) N P K(Rs./Packet)	10 900
<u>A</u> 4.	Tractor hiring charges (Rs./hour)	400
<u>B</u> 5.	Labour wages (Rs./man day)	174
<u>B</u> 6.	Sale Price-Lemongrass Oil (Rs./kg)	800

**Annexure -III**

<b>Economics - Lemongrass (1<sup>st</sup> Year)</b>		
<b>A. Income:</b>		
1.	Lemongrass Oil (60 kg)	48000.00
	<b>Total :</b>	<b>48000.00</b>
<b>B. Expenditure:</b>		
1	Production expenses	31712.00
	<b>Total :</b>	<b>31712.00</b>
	<b>C. Net Income (A - B)</b>	<b>16288.00</b>

**Annexure -IV**

<b>Economics - Lemongrass (2<sup>nd</sup> to 5<sup>th</sup> Year)</b>		
<b>A. Income:</b>		
1.	Lemongrass Oil (80 kg)	64000.00
	<b>Total :</b>	<b>64000.00</b>
<b>B. Expenditure:</b>		
1	Production expenses (Irrigation, Harvesting, Distillation, Unit Charges, Fertilizer-npk)	8104.00
	<b>Total :</b>	<b>8014.00</b>
	<b>C. Net Income (A - B) (Yearly)</b>	<b>55896.00</b>

**Annexure -V**

<b>Economics - Lemongrass (5<sup>th</sup> Year)</b>		
<b>A. Income:</b>		
1.	Lemongrass Oil (80 kg)	64000.00
2.	Slips	300000.00
	<b>Total :</b>	<b>364000.00</b>
<b>B. Expenditure:</b>		
1	Production expenses (Irrigation, Harvesting, Distillation, Unit Charges, Fertilizer-npk)	8104.00
	<b>Total :</b>	<b>8104.00</b>
	<b>C. Net Income (A - B) (Yearly)</b>	<b>355896.00</b>





## Cultivation of Palmaroza

### **Name of Plant :**

Scientific name : *Cymbopogon martini*

Local name : Rosha grass, Rusha ghas.

### **Plant Part used in aromatic oil extraction:**

Floral shoots and above ground parts of the plant are used for distillation of essential oil.

### **Characteristics of the plant:**

Palmarosa is an aromatic tall perennial grass, which contain a sweet smelling oil of rose like odour in its flowering tops and foliage. It grows to height of 1.5-2.5 m, roots are shallow and fibrous, culms erect and nodes swollen. Leaf sheath is glabrous, ligule membranous, blades linear and flat. Inflorescence is large compound panicle up to 80 cm, spatheate recemes up to 1.5 cm. Recemes with several spikelets hermaphrodite, oblong elliptic and awned. Mature seeds are brown, fine hairy and easily disposed by air. It is a best natural source of geraniol (75-90%)

### **Major Production Areas:**

This plant is a native of India and it grows wild in forests of Madhya Pradesh, Maharashtra, Andhra Pradesh, Karnataka, Uttar Pradesh and Odisha. It is also found in lesser frequency in Karnataka, Tamil Nadu and in some parts of Uttar Pradesh. There is now expansion in cultivated area which is spread over in the states of Uttar Pradesh, Andhra Pradesh, Rajasthan, Karnataka, Maharashtra, Madhya Pradesh, Gujrat and Tamil Nadu.

### **Characteristics of Cymbopogon Varieties:**

Palmaroza (*C. Martini*) is one among 140 species of the genus *Cymbopogon* and it has two cultivable varieties;

1. *C. Martini* var. *Motia-Palmarosa*
2. *C. Martini* var. *Sobia – Ginger grass*

*C. Martini* var *motia* yields an essential oil with high geraniol content (60-90%) which is also called as East Indian Geranium Oil or Russa Oil. It has dark green leaves, which are leathery, prominently mid ribbed, roundish at the base and form an obtuse to right angle with the stem. It is a diploid ( $2n=20$ ) and the oil is rich in geraniol, geranyl acetate and linalool.

*C. Martini* var *Sofia* called as *Ginger grass* is also grown widely in India and it yields oil of lower geraniol content. It has a dense tufts and more luxuriant growth but with shorter inflorescence and curved leaf base attached at an acute angle to the stem. It is tetraploid ( $2n=40$ ). Its oil is known as *Ginger Grass oil* is of inferior grade and fetches much less price than the *Palmarosa oil*. The oil contains less of geraniol and more of other components like perillyl alcohol, carvone, carvone dipentene etc.





Proper identification of the species is very important and expert advice can be taken to avoid mistakes in species identification. Government recognized herbariums can be used to verify the correct species. Cultivation of inappropriate species/varieties (eg. Ver. Sofia) may deteriorate the oil yield and quality.

Varieties like IW-31243, IW-31245, PRC-1, Trishna, Tripta, Vaishnavi, Cim-Harsha have been released by different institutes in India.

### **Cultivation Methods**

#### **Soil**

Palmarosa can be grown in poor sandy loam to heavy fertile soils. A well drained loamy soil with pH 6 to 7 is ideal. Although it grows best on soils having neutral pH, it survives and gives economic yields on alkaline soil of pH up to 9. A rise in pH above 8.5 is found to decrease the plant growth and oil yield but has no adverse influence on the quality of oil produced. But, if the soil is not well drained after heavy irrigation, standing water during summer seasons can affect the growth of the grass.

#### **Climate**

Palmarosa grows well in warm humid areas with high temperature and, plenty of sunshine during its growing period. The ideal elevation for its cultivation is up to 300 m. Annual rainfall of 90-150 cm and temperature of 15 to 35 °C with ample sunshine is congenial for its cultivation. It is susceptible to frost and hence frost-prone areas are not suitable for its cultivation.

#### **Propagation**

The crop can be propagated by both seeds and slips. For commercial cultivation, the crop is propagated by seeds. It is always better to use fresh seeds that were harvested during the previous season, which are in good condition and free from pests.

**By seedlings:** The best method for large scale propagation is by raising seedlings in nursery and transplanting in the main field. Raised Nursery beds of 5x1 m should be prepared with 50 cm height during mid May-June. Seed beds should be well pulverized and add 2 baskets of cow dung manure, 100g calcium ammonium nitrate, 150 g super phosphate and 50 g muriate of potash in each bed. As seeds are very small and light in weight they are usually mixed with fine sand or soil in a ratio of 1:10 for even distribution and ease in sowing. Lines of 3cm deep and 10cm apart are made and the seeds are uniformly sown in lines and covered with soil and manure mixture. The beds are irrigated with rose can on alternate days. The seeds start germinating with 3-4 days and in about 4-6 weeks seedlings are ready for transplanting in the main field. About 3.5 to 5 kg seeds are enough to transplant one hectare of land.

**By Slips:** Plants producing high yield and better quality oil are to be selected for taking slips. Clumps are trimmed from 20-25 cm above ground and dug out without injuring the





roots. The individual slip or a group of 2-3 slips having enough healthy root system are separated just before planting to minimize drying and loss of the roots.

#### **Land Preparation:**

The land is ploughed 2-3 times to produce a fine tilth before the seedling or slips are transplanted. It is then laid into beds after applying the required dose of manures and fertilisers.

#### **Planting / Transplanting:**

Seeds are sown or seedling are transplanted during the onset of monsoon (June to August). Ensure correct spacing between plants and rows. Healthy and established seedlings or slips of 20-25 cm long are planted during the onset of monsoon (June end to August) in rows of 30-60 cm apart with plants spaced at 30-60 cm within the rows. In fertile areas, spacing should be increased. Planting may be done on ridges in areas receiving high rainfall to avoid water logging. Seedlings/slips are planted firmly but not very deep in to the soil. Transplanting is done usually in the evening hours avoid transplantation shocks. The plots are given light irrigation after transplanting. Gap filling should be done within 8-10 days of planting. It is advisable to plant two seedlings/slips per hill to avoid seedling mortality.

#### **Crop Nutrition:**

As the palmarosa grass is perennial and whole herb is the economic part, it is necessary to frequently replenish the soil. Farm yard manure/compost are applied at 10 t/h before planting. The recommended dose of fertilizer to palmarosa is 100:50:50 kg/ha of N:P<sub>2</sub>O<sub>5</sub>K<sub>2</sub>O. Phosphate and potash fertilizers are applied in two split doses as basal dose, one month after transplanting and two more doses after each harvest. NPK application should be repeated each year at the time of appearance of fresh leaves. Application of micronutrients like ferrous sulphate and manganese sulphate improve the plant growth, herbage and oil yield. However, it may be applied if soil is deficient of iron and manganese.

#### **Irrigation:**

Water requirement depends up on the climatic condition. With an ample supply of water, growth is luxuriant, but if drought prevails the growth is arrested, leaves wither and the oil content gets reduced. The crop is highly sensitive to water logging, where the plant becomes stunted and dies at later stages and proper drainage should be provided to prevent water logging. In general, the field is to be irrigated at 10-14 days interval during summer. Apply mulches to conserve soil moisture. Irrigation should be discontinued 7- 10 days before harvesting.

#### **Intercultural operation:**

Keeping the crop weed free during early establishment period is essential to get good harvest. Manage weeds before they start competing with the main crop for nutrients and light. It needs 3-4 hoeing and weeding during the first year, which can be restricted to two





in the subsequent years. Use of mulches not only maintains soil moisture but also inhibits weed growth.

#### Plant Protection:

Palmarosa is a hardy crop and is resistant to many pests. Pest and disease problems should be managed by using botanical pesticides made from locally available resources or registered product from reputed manufacturer or institution. Use chemical pesticides as last option and maintain sufficient time between applications and harvest (pre harvest interval/safe waiting period) so that the chemical cannot be detected in the harvested plant material.

#### Insect pests

##### Sucking pests

1. **Aphids:** Adults and nymphs of *Aphis gossypii* suck sap from inflorescence. The infestation is maximum during January- April.
2. **Thrips:** Adult and nymphs of thrips (*Haplothrips* sp) are yellowish brown in colour. They damage young shoots tips, leaves and floral parts affecting seeds setting. Attack is more severe during February-April and July-August months.

**Management:** These sucking pests can be managed by spraying azadirachtin 1% (10,000 ppm) @ 5ml/l

**White grub:** Grubs of *Holotrichia consanguinea* feed on roots of palmarosa. Grub is dirty white to brown coloured and severe infestation occurs during June-November months.

##### **Management:**

**Termite:** *Microtermis* sp. is the major termite attacking palmarosa. Whitish coloured adults damage the crop throughout the year. Newly planted seedlings are more vulnerable and termites eat the fibrous roots leading to the death of plants.

**Management :** Flooding the soil with irrigation water. In severe cases, add Chlorpyrifos 20 EC in irrigation water and used for flooding.

#### Diseases:

**Ellisiella blight:** It is one of the serious diseases of palmarosa caused by *Ellisiella caudate*. This disease is epiphytic from during rainy season and causes considerable loss in production of leaves and essential oil. Initially, small grey necrotic spots appear as a symptom on the surface of infected leaves. In severe cases lesions get enlarged and coalesce resulting in premature drying of infected leaves. Fungus sporulates on dried necrotic lesions.

**Management:** Disease can be effectively managed by foliar spraying of Bordeaux mixture 1% at 15 days interval.





**Curvularia blotch:** This disease is caused by *Curvularia andrographis* and *C. Trifolii*. Disease occurs in epiphytotic form during August and October. Small eye shaped, orange/brick red necrotic lesions appear and coalesce together resulting in premature drying of leaves.

**Management:** Foliar application of Bordeaux mixture 1% or Mancozeb @ 0.3% at 15 days interval at initial stages of infection effectively controls the disease.

#### **Harvesting:**

Harvest palmarosa at the right stage to get high oil yield. The essential oil is present in all parts of the grass, viz. inflorescence, leaves and stems of which the inflorescence contains the major portion. Hence, the crop should be harvested at full flowering to seed production stage in order to obtain maximum and good quality oil. Harvesting is usually done with a sickle at 15-20 cm above the ground surface. Harvest the crop in dry weather or during the hot hours of the day and do not harvest the crop when it is raining, or early in the morning when there is dew on the ground.

The number of harvest depends upon the climatic condition of the place, where it is grown. Generally during the first year, only one harvesting can be done during October-November, whereas 3-4 harvest can be obtained during the subsequent years. The crop remains productive up to 4-5 years depending upon the management practices followed. However, both herbage and oil yield start decreasing from the fourth year onwards. It is, therefore, recommended to keep the crop for only 4-5 years.

#### **Processing:**

Post harvest processing is usually the most critical stage in determining the end quality of the palmarosa. Immediately after harvesting, transport the plant part for further processing.

To obtain maximum yield of essential oil and to facilitate easy release of oil, harvested and cleaned palmarosa grass is chopped into 5-10cm length (communication). Chopping the grass has further advantages that more grass can be filled into the still and even packing is facilitated. For economical production of the oil, it is advisable that the harvested material is allowed to wilt in shade for 24-48 hours. From quality point of view, the grass should be distilled as fresh as possible. Oil obtained from dry or fermented grass is of inferior quality.

Palmarosa can be distilled either by hydro-distillation or steam distillation methods. Steam distillation results in maximum yield of better quality oil. Distillation unit should be clean, rust free and free of any other odour. The oil, being lighter than water and





insoluble, floats on the top of the separator and is continuously drawn off. The oil is then decanted and filtered. The distilled oil is treated with anhydrous sodium sulphate or common salt at the rate of 20g per litre to remove the moisture. The oil should be stored in sealed amber coloured glass bottles or containers and stored in a cool and dry place. All processing activities should be documented in a diary.

#### Expected Yield:

Herbage yield and essential oil content of palmarosa depend upon many factors such as soil and climatic conditions, crop nutrition, management practices, harvesting time, maturity stage of grass, extent of wilting and distillation process. Fresh herbage yield of about 220-250 kg/ha may be obtained from second year onwards from an irrigated crop. Oil yield is low in first year and it increases during 2-4 years of planting but gradually decreases thereafter. All parts of the plant contain essential oil, the maximum being present in inflorescence and the least in stem.

#### Financial aspects:

##### 5.3 Sale price:

The sale price of Palmarosa Oil has been considered at Rs. 900 to Rs.1000 /kg respectively.

##### 5.4 Cost of Cultivation:

The cost of cultivation of 1 Acre Palmarosa (under transplanted conditions) is estimated at Rs. 24007/-. The details are presented in Annexure -I. The economics of cultivation of Lemongrass is given in Annexure – II & Annexure – III, IV, V.

#### Annexure –I

Cost of Cultivation – Palmarosa		
Sl. No.	Materials	Amount in Rs.
	<b>A. Materials.</b>	
1.	Seeds	3750.00
2.	Farm yard Manure (FYM)	2500.00
3.	Fertilizers-npk (2Pkt/Acre)	1800.00
4.	Seed treatment chemicals	200.00
5.	Plant protection chemicals	500.00
6.	Diesel for Irrigation	825.00
	<b>Sub Total (A)</b>	<b>9575.00</b>
	<b>B. Operations.</b>	
1.	Land preparation – Tractor ploughing, discing	1600.00
2.	Making of ridges and furrows (Labour)	522.00
3.	Nursery bed preparation, raising and maintenance (Labour)	870.00



4.	Transplanting (Labour)	2610.00
5.	Application of manures and fertilizers (Labour)	522.00
6.	Plant protection (Labour)	174.00
7.	Irrigation (Labour)	1044.00
8.	Weeding (Labour)	3480.00
9.	Harvesting, Distillation (Labour)	2610.00
10.	Distillation Unit Charges	1000.00
	<b>Sub Total (B)</b>	<b>14432.00</b>
	<b>Grand Total (A+ B)</b>	<b>24007.00</b>
	<b>Means of Finance</b>	
A.	Farmer Contribution (20% of total cost)	4801.40
B.	I Sparsh Contribution (80% of total cost)	19205.60

**Annexure -II**

<b>Techno Economic Parameters – Palmaroza</b>		
<b>I. Technical Parameters:</b>		
1.	Variety	
2.	Spacing (cm)	60x30
3.	Planting material	Seeds
4.	Seed Rate (kg/Acre)	1500.00
5.	Plant population (plants/Acre)	15000
6.	Seed treatment chemicals (g/Acre)	500
7.	Manure and fertilizer FYM (t/Acre) NPK (Pkt/Acre)	0.25 02
8.	Labour requirement (mandays)	68
i.	Land preparation- Tractor ploughing, discing (hours)	4
ii.	Making of ridges and furrows	3
iii.	Nursery bed preparation, raising and maintenance	5
iv.	Transplanting	15
v.	Application of manures and fertilizers	3
vi.	Plant protection	1
vii.	Irrigation	6
viii.	Weeding	20
ix	Harvesting berries and post harvest handling (3-4time)	15
X	Distillation Unit Charges/time (1 <sup>st</sup> year)	200
9.	Yield (kg/Acre)	
	Oil ( Kg per acre)	30
	Slips(per acre)	
	Seeds ( Kg per acre)	8
<b>II. Economic Parameters:</b>		
1.	Cost of seed (Rs./kg)	6400
2.	Seed treatment chemicals	200

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3.	Manure and fertilizer FYM (t/Acre) NPK (Pkt/Acre)	0.25 02
4.	Tractor hiring charges (Rs./hour)	400
5.	Labour wages (Rs./man day)	174
6.	Sale Price – Palmarosa Oil (Rs./kg)	1000
7.	Sale Price-Seeds (Rs./kg)	800

**Annexure -III**

Economics – Palmarosa		
<b>A. Income:</b>		
1.	Palmarosa Oil	30000.00
2.	Seeds	6400.00
	<b>Total :</b>	<b>36400.00</b>
<b>B. Expenditure:</b>		
1	Production expenses	24007.00
	<b>Total :</b>	<b>24007.00</b>
	<b>C. Net Income (A - B)</b>	<b>12393.00</b>

**Annexure -IV**

Economics – Palmarosa (2 <sup>nd</sup> to 5 <sup>th</sup> Year)		
<b>A. Income:</b>		
1.	Lemongrass Oil (40 kg)	40000.00
2.	Seeds	8000.00
	<b>Total :</b>	<b>48000.00</b>
<b>B. Expenditure:</b>		
1	Production expenses (Irrigation, Harvesting, Distillation, Unit Charges, Fertilizer-npk)	7279.00
	<b>Total :</b>	<b>7279.00</b>
	<b>C. Net Income (A - B) (Yearly)</b>	<b>40721.00</b>

**Annexure -V**

Economics – Palmarosa (5 <sup>th</sup> Year)		
<b>A. Income:</b>		
1.	Lemongrass Oil (50 kg)	50000.00
2.	Seeds	8000.00
	<b>Total :</b>	<b>58000.00</b>
<b>B. Expenditure:</b>		
1	Production expenses (Irrigation, Harvesting, Distillation, Unit Charges, Fertilizer-npk)	7279.00
	<b>Total :</b>	<b>7279.00</b>
	<b>C. Net Income (A - B) (Yearly)</b>	<b>50721.00</b>

*(Signature)*



## **:- TULSI:-**

*Ocimum sanctum/Basilicum Linn. Family- Lamiaceae*

An annual plant, 30-60 cm high, much branched; Stem and branches usually purplish, sub- quadrangular; leaves 2.5 –5 by 1.6-3.2 cm . elliptic oblong- obtuse, pubescent on both side and minutely gland – dotted . Flowers in racemes.

**COMMON NAMES:** Holy Basil, Krishna Tulsi.,

**DISTRIBUTION :** Found all over the country..

**PART USED:** Leaf, Whole plant , Seed ,

### **CULTIVATION :**

#### **SOIL AND CLIMATE:**

Thrives well on variety of soils . Rich loam to poor laterite, saline and alkaline to moderately acidie soils are well suited for its cultivation . Well – drained soil helps better vegetative growth. Water logged condition can cause root- rot and result in stunted growth.

The Plant can be grown under partially shaded conditions but with low oil contents . It flourishes well under fairly high rainfall and humid conditions. Long days and high temperatures have been found favourable for plant growth and oil production . Topical and sub-topical climate ( at altitudes upto 900 m) is suited for its cultivation .

#### **LAND AND PREPARATION :**

The land is brought to fine tilth and laid out into plots of convenient sizes for irrigation . It is preferable to add 15 tonnes of farmyard manure per hectare during the preparation of land and mixed well in the soil .

#### **NURSERY RAISING AND PLANTING :**

the nursery can be raised in the third week of February and transplanting is generally started in the middle of April . The plant is propagated by seeds . Raised seed bags of 15"x 4'9" size should be thoroughly prepared and well manured by addition of farmyard manure. About 200-300g seeds are enough to raise the





seedlings for planting one hectare of land .the seed should be sown 2 cm below in the nursery beds .The seeds germinate in 8-12 days and the seedlings are ready for transplanting in about 6 weeks time 4-5 leaf . The seedlings are transplanted at 40 x 40 cm to get high herbage and oil yield per hectare.

#### **WEEDING AND HOEING :**

First weeding is done one month after planting and the second 4 weeks after the first . One hoeing after two months of planting is sufficient .

#### **MANURE/ FERTILIZER:**

Compost/ Vermi compost and organic manure is preferred . The optimum fertilizer dose recommended for this crop is 120 kg nitrogen and 60 kg . P<sub>2</sub>O<sub>5</sub> per hectare.

#### **IRRIGATION :**

Irrigation depends upon the moisture content of soil . In summer 03 irrigations per month are necessary, in rainy season no irrigation is required . About 12-15 irrigations are enough during the year.

#### **HARVESTING/ POST HARVESTING OPERATION & YIELD :**

The crop is harvested at full bloom stage. The first harvest is obtained at 90-95 days of planting. Then it may be harvested every 65-75 days interval. Harvesting is done usually on bright sunny days for good oil yield and its quality. It is not desirable to harvest the crop if there was a rain in the previous day. About 5 tonnes of fresh herbage can be obtained twice or thrice a year per hectare.

Notes: Market for medicinal plants is volatile and the economics may vary.

#### **Financial aspects:**

##### **1.1 Sale price:**

The sale price of Tulsi Oil has been considered at Rs. 500 to Rs.700 /kg respectively.

##### **1.2 Cost of Cultivation:**

The cost of cultivation of 1 Acre Tulsi (under transplanted conditions) is estimated at

Rs. 10518/-. The details are presented in Annexure -I. The economics of cultivation of Lemongrass is given in Annexure – II & Annexure – III.





Annexure -I

Cost of Cultivation – Tulsi		
Sl. No.	Materials	Amount in Rs.
	<b>A. Materials.</b>	
1.	Seeds	1500.00
2.	Seed treatment chemicals	200.00
3.	Plant protection Organic Inputs	500.00
4.	Diesel for Irrigation	550.00
	<b>Sub Total (A)</b>	<b>2750.00</b>
	<b>B. Operations.</b>	
1.	Land preparation – Tractor ploughing, discing	1600.00
2.	Making of ridges and furrows (Labour)	348.00
3.	Nursery bed preparation, raising and maintenance (Labour)	348.00
4.	Transplanting (Labour)	1392.00
5.	Application of manures and fertilizers (Labour)	348.00
6.	Plant protection (Labour)	174.00
7.	Irrigation (Labour)	348.00
8.	Weeding (Labour)	1740.00
9.	Harvesting, Distillation (Labour)	870.00
10.	Distillation Unit Charges	600.00
	<b>Sub Total (B)</b>	<b>7352.00</b>
	<b>Grand Total (A+ B)</b>	<b>10518.00</b>
	<b>Means of Finance</b>	
A.	Farmer Contribution (20% of total cost)	<b>2103.60</b>
B.	I Sparsh Contribution (80% of total cost)	<b>8414.40</b>

Annexure -II

Techno Economic Parameters – Tulsi		
<b>I. Technical Parameters:</b>		
1.	Variety	Sanctum/Basilcum
2.	Spacing (cm)	60x30
3.	Planting material	Seeds
4.	Seed Rate (kg/Acre)	1500.00
5.	Plant population (plants/Acre)	22000
6.	Seed treatment chemicals (g/Acre)	500





8.	Labour requirement (mandays)	32
i.	Land preparation- Tractor ploughing, discing (hours)	4
ii.	Making of ridges and furrows	2
iii.	Nursery bed preparation, raising and maintenance	2
iv.	Transplanting	8
v.	Application of manures and fertilizers	2
vi.	Plant protection	1
vii.	Irrigation	2
viii.	Weeding	10
ix	Harvesting berries and post harvest handling (3time)	5
	Distillation Unit Charges/time	200
9.	Yield (kg/Acre)	
	Tulsi Oil ( Kg/ per acre)	40
	Seeds ( Kg per acre)	1
<b>II. Economic Parameters:</b>		
1.	Cost of seed (Rs./kg)	1500
2.	Seed treatment chemicals	200
4.	Tractor hiring charges (Rs./hour)	400
5.	Labour wages (Rs./man day)	174
6.	Sale Price – Tulsi Oil (Rs./kg)	650

**Annexure –III**

Economics – Tulsi		
<b>A. Income:</b>		
1.	Tusli	26000.00
	<b>Total :</b>	<b>26000.00</b>
<b>B. Expenditure:</b>		
1	Production expenses	10518.00
	<b>Total :</b>	<b>10518.00</b>
	<b>C. Net Income (A - B)</b>	<b>15482.00</b>





संलग्नक-2

सम्बन्धित अधिकारी / विभाग जिनसे परियोजनाओं के तकनीकी जानकारी एवं विपणन समन्वय हेतु आवश्यकतानुसार सम्पर्क किया जा सकता है।

क्रम सं०	विभाग का नाम	सम्बन्धित अधिकारी	दूरभाष
1	परियोजना समन्वयक, यू०पी० डास्प, चतुर्थ तल, पिकप भवन, गोमतीनगर, लखनऊ।	श्रीमती रेणुका कुमार, आई०ए०एस	0522-2720839
2	तकनीकी समन्वयक, यू०पी० डास्प, चतुर्थ तल, पिकप भवन, गोमतीनगर, लखनऊ।	डा० गजेन्द्र सिंह	9453601240
3	वरिष्ठ तकनीकी विशेषज्ञ(कृषि विपणन), यू०पी० डास्प।	श्री राजेश कुमार गुप्ता	9839398494
4	राज्य समन्वयक / सदस्य संयोजक, उ०प्र० राज्य जैव ऊर्जा विकास बोर्ड, नियोजन विभाग, उ०प्र०।	श्री पी०एस० ओझा	0522-2236213 9415004917
5	संयुक्त सचिव, समन्वय विभाग, कृषि उत्पादन आयुक्त शाखा, उ०प्र० शासन।	श्री सुशील कुमार पाण्डेय	9454412824

800033