

**Operational Guidelines for Horticulture Programmes**  
**under Karnataka Watershed Development Project-II,**  
**SUJALA-III (2016-17)**

I) **Project Name:** World Bank Assisted Karnataka Watershed Development Project-II (SUJALA-III).

II) **Brief Description of the Project:**

Horticulture crops provide excellent opportunities in raising the income of the farmers even in the dry land areas. Based on the successful experience of SUJALA-I, production and productivity improvement, direct market linkage, post-harvest and value chain support activities are proposed to be implemented under KWDP-II, SUJALA-III (Horticulture component). The Project intends to adopt holistic approach in implementation of the components in SUJALA-III with the convergence of labour oriented MGNREGS and other departmental schemes, with the vision of achieving overall development of Horticulture and strengthen the knowledge base regarding horticultural potential in rainfed areas. It is also aimed to demonstrate and build the capacity of institutions and communities to improve production and value addition of Horticultural produce in project areas. The project will be implemented on participatory mode where the farmer / beneficiary, NGO's, facilitators, project staff will be involved.

**Objectives:**

- Extension and demonstrations of annual and perennial horticulture crops, nutritional gardens and crop water management to improve the productivity.
- Strengthen the Horticulture nurseries/farms of the Department in respect of necessary infrastructures and progeny orchards so as to facilitate the production of good quality seed and planting material.
- Establishment of soil, water and leaf analysis facilities to monitor the nutritional status.
- Strengthening post-harvest management, marketing and value addition through technical support by instituting the studies for generating scientific technical know-how.

To achieve the above objectives, the following activities will be implemented under the project.

- A. Extension and Demonstration for productivity improvement.
- B. Farmer Horticulture Soil and crop monitoring
- C. Horticulture Post Harvest Management and Value addition.
- D. Strengthening the Market Linkages for Horticultural farmers.
- E. Horticulture service support.

### **Convergence of SUJALA-III activities:**

- Horticulture sector intends to adopt holistic approach in implementation of the components in SUJALA-III and ensure the convergence of departmental activities with the vision of achieving overall development of Horticulture in the project area particularly the productivity of Horticulture crops. The operational cost involved in development could easily be converged with the popular MGNREGS programme.
- Convergence with other schemes of the Department would in turn increase the horticulture crops area, production and productivity in the micro-watershed. A detailed plan of action shall be prepared by the project officers of the districts specially for convergence with MGNREGS for treating common land resources and other schemes such as PPIHD and FPO promotion link to farmers in supply and market chains with all technical and field level support for value addition wherever possible.

### **Cost Sharing Pattern:**

The components under the programme will be implemented effectively involving the beneficiaries at all levels of demonstrations including cost sharing for different activities. Namely,

- Farmers contribution towards membership fee in formation of Farmer Interest Groups (FIG).
- Under the perennial crop demonstrations (AEP) based on the crop selected by the beneficiary, Project and the beneficiary contribution ratio will range from **75:25** and **80:20** respectively.
- Under the annual crop demonstrations again based on the spacing and seed rate the Project and the beneficiary contribution ratio shall vary.

- The cost sharing pattern will differ from other schemes in the Department as they are implemented in irrigated areas, while this project is aimed to cover the dry land areas of micro-watersheds.
- Under the component, “productivity improvement in existing Horticulture orchards in the micro-watersheds”, the project and beneficiary contribution ratio will be **50:50** respectively.

## **Component A:**

### **Extension and Demonstration for productivity improvement.**

The productivity of Horticultural crops in dry land areas is generally low as farmers are adopting low investment cropping systems to avert the risk of crop failures. This component targets on building the capacity of farmers individually as well as in groups by providing required production package of practices for perennial and annual crops. With respect to Perennial crop demonstrations in the micro-watersheds, based on the Land Resource Inventory study (LRI) and the hydrology study, the recommendations for crop suitability, the soil characteristic treatments / management interventions are addressed. In this regard, the suggested treatments in the micro-watershed with respect to each crop is unique. The interventions will follow the schedule of trainings, adoption of Good management Practices including integrated nutrition, pest and disease management, crop water requirement, water availability and its conservation, soil treatments and its conservation weed control, intercropping, and organic mulching for conserving moisture and enriching the soil fertility. The component would also support trainings, field days, exposure visits and development of crop specific literature to provide the horticulture farmers with suitable reference material on productivity improvements.

### **Salient features:**

- Improving knowledge base and skills of farmers on production practices for perennial and annual horticulture crops in watershed areas as an alternative land use systems.
- Motivating the farmers to adopt Good Management Practices for sustainable production of horticultural crops in rainfed areas.

## **Activities under the Component:**

### **1. Selection of micro-watersheds:**

- Micro-watersheds from the batch V and VI are selected for treatments during the financial year 2016-17.
- The Land Resource Inventory of micro watersheds was undertaken by university partners to provide comprehensive site specific cadastral level information useful for farm level planning, watershed planning and integrated development of the watershed under KWDP-II, SUJALA-III.
- The Land Resource information (Atlas) contains database collected at land parcel / survey number level on soils, climate, water, vegetation, crop and cropping patterns, socio-economic conditions, marketing facilities etc., helps in identifying soil and water conservation measures required, suitability for crops and other uses and finally for preparing viable and sustainable land use options for each and every land parcel.
- Primarily the Socio-economic and natural resource status in the micro-watersheds will help in understanding the area available under rainfed horticulture crops in micro-watersheds and the scope for horticulture expansion.
- Problems faced by the farmers in crop production, soil and water management along with post-harvest management and marketing.
- Existing infrastructures and scope for value addition to horticulture produce in micro watershed areas.

### **2. Micro-watershed Planning:**

- The information comprising of present horticulture crop status, socio economic features, the marketing systems etc., in micro-watersheds is utilised for planning the comprehensive activities for each micro-watershed. The DPR or an action plan is prepared for each micro-watershed.
- Identifying areas suitable or site specific areas for the introduction of new crops based on LRI will help in this strategic planning.
- The activities right from awareness, farmer contact, planning and up to the approval for taking up treatments in the batches of micro-watersheds shall be closely monitored by the project staff for effective implementation of horticulture activities.
- For recommending the practices / interventions / techniques to be incorporated in the perennial Horticulture crop demonstrations

especially with regard to Land Resource Inventory studies is made aware to the farmers who are interested to grow horticulture crops.

### **3. Formation of Farmer Interest Groups (FIG):**

- The Farmer Interest Groups (FIGs) are formed at micro-watershed level in selected Subwatersheds.
- This unregistered Farmer Interest Groups comprises of maximum 20 members interested to grow Horticulture crops with a minimum land holding of at least 0.2 hectares and show willingness to contribute for the operational costs under crop demonstrations and other activities and also converging with other scheme activities of line departments. However, the different activities to be taken up amongst the beneficiaries of FIG shall be decided by the FIG itself and the marginal & small farmers in the FIG shall be given first preference. The beneficiaries of FIG can be selected on lottery method if there is demand.
- The number of FIG groups to be formed in micro-watersheds/sub-watersheds is decided based on the potentiality of Horticulture and farmers demand in the micro-watersheds.
- The farmer should have khata / Pahani in his name to become the member of the FIG group.
- Active member in the group identified as lead facilitator shall carry out the different activities of FIG group based on the resolution made taking the consent of all the members of FIG group. The selected lead facilitators can be changed based on decision of the group if his performance is poor.
- Depending on the activities of FIG, rules and regulations are formed for smooth functioning of the group.
- Farmer Interest Groups (FIGs) at micro-watersheds will be linked to Horticulture Farmer Producers Organization (FPOs) formed at Taluk level/Hobli level.
- A membership fees of Rs.100 will be collected from all the members in a FIG.
- Initially to support horticulture activities a sum of **Rs.5000/-** will be given as **Grant**. The amount along with the membership fees shall be maintained in a bank account in the joint account of FIG group lead farmer or prathinidhi and Assistant Director of Horticulture for each Farmer Interest Group. The group shall maintain the vouchers

on meeting expenditures and other horticulture activities like Purchase of inputs, sprayers, crates, production of vermi compost, preparation of Bordeaux mixture, Panchagavya, custom hiring services etc.,

- The group should meet frequently based on the cropping season and need of the members and discuss regarding maintain the books, records, attendance, proceedings of the meeting, cash book and other relevant documents of the FIG group.
- Each FIG is unique in selection of crops (in case it is a mono crop cluster) or in terms of each management unit or part of area as described in the LRI studies.
- Application / Acceptance letter should be obtained from the FIG members/farmers for the benefits given from the Project and regarding their share and contribution to the group or community.
- Training regarding the objectives and programmes, LRI information, FIG formation, responsibility of members, FPO linkages, Trainings and Books of account maintenance should be given to all the members of FIG. The Assistant Director of Horticulture of the project is responsible for imparting knowledge and guidance.
- Farmers Producer Organisations (FPO's) are formed under various schemes by the Department of Horticulture through Small Farmers Agribusiness Consortium (SFAC) which is a Central Government approved agency. The SFAC guidelines will be followed for FPO formation and currently it is proposed to form one FPO in each SUJALA district. However the number of FPOs may be increased based on the potentiality of Horticulture in the micro-watersheds or in a contiguous area. The FIG formed under SUJALA programme shall be the members of FPO. Instructions from Additional Director of Horticulture (Oil Palm) the nodal officer for FPO formation are to be observed.

#### **4. Training :**

- a. Institutional training to lead Facilitators.
- b. Training to FIG members.

##### **a. Institutional training to lead Facilitators:**

- The Project staff would organize institutional trainings to lead facilitators on programme awareness, Farm input production, skill development in dry land horticulture, land use pattern, LRI studies

watershed concepts, INM, IPM, Nursery management, production technology, water available management, post- harvest handling, PHM activity and establishment of direct market linkages, including value addition, advanced technologies etc., with reputed Government Institutions having well equipped facilities and training modules (IIHR, Universities, KVK's etc.,).

- The lead facilitator services will be used to guide and train other farmers in implementation of horticulture activities in micro-watersheds.
- Detail estimated expenditure for the Institutional training programme will be obtained from the selected Institutes and approval is sought from the Project Monitoring Cell. The training shall be for minimum of 3 days. The approximate cost per person is Rs. 1500/-.

**b. Training to FIG members:**

- Apart from the Institutional trainings to lead facilitators one day training programme is organised to the members of FIG and other farmers already growing and interested to grow horticulture crops. Lead facilitators would play key role in mobilising the local trainings. The trainings are conducted on dry land horticulture crop management, INM, IPM, soil fertility, crop health, production aspects, water management and FPO concepts and as required for local situations. The farmers will be provided with a booklet covering all these aspects.
- The local trainings will be conducted by hiring an agency or the Project officers themselves. However, expenditures shall be drawn by Project officers.
- Total amount of Rs. 12500/- is allocated for each local one day training with a minimum of 50 members.
- Detail estimated expenditure is provided in **Annexure-1**.
- Documentation of all the training programmes should be properly and effectively made and systematically maintained.
- All the bills and vouchers pertaining to the training programme should be obtained within a week of completion of training programme from the agency.
- Report on training programmes having details of list of training programmes, subject matter specialist, technical bulletin, date and

place of training programme should be submitted to the PMC-along with the claim bill.

#### **5. Saturation of selected Subwatersheds through cluster approach:**

- The project aims to plan the activities in the watersheds based on the output of LRI and hydrology studies and as a pilot plan the Watershed Development Department under SUJALA-III project is implementing the soil and water conservation activities by saturating (Saturation meaning is complete integrated activity, developed by converging schemes of all departments in the selected Subwatersheds) the selected Subwatersheds in 4 districts viz., Bidar, Chamarajnaragar, Koppal, and Tumkur.
- The Horticulture Department shall simultaneously take up the crop plan and crop production activities with interventions for integrated horticulture development and productivity improvement.
- The selected Subwatersheds for Saturation of all integrated activities in 4 districts are Bidar – Raipelli, Chamarajanagar – Harve, Koppal – Bedavatti, Tumkur – Hebbur and the selected Subwatersheds for treatment in the remaining 7 implementing districts are Davangere – Kanchikere, Harapanahalli Tq, Gadag– Shirhatti, Gadag taluk, Kalburgi–Kalmandargi, Kalburgi taluk, Yadgiri–Malhar, Yadgiri taluk, Raichur – Raichur taluk, Vijayapur – Vijayapur taluk, Chikkamagaluru-Tarikere subwatersheds.
- As an initiation and to have an end to end horticultural approach in the subwatershed the various additional and new activities proposed to be implemented along with FIG formation and training are as follows:
  1. FIG formation.
  2. Awareness, training and capacity building (including training of trainers).
  3. Crop demonstrations (AEP, Rejuvenation).
  4. Land treatments (Soil Amelioration, soil & water conservation & micro nutrient treatments).
  5. FPO formation.
  6. Linking with PPP-IHD (end to end crop development).
  7. Post-harvest management, processing and Market linkages.
  8. Innovative and Research programmes (Crop hubs, Horticulture based animal husbandry and fishery).
- The Survey number wise or plot wise details of farmers/beneficiaries in identified subwatersheds, the soil and water conservation plan as



prepared by district partner team and agriculture officers should be collected from Universities or Joint Director Agriculture of respective districts.

- The detailed activities having Horticulture crop plan for productivity enhancement or interventions for existing crops has to be then prepared for each survey number/ farmer. The suitable maps as obtained for the different horticulture crops is analysed / grouped to select best crop. The crop selected (S1-Highly suitable, S2-Moderately suitable, S3- Marginally suitable) is based on the soil characteristic recommendations given by Universities for crop suitability. The selected major 3 crops out of the 11 or more dry land crops with recommended techniques with respect to each survey number should be proposed based on limitations that can be corrected. Finally one crop is selected based on farmers choice out of the 3 major shortlisted crops depending upon local requirement, income realized and market demand.
- Water harvesting farm pond and other such structures are required to the farmers for supporting irrigation and this alone cannot promote crops that need high water requirement at critical stages. Hence drip irrigation is proposed as supplement.
- Transfer of techniques shall be taken up through training of trainers for proper understanding and enhancing of knowledge to the farmers.
- Organizing farmers into FPO will help them to enhance production and market their produce in bulk eliminating the middlemen.
- Preparation of unique plan for each subwatershed with interventions for saturation is the special feature of the action plan. The indicative framework for preparation of action plan for saturation of subwatersheds is given in **Annexure-2**.
- The different activities taken up in each survey number or site specific areas are tabulated. All the activities in each survey number has to be documented and maintained for case studies and for evaluation. After approval of DPR / action plans detailed estimated budget requirement has to be prepared and submitted along with the cost estimates for individual activity with authenticated source and approval is sought from the appropriate authority.
- Convergence plan should be prepared for available schemes in the department ex: PPP-IHD or other schemes of various departments.

## **6. Crop Demonstrations:**

- Crop demonstration (area expansion with technique adoption) activity is taken up based on the crop suitability obtained from the LRI information. The Crop suitability data generated by University Partners will be used for identifying problems, site and area specific constraints affecting crop production and potentials of the selected subwatershed.
- The data on LRI and hydrology are analysed to provide the crop advisories to farmers through Decision Support Systems (DSS).
- Climate analysis used for identifying periods of onset and withdrawal of the monsoon, droughts of different duration and intensity, periods of intense rains and occurrence of floods and other aberrations that affect crop production for developing appropriate contingency crop plans to mitigate the adversities of climate is also provided through DSS.
- With respect to soil, crop suitability in each survey number is obtained either as highly suitable, moderately suitable, marginally suitable and not suitable. The highly suitable crop needs no technical interventions and can be cultivated as per the package of practices or with minimum interventions, whereas the moderately and marginally suitable crops are with certain limitations (eg. Depth, Gravelliness, rooting, slope, texture, PH etc.,) and crops are cultivated by correcting such limiting factors. However certain limitations cannot be corrected. The correctable limitations are intervenable and thus the requirement of treatments / techniques in each survey number varies with crop, soil & water relationship. Thus the integrated and sustainable Horticulture crop demonstration models / units are formed with an objective of introducing new technologies / techniques or adopting various aspects of good management practices, soil management and water management practices for productivity improvement.
- Demonstration units of perennials as main crop (Mango, Sapota, Jamun, Jackfruit, Tamarind, Amla, Guava, Cashew, Custard apple and Acid lime) with intercropping of locally suitable crops or relevant seasonal crops should be taken up in farmers plots selected amongst the members of FIG groups. The annual crop demonstrations ( Brinjal, Chilli, Curry leaf, Drum stick, Dolichos, French bean, Okra, Onion etc.,) are taken up in the valley region where there is potential for resources.

- The following technologies / interventions are broadly incorporated in the demonstrations where ever feasible.

**i) Water management:**

- a) Water storage structure:** This includes better rain water management by construction of Farm ponds, catch pits, trenches and bunds (crescent bunds, contour bunds etc., across the slope) depending on the slope and run off.
- b) Micro irrigation:** Providing protective irrigation through Drip irrigation system for better productivity. The National Mission on Micro Irrigation (NMMI) guidelines (2016-17) is followed and installation is done through companies selected by tender process.
- c) Gravity Drum kit Micro irrigation system:** For this activity the indicative cost norms obtained from the Watershed Department is provided in the Annexure-3.
- d) Mulching:** Organic mulches like green manure is used for better crop management through water conservation, weed control and creating congenial micro climate for crop development.
- e) Trench cum bund :** Under saturation programme as per the LRI findings, the trench cum bunding activity is implemented as per the WDD guidelines and schedule of rates. The bund formation will increase the water infiltration and reduce the soil erosion.

**ii) Soil management:**

- **Organic Manures and Integrated Nutrient Management:** Soil organic matter level is increased through judicious use of organic Manures, Vermi-compost, green leaf manure crops, crop residue incorporation and other INM constituents. The Organic inputs such as Neem cake and Biofertilizers (Azospirillum, Azotobacter, and Pseudomonas) are applied based on department recommendations vide reference book “Biofertilizers and Biocontrol agents for Horticulture Crops” published at Biocentre, Hulimavu, for promoting organic farming. Carbon sequestration is considered as one of fertility improving factor. Use of wood ash, paper mill sludge, molasses can be tried.
- **Green manure crops/Fodder crops:** Green manure crops/Fodder crops such as Sun hemp, Horse gram, Mucana (Velvet bean), Diancha are grown to encourage in-situ green manuring which inturn increases soil fertility.

- **Soil and water testing:** To identify soil nutrient status or soil health status for major nutrients and micro nutrients (N,P,K, Organic Carbon, pH, Zn, B, Fe) soil and water testing is carried out before taking up the crop demonstrations. This also helps in analysing the problematic soils and crop suitability. Later the recommendations are followed as per the package of practices (i.e from the 2<sup>nd</sup> year of crop growth). Based on recommendations of soil and water analysis or the fertility status as obtained in the fertility maps the quantity of critical inputs and supplements (i.e the need based micro nutrients) are recommended for better productivity.
- **Bund sowing:** Suitable annual vegetable seeds and biannual seedlings are sown all along the bunds in the farmer fields. This practice helps in strengthening the bunds against rain and wind associated erosion and generates additional income to farmers.

### iii) Crop management:

The good crop management practices as per the package of practices are followed and the interventions recommended for crop plan are adopted.

- **Border plants:** Border plants such as Drum stick, Jack fruit, Karonda, Neem, Honge, Jamun, Tamarind, Pongamia, Silver oak etc., are introduced as Wind Breaks in two rows by zig-zag method of planting by proper spacing to protect from wind damages and various pests and diseases.
- **Intercrops and Mixed crops:** Intercrops and Mixed crops are grown for Land use efficiency which in turn increase the productivity and income during the juvenile period. Short duration high yielding varieties and locally relevant seasonal crops are chosen as intercropped.
- **Technical specifications:** **Technical specifications** to procure perennial crops is as follows:
  - 1) High yielding, drought tolerant and suitable to rainfed area hardy varieties and market demand varieties of different crops such as Mango, Cashew, Sapota, Jack fruit, Jamun, Amla, Guava, Tamarind, Annonaceous fruits are grown as per recommended spacings.
  - 2) One year old improved variety grafted plants developed preferably through Approach/Soft wood grafting method having minimum of 2-3 ft height and 5-8 cm stem girth at a height of 5 cm from the top of the polybag.

- 3) Well-developed healthy grafted plants grown in open sack poly bag of 6"\*9" size with minimum 300 guage strong polybag free from pests and diseases having more number of well developed, healthy, active and energetic roots.
  - 4) Plants should have minimum 10-12 green leaves.
  - 5) Follow the crop specific spacing and other cultural practices as per the package of practices.
- **Technical specifications of the annual crops is as follows:**
    - 1) High yielding improved variety seeds/seedlings
    - 2) Healthy seedlings free from pests and diseases.
    - 3) Seedlings should be of 10-15 cm height having 2-4 healthy green leaves.
    - 4) Follow the crop specific spacing and other cultural practices as per the package of practices.

**iv) Maintenance and Convergence:**

- The soil type, soil pH, depth, texture, gravelliness are considered for crop selection based on LRI information.
- The minimum area taken for perennial demonstration would be **0.4 ha** and up to the maximum area of **1 ha** and in case of annuals it is **0.2 ha to 0.4 ha** per beneficiary.
- The Project would support the costs involved for planting materials and inputs.
- The operational costs should be met out by the beneficiary himself.
- The cost involved on material component for second year maintenance in demonstration field is from the project.
- The Small Farmer and Marginal Farmer, SC/ST, Women farmers should be encouraged as per the reservation guidelines.
- To keep FIG continuously active the FIG should be given benefits from the various schemes in the Department and other departments through convergence.
- The Indicative Cost of different perennial crops and annual crops are provided in the **Annexure-4** and this does not include the indicative costs for intervenable techniques as per LRI recommendations. The productivity improvement is documented by recording the different growth and yield parameters.

- Control plots: Minimum 5% plots under demonstrations are maintained as control plots or (additional area on individual plot as maintained by beneficiary).
- For the demonstrations taken during the first year, its second year maintenance cost claimed during the next year is followed as per the previous cost norms.

## **7. Crop Soil water relationship for productivity improvement in Departmental farms:**

- To disseminate complete knowledge on watershed concepts for farmers of micro-watershed areas in relation to soil water conservation (Like Boundary trench cum Bunding, Crescent bunding, Catch pits, Water storage structures-Community pond, Farm pond, trench method of planting, the crop management models etc.,) with respect to productivity improvement the demonstrations shall be laid down in the Department farms. This encourages the farmers to adopt various watershed activities in their own fields/lands and to maintain the natural resources without further depletion.
- Departmental farms approved by the KSHDA are selected. In case of the farms which are not in the micro-watershed area, the farms should be in the taluk of the micro-watershed area or it has to be nearer, feasible and helpful to the farmers.
- The activities are taken after a topographical survey of the entire farm and LRI information for Crop planning and infrastructures. The estimates for infrastructures are obtained from the competent authority. The DPR with appropriate Horticulture practices has to be prepared and approval is sought from the Director of Horticulture.
- The construction of polyhouse with water harvesting structure can also be included where ever necessary.
- The additional budget requirement will be converged with Departmental Scheme and through the KSHDA funds or MGNREGS funds.
- The model nursery activities for propagation of planting material are to be included so that the quality planting material can be produced for the local requirements.

## **8. Creation of rainfed polyhouse with water storage structures:**

- To encourage small and marginal farmers in cultivation of high value cash crops under polyhouses in low rain areas, polyhouse demonstrations along with rain water storage structure is proposed.
- The rain water storage structure with a capacity of **507 cum (13x13x3mt)** along with shadenet cover and a poly house with a dimension of **1000 sq.mt** is recommended.
- The cost of material is from the project and the beneficiary should bear the labour cost of poly house erection and operational cost. (approx. 10-15% of total cost).
- The polyhouse construction is done through companies selected by tender process.
- In case if the demand is more than the target the beneficiary is selected through lottery
- However cluster approach is to be followed.
- **The cost norms for the structure is provided in the Annexure-5. (as per market rates)**
- The beneficiary should also be ready to contribute 5% material cost of tender approved amount for the benefit of community (ie., to the FIG/FPO groups).
- The activity should be in a cluster approach to help the beneficiaries for marketing the produce.
- Technical scrutiny committee comprising specialist of protected cultivation should be formulated at district level to inspect quality of work at frequent intervals and to examine quality of work as per specifications.
- In case of any defaults identified during inspection, the suppliers should be held responsible and give instructions to rectify problems. After incorporating required corrections, it should be certified by the technical scrutiny committee before making final payment to the supplier.
- The impactness of protected cultivation, water stored for efficient use, its impact as compared to open field cultivation has to be documented and a case study should be made with respect of each polyhouse constructed at districts.

## 9. Creation of shadenet structures for cultivation of high value crops:

- The production of vegetable crops and profitability of farmers can be enhanced by encouraging 'off-season' production under shade net structures.
- Year round cultivation of seasonal Horticulture crops in micro watershed areas.
- Economic status of farming community can be strengthened by increasing production and quality of produce by limited area usage.
- Reduction in usage of plant protection chemicals by following protected cultivation.
- Farmer should have interest in growing high value horticulture crops in 1000sq.mtr. shade net house. He should also make efficient utilization of the same in future.
- As shadenet house is being implemented in rainfed area, farmers should have the capacity to provide protected irrigation in case of rain failures.
- Required certificates and documents should be collected from selected beneficiary farmers.
- The activity should be in a cluster approach to help the beneficiaries for marketing the produce.
- In case if the demand is more than the target the beneficiary is selected through lottery method. However cluster approach is to be followed.
- Estimated cost for the construction of 1000sqmt, 2000 sqmt, 3000 sqmt and 4000 sqmt GI pipe Shadenet House with Antichamber is provided in the **Annexure-6**.
- The beneficiary should also be ready to contribute 5% material cost of tender approved amount for the benefit of community (ie., to the FIG/FPO groups).
- Technical scrutiny committee comprising specialist in protected cultivation should be formulated at district level to inspect quality of work at frequent intervals and to examine quality of work as per specifications.
- In case of any defaults identified during inspection, the suppliers should be held responsible and given instructions to rectify problems. After incorporating required corrections, it should be



certified by the technical scrutiny committee before making final payment to the supplier.

- If defaults are not rectified by the supplier then action shall be taken on suppliers as per the tender rules.

#### **10. Horticulture Service Support (Nutrition Kits):**

- Plants need sufficient nutrients in proper balance for normal growth and development.
- Nutritional kits are distributed to improve the soil nutritional status and income through increased production of Horticulture crops in watershed areas.
- Bio-fertilizers which are less expensive, eco-friendly and sustainable inputs containing microorganisms which are capable of mobilizing nutritive elements from non-usable form to usable form through biological processes and finally increase the Physico-chemical properties of soils enriching the soil fertility can be promoted.
- If a farmer in FIG is given the benefit of Demonstrations, other farmers in micro-watersheds or even non micro watershed area are given priority to avail this component so as to maintain socio-economic equality in the locality to some extent.
- The Package of Bio-inputs (Nutrition kits) for Fruit crops and vegetable crops is provided in **Annexure -7.**
- At least 10% of plots are tested for improvement in soil fertility before and after the crop cultivation.

#### **11. Field days :**

- Crop demonstrations taken in the project area for productivity increase will be followed by organising the field days to expose the neighbourhood farmers on the techno-managerial aspects of the suggested practices and techniques followed in the demonstrations.
- The Field
- days will be conducted through an agency or project officers and expenditure shall be drawn by Project officers themselves.
- The lead facilitator selected among FIG's, Department officers, KVK officials and NGO's shall co-ordinate in organising Field days.
- During field days interactions will be organized between the experts and farmers of the Micro-watershed area.

- The productivity is analysed and the benefits are evaluated. The sample booklet for recording “**Growth and Yield Parameters**” is provided in **Annexure-8**.
- A hand book on sustainable practices of dry crops will be made available to the farmers during the field days.
- Each field day is organised at **Rs.20000/-** with a minimum of **60-80** members per Field day. Estimated details are provided in the **Annexure-9**.
- Documentation of all the field days should be properly and effectively made. The growth and yield parameters, the local techniques adopted and intervenable activities are to be listed and the end results are to be documented.

## **12. Exposure Visits:**

- Exposure visits are organised to the FIG members/farmers to the places of excellence, research organizations, as well as to the places where rain-fed Horticulture is successfully carried out in the field including the fields of progressive farmers with a view of disseminating technical knowledge on latest technological issues of rain-fed Horticulture, recent releases on the crop varieties, marketing prospects, FPO concepts etc.,
- The exposure visits will be organized within the state and outside the state.
- The details of visit should be decided during the course of implementation in consultation with PMC and approval should be obtained from the Directorate of Horticulture.
- The cost of exposure visit depends on place of visit and DPR has to be prepared and submit to the PMC for approval.
- The visits can be organised through an agency.

## **III. Criteria in Selection of the Beneficiaries:**

- The General guidelines of the department is followed where ever possible (Ref No Govt.Order.No:DH:53:HPP:2016,Bangalore, Dated:27-06-2016)
- Beneficiaries for crop demonstrations are selected among the FIG members formed in the MWS based on the interest of the farmer, availability of land, contribution against the operational cost and his willingness to converge the activities of other schemes (Acceptance letter should be provided). The farmer should agree to maintain the

demonstration plot in future and to take up field days in his demonstration plot under the guidance of subject matter specialist and department officers. However, all the beneficiaries can be included for demonstrations in a MWS through cluster approach based on LRI studies with respect to crop and land use capabilities.

- All the members in a FIG shall avail one or the other benefits in the project. The farmers should get involved in the programme and participate in taking up each activity on a participatory mode. Selection of the beneficiaries amongst the members for each activity is by conducting the meeting having discussions and drawing proceedings. The economically weak beneficiary in the FIG should be given first preference.
- If there is more demand among the FIG members, selection should be based on lottery.
- Beneficiary should submit application in prescribed format with relevant documents to the project officer at the district office.
- The land should be in the name of the beneficiary. In case of joint khata **Accordance letter** along with certificate from Revenue Inspector should be submitted by the beneficiary.
- Beneficiary must hold Adhaar card / epic card.
- In case the land is in the name of Deceased parents, Death Certificate certified by RI and Accordance letter (Affidavit) from other members of the family has to be submitted along with certificate from Revenue Inspector to avoid any land disputes.
- As the Demonstrations and other activities are implemented in rainfed areas, the farmer should have a capacity to provide protective irrigation in case of rain failures or at critical stages of crop.
- Preference should be given to women, schedule caste and schedule tribe farmers during beneficiary selection.
- As per Government orders generally as in other schemes of Department of Horticulture, under World Bank assisted KWDP-II SUJALA-III Project also benefits are provided based on reservations among the different categories.
  1. Schedule Caste (SC)- 17.15%
  2. Schedule Tribe (ST)-6.95%
  3. Women-33%
  4. Physically Handicapped-3%
  5. Minorities -5%

#### **IV. Records and Inspections:**

The following documents should be collected from the farmer / beneficiary.

- Duly filled prescribed application form with relevant documents along with the signature, Photo of beneficiary (in duplicate) Bank Account number, EPIC Card number, Aadhar card number and Mobile Number.
- RTC.
- Boundary sketch of the land.
- Computerised Revenue Crop Certificate. Affidavit from the beneficiary for taking up the demonstrations as per the guidelines of the project.
- The Project officers of KWDP-II, (SUJALA-III) should scrutinise the documents submitted and maintain the documents in the register.
- The demonstration plots should be regularly inspected and technically guided.
- All the activities proposed plot wise should be documented and inputs/investments has to be recorded for calculation of Cost-Benefit ratio.
- Horticulture Assistant and Assistant Director of Horticulture to inspect - 100% Demonstration plots.
- Project Officer to inspect– 75% of the plots inspected by HA and ADH.
- Project Co-ordinator – 10% of the plots inspected by project officer.

#### **Component B:**

##### **Soil and Crop Monitoring in Farmer's Field:**

##### **Objectives:**

The objectives of this component is to educate and facilitate the farmers in watershed areas to take up soil, water and leaf analysis for the following purposes.

- To identify the problematic soils and support reclamation by adopting suitable measures and improve the soil fertility status.
- To demonstrate application of nutrients based on the nutrient status of the soil.

- To help the farmers in deciding the crops and the method of irrigation to be followed based on water analysis.
- To help in adopting supplementary measures in maintaining the nutrient status, mainly in perennials and heavy nutrient requiring crops like fruits and plantation crops by assessing the deficiency through leaf and tissue analysis.

### **1. Establishment of Soil, Water and leaf analysis laboratory:**

- To overcome low cost practices resulting in poor soil fertility and lower yields in farmer field and to build capacity of farmers to take timely decisions in application of right nutrients based on appropriate scientific knowledge, it is proposed to establish soil, water and plant tissue analysis laboratories at district level and facilitate the farmers to get the soil and plant nutrient status analysed for incorporation of suitable quantity of nutrients to maintain a good health of crop-soil-humus ratio.
- Establishment of soil, water and tissue analysis facilities shall help the farmers, especially those taking up demonstrations of annual and perennial crops, to check the soil for nutrient status, quality of water and nutrient status at different stages of crop growth at micro-watershed levels.
- The civil constructions will be taken up by following appropriate method of procurement under World Bank procurement guidelines.
- The Engineering cell in the Department would assist in preparation of estimates, plan and design for obtaining proper sanctions.
- The terms & conditions of the tender document shall be strictly adhered.
- The project officers of the district should regularly follow up with the approved bidder / contractor and complete the works within the time frame.
- The Engineering cell in the department shall monitor the quality of work, certify the MB book and bills raised and finally recommend for approval.

### **2. Sampling and testing of soil, water and leaf tissue and development of Soil Health Cards:**

- Soil and leaf tissue analysis will be carried out for major nutrients (N.P.K.pH, EC, Secondary nutrients (Ca, Mg, S), Micro nutrients (Ca, Zn, Mn, B, Fe etc.,) and water analysis for pH, EC, Carbonates/Bicarbonates, Chlorides and Sodium.

- In each micro-watershed, two samples will be analysed that will help in knowing the status of soil broadly for right amendments. However, all the members of FIG should be given the benefit of sample analysis.
- The analysis should be carried out in Government Institutions /Universities such as KVK's, Biocentre - Hulimavu.
- The project would cover the cost for analysis and transportation to the nearest lab.
- Based on the test results the project officers would suggest application of nutrients and reclamation. Soil health cards are issued to facilitate the farmers for future reference and to understand the integrated nutrient management.

Note: Soil samples need not be assessed or analysed the plots which are already available in the fertility maps provided by Universities. However in all demonstration plots samples are to be analysed.

### **Component C:**

#### **Post-harvest Management & Value addition:**

This subcomponent aims at collecting information representing the status of district as a whole and not the micro watersheds in terms of existing horticulture area, potential for expansion of area under horticulture, increasing production and productivity of horticulture crops by implementing need based and suitable expandable pre-harvest and post-harvest operations / interventions. Farmer adoptable small post-harvest technologies and post-harvest infrastructures such as precooling units, pack houses, cold storage units, Aggregating centers etc., and facilitating marketing linkages, thereby minimizing the post-harvest and marketing losses.

NABCONS, a consultant identified for conducting baseline survey studies and developing a report by analyzing the data and providing recommendations on the need based post-harvest and marketing infrastructures technologies for value addition, designs and specifications of recommended infrastructure shall be suggested. Based on the suggestions the estimates for the proposed, need based Post-harvest & Marketing infrastructure and other activities would be obtained from the appropriate agency for market values and World Bank Procurement procedures for the Goods, Works etc., would be followed and detailed Guidelines in this regard would be circulated on a regular basis.

However, irrespective of the study and report “need based” small scale farmer adoptable postharvest and marketing technologies would be proposed such as use of plastic crates, low energy storage units, minimal processing and marketing techniques/facilities shall be proposed. The district officers shall closely monitor these activities towards achieving the outcome of result framework postharvest indicators.

### **Component D:**

#### **Strengthening market linkages for Horticultural farmers.**

Under this subcomponent FIGs formed in districts at MWS including eligible and interested farmer based on the scope for end to end horticulture activities are federated to form Farmer Producer Organization (FPO). The farmers under FPO would be provided all the benefits of marketing linkages and support.

All the FPOs formed & registered will be monitored by following PPP-IHD guidelines formulated in the Horticulture Department. This scheme envisages for empowering farmers to take care of their needs with backward & forward linkages. Each FPO is comprised of about 1000 farmers mobilized as 20 members in each Farmer Interest Groups.

The FPOs formed under the project will be registered under Company’s Act, 2013 as a Producer Company in each implementing districts. However, additional FPO can be formed based on the potentiality or resources in MWS or demand from farmers. For the registered FPOs the following facilities are provided:

1. Government of Karnataka is providing financial support for the infrastructural facilities of FPOs up to 90%
2. Selected Resource Institutions (RI) to assist and organize the working of FPOs and to provide them management support for 3 years.
3. RIs engage the Local Resource Persons (LRP) to help the farmers with necessary inputs and keep tracking the progress of the activities in field.
4. RIs in turn are provided with technical inputs by the State Universities and IIHR resource persons.
5. The management support will be provided to the FPOs for 3 years by the state government.
6. FPOs are granted licenses in seeds, fertilizers and pesticides for storage and sales.

7. The FPOs will be provided with APMC Commission Agent license and Trader license with priority go-down space in APMCs.

Further, the Resource Institutes (RIs) allotted by SFAC, New Delhi are involved in formation of FIG and FPO groups, Monitoring the activities of FPOs, preparation of business plan & its implementation.

However for working towards sustainability of the FPOs under the project close monitoring, planning of activities as per the business plan to be developed for 2-3 crops proposed as per the LRI studies and implementation of these activities will be done by district implementing officers with the assistance of the consultant.

The consultant for preparation of business plan for SUJALA FPOs shall be hired by Single Source method as per World Bank Procurement Procedures.

## **Component E:**

### **Horticulture Service support**

In order to achieve the goals and objectives enlisted under the project, the Project Monitoring Cell (PMC) at the Directorate of Horticulture, Project offices at 7 districts are functioning as an extended arm for implementation of SUJALA-III. With this structure, it has been aimed at building better support for functioning and timely monitoring of horticultural component. The main objective of PMC is to plan, monitor, coordinate and facilitate the convergence of the horticulture programme with that of SUJALA-III and also arrange for the flow of latest technology available on project activities like crop production, crop management, post-harvest handling and arranging for marketing linkages to the farmers/farmer groups in the MWS and Subwatershed level. In addition to regular project staff required services at various levels will be taken on outsourcing basis and as consultancy services for the implementation of the project activities.

## **V. Method of Procurement:**

- Horticulture inputs and planting materials needed for implementing demonstrations, materials required for construction of polyhouse and shadenet structures in farmers and inputs required for other activities are procured by following World Bank procurement Procedures.



- All the materials to be procured for different activities under the project should be included in the procurement plan mentioning the appropriate method of procurement by taking prior approval from the World Bank.
- Quality test certificate should be maintained for all the inputs purchased and wherever applicable.
- All procurements are through e-portal and in case if there is no participation of bidders in first call, only then the manual procurement can be followed (up to shopping threshold).
- All the bills should be submitted to the PMC for counter signature.

## **VI. Literature and Publication:**

- Literature on Annual crops, perennial crops, cultivation aspects productivity improvement of existing orchards, latest techniques, INM, IPM, water conservation, land use pattern, efficient utilisation of resources and other similar topics felt appropriate for the programme implementation are to be published and distributed to the members of the FIG groups and other stake holders after obtaining approval from the Project Technical committee.
- Publication of Booklet having consolidated information on post-harvest management, processing and marketing of different Horticulture crops can also serve the requirement towards post-harvest activities and their demonstrations.
- The farmers will be provided with a booklet covering the details on soil sampling size, steps followed in collecting soil, water and leaf samples, preparation of composite samples and interpretation of water and leaf tissue test results with suitable amendments in Kannada language for easy understanding of farmers.
- The cost of publishing each booklet depends on the quality and its volume and appropriate procurement procedures are followed.
- The district Project officer shall prepare information in consultation with the Scientists of Universities, Krishi Vignan Kendra Research Institutes (KVK), SADH plant nutrition, Biocentre, Hulimavu and obtain approval of PMC. The PMC shall also prepare the publications by direct contract with Universities or through an agency or individuals.

## **VII. Reporting and Documentation:**

1. All the activities/component implemented, methodology, beneficiaries along with their feedback, outcome of the activities,

extent of incorporation of technology, learnt lessons, risks and mitigations, case studies and success stories has to be documented systematically of the FIG group in general and individual beneficiary wise by the department officers.

2. The progress report and the expenditure statement along with 62 B has to be submitted by third of every month in the prescribed format.
3. The documented soft and hard copy of success stories, photographs audio & video tapes, case studies literatures, publication should be regularly submitted to PMC month wise & quarter wise to be published in e-newsletter and other plot forms.

**Note:**

1. The concept note on the Project is attached in the **Annexure-10** to provide an overview of the project.
2. GPS photographs shall be taken in beneficiary field before the activity implementation, during all stages of implementation and after completion of the activity along with the beneficiaries.
3. Survey number wise mapping of all the above activities through GPS coordinates.
4. All the planting materials and inputs procured for demonstrations should be certified by the beneficiary, Horticulture Assistant, Assistant Director of Horticulture and Project Officers.
5. The indicative cost norms for all the activities given during 2015-16 will remain same for the year 2016-17. (**Annexure-1, 3-9**) If there are any changes corrigendum shall be issued regularly.
6. Certifying team will be held responsible for any misappropriation in the implementation of all the activities.
7. Project officer is held responsible for late submission, ineligible and incomplete proposals.
8. The project activities should be implemented according to the approved MPIC.
9. The project officer should give sanction order as per the Finance Department order No: FD2 TFP 2010, Bangalore dated: 30-04-2010.

**Director of Horticulture**