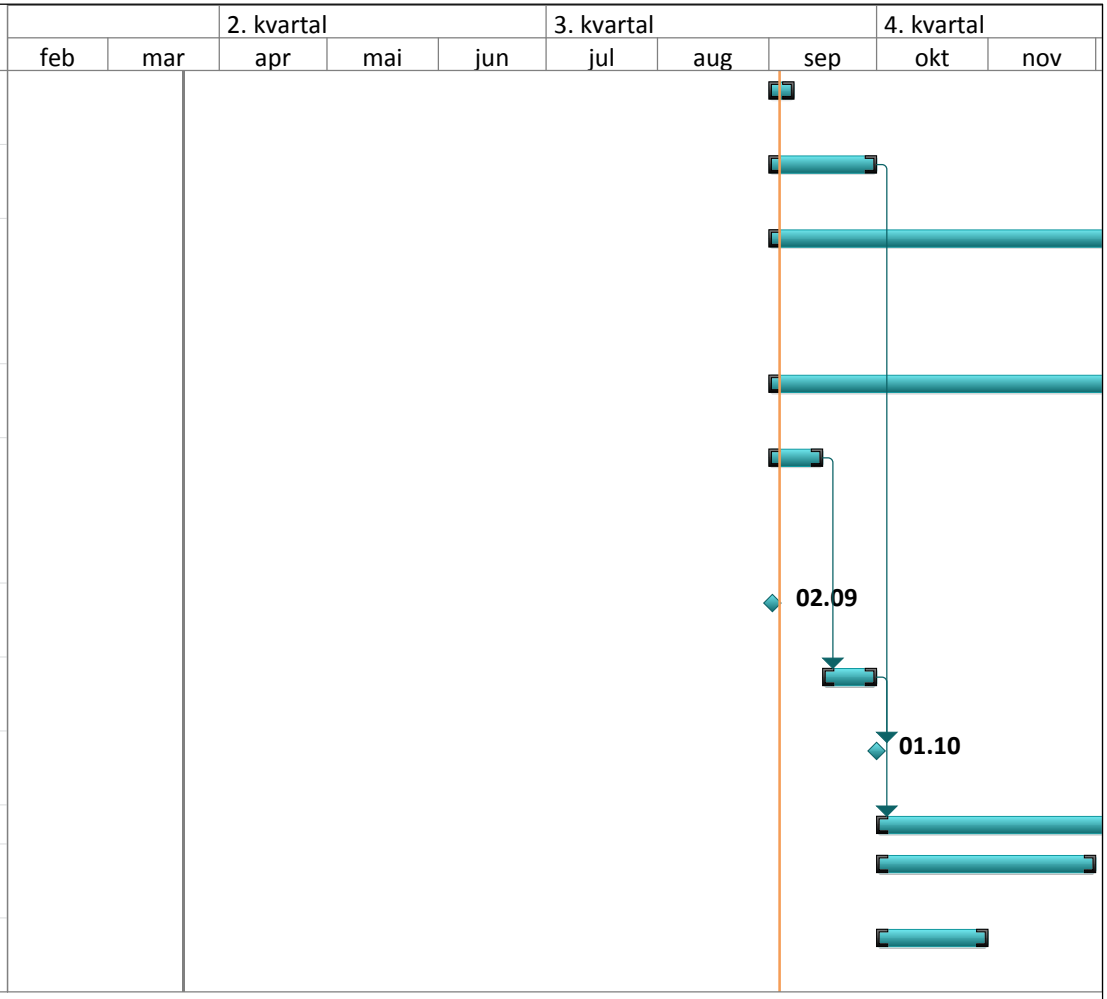
| ID | | Aktivitetsı | Task Name | Varighet | Start |
|---|---|---|---|---|---|
| 1 | | | Sign contract with TdN and Hugo Tarillo (SF) | 7 dager | sø 01.09.13 |
| 2 | | | Select Project Coordinator (TdN) | 22 dager | sø 01.09.13 |
| 4 | | | Present project in detail to community (Parco Alto) and negatiate contributions (TdN) | 88 dager | sø 01.09.13 |
| 5 | | | Linking up with local and regional authorities (TdN) | 392 dager | sø 01.09.13 |
| 7 | | | Elaborate ToR and select consultant for baseline study and final evaluation (SF) | 12 dager | sø 01.09.13 |
| 6 | | | Deliver revised Implementation Plan (SF) | 0 dager | ma 02.09.13 |
| 8 | | | Design of M&E system (consultant B + SF) | 11 dager | ma 16.09.13 |
| 3 | | | Hire Project Coordinator - PC (TdN) | 0 dager | ti 01.10.13 |
| 9 | | | Monitoring (TdN + SF) | 370 dager | ti 01.10.13 |
| 12 | | | Construction of buildings for the Core Enterprise (PC) | 45 dager | ti 01.10.13 |
| 15 | | | Carry out baseline study (PC + Consultant B) | 23 dager | ti 01.10.13 |




Project: HGF-Project Plan
Date: on 04.09.13

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| Task | | External Milestone | | Manual Summary Rollup | |
| Split | | Inactive Task | | Manual Summary | |
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| Summary | | Inactive Summary | | Finish-only | |
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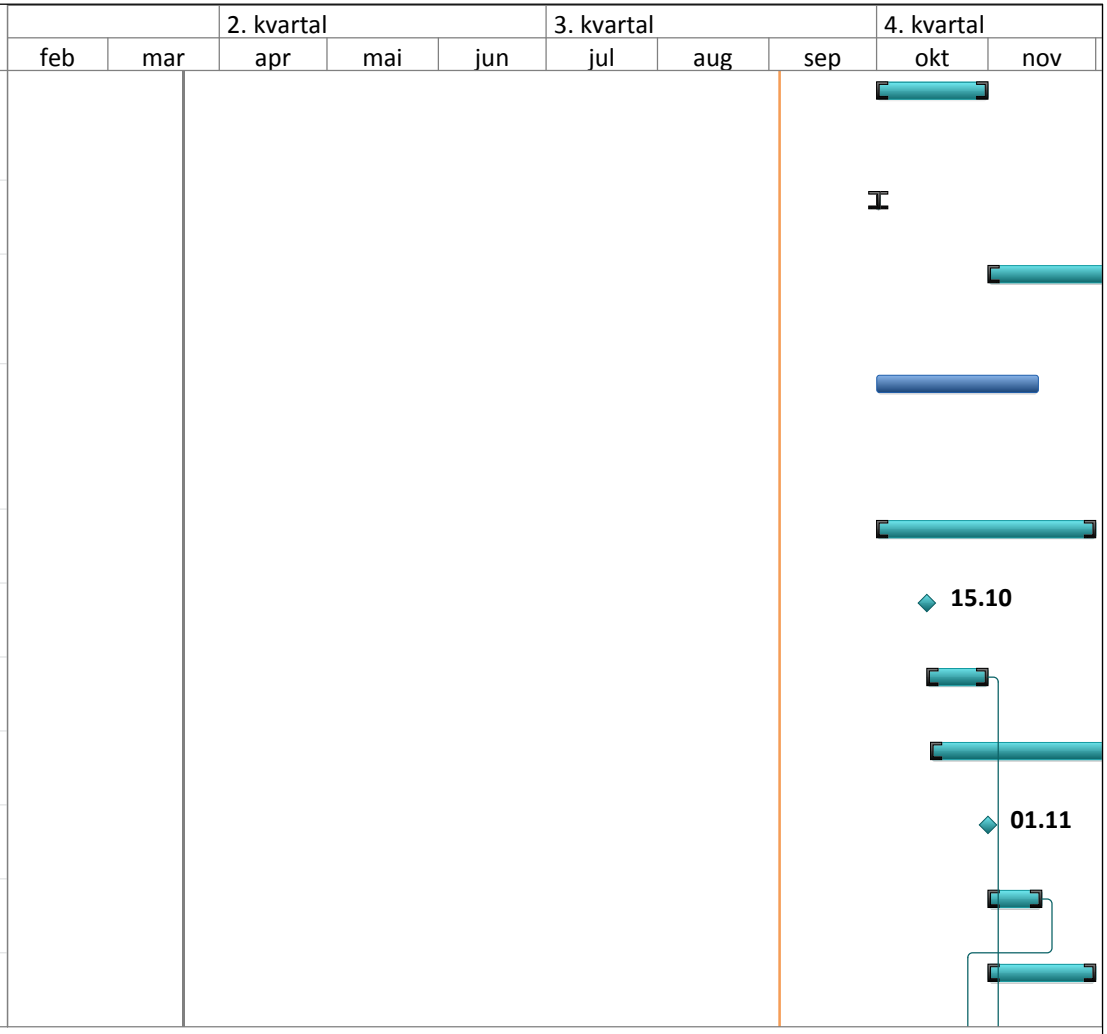
| External Tasks | | Duration-only | | Progress | |

| ID | | Aktivitetsı | Task Name | Varighet | Start |
|---|---|---|---|---|---|
| 21 | | | Inventory of animals and potential supplying families (PC) | 23 dager | ti 01.10.13 |
| 22 | | | Purchase of HGF equipment and guinea pig cages (PC) | 1 dag | ti 01.10.13 |
| 24 | | | Start purchase of barley and promote its cultivation (PC + Plant Manager (PM)) | 43 dager | fr 01.11.13 |
| 34 | | | Construction of greenhouses and breeding space for guinea pigs and sheep (PC + PM) | 33 dager | ti 01.10.13 |
| 43 | | | Promote the sowing of barley (PC+PM) | 45 dager | ti 01.10.13 |
| 10 | | | Agreement signed between TdN and community (TdN) | 0 dager | ti 15.10.13 |
| 16 | | | Selection and hiring of Plant Manager (TdN) | 13 dager | ti 15.10.13 |
| 14 | | | Formalization of the enterprise (PC) | 68 dager | on 16.10.13 |
| 13 | | | First building completed (PM) | 0 dager | fr 01.11.13 |
| 17 | | | Selection and hiring of worker #1 (PM) | 11 dager | fr 01.11.13 |
| 20 | | | Technical training for PC and PM (consultant A) | 22 dager | fr 01.11.13 |




Project: HGF-Project Plan
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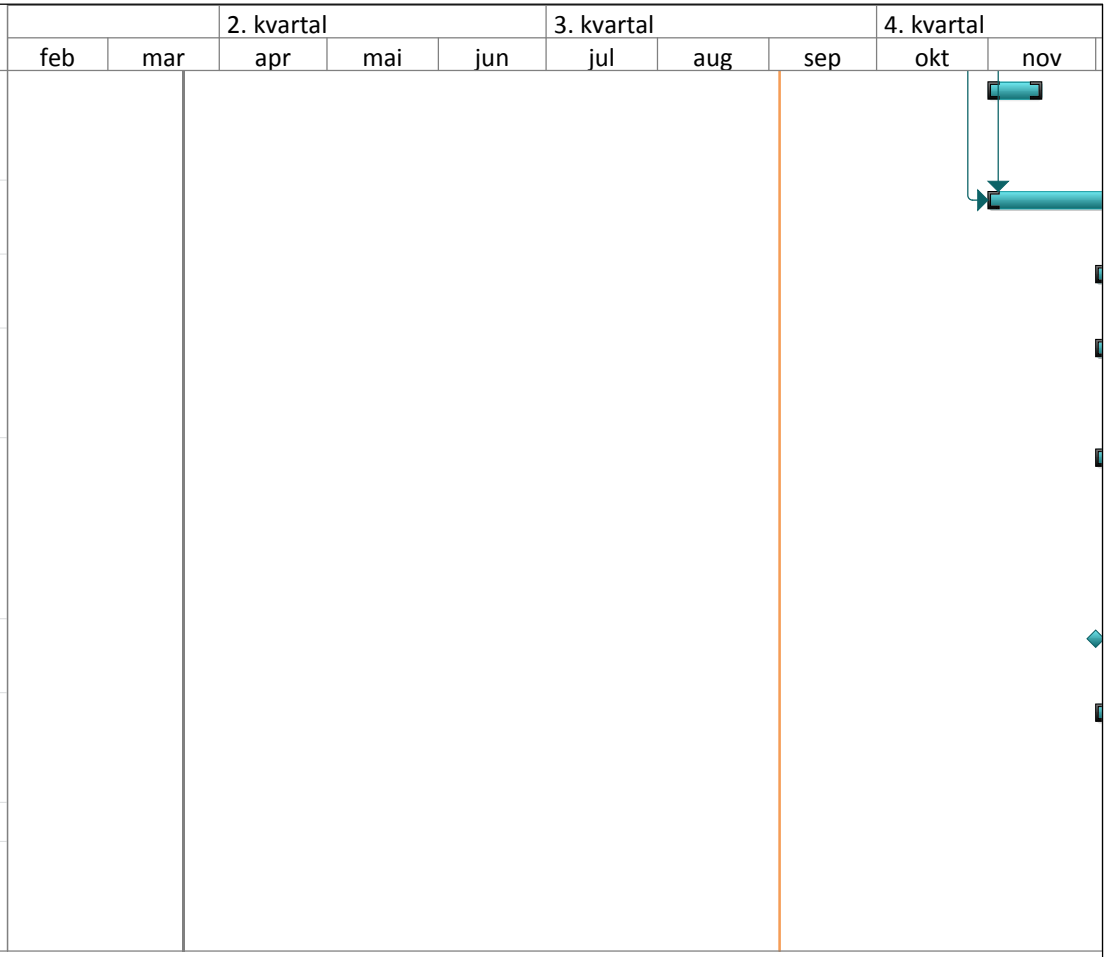
| ID | | Aktivitetsı | Task Name | Varighet | Start |
|---|---|---|---|---|---|
| 23 | | | Transport of HGF equipment from Arequipa and installation in Anchonga | 11 dager | fr 01.11.13 |
| 31 | | | Technical training of PM and workers (consultant A) | 45 dager | fr 01.11.13 |
| 25 | | | Purchase of sheep from families: 25 per week (PM) | 132 dager | sø 01.12.13 |
| 30 | | | Purchase of guinea pigs from families: 50 per week (PM) | 327 dager | sø 01.12.13 |
| 32 | | | Workshops for locals on HGF and animal raising (animal health, nutrition, shelter, reproduction) (PM + consultant A) | 172 dager | sø 01.12.13 |
| 42 | | | Core enterprise starts operations (PC) | 0 dager | sø 01.12.13 |
| 57 | | | Identify buyers of livestock and prepare marketing plan (PC + consultant A) | 47 dager | sø 01.12.13 |
| 11 | | | Enterprise is formalized (PC) | 0 dager | on 01.01.14 |
| 36 | | | Purchase of 10 improved rams for breeding purposes (PC + consultant A) | 23 dager | on 01.01.14 |

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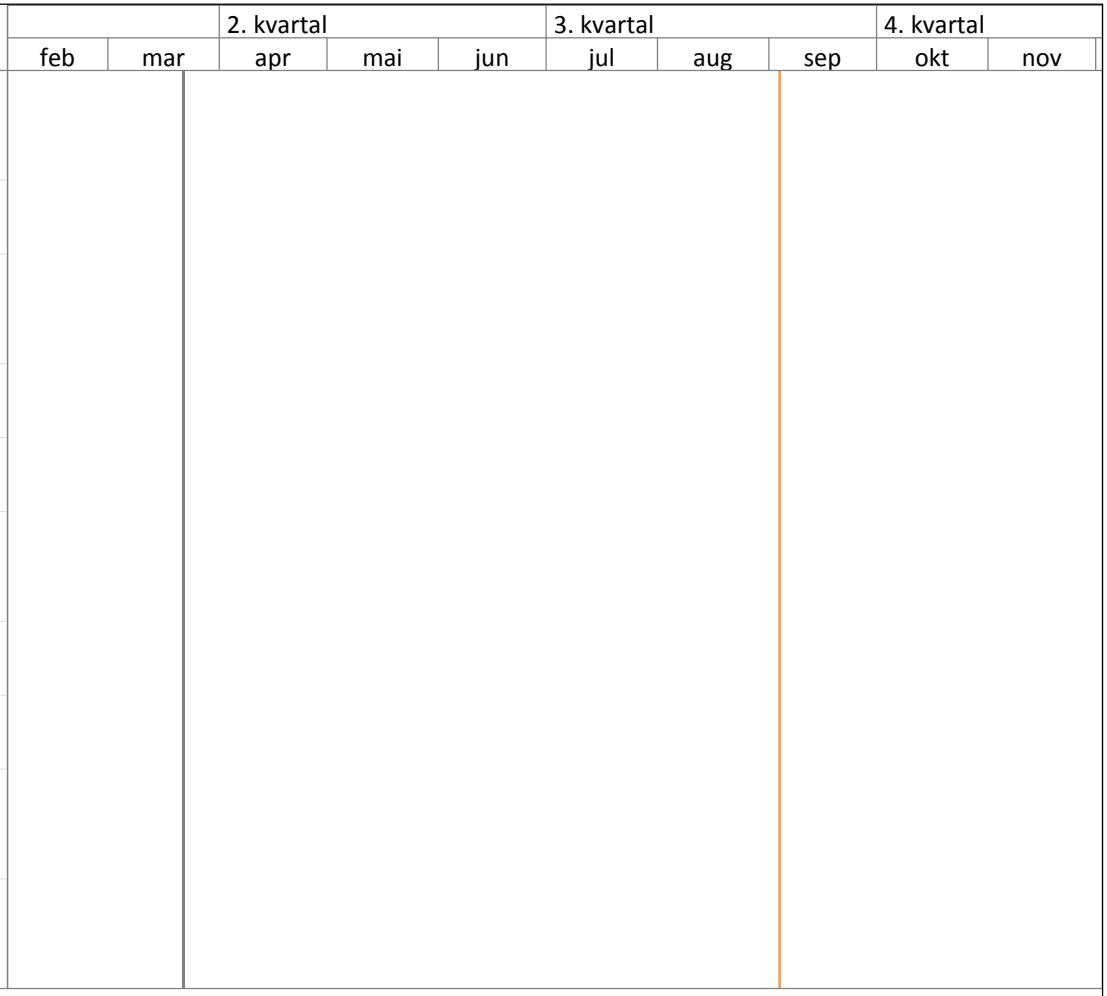
| External Tasks | | Duration-only | | Progress | |

| ID | | Aktivitetsı | Task Name | Varighet | Start |
|---|---|---|---|---|---|
| 37 | | | Purchase of 330 guinea pigs for breed improvement purposes (PC + consultant | 23 dager | on 01.01.14 |
| 19 | | | Selection and hiring of worker #2 (PM) | 21 dager | lø 01.02.14 |
| 35 | | | Purchase of HGF equipment and cages (PC + consultant A) | 21 dager | lø 01.02.14 |
| 44 | | | Sales of fattened sheep and guinea pigs (PM) | 282 dager | lø 01.02.14 |
| 45 | | | First sales of Core Enterprise (PM) | 0 dager | lø 01.02.14 |
| 49 | | | Implementation of breed improvement program(PC + consultant A) | 282 dager | lø 01.02.14 |
| 40 | | | Start of apprenticeship program (PC) | 0 dager | lø 01.03.14 |
| 41 | | | Apprenticeship program operational (PC) | 262 dager | lø 01.03.14 |
| 33 | | | Selection of family enterprises eligible for loans (PC + PM) | 65 dager | ti 01.04.14 |
| 38 | | | Purchase of additional 10 improved rams (PC + consultant A) | 23 dager | to 01.05.14 |

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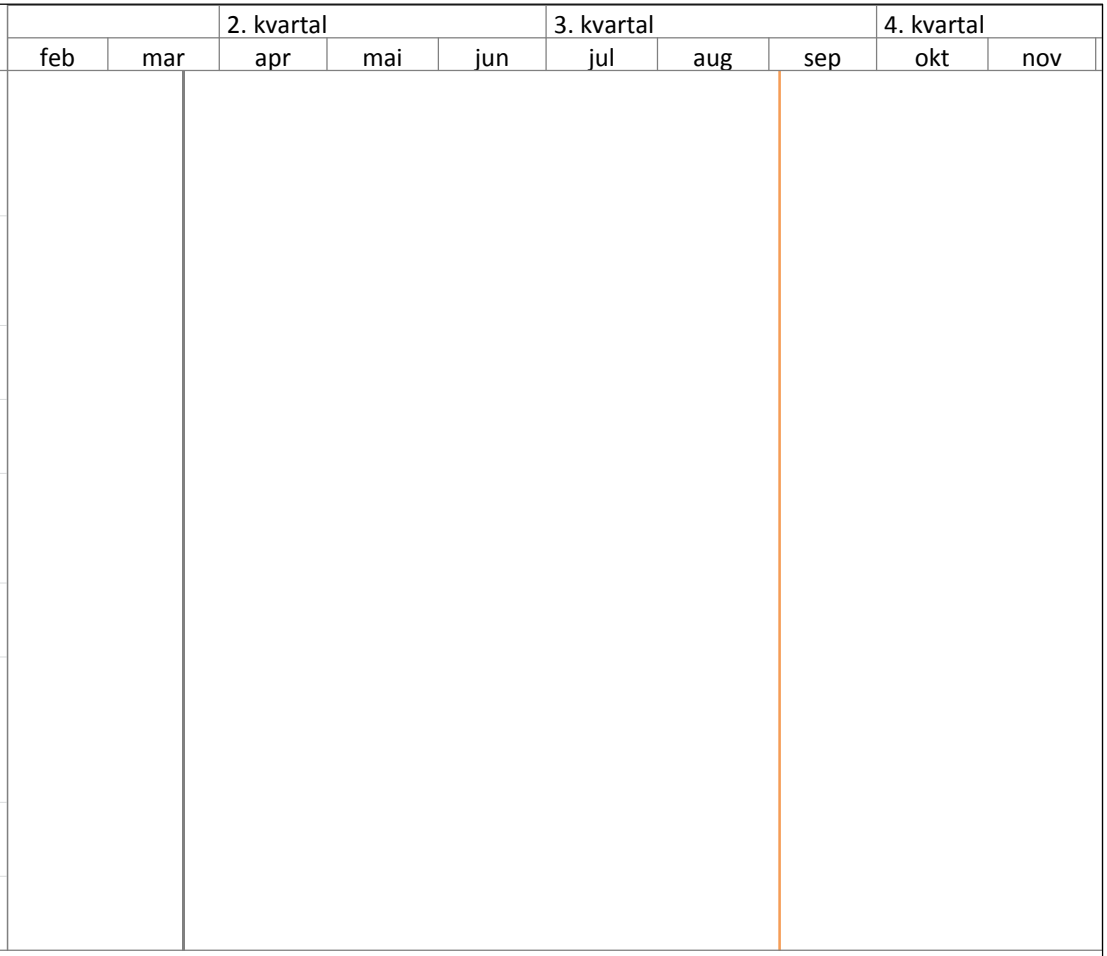
| ID | | Aktivitetsı | Task Name | Varighet | Start |
|---|---|---|---|---|---|
| 27 | | | Core enterprise reaches maximum capacity (25 sheep and 50 guinea pigs per week) (PM) | 0 dager | sø 01.06.14 |
| 28 | | | Purchase of sheep from family enterprises (50 per week) (PM) | 197 dager | sø 01.06.14 |
| 29 | | | First loan issued to a family enterprise (PC) | 0 dager | ti 01.07.14 |
| 18 | | | Issuance of loans to family enterprises (PC) | 180 dager | ti 01.07.14 |
| 26 | | | Installation and operation of a biodigester (PC + consultant A) | 175 dager | ti 01.07.14 |
| 46 | | | Biodigester is operational (PC + consultant A) | 0 dager | fr 01.08.14 |
| 47 | | | Promote the use of biol (liquid fertilizer from biodigester) and train farmers (PC + PM) | 66 dager | fr 01.08.14 |
| 48 | | | Plan production of barley among farmers (PC + PM) | 43 dager | fr 01.08.14 |
| 55 | | | family enterorises are operational (PC + PM) | 152 dager | fr 01.08.14 |

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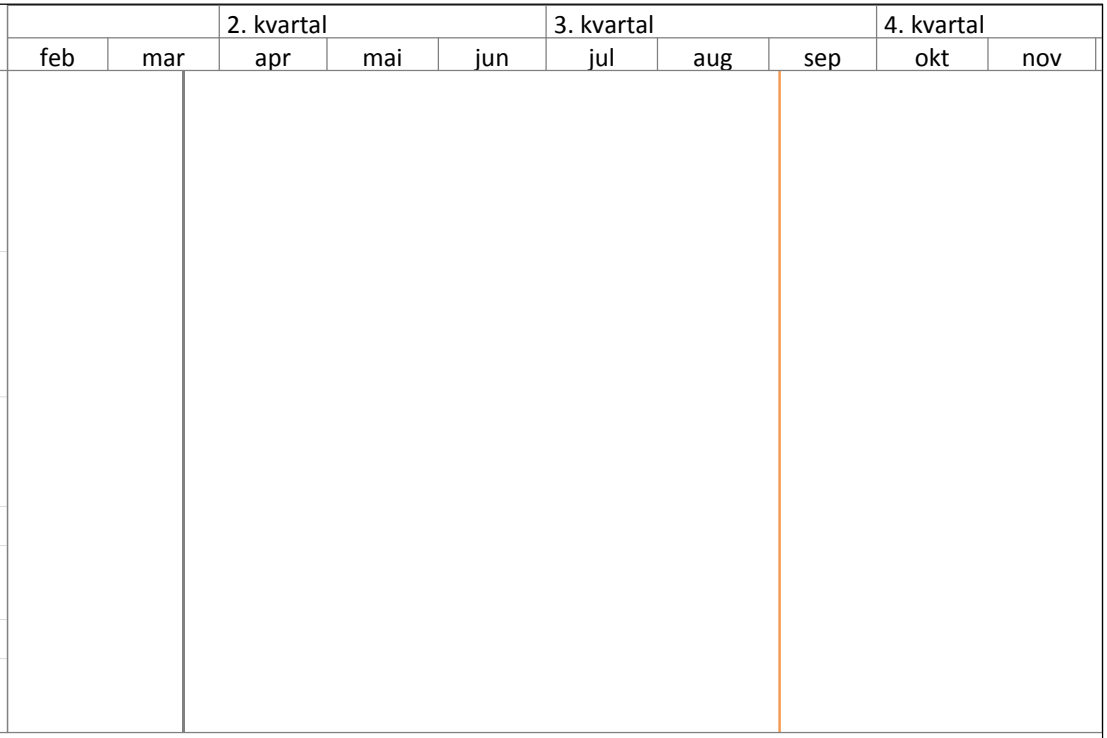
| ID | | Aktivitetsı | Task Name | Varighet | Start |
|---|---|---|---|---|---|
| 53 | | | Negotiation with government and other actors with a view at a possible 2nd phase (TdN + SF) | 131 dager | ma 01.09.14 |
| 56 | | | First sale of fattened animals by a family enterprise to the core enterprise (PM) | 0 dager | on 01.10.14 |
| 50 | | | Preparation and celebration of closing event (PC + TdN + SF) | 76 dager | lø 01.11.14 |
| 39 | | | Final measurements (PC) | 31 dager | ma 01.12.14 |
| 52 | | | Final evaluation (consultant B) | 16 dager | ma 12.01.15 |
| 51 | | | Closing evcent (PC + TdN) | 0 dager | fr 13.02.15 |
| 54 | | | Presentation of final report to USAID (SF) | 0 dager | fr 01.05.15 |

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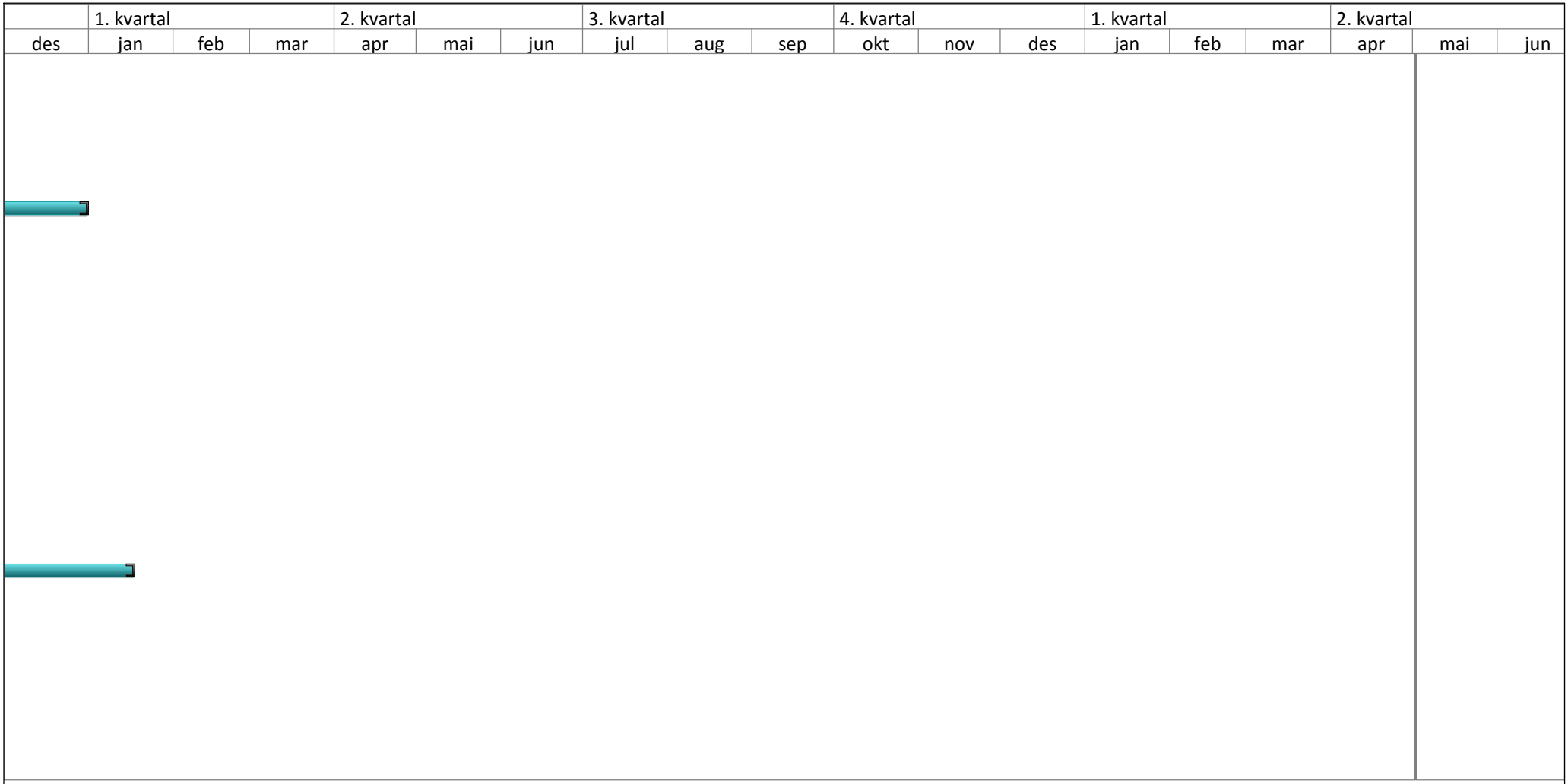


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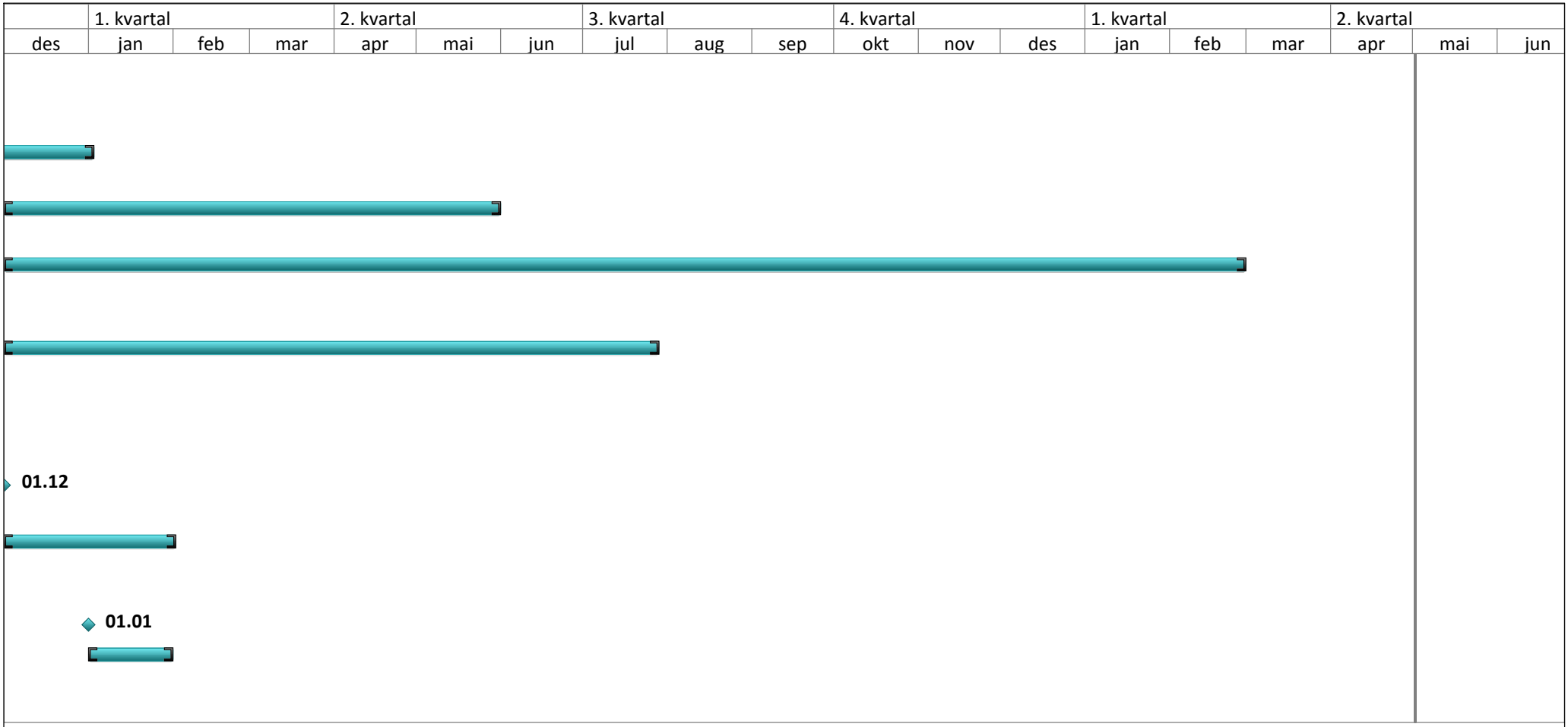


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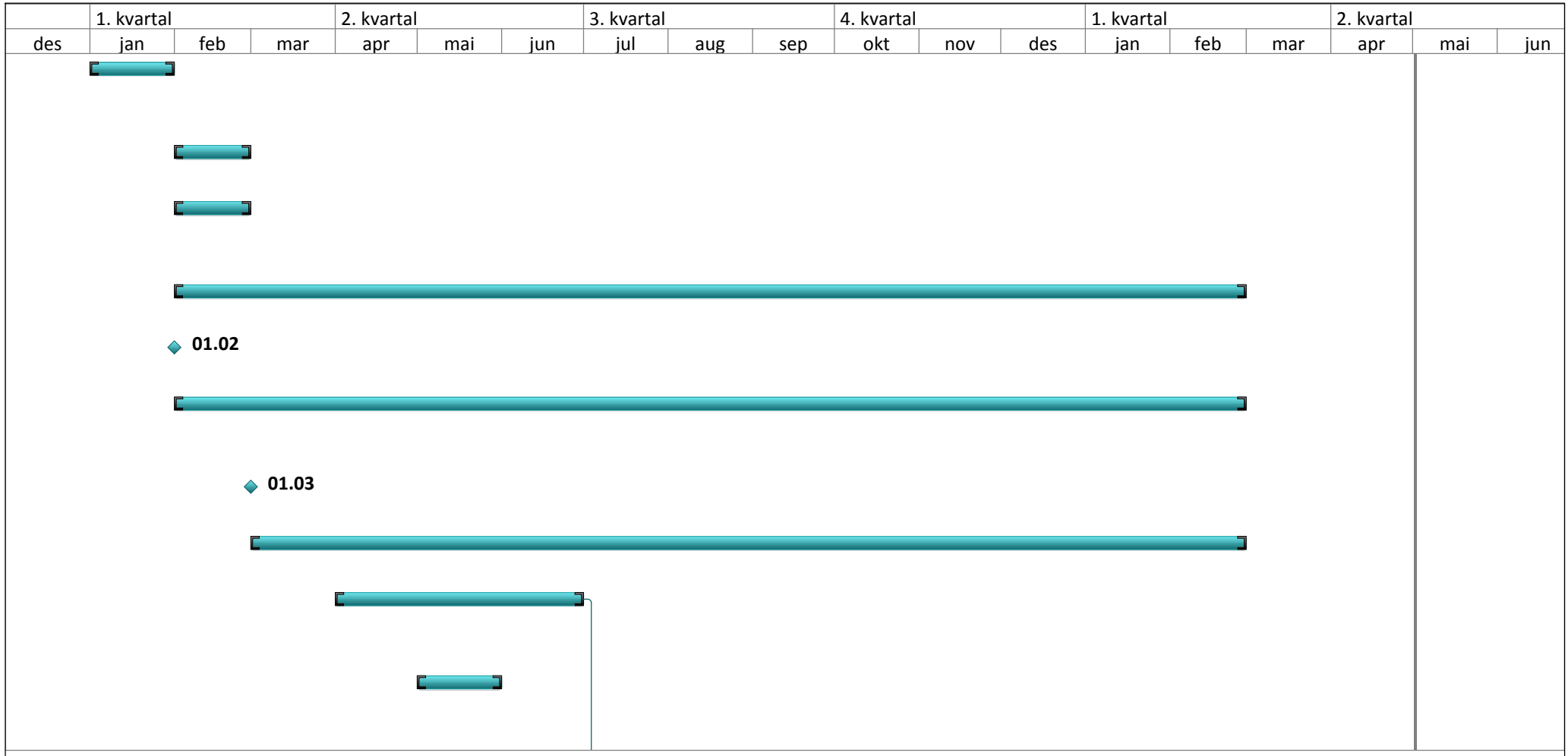


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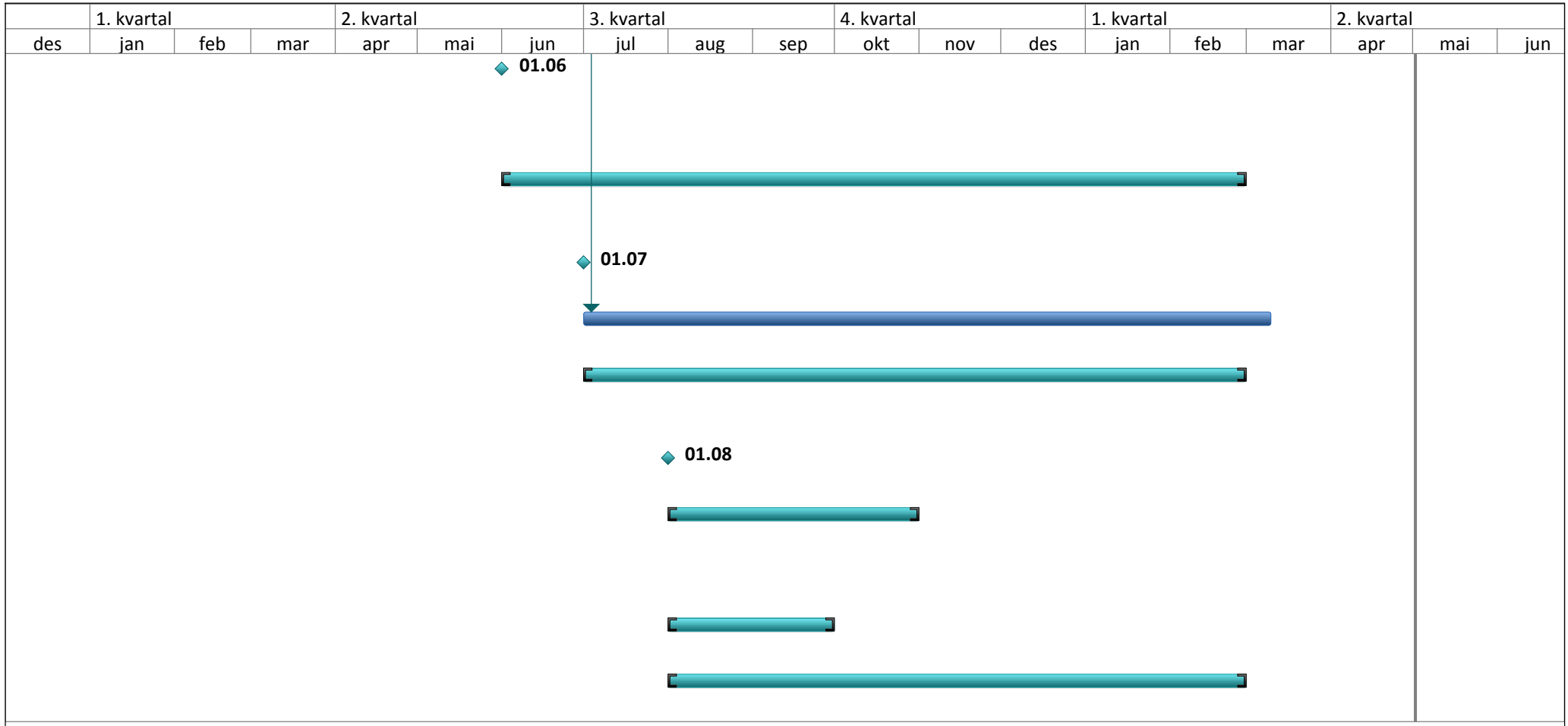


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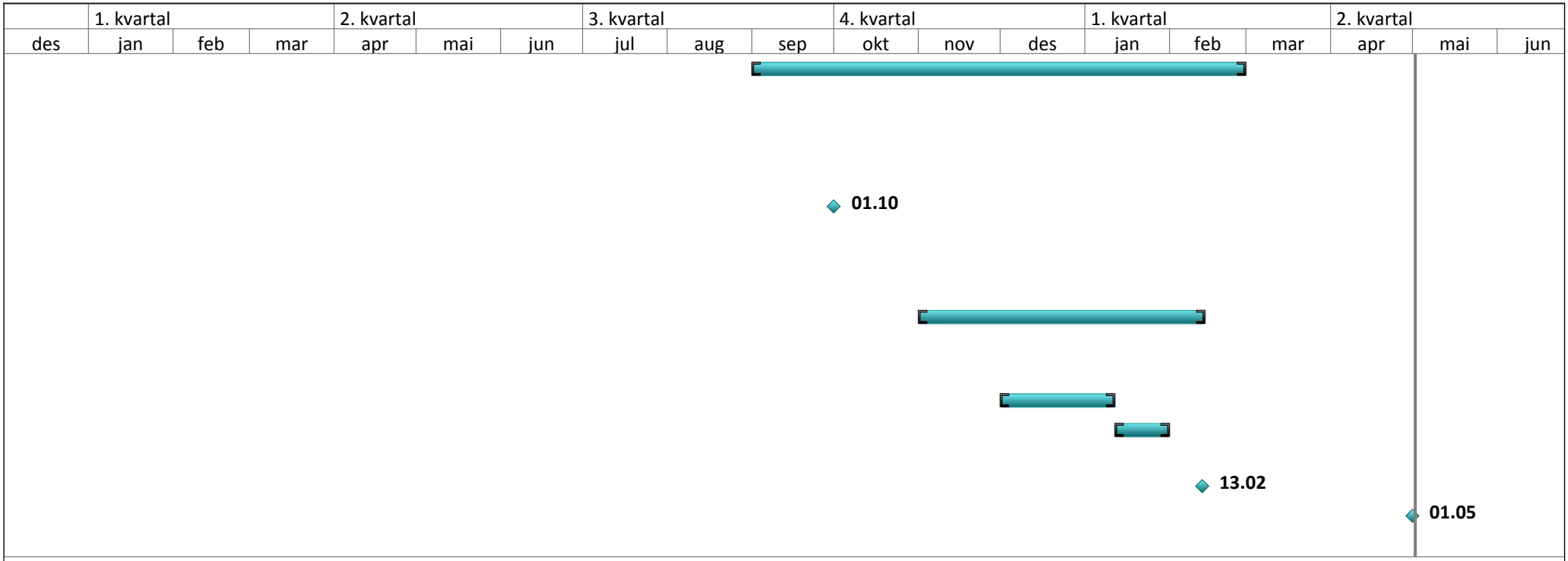


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## Hydroponic Green Forage: a fodder solution for livestock in regions with land and water scarcity

N.B. In order to maintain coherence with the data collection tools, the abreviations used in the table below generally correspond to the original Spanish terms, except for: Hydroponic reen Forage (HGF), Core Community Enterprise (CCE) and Family Enterprise (FE).

| Hierarchy of Objectives | Proposed indicator | Definition | Target | Means of verification (tools) | Collection methods | Frequency | Processing | Data gathering |
|---|---|---|---|---|---|---|---|---|
| **Purpose** | | | | | | | | |
| Improving livestock productivity of households in the community of Rantay in Peru through the implementation of a Hydroponic Green Forage (HGF) system | | | | | | | | |
| **Result 1** | | | | | | | | |
| **The Core Community Enterprise (CCE) is self-sustainable and continues to operate without outside help by project end.** | At project completion the CCE will have achieved annual net profit greater than or equal to 10% of its sales. | Net profit is considered as the final result of the Profit and Loss Account (EPG). | ≥ 10% | (1) EPG Report of the CCE.<br>(2) Monthly report of income and expenditures of the CCE. | Monthly record of income and expenditure statements of the CCE | Monthly reports and EPG report at project end. | Bookkeeping of CCE | HGF Project Coordinator |
| | At project completion, the CCE will have achieved annual average rate of return of FVH (TPAR) greater than or equal to 6. In other words: each kg of barley seed produces on average 6 kg of FVH. | The TPAR is obtained from the simple average of the rates of return from last 52 weeks, which will be measured once a week (predetermined day), considering a period of 12 days from planting to harvest. The rate measures the weight of hydroponic green fodder produced for each kilo of barley seed. We propose a minimum yield of 6 given the conditions in which the project develops (altitude about 3500 m, temperatures 0-20 degrees Celsius). | TPAR=$\frac{Q_{FVH}}{Q_{sem}}$<br>TPAR≥ 6 | (1) Registering Performance FVH<br>(2) Monthly production. | Record performance weekly modules FVH | Register weekly performance in the Reg No. 001. Monthly report production results. | The worker responsible records and archives data for further processing, analysis and report generation by HGF Plant respective manager. | HGF Plant manager |
| | At the end of the project the FVH production rate ($TP_{FVH}$) in kg/m2 /day achieves values of at least 2.3 and will be greater than the rates of natural pasture production ($TP_{PN}$) and production rate of cultivated grasses ($TP_{PC}$ ) in the area. | The $TP_{FVH}$ indicates the potential for HGF to substitute natural and / or cultivated forage.<br>The natural pasture and cultivated will be monitored in at least one productive unit (farm). | $TP_{FVH} \geq 2.3$<br>$TP_{FVH} > TPPN$<br>$TP_{FVH} > TPPC$<br>$TP_{FVH} = \frac{(\frac{TPAR}{Area\ bandeja})}{Periodo\ producción}$<br>$TP_{PN} = \frac{(\frac{peso\ pastosnaturales}{Area\ producción})}{Periodo\ producción}$<br>$TP_{PC} = \frac{(\frac{peso\ pastoscultivados}{Area\ producción})}{Periodo\ producción}$ | (1) Record of FVH production / m2<br>(2) Record of natural pastures production /m2<br>(3) Record of cultivated forage / m2 | Record once per week HGF modules<br>The record period will be according to usual periods of harvest/cutting in the area. | Record once a week in the CCE.<br>Variable frequency in natural and cultivated pastures. | The responsible worker records and archives the data for later processing, analysis and report generation by the HGF Plant manager. | HGF Plant manager |
| **Result 2** | | | | | | | | |
| **The health and quality of animals have improved** | At project completion, the annual percentage weight gain in animals fed in the CCE ($I_{ppEN}$) and the % weight increase of animals fattened in traditional production units ($I_{ppET}$) is at least 20% higher | This indicator seeks to identify weight gain as a result of FVH, evaluating animals fattened in the CCE and traditionally fattened animals in the area. The latter will be evaluated through Control Families (FC) with characteristics that are representative for the way livestock is reared in the area. | $I_{ppEN}$ - $I_{ppET}$ ≥ 20%, donde :<br>$I_{ppEN} = (\frac{P_{ann}}{P_{ini}} - 1)\ x\ 100$<br>$I_{ppET} = (\frac{P_{FFC}}{P_{IFC}} - 1)x100$ | (1) Weight records of animals in the CCE.<br>(2) Weight records of animal weight in FE.<br>(3) Monthly production reports CCE. | Records of animal weight per batch of animals at the beginning and end of each fattening cycle for Enterprise Core.<br>Record the weight of 10 animals per Control Family . The animals must have similar characteristics to those acquired by the CCE.<br>The control group will consist of 6 families with sheep and 2 families with guinea pigs. | Record the weights for each fattening cycle of the CCE.<br>In the FC record weights at 12, 10, 8, 6, 4 and 2 months before the end of the project.<br>(Reg. No. 003) | The responsible worker records and archives data for further processing, analysis and report generation by HGF Plant respective manager. | HGF Plant manager |
| | At project completion, the percentage weight gain in animals fed in Family Enterprises ($I_{ppEF}$) and the % weight increase of animals fattened in traditional production units ($I_{ppET}$) is at least 20% higher | This indicator seeks to identify weight gain as a result of FVH, evaluating animals fattened in FE and traditionally fattened animals in the area. The latter will be evaluated through Control Families (FC). | $I_{ppEF}$ - $I_{ppET}$ ≥ 20%, donde :<br>$I_{ppEF} = (\frac{P_{ann}}{P_{ini}} - 1)\ x\ 100$<br>$I_{ppET} = (\frac{P_{FFC}}{P_{IFC}} - 1)x100$ | (1) Weight records of animals in the FE.<br>(2) animal pesos FC.<br>(3) Monthly production reports of FE. | Records of animal weight per batch of animals at the beginning and end of each fattening cycle in EF and FC. | Record the weights for each fattening process EF.<br>In the FC recording weights at 12, 10, 8, 6, 4, 2 months before the end of the project.<br>(Reg. No. 003) | The HGF plant manager physically records the weights, for further processing, analysis and generation of the respective reports. | HGF Project Coordinator |
| | At project completion, the rejection rate of carcasses due to the presence of parasites (TRCP) will be lower in the animals fattened by the CCE and FE , in comparison with the baseline. | It seeks to measure the improvement in quality since the proposed model considers the use of a deworming process. Therefore, fattened animals should be free from parasites. A deparasiting program will be applied against HIDATIDOSIS and DISTAMATOSIS (fluke), as they are the only two illnesses reported by the slaughterhouse of Lircay. | (TRCPEN<TRCPcamal)<br>(TRCPEF<TRCPcamal) | (1) Results of the baseline study.<br>(2) Record of number of animals slaughtered and rejected by the slaughterhouse.<br>(3) Records of sanatary assessment and / or medical report of the slaughterhouse. | Records of animals slaugthered by the slaughterhouse.<br>Records of sanitary assessment or certificate of absence of parasites by a veterinarian.<br>In this case we evaluate the slaugthering of 3 animals of each species at the end of the project, both the CCE and in the FE. | It is measured at the beginning of the project (baseline) and every time animals are sold and slaugthered by the slaughterhouse or by certification by a veterinarian at project completion.<br>(Reg. No. 004, 005) | Plant manager HGF keeps record of the data for further processing, analysis and generation of the respective reports. | HGF Plant manager |

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| | At project completion the mortality rate of animals fed with HGF ($TM_{FVH}$) will be lower than the average animal mortality rate in the zone ($TM_2$) | This indicator measures the mortality among animals fed under a HGF regime, compared to the usual death rate in the area. The latter is evaluated through Control families (FC) which are the same as evaluated under $I_{PpET}$. | $TM_{FVH} < TM_2$ | (1) Record of death of animals in the CCE.<br>(2) Record of death of animals in the FE.<br>(3) Record of death of animals in the FC.<br>(4) Monthly Report | Registration of death of animals in EN, FE and FC<br>In the FE and FC data will be collected during monthly monitoring visits. | In CCE: register deaths when they occur. Register deaths in the FE and FC during the visit of HGF Plant manager.<br>In the beginning of the project the current mortality rate in the community will be obtained from official sources. | A trained worker of the CCE records and archives data for further processing and analysis by the Plant Manager.<br>The record in the FE and FC will be conducted by the Plant Manager. | HGF Project Coordinator |
| **Result 3** | | | | | | | | |
| **The participation of children in the work of herding animals is reduced** | Upon completion of the project, the number of hours that children of 6-14 years of Family Enterprises (FE) devote to herding animals, will be reduced by 10% | Child labor related to herding involves the activity of bringing the livestock to the grazing fields and back home in the late afternoon. Generally the grazing areas are located at large distances from home, even more so in the dry season. Grazing can start very early in the morning (before going to school) and finish in the late afternoon. It is done every day of the week, including Saturdays and Sundays.<br>The work can be done alone or in the company of older siblings or parents. | 10% | (1) Child labour survey<br>(2) Results of the Baseline Study. | Interview with children of FE (and the control group if applicable).<br><br>Interview with child and / or adult, depending on child's age.<br><br>The calculation formula considers the time spent herding (hours per day) and how often it is done (# days a week) * 30 days, which would get the child labor rate for herding animals. | The measurement will be done at both project start and end. The comparison may be a control group or the baseline. | The interview results will be processed in a database for the % reduction of child labor | Huancavelica's TdN coordinator<br>HGF Project Coordinator<br>M&E SF |
| | 90% of children in Family Enterprises (FE) have a higher percentage of school attendance compared to other children. | Effective school attendance is a requirement to complete the school year and pass on to the next grade. The indicator shows the effect on school attendance of the reduced participation of children in herding.<br>% AEEF: school attendance rate Family Enterprises<br>% ACS: School attendance rate of the rest of the school | %AEEF>%AEC | (1) Records of attendance of primary school in the community.<br>(2) Non-structured interviews with school teachers | Information will be collected through school visits, interviews with the teacher in charge and existing records on student attendance kept by teachers. | AT the beginning of the project in 2013 (baseline) and at the end of each quarter of the 2014 school year. | The data will be processed in a database. | HGF Project Coordinator<br>M&E SF |
| **Result 4** | | | | | | | | |
| **The family income has improved** | At project completion household income from sales of guinea pigs has increased by 15% compared to the baseline study. | The family income measured here limited to the income generated from the sale of guinea pigs. Calculating the baseline level can be difficult. It is suggested to ask for the number of animals sold value them at the current price. The CCE keeps equally record of the number and price of guinea pigs purchased. These can be used to crosscheck the answers at family level. | 15% | (1) Results of the Baseline Study.<br>(2) Records of CCE purchase of guinea pigs.<br>(3) Final Report. | Survey at the beginning and end of the project.<br>CCE Records. | It is measured at the start of the project (baseline) and at the end of it. The control is done with monthly analysis of purchases made. | Baseline study (M&E Officers SF and TDN).<br>Final assessment (M&E Officers SF and TDN).<br>Plant Manager | Plant manager |
| | At project completion household income from sheep sales have increased by 15% compared to the baseline study. | The family income measured here is limited to the income generated from the sale of guinea pigs. Calculating the baseline can be difficult. It is suggested to ask for the number of animals sold value them at the current price. The CCE keeps equally record of the number and price of guinea pigs purchased. These can be used to crosscheck the answers at family level. | 15% | (1) Results of the Baseline Study.<br>(2) Records of CCE purchase of sheep.<br>(3) Final Report. | Survey at the beginning and end of the project.<br>CCE Records. | It is measured at the start of the project (baseline) and at the end of it. The control is done with monthly analysis of purchases made. | Baseline study (M&E Officers SF and TDN).<br>Final assessment (M&E Officers SF and TDN).<br>Plant Manager | Plant manager |
| | At the end of the project the CCE has purchased animals from 50 families in at least three separate occasions (at least 2 guinea pigs or one sheep per occasion) | The usual sale of animals through middlemen that visit the communities will be replaced by the purchase of animals by the CCE. This means that the company must be efficient and offer competitive prices to the families that sell animals. | 300 | (1) Record of purchases by the CCE. | Monthly purchasing records of the CCE | Monthly record of purchases by the CCE in format EN-RC-01 | Plant manager | Plant manager<br>HGF Project Coordinator |
| | At project end, the yield increase has been measured of a traditional crop in the area, as a result of the use of biol. | To validate the model proposed by the project is important to use a demonstration plot: one area is worked with traditional technology and another using biol (efluents from biodigestor). The yields of both areas are compared. The crop to be use is barley. | Crop yield biol > crop yield without biol | (1) Technical Report of the demonstration plot. | Technical Report contents:<br>(1) Date of installation demonstration area and control area.<br>(2) Date of harvest.<br>(3) Installed areas (treatment and control) .<br>(4) Species sown.<br>(5) Description of the treatment in both areas.<br>(6) Yields in both areas.<br>(7) Supporting records .<br>(8) Photographic records. | Monthly reports and final report. | Plant manager | Plant manager<br>HGF Project Coordinator |
| **Result 5** | | | | | | | | |
| **The local and regional government support the HGF model and its disemmination** | At least 03 officials of each local government (Rantay community, Anchonga district, Angaraes province and Huancavelica region) are aware of the project and the technologies used in its implementation. | Authorities of Anchonga, Angaraes and Huancavelica know the implemented model, expressing its importance for local economis development, value the hydroponics technique as an alternative livelihood strategy for livestock owners in times of drought and / or frost. | 12 | (1) Results of final evaluation.<br>(2) Monitoring the project.<br>(3) Structured interview questionnaires | Interview with the authorities at the community, district, province and region. | At project completion | The qualitative variables of the interview will be quantified through a valuation table, scored and rated as indicated. | HGF Project Coordinator |
| | Upon its completion, the project has support of Local and Regional Government for the expansion of the project, expressed in 02 letters of intent. | Letters expressing the intention of authorities to promote the experience of the project to other communities with public funds through the mechanisms established for that matter. | 2 | (1) Letters of Intent. | Advocacy with local authorities to sign the letter of intent | At project completion | Not required. | HGF Project Coordinator |
| **ACTIVITIES** | | | | | | | | |

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| **Activities Outcome 1** | | | | | | | | |
| A1.1. Creating awareness in the Community about the benefits of the project | Agreement signed between TdN and the community to establish the core business, which stipulates the obligations of both parties. | The agreement confirms the effectiveness of the awareness raising process and commitment of the community | 1 Agreement signed between TdN and community | (1) Minutes from awareness raising meeting<br>(2) An Act confirming the community's agreement to establish the CCE | Meeting between project team and members of the community | First month: awareness raising Meeting Minutes<br>Second month: Act confirming the community's agreement to establish the CCE | TdN team during community meetings | Project Coordinator |
| A1.2. Legal establishment of the CCE | The CCE has core RUC registration number, inscription in public records | RUC nr., minutes and records confirm the legal establishment of the CCE . | 1 company registered | (1) Minutes of agreement containing:<br>Type of company to be establised<br>Company Name<br>(1) Minutes of constitution of the enterprise<br>(1) Copy of registration of the CCE<br>(1) RUC listing | Registration and filing of documents | Second month: Act of agreement<br>Third month: Minutes of constitution<br>Fourth month: Copy of CCE registration<br>Fifth month: RUC Listing | Not required. | Project Coordinator |
| A1.3. Installing a greenhouse for HGF production | 120m2 greenhouse with HGF production system of 1440 trays in total | The greenhouse and the HGF system must be technically appropriate for its proper functioning and operation, and its subsequent systematizatio and replication. | 120m2 of greenhouses with HGF production system of 1440 trays in total | (1) Technical drawings of the greenhouse construction<br>(2) Layout of the distribution of the production HGF system<br>(3) Operating Plan Greenhouse<br>(4) Photo Archives | Generated by the technical consultant and delivered to the plant manager and project coordinator | 2 months: Technical plan (Lay-out) of the green house and the HGF system<br>3 months: Operational plan of the greenhouse, photografic files | The documents will be received by the Plant Manager and presented in reports | Project Coordinator |
| | The greenhouse provides HGF daily to the fattening and production centers | The operation will be measured by the supply of fodder for guinea pigs and sheep. This variable may be subject to variation depending on the dynamic flow of buying and selling animals. | Daily supply of forage | (1) Record of HGF yields | Will be recorded by worker of the CCE on a daily basis | Daily from the moment the CCE starts functioning | Processing is performed the Plant Manager | Plant manager |
| | Average water consumption per kilogram of FVH is lower than average water consumption per kilogram of natural pasture grass and grass produced in the area | Allows to evaluate the efficiency of the system in terms of water consumption. Keeps track of water consumption per kilogram of HGF produced. It also must evaluate 1) rainfall used to produce natural grass (control families) 2) the volume of surface irrigation water plus rain, used to grow grasses by control families. | (Litres of water consumption / Kg of HGF) < (litres of water consumption / kg natural grass)<br>(Liters of water consumption / Kg HGF) < (m3 of water consumption / Kg pastos grown) | (1) Records of water consumption | Water consumption in the CCE is recorded by the workers.<br>Water consumption of natural pastures will be collected by the Plant Manager from a meteorological station in the area.<br>Water consumption by surface irrigation will be quantified by the plant manager | 1 time per week at CCE<br>In natural and cultivated pastures data collection will depend on the forage production monitoring | The worker responsible for HGF will record water use data of CCE | Plant manager |
| A 1.4. Installing a biodigester | 1 Biodigestor installed | The digester is an insulated container that allows the production of gas and organic fertilizer, both liquid ("biol") and solid ("biosol"), mainly from organic materials and water | (1) Biodigestor | (1) Photographic files | Taking Pictures by the Plant Manager | Only once | The manager takes photos and files for subsequent monthly report and related reports. | HGF Project Coordinator |
| | At least 100 liters a week of sludge is used as fertilizer | Sludge (biol and biosol) is obtained steadily following the constant feeding of the digester to produce biogas on a permanent basis. | Biol harvested ≥ 100 liters per week | (1) Record of filling and discharging of the digester | Record will be kept of the volume added to the biodigestor (manure + water in proportions established) and and the volume discharged (mud = solid + liquid). | At least 2 times per week | The worker responsible records the process of loading and unloading and the Plant Manager processes the information using spreadsheet for report generation | Plant manager |
| | At least one hour per day of biogas combustion using a standard kitchen stove | A digester should have a daily producton volume (m3 of biogas) of 15% to 30% of the total volume loaded. With this production function being constant maintenance (daily). | 30 hours per month | (1) Registration with biogas burner use | Records will be kept of the daily use of biogas in hours. | Journal. Recording will start at most two months after the first load of the digester | The working responsible keeps the records for further processing. | Plant manager |
| A 1.5. Installing a fattening of sheep | A sheep stable of 120m 2 | Shows that the facility has capacity to fatten 100 sheep simultaneouosly. | 120m$^2$ | (1) Technical drawings of stable construction<br>(2) Photo Archives | Generated by the technical consultant and delivered to the Plant Manager and Project Coordinator | At 2 months: Technical drawings of the building and feedlot<br>At 3 months: Photographic archive | The Plant manager receives the documents and attaches them in the respective reports | Plant manager |
| | The feedlot sells every two months 100% of sheep purchased for fattening | The indicator shows if the sheep fattening unit is operating | 100% of the fattened animals have been sold | (1) Records of weight per animal for each batch of animals entering the CCE<br>(1) Sales Records | The weighing and registration of animals will be carried out by the Plant Manager | In each fattening cycle. | The Plant manager records the weights.<br>Subsequently, the information will be processed in a spreadsheet for analysis and report generation | Plant manager |
| A 1.6. Installing a central rearing of guinea pigs | A guinea pig farm of 60 m 2. | Shows that the facility has capacity to keep simultaneouosly 330 guinea pigs for reproduction and 200 guinea pigs for fattening | 60m$^2$ farm | (1) Technical drawings of stable construction<br>(2) Photo Archives | Generated by the technical consultant and delivered to the Plant Manager and Project Coordinator | At 2 months: Technical drawings of the building and feedlot<br>At 3 months: Photographic archive | The Plant manager receives the documents and attaches them in the respective reports | Plant manager |
| | The feedlot sells every two months 100% of guinea pigs purchased for fattening | The indicator shows if the guinea pig fattening unit is operating | 100% of the fattened animals have been sold | (1) Records of weight per animal for each batch of animals entering the CCE<br>(1) Sales Records | The weighing and registration of animals will be carried out by the Plant Manager | In each fattening cycle. | The Plant manager records the weights.<br>Subsequently, the information will be processed in a spreadsheet for analysis and report generation | Plant manager |
| **Activities of Results 2** | | | | | | | | |

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| 2.1. Sheep breed improvement | Acquisition of 20 improved breed rams of the JUNIN race | The 20 rams are needed for the genetic improvement process and will be acquired in two stages: 10 units in the 5th month and 10 units in the ninth month. These animals must present features previously established by the technical advisor | 20 rams | (1) ToR of sheep characteristics to be adquired<br>(2) Quotations<br>(3) Receipts.<br>(4) Certification of quality.<br>(5) Photograph Archives | ToR is requested by the Plant Manager to the technical advisor. Manager also requests quotations and receipts | Month 4: ToR for acquisition of sheep and quotes<br>Month 5 and 9: Receipts<br>Quality certificate.<br>Photographic Archive | The Plant Manager will recieve ToR , as well as quotes and receipts and processes them for the coresponding reports. | Plant manager |
| | At least 20 families benefit from access to the improved rams during 2014. | The rams are meant to improve the breed in the area. The population of sheep per family is variable. However, the number of females per male can be between 30-50, then the loan of one per family for a period of six months should cover certain genetic improvement. | 20 familes favored with the loan of rams by the CCE | (1) Loan Registration of breeding rams | The Plant manager records the loan | Every 6 months | The Plant manager records and prepares reports | Plant manager |
| A 2.2. Improved guinea pig line | Purchase of 300 guinea pigs guinea pigs females and 30 males of an improved breeding line | The guinea pigs are for production and breeding purposes, the offspring will be exchanged with local guinea pigs. The acquisition will take place in the fifth month. | guinea pig: 300 females and 30 males | (1) ToR for acquisition of guinea pigs<br>(2) QUotations<br>(3) Receipts.<br>(4) Quality Certificate.<br>(5) Photographic Archives | ToR is requested by the Plant Manager to the technical advisor. Manager also requests quotations and receipts | Month 4: ToR for acquisition of sheep and quotes<br>Month 5: Receipts<br>Quality certificate.<br>Photographic Archive | The Plant Manager will recieve ToR , as well as quotes and receipts and processes them for the coresponding reports. | Plant manager |
| | At least 30 families favored the loan of improved guinea pigs or exchange of local for improved guinea pigs during 2014. | This activity aims to improve the guinea pig breed in the area. The population of guinea pigs per family is variable in time, just as can happen in the CCE. | 30 familes benefit from the guinea pig exchange or loan by the CCE | (1) Record of guinea pig exchanges and loans | Record at the moment of exchange or loan of guinea pigs | Weekly | The Plant manager records and prepares reports | Plant manager |
| **A2.3. Workshops on Hydroponics, sheep, guinea pigs and business skills.** | 01 Training Plan which covers: Hydroponics, sheep, guinea pigs and business skills | Document containing: general objectives of each module, methodology to be used in the workshops, contents, operating plan, presenters.<br>The document will have a version in Quechua and one in Spanish. | 1 | (1) Training Plan | The technical team will write the plan and hand it over to the HGF Project Coordinator | One time only | Not required. | HGF Project Coordinator |
| | (2) workshops in hydroponic technology | 1. Production of HGF.<br>2. Use of HGF in animal feeding. | **2 workshops** | (1) List of participants of the workshop<br>(2) Workshop report | Participant list in a simple format<br>The workshop must have its execution report | According to schedule of workshops | Elaboration of listings, reports, physical and electronic archiving | HGF Project Coordinator |
| | (05) workshops on sheep breeding | 1. Genetics<br>2. Supply<br>3. Health<br>4. Operation<br>5. Marketing | 5 workshops | (1) List of participants of the workshop<br>(2) Workshop report | Participant list in a simple format<br>The workshop must have its execution report | According schedule of workshops | Elaboration of listings, reports, physical and electronic archiving | HGF Project Coordinator |
| | (05) workshops in guinea pig breeding | 1. Genetics<br>2. Supply<br>3. Health<br>4. Operation<br>5. Marketing | 5 workshops | (1) List of participants of the workshop<br>(2) Workshop report | Participant list in a simple format<br>The workshop must have its execution report | According schedule of workshops | Elaboration of listings, reports, physical and electronic archiving | HGF Project Coordinator |
| | (04) workshops on Entrepreneurship Development. | 1. Business Opportunity Identification.<br>2. Success production.<br>3. Marketing with Success.<br>4. Business Tools. | 4 workshops | (1) List of participants of the workshop<br>(2) Workshop report | Participant list in a simple format<br>The workshop must have its execution report | According schedule of workshops | Elaboration of listings, reports, physical and electronic archiving | HGF Project Coordinator |
| | On average, at least 20 participants in each workshop. | This indicator measures the participation in the workshops. | ≥20 | (1) List of workshop attendance | Roll call taken on the day of the workshop. | Monthly and from the fourth month after the project begins | The manager takes the attendance list in Reg No. 010 and files it for later use in monthly report and other reports. | Plant manager |
| | 32 apprentices apply 100% of the knowledge received in the workshops | Trainees will be assessed in the application of the knowledge received in the workshops | 32 | (1) 32 test input and 32 output | Diagnoses will be built by the Plant Manager | 2 times a month for each trainee (beginning and end) | Plant manager | Plant manager |
| **Activities for Outcome 3** | | | | | | | | |
| A3.1.Identificacion of the incidence of child labor devoted to herding | 01 Survey taken from families | The survey identifies the incidence of children involved in herding animals, number of hours a day, times per week, month and the effects it would have on school attendance and health. | 01 survey | (1) Report.<br>(2) Questionnaires<br>(3) List of families identified with high incidence of child labor. | Field Survey and information processing. | Completing the second month of the project | Field visit, interview families. | SF South America |
| A3.2. Sensitization of families with high incidence of child grazing | 2 (two) awareness raising meetings for families with high incidence of herding by children | Awareness and advocacy among families identified, explaining the benefits of the new technology. | 2 | (1) Minutes of meeting and attendance lists. | As many meetings as the project team decides. | For each meeting. | Preparing meeting minutes and filling attendance lists. | Plant manager |
| | Creating at least two family businesses among families with high incidence of herding by children | Awareness raising and advocacy among the identified families, support for the creation of at least two Family Enterprises (FE). | 2 family enterprises | (1) Articles of legal establishment of Family Enterprises | Once the process make a report and attach the articles of incorporation. | Once | Have copies of the articles of incorporation of family businesses. | Plant manager |
| A3.3. Workshop for parents in the community about the effects of herding by children on the health and education of their children | 02 workshops for parents on the effects of herding on children. | Training session on the effects of herding on children. The content shows the consequences on the child's development, their education, health. It will be designed and delivered in Quechua and Castiilian. It will be elaborated from the sixth or seventh month of the project. | 2 workshops | (1) training plan<br>(2) Pictures | Registration and filing of documents | Twice | The responsible staff elaborates the activity report and files it. | Project Coordinator |
| | At least 40 fathers and / or mothers participate in the workshop about the effects of herding on children. | 40 adults (male or female) attend the workshops on effects of herding on children. | 40 household heads | (1) Attendance list of workshop | Attendance list filled out on the day of the workshop. | Twice | The manager records the attendance in the Reg No. 010 and files it for later reporting . | Project Coordinator |

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| | At least 50% + 1 of the parents participating in the workshop can recognize the effects of grazing on the health and education of children | At least more than half of parents have internalized the basics to understand the effect of herding on the health and education of children. | 50% of participants | (1) Final evaluation workshop. | Evaluation at the end of the workshop among parents who attended. | Twice | The official making assessments and archived for subsequent monthly report and related reports. | Project Coordinator |
| A3.4. Workshop on health and hygiene at home aimed at families | 02 workshops for families on health and hygiene at home | Training session deal with the following issues: Health risks due to raising animal within the family's home, prevention and control of diseases at home (personal hygiene, household hygiene, medical monitoring). | 2 | (1) Training plan<br>(2) Photographic Archive | Registration and filing of documents | Twice | The responsible staff member elaborates the activity report and files it. | Project Coordinator |
| | At least 40 parents and / or mothers participate in the workshop. | This indicator measures the attendancy at the workshop. | 40 | (1) Attendance list of workshop | Attendance list filled out on the day of the workshop. | Twice | The manager records the attendance in the Reg No. 010 and files it for later reporting . | Project Coordinator |
| | At project completion, 75% of Family Enterprises breed their animals outside the house. | Families have a new space for hydroponic forage cultivation, breeding guinea pigs and sheep. They have reorganized their homes, reducing the risk of animal-transmitted diseases for their children. This will be monitored through the technical assistance visits. | 75% | (1) Results of the Baseline Study.<br>(2) Record of location of houses.<br>(3) Photographic Archive | Evaluation at the end of the workshop among parents who attended. | Twice | The responsible staff member does the assessments and archives them for later reporting. | Project Coordinator |
| | 80% of children of Famly Enterprises take their children to their health checks, after the Family Enterprises have been established. | Children are taken to their controls in the health center since mothers improve their knowledge of child care. Improved home hygiene reduces the risk of disease for children. Will be monitored through the technical assistance visits. | 80% | (1) Results of the baseline study.<br>(2) Health and hygiene records (Family Enterprises).<br>(3) Records of child health clinic (presence of diseases). | Records of household visits / field journal | During the visit of technical assistance to families | During the technical visit to the family Enterprises, the relevant information is record. Also a visit to the health center can be made. | Project Coordinator |
| **Activities of Result 4** | | | | | | | | |
| A4.1. Selection from 08 families in which Family Enterpises will be implemented | 08 families in the Rantay community involved in the project | The selected families have shown interest and are motivated to get involved in the project. They speack Quechua. They have children that go to school, with ages that are of interest of the project. They raise sheep and/or guinea pigs (without excluding the raising of other animals). They have access to land and develop agricultural activities (the size of the field will be a secondary factor). They do not have other entrepreneurial activities, nor have they benefited from another, similar project. Their living conditions and their homes fit within the parameters of rurality and poverty. | 8 | (1) Household Registration<br>(2) Written Acts of commitment<br>(3) Photographic Archives | Each selected family will have a log file that will contain the following information: parental data, data of children, occupation, level of study, housing conditions, etc. The family signs a letter of commitment. | During the first 6 months of the project | The project coordinator will fill the data in the formats, will file them and updated them when needed. | Project Coordinator |
| A4.2. Implementation of family businesses | 6 families have implemented the technology for the rearing of sheep | Operational Family Enterprise: a FE that has its articles of incorporation (Model Act - C01) and that has effectuated at least one sale to the CCE. | 6 | (1) Articles of Incorporation.<br>(2) the company's shopping core. | Project awareness meetings. Purchases made by the core company duly registered. | Monthly | The manager must report the progress in the establishment of businesses and the operation of the same. | Project Coordinator |
| | 2 families have implemented the technology for the rearing of guinea pigs | Operational Family Enterprise: a FE that has its articles of incorporation (Model Act - C01) and that has effectuated at least one sale to the CCE. | 2 | (1) Articles of Incorporation.<br>(2) the company's shopping core. | Project awareness meetings. Purchases made by the core company duly registered. | Monthly | The manager must report the progress in the establishment of businesses and the operation of the same. | Project Coordinator |
| | 8 families have implemented the technology of hydroponics green fodder | The implementation consists of the installation of a HGF production module with 40 trays, whose production capacity is 30 to 40 kg of HGF per day. | 8 | (1) Delivery document<br>(2) Photo Archives | The manager should record the installation of the delivered equipment. | **1 time** | The manager must install and verify proper operation. | Project Coordinator |
| | At project completion the Family Enterprises that fatten sheep have made at least two (2) sales to the CCE. | For the purpose of this indicator, sales are defined as sales made by Family Enterprises (i.e. those who have their respective articles of incorporation) to the CCE and are duly recorded in the purchase registry of the CCE | 2 | (1) Register of purchases of the company core. | The company responsible for the core should properly account for all purchases made by identifying the family to differentiate companies keep those to other customers. | Daily / Monthly | The manager must process monthly purchase records and issue a report of purchases made from Family Enterprises. | Project Coordinator |
| | At project completion the Family Enterprises that fatten guinea pigs have made at least two (2) sales to the CCE. | It is considered as sales for this indicator to those made by family businesses (ie have their respective articles of incorporation) to the core business and are duly recorded in the registry of core business purchases | 2 | (1) Register of purchases of the CCE. | The CCE responsible should properly account for all purchases made by identifying the purchases from FE, to differentiate these purchases from those from other customers. | Daily / Monthly | The manager must process monthly purchase records and issue a report of purchases made from Family Enterprises. | Project Coordinator |
| | Upon completion of the project at least 80% of family businesses are not behind in their loan repayment | It is considered that a Family Enterprise is not behind with its repayments if it has handed over the agreed upon number of animals. | 80% | (1) recording the loans from the CCE to FE.<br>(2) Credit Report. | Properly account for loans and payments thereof. | Daily / Monthly | The manager must process mensualemente loan records and issue a monthly credits reports. | Project Coordinator |
| A4.3. Technical assistance to family businesses | At project completion 100% of family firms have received technical assistance at least 2 times a month. | Through this visit, the implementation and evolution is monitored of the FE that will supply the CCE. It also collects information on other social indicators. The visits will be made after the Family Enterprises ave started to become operational. Visits are made with regular time intervals. | 2 times per month | (1) technical assistance Sheets<br>(1) Monthly Report | Technical Assistance sheets are made in duplicate: 01 for the FE and 01 files of CCE. The technical visit sheets will be handed over to the beneficiaries and the copy will be filed at the CCE | Monthly | The Plant Manager fills in visit sheets and generates the monthly report | Plant manager |
| | A workshop promoting Biol using the demonstration plot of the project. | To sraise awareness among farmers, one workshop (or more) are organized to show in a demonstration plot how biol is used (the same as the result 4). | 1 | (1) Pictures of the workshop.<br>(2) Attendancy list of workshop. | Taking the respective lists and ictures made at the time of the workshop | The times the workshop is carried out | The manager prepares a report of the workshop and archives it for later reporting. | Plant manager |

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| A4.4. Promoting the benefits of "biol" as a fertilizer | Upon completion of the project at least 10 farmers have used biol in their fields as fertilizer | Is considered that a farmer has used as biol as a fertilizer if it has been used on at least 1000 m2 | 10 | (1) Registration of biol deliveries from the CCE to farmers | Records of biol production of the CCE and delivery records. | Weekly | Report how much biol (liter or kg) has been delivered to each farmer. | Plant manager |
| | At project completion crop yields will have increased by at least 10% in comparison with the baseline (optional) | The final production of the area where biol is applied should be recorded and compared with the data provided in the baseline survey. However, for simplicity and because this is a pilot project this indicator can be omited and only measured as the yield on the demonstration plot. | 10% | (1) Records of production yields in the plots that have used biol | Production log for each of the fields involved. | At scheduled harvest time | Process the information and produce brief report for inclusion in the respective report. | Plant manager |
| **Activities of Result 5** | | | | | | | | |
| A5.1. Preparation of Business Plans: 1. Core Communty Enterprise (CCE)<br>2. Family Enterprise (FE) | At project completion are 2 business plans prepared and systematized. | The document presents the business idea, describes in detail the market study, the operational , organizational and financial plan, etc.. | 2 | (1) Document: Business Plan | Document based on the experience of the project and the detailed records of all project activities. | Once | Not requiered | Advisor |
| A5.2. Inauguration of the CCE | 01 opening ceremony | Organise an opening ceremony and invite authorities and potential buyers of the products sold by the CCE | 01 ceremony | (1) Invitation Letters<br>(2) Activity Plan<br>(3) Photographic Archives | Taking Pictures by the management of the ceremony | Only once | The project coordinator takes pictures and files them | Project Coordinator |
| A5.3. Informing the community of the HGF technology. | The CCE participates in at least 4 events (regional fairs, local fairs, competitions, seminars) | Participation in these events allows the CCE to inform and promote the HGF technology in communities in Anchonga and Lircay. | 4 | (1) Business Plan<br>(2) Certificates of participation.<br>(3) Photographic Archives. | The activity plan will be carried out according to the events calender determined by the local governments.<br>Pictures will be taken during the events. In addition, a certificate of participation will be requested from the organizers. | The activity plan at the beginning of the project<br>The rest will be defined depending on the plan. | The indicators will be reported on in the quarterly reports | HGF Project Coordinator |
| A5.4.Participacion in PROCOMPITE | 01 proposal submitted in the competition for public funds PROCOMPITE (promoting productive projects in rural areas) | Participate PROCOMPITE to strengthen or expand the CCE | 01 participation | (1) Technical-economic proposal and business plan submitted | Developing a business plan to present to PROCOMPITE | Only once | The coordinator prepares the project for submission to PROCOMPITE | Project Coordinator |
| A5.5. Reports to the respective authorities | 02 reports submitted to the authorities of local and regional government | Provide local and regional authorities with a mid-term report in June 2014 and a final report in Jnue 2015. | 02 reports | (1) Reports | Drafting 2 reports to local and regional government | 02 times | The coordinator prepares the reports for submission to the respective authorities. | Project Coordinator |
| A5.6. Advocacy process towards public and private actors for support in a future expansion phase | At least two letters of intent for (technical and/or economic) collaboration from different institutions | Letters of Intent: commitments to support the project with tangible help (technical and/or economic). | 2 cards | (1) Letters of Intent. | Meeting between the Project Coordinator and the public and private actors. | Only once | The Project Coordinator receives the Letters of Intent and attaches them to the relevant report. | Project Coordinator |
| A5.7. Closing conference for potential developers, replicators and suppliers. | At least 30 people participate in the closing conference | Conference presentation of the project and the results of its evaluation. | 30 | (1) Participant List of closing event.<br>(2) Photographic archives | Participant lis and pictures taken on the day of the conference. | Only once | The responisble person takes participant list and pictures and archives them for later reporting. | Project Coordinator |
| | At least three types of institutions participating in the closing ceremony (NGOs, government offices, private sector, universities) | Different types of institutions should participate in order to achieve greater dissemination and realize synergies. | 3 types | (1) Participant list (under the heading "institution"). | Participant list taken on the day of the closing event. | Only once | The responisble person takes participant list and pictures and archives them for later reporting. | Project Coordinator |
| | Closing Conference is held and the project and the evaluation results have been presented. | Conference presentation of the results of the evaluation and the project. | 1 conference | (1) Photographic Archives. | The conference responsible takes pictures at the event. | Only once | The responisble person takes pictures and archives them for later reporting. | Project Coordinator |
| A5.8. External Evaluation. | Final evaluation report has been presented. | Document that evaluates the results of the project, identifying the successes and failures, direct and indirect beneficiaries, as well as the factors that influenced the achievement of the objectives. | 1 external evaluation | (1) Document: External Evaluation | All documentation generated during the project. | At project completion | Corroborate the information generated in the project. | External Evaluator |
| A5.9. Environmental Mitigation and Monitoring Report | 01 report prepared | This report will be describe the environmental impact of the project according to the instructions of the Environmental Compliance Checklist | 01 report | (1) Paper prepared | Identification of data through interviews with local leaders. Information gathering through field visits | At project completion | Not required | Project Coordinator |

**Milestone #3a**

## Transcription and translation of community commitment

ORIGINAL SPANISH VERSION

«Acta de Asamblea General Extraordinaria»

En el pueblo de Rantay, a los 25 dias del mes de Septiembre de 2013, siendo horas 3 p.m. de la tarde, se reunieron las autoridades y comuneros en general con las siguientes agendas:

1. Acordar para trabajos con proyecto Forraje Hidroponico
2. Ceder el establo en cesion de uso al proyecto por 3 años

Acta seguido el señor Honorato Vargas Hileria en calidad de presidente informa sobre el proyecto que es beneficioso para la comunidad. Ceder el establo y la comunidad que seremos socios del proyecto Forraje. Con las agendas acordes nos comprometemos a trabajar cada comunero, sin faltar, a trabajar en bien de la comunidad.

No habiendo mas puntos que tratar se dio por terminado la reunión siendo a horas 5:30 p.m. de la tarde. Del mismo dice pasado a firmar en señal de conformidad de los presentes.

(signed by 34 persons)

CERTIFICO la reproducción del presente documento el cual guarda absoluta conformidad con el original.

Huancavelica, 14 OCT 2013

Maria Morales Torres
Notaria – abogada
Huancavelica

TRANSLATED VERSION IN ENGLISH

«Minutes of Extraordinary General Meeting»

In the village of Rantay, at 25 days of September 2013, at 3 pm in the afternoon, authorities and community members in general met with the following agenda:

1. Agree to work with the project Hydroponic Forage
2. Transfer the use of the stable to the project for a period of 3 years

Following the Act, Mr. Honorato Vargas Hileria, as president, informs about the Project that is beneficial to the community. Transfering the use of the stable and the community will be partner of the Forrage project. With the agendas in agreement, we commit ourselves to work each community member, without fail, to work for the good of the community.

Not having more points to treat, the meeting finished at 5:30 p.m. The same (Act) was passed on for signature as signal of agreement of the persons present.

(signed by 34 persons)

I CERTIFY that the copy of this document is absolutely consistent with the original.

Huancavelica, Oct. 14, 2013

Maria Morales Torres
Notary – lawyer
Huancavelica

## Milestone #3b

# Update of project implementation and evaluation activities

| | |
|---|---|
| Project title: | Hydroponic Green Forage - a fodder solution for livestock in regions with land and water scarcity |
| Intervention country: | Peru |
| Responsible Agency: | Stromme Foundation |
| USAID Grant ID: | AID-OAA-F-13-00055 |
| Reported period: | Sept-Dec 2013 |
| Report date: | January 07th, 2014 |
| Related milestone: | #3 |
| Elaborated by: | Peter Moers, Program Officer, Stromme Foundation (peter.moers@stromme.org) |

The following compares planned and realised project activities. "Planned" refers to the planned completion date.

| Activity | Planned | Realized | Remarks |
|---|---|---|---|
| Contract signed with Technical Advisor | Sep 07, 2013 | Sep 02, 2013 | As planned. |
| Hire Project Coordinator | Sep 30, 2013 | Sep 09, 2013 | Faster than planned thank to the immediate availability of the selected candidate. |
| Draft ToR for M&E design and select consultant | Sep 15, 2013 | Sep 20, 2013 | As planned. |
| Design M&E instrument | Sep 30, 2013 | Oct 31, 2013 | The time (11 days) reserved for designing and discussing the M&E plan proved to be insufficient. Consultant was also not available immediately. |
| Agreement between local partner (TDN) and community | Oct 15, 2013 | Oct 14, 2013 | On Sep 17, after several weeks of negotiation, the originally foreseen community (Parco Alto) decided not join the project in 2013 (although they remain interested to join in the future). Fortunately, during the project preparation phase, local partner Tierra de Niños had identified a second interested community (Rantay; 12°55'59.27"S, 74°42'15.73"W), which avoided a significant delay. |
| Finishing baseline study | Oct. 31, 2013 | Dec 12, 2013 | In order to avoid double work and unnecessary bothering of participants, the were baseline studies for the HGF project and that of other project in the intervention zone have been synchronized. Since operations of the Core Enterprise had not yet started, this had no effect on the results of the survey. |
| Construction of buildings for Core Enterprise | Nov 30, 2013 | Dec 15 2013 | The change of community caused a delay in the start date of the building activities. On the other hand, existing building on the new site saved time. Only the greenhouse needed to be built and some refurbishment done. Since the altitude is lower (3160 m) than the originally planned site (3650), no adobe walls are needed in the greenhouse. This also saved time. On the other hand, the site is not connected to the electricity grid, which led to the need to buy a small generator to power the irrigation system. |
| Purchase and delivery of HGF equipm. and guinea pig cages | Oct 31, 2013 | Nov 11,2013 | Small delay due to transport logistics. |
| Hiring of Plant Manager | Oct 31, 2013 | Nov 15, 2013 | Slight delay because local government needed to approve the candidate. |
| Building of the Core Enterprise | Nov 30, 2013 | Dec 3, 2013 | The contribution of the community to the building activities has been less than |

| Activity | Planned | Realized | Remarks |
|---|---|---|---|
| finished | | | expected, due to the fact that the building took place in the midst of the agricultural season. Future projects should start earlier in the year to avoid this. Nevertheless, thanks to the fact that the new site has pre-existing buildings, the building activity could be finished almost as planned. |
| Core Enterprise (CE) starts operations | Dec 01, 2013 | Dec 10, 2013 | First trays were sown on Dec. 10, 2013. |
| Hiring of first worker | Nov 15, 2013 | Postponed to Jan 2014 | Given the small scale of operations and the training process the Plant Manager is still in, the first worker will not be hired until the third week of January 2014. |
| Start of technical training of CE staff and Project Coord. | Nov 01, 2013 | Nov 15, 2013 | Started with the hiring of the Plant Manager. Has become more intensive since Dec 10 when the CE has become operational. |
| Start workshops for locals on HGF and animal raising | Dec 01, 2013 | Dec 19, 2014 | First introductory workshop was organized on Dec 18. Participation was low for the same reasons as mentioned above: people are occupied with agric. activities. |
| First purchase of guinea pigs and sheep from families | Dec 01, 2013 | Jan 07, 2014 | 1month delay because refurbishment of sheep stables and finishing of the building that houses the guinea pig cages. First sheep from families have been bought on Jan 07, 2014. This delay is again a consequence of the lower than expected community participation due to agricultural and end-of-year activities. |
| Core Enterprise is formalized | Jan 01, 2014 | Postponed to March 2014 | 35 families have signed up for becoming shareholder in the CE. An Act to concede the existing infrastructure to the enterprise for a period of 3 years has been signed by community representatives and legalized by a notary. However, few steps have been taken to legalize the enterprise as an independent entity. Main reason has been the above mentioned lack of participation of the community. It is therefore proposed to take up this process in March 2014. In the meantime, enterprise staff will be hired under the legal entity of TDN. |
| Buy 330 improved breed guinea pigs | Jan 01, 2014 | Dec 18, 2013 | Animals have been ordered on Nov. 5 and were recollected on Dec. 18. Supplier is the Veterinary Institute of Tropical and Andes Research in Huancayo (IVITA). |

Other, unplanned events:

• • •

1. The new site does not (yet) have electricity. On the other hand, the site has several existing buildings can be used. This led to some budget shifts: the savings in the building component were used to buy the generator.

Meeting in Rantay Community (Oct. 2013)

Start of greenhouse construction (Oct. 2013)

Laying a cement floor in the greenhouse (Nov. 2013)

Assembly of HGF racks (Nov. 2013)

Dosification of pre-germinated barley seeds (Dec. 2013)

Placing trays into the racks (Dec. 2013)

Speading seeds evenly over the trays (Dec. 2013)

First racks in production (Dec. 2013)

## Milestone #4a

# Update of project implementation and evaluation activities

| | |
|---|---|
| Project title: | Hydroponic Green Forage - a fodder solution for livestock in regions with land and water scarcity |
| Intervention country: | Peru |
| Responsible Agency: | Stromme Foundation |
| USAID Grant ID: | AID-OAA-F-13-00055 |
| Reported period: | Jan.-Dec 2014 |
| Report date: | Jan. 5th, 2015 |
| Related milestone: | #4 |
| Elaborated by: | Peter Moers, Program Officer, Stromme Foundation (peter.moers@stromme.org) |

Milestone 4 includes the following targets / products:

| | Target / product | Supporting documents |
|---|---|---|
| 1. | Update of project implementation and evaluation activities including indicators listed in milestone 2. | • the present report<br>• Milestone 4b. Cash flow projection – Core Enterprise |
| 2. | Core enterprise is fully legalized | • Milestone 4d. Draft Enterprise Constitution Act<br>• Milestone e. Enterprise name reservation |
| 3. | Core enterprise starts operations | • See pictures below (p. 9-10). |
| 4. | First sales of the core enterprise | • Milestone 4f. |
| 5. | Apprenticeship program has begun | • Annex c. Apprenticeship Program |

The following table compares planned and realised project activities. "Planned" refers to the planned completion date.

| Activity | Planned | Real | Remarks |
|---|---|---|---|
| Core Enterprise (CE) is formalized | Jan 2014 | Delayed;- expected Feb 2015 | Reasons for delay: (1) lack of time of farmers during rainy season (until April – May: agricultural activities); (2) need for local partner Tierra de Niños to change its bylaws (so it can become a shareholder); (3) underestimation of time needed for legal procedure. In the meantime, CE staff is hired under the legal entity of TDN. |
| Purchase of 10 improved rams | Feb 2014 | May, 2014 | 10 rams of the breed "Junin" were purchased in May 2014. Reason of delay: the market for breeding animals is very slow in the months of December to April due to the heavy rainfall. This limits the transport possibilities of both sellers and buyers. |
| Start of sales of fattened sheep | Feb 2014 | March 2014 | First sheep sold in March 2014. Reasons: (1) need to investigate the market; (2) problems in the supply of barley led to an underproduction of HGF, which in turn led to slow weight increase of sheep. Lesson: ensure supply of barley by promoting the production of barley among local farmers or own production. |
| Start breed improvement | Feb 2014 | Feb 2014 | Guinea pigs: as planned. Sheep: delayed due to delay in purchase of rams (see above) |
| Start of apprenticeship program | Mar 2014 | Feb 2014 | The apprenticeship program started in February 2014 with in total 18 participants. On average the apprentices attended 3.3 times per month (see 4a) in shifts of 4 hours/day. The time invested by the apprentices is also considered as a contribution to the Core Enterprise. |
| Selection of Family Enterprises (FE) for loans | Apr 2014 | May 2014 | Delay due to agricultural activities of the community in April/May 2014. |
| Core Enterprise reaches max. capacity (25 sheep and 50 guinea pigs per week) | Jun 2014 | Not relevant | Since the calculation show that the fattening of sheep is not profitable, the target for sheep has been reduced drastically (to 1 sheep per week on average). At the same time the target for guinea pigs has been increased (to 60 a week). The maximum production will be achieved in May 2015. |
| First loan issued to Family Enterprise (FE) | July 2014 | July, 2014 | The first HGF equipment was handed over to a FE in August 2014. By the end of Sept. 2014 the number had grown to 6. The total number will be 12. This is double the target, which has been made possible by using cheaper technical solutions, more contribution of the FE (especially the room where the HGF unit is placed) and the collaboration with |

| Activity | Planned | Real | Remarks |
|---|---|---|---|
| | | | FONCODES (see p. 5).<br>Initially, a repayment scheme was proposed to cover the cost of the equipment. However, none of the families was willing to go along with such an agreement. Therefore a lease-lend agreement was proposed, which implies that the FE does not pay for the equipment as long as it is used. If the FE discontinues the use of the equipment, it has to be returned to the CE.<br>Given the fact that this is a pilot and the demonstration at family enterprise level is an important component, this condition was accepted by the Project. Once the concept has been proven and the economic benefits have become evident, it is expected that the equipment can be sold under commercial terms. The same holds for FE that wish to expand their HGF production capacity. |
| Installation of a biodigester | July 2014 | Oct 2014 | Due to the change in strategy (less sheep, more guinea pigs), the amount of dung available is smaller than expected. This also led to a reconsideration of the size of the biodigester. A new model had to be identified and technical background information had to be found. |
| Biodigestor is operational | Aug 2014 | Dec 2014 | Delayed due to the reason cited above. |
| First family enterprise is operational | Aug 2014 | Aug 2014 | The first 2 FE started to produce HGF in August, which coincides with a critical dry period and scarcity of green pastures. |
| Promote the use of "biol" (biodigestor liquid outflow) as a fertilizer | Oct. 2014 | Expected: Jan 2015 | Will start once the biodigester is producing "biol". |
| Plan production of barley with farmers | Sep 2014 | Nov 2014 | The CE has contracted the production of 2 ha at the beginning of the rainy season (Nov.) with an improved barley variety. This is expected to yield 5000 kg of seeds, covering the demand of seed by the CE for a period of 4 months. The field data produced by this experience will be used to formulate an upscaling strategy in the next agricultural year. |
| First sale of fattened animals by a FE to the CE | Oct 2014 | N.A. | This activity is eliminated, since the CE does currently not play a role as marketing channel for the FE. See the analysis under Lesson 1 (below). |
| Negotiation with gov't and other actors with view at | Sep 2014 | Jun 2014 | This is a continuous process which has already yielded some first results (see unplanned |

| Activity | Planned | Real | Remarks |
|---|---|---|---|
| possible 2nd phase | | | results under this table). The process will continue during the first 6 months of 2015. |
| Preparation and celebration of closing event | Nov 2014 | | The closing event was initially planned to be held in February 2015. Due to the delays (especially in the legalisation process), the event has been postponed until June 2015. |
| Final evaluation | Jan 2015 | May 2015 | Postponed for the same reasons as mentioned above. |
| Final report | May 2015 | June 2015 | Postponed for the same reasons as mentioned above. |

• • •

Other, unplanned results or actions:

1. The project has drawn the attention of a national (public) rural development agency called FONCODES, though its program "mi Chacra Emprendedora". One of the objectives of the program is to promote enterprise development among poor rural households. The introduction of simple, low-cost technological innovations forms part of its strategy. After having visited the CE and some Family Enterprises in Rantay, FONCODES has decided – as a pilot - to provide a HGF unit to each eligible household (about 30 units in total). Local partner Tierra de Niños is in negotiation with FONCODES to provide the technical assistance for its proper use in Rantay and for a further expansion to 160 households in the Congalla district (part of the same province). FONCODES also works in several other districts in the same province and may in that sense become an interesting partner in a possible second phase.

Lessons:

1. In this first pilot, the CE has played an important role in building the capacity and confidence of pioneer FE, so they are willing and able to adopt the HGF technology. However, the importance of the CE as a marketing channel for animals produced by the FE is very limited in this initial stage, because:
    a. the trade volume, working capital, human resource capacity and infrastructure of the CE is small which in turn limits its negotiation power and ability to reach large urban markets;
    b. the production volume of the FE is small, mainly supplying the needs of the own family and neighbors, limiting the possibility of the CE to buy animals at competitive prices.

    In a scaling-up project, we would not start with setting up a new CE in new intervention areas, but rather make use of the existing one. The focus in new intervention areas would be on the FE. Once the production of these FE has grown beyond the demand of the local market, a local processing and marketing enterprise can be set up, probably linked to the CE in Rantay.

More lessons and insight have been described in the document "Impact of proposed changes", sent on Dec 3, 2014.

Workshop on HGF production (Jan. 2014)

Baseline interviews (Feb. 2014)

Simple rainwater harvesting system (March 2014)

Multi-level guinea pig cages in production (Apr. '14)

First off-spring of improved breed guinea pigs. Part has been distributed to households (March 2014)

System to recollect Guinea pig droppings, which are used as a sheep fodder supplement (Apr. 2014).

Simple mill used to crunch dried guinea pig droppings, which are mixed with sheep fodder (May '14)

Keeping records is an important part of the work at the Core Enterprise (April 2014)

Purchasing 10 improved Junin breed rams (May '14)

Junin rams arrived at their new home (May 2014)

Recently born lamb at Core Enterprise (May 2014)

Feeding time for the sheep (May 2014)

Visit to a livestock market in Acobamba, as part of the market study (March, 2014)

A potential buyer checks a sheep before making a bid (Acobamba, March 2014)

Harvesting HGF (April 2014)

Feeding HGF to the sheep (April 2014)

Workshop and shareholder meeting (May 2014)

Community reparing the water channel (May 2014)

First family enterprise HGF unit installed (Aug. 2014)

Typical structure built to house a HGF unit (Aug. '14)

Irrigated plot currently used to produce green forage

Family Enterprise with low-cost guinea pig cages

Installation of the biodigester (Oct-Nov. 2014)

Outflow of the biodigester (Dec. 2014)

Housing of the biodigester to maintain warmth (Dec)

Inside view of the biodigester in operation (Dec. 2014)

New guinea pig breeding unit iinstalled, part of an expansion from 200 to 300 reproducers (Nov. 2014).

Workshop in guinea pig breeding (Oct. 2014)

2 ha of barley commissioned by CE, sown in Nov. 14

View of the eroded grazing grounds near Rantay, at the height of the dry season (Aug. 2014)

The following table compares planned and realised project activities. "Planned" refers to the planned completion date.

| Activity | Planned | Real | Remarks |
|---|---|---|---|
| Core Enterprise (CE) is formalized | Jan 2014 | Delayed;- expected Feb 2015 | Reasons for delay: (1) lack of time of farmers during rainy season (until April – May: agricultural activities); (2) need for local partner Tierra de Niños to change its bylaws (so it can become a shareholder); (3) underestimation of time needed for legal procedure. In the meantime, CE staff is hired under the legal entity of TDN. (4) The community has elected a new president. This implied a legal process to nominate a new legal representative of the community in the CE. |
| Start of sales of fattened sheep | Feb 2014 | March 2014 | Achieved. See Milestone report #4. |
| Start breed improvement | Feb 2014 | Feb 2014 | Achieved. See Milestone report #4. |
| Start of apprenticeship program | Mar 2014 | Feb 2014 | Achieved. See Milestone report #4. |
| Selection of Family Enterprises (FE) for loans | Apr 2014 | May 2014 | Achieved. See Milestone report #4. |
| Core Enterprise reaches max. capacity (25 sheep and 50 guinea pigs per week) | Jun 2014 | Not relevant | Target dropped: sheep fattening is not profitable. See Milestone report #4. |
| First loan issued to Family Enterprise (FE) | July 2014 | July, 2014 | Achieved. See Milestone report #4. |
| Installation of a biodigester | July 2014 | Oct 2014 | Smaller unit installed due to smaller amount of dung available. See Milestone report #4. |
| Biodigestor is operational | Aug 2014 | Jan 2015 | Delayed due to the reason cited above. Update Feb. 2015: Digester is inflating (producing gas), but not yet liquid fertilizer ("biol"). |
| First family enterprise is operational | Aug 2014 | Aug 2014 | Achieved. See Milestone report #4. Total number of FEs has grown beyond expectations. It is hoped that by project end more than 250 FEs will be set up, instead of 12 planned. |
| Promote the use of "biol" (biodigestor liquid outflow) as a fertilizer | Oct. 2014 | Expected: Mar 2015 | Will start once the biodigester is producing "biol". |

| Activity | Planned | Real | Remarks |
|---|---|---|---|
| Plan production of barley with farmers | Sep 2014 | Nov 2014 | The CE has contracted the production of 2 ha at the beginning of the rainy season (Nov.) with an improved barley variety. This is expected to yield 5000 kg of seeds, covering the demand of seed by the CE for a period of 4 months. The field data produced by this experience will be used to formulate an upscaling strategy in the next agricultural year. |
| First sale of fattened animals by a FE to the CE | Oct 2014 | N.A. | This activity is eliminated, since the CE does currently not play a role as marketing channel for the FE. See the analysis under Lesson 1 (below). |
| Negotiation with gov't and other actors with view at possible 2nd phase | Sep 2014 | Jun 2014 | This is a continuous process which has already yielded some first results (see spin-off activities below) which will continue in 2015. |
| Preparation and celebration of closing event | Nov 2014 | Aug 2015 | The closing event was initially planned to be held in February 2015. Due to the delays (especially in the legalisation process), the event has been postponed to a later date in 2015. |
| Final evaluation | Jan 2015 | Aug 2015 | Postponed for the same reasons as mentioned above. |
| Final report | May 2015 | Sep 2015 | Postponed for the same reasons as mentioned above. |

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**Strategy adjustments**:

The project has yielded a wealth of experience and lessons that have led to a strategy adjustment proposal (with corresponding milestone adjustments) that was presented to USAID/DIV on March 26, 2015. The main changes proposed include:

1. Reduced focus on Core Enterprise (CE). In the period Nov. '14 – Jan. '15 several efforts have been undertaken to make the CE profitable. The manager of the plant was eliminated, leaving one full-time worker (who doubles as a watchman). Also, the number of guinea pigs was increased by almost 200. Unfortunately, the measures have not produced the results hoped for. The number of guinea pigs fell sharp between November 2014 and January 2015, from 476 to 206 animals: too few to sustain the operational costs of the CE. The main (possible) reasons for this reduction were:
   - Workers did not comply with their responsibilities, leading to irregular feeding of the animals, deficient health control of animals, infrequent cleaning of the guinea pig cages, late harvesting of HGF, too long intervals between watering the HGF etc.
   - Milled barley, that has not germinated, is generally fed to sheep. By mistake, this fodder was given to guinea pigs. As a consequence, many guinea pigs (being monogastrics) suffered from stomach problems, some of which were fatal.
   - Foot Infections, possibly related to the infrequent cleaning of the cages.
   - (possibly) Guinea pigs may contracted bacterial diseases that after having eaten HGF contaminated by rats. Laboratory research on the presence of certain bacteria may give a clue.

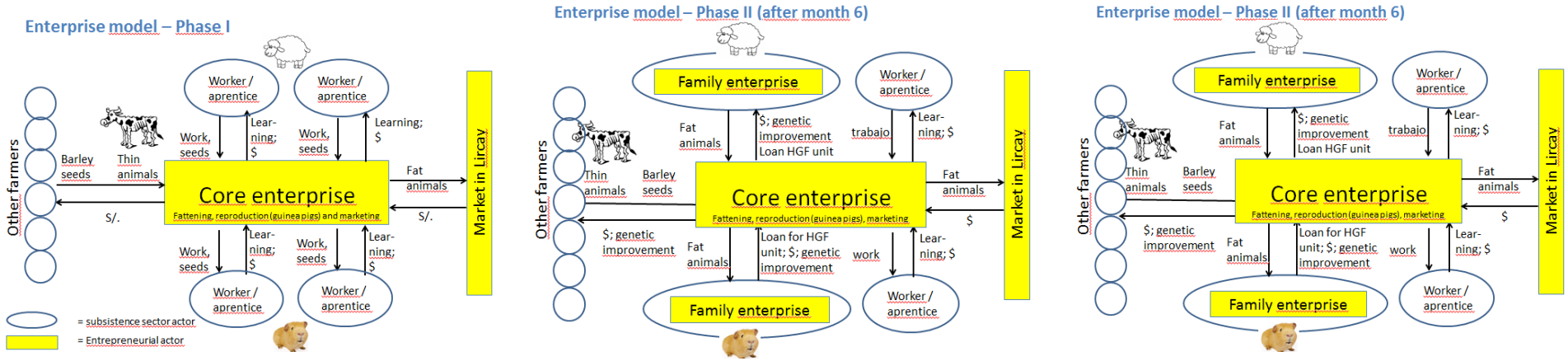
   Lack of supervision is certainly an underlying problem explaining these developments. In an effort to reduce labour costs and accelerate the economic sustainability of the CE, the contract of the plant manager was terminated in December. It was hoped that the supervision by the full-time project coordinator and the technical advisor (visiting 1 week per month) would be enough to compensate for the elimination of the plant manager. This did not work out as planned.

   The deeper cause behind the lack of supervision is probably the lack of ownership felt by the shareholders of the CE: the local NGO, the community and 17 individual guinea pig breeders. The reasons behind this weak sense of ownership will be analysed in more detail in the end report, but it seems plausible that the little time available to engage in community processes and the large distance between the community and the production plant (2 h. return trip by foot, descending 500 m. in altitude), combined with the little experience of the local partner in enterprise development, have played a role.

   Since the project approaches its end and project funding is too limited to set up an enterprise of sufficiently large scale, it does not make sense to revive the CE before the end of project (until June 2015). Rather, it is proposed to find a solution to transfer the equipment to a individual FEs, to ensure its continued use.

2. Increase focus on Family Enterprises (FE). At the same time that the CE has encountered multiple problems, the number of FEs has grown beyond expectations. The project aimed to create 8 FEs (see Full Application, p. 25). In reality, it is anticipated that 262 FE units will be installed

by project end, though most of them in another district (see below: spin-offs). The issues that have plagued the CE (high labour costs, deficient attention to the animals and HGF, mice and rat attacks) have not occurred in the FEs. Also here, the sense of ownership is probably the main explaining factor. This confirms the lesson that the production function is best left to individual households. When designing the project, it was anticipated that the production function of the CE would gradually be transferred from the CE to the FEs, while the CE would focus on processing and marketing (see graphs below).




A major lesson from the project is that the production is best started immediately at household level. The training and demonstration function that the CE has in phase 1, can probably be achieved easier and cheaper by creating a model enterprise with a well-motivated individual farmer in the village. This leaves the question how to deal whether it would have been possible to build the marketing function of the CE during the lifetime of the project. The impression is that the time, scale and capital needed to build such an enterprise exceeds the constraints that pilot projects generally have. What the project <u>can</u> demonstrate though is the technical and economic feasibility of introducing the technology at household level. During the remaining months of the project it is therefore proposed to focus on the technical and economic consolidation of the FEs.

3. <u>Promote the formation of an informal guinea pig producers' association</u>. With the production functions transferred entirely to the FE, it can be anticipated that producers soon will look for the opening of new markets, beyond their local communities. With this future demand in mind, the idea of a joint marketing association will be discussed. This time, the initiative will be left to the community and the project will contribute with organisational support, as requested. In a possible second phase, one can envision several producers' associations joining forces to form a

processing and marketing enterprise for guinea pigs that is able to reach the large and profitable market in the major cities. An NGO has already been identified that has experience in setting up a similar enterprise in another part of the country.

Spin-off activities:
The project has led to several spin-offs that will be described here:

1. Rantay community, Angonga, Angaraes province, Peru. As described milestone report #4, the project has drawn the attention of FONCODES (a national rural development fund), though its program "mi Chacra Emprendedora". FONCODES has funded an HGF unit to each eligible household (some 40 in total). The project plans to provide training and technical assistance to the beneficiary households.

2. Congalla, Angaraes province, Peru. Congalla is another district located in the same province as Anchonga (Angaraes). Local partner Tierra de Niños, with support of SF has distributed small HGF and guinea pig production packages to 160 women in the Congalla district. The packages include 5 guinea pigs (4 F, 1 M), 4 trays to cultivate HGF, a small trough for the forage and one for fodder concentrates and a small water dispenser. Total value of this package is about $25 per household, incl. guinea pigs ($10 without animals). Beneficiaries contribute with the housing for the guinea pigs and the HGF production (generally a small adobe building), as well as the small "pits" where the animals are held. End goal is to reach 800 women in a period of 5 years in 3 districts. FONCODES works in several districts more in the same province and may become an important partner in a possible second phase. See below for pictures of the activities in Congalla.

3. La Paz Department, Bolivia. In August 2014, the project received a visit from 4 delegates from a large milk cooperative, AMULTIAGROS, based in the La Paz department in Bolivia. The delegation was very positive and has requested its main supporter, the Canadian *Léger Foundation* to include a HGF component in their proposal to the Canadian development Agency (CIDA). The component aims to increase fodder security for cows of coop members based at the Andes plateau (3500-4500 m). An approval of this proposal would create an opportunity to introduce the concept to the Bolivian market. Since the farmers in the target group are part of a well-functioning milk processing and marketing enterprise, it is expected that many of the entrepreneurial problems and delays encountered in the Peruvian project can be leaped over. E.g. the idea to make the HGF equipment available to farmers in the form of in kind loans that are repaid also in kind (in milk, in this case) is much easier to organize within a cooperative with existing cash flows, than in a context where the enterprise has to be built from scratch,

Installation of the biodigester (Oct-Nov. 2014)

Outflow of the biodigester (Dec. 2014)

Housing of the biodigester to maintain warmth (Dec)

Inside view of the biodigester in operation (Dec. 2014)

Inflating biodigester bag (Feb. 2015)

Barley (sown by CE) in flowering stage (Feb. 2015)

Guinea pig died of foot infection (Feb. 2015)

**Expansion project in Congalla district (Angaraes, Huancavelica, Peru)**

Visit of delegation from Congalla to Rantay (Oct. '14)

Small units for HGF and guinea pig production, ready to be distributed in Congalla (Dec. '14)

Distribution of guinea pigs (improved breed) in Congalla (Dec. '14)

Low-cost drinking water dispenser (Jan. '15)

Low-cost troughs for forrage and concentrates (Jan. '15)

Germination of barley seeds at a Family Enterprise

HGF in bucket (producer was out of trays)

Household production unit for HGF (Jan. '15)

Girl in Congalla ready to feed the family's guinea pigs

Technical training in guinea pig raising in Congalla (Jan 2015)

Typical irrigated forrage field that can be replaced by HGF (Jan. 2015)

**Proyecto: Hydroponic Green Forage - a fodder solution for livestock in regions with land and water scarcity**

## DISEÑO DE BIODIGESTOR

De: Hugo Tarrillo – Asesor del Proyecto
Para: Susana Tapia – Fundación Stromme – Oficina Regional Sudamérica.

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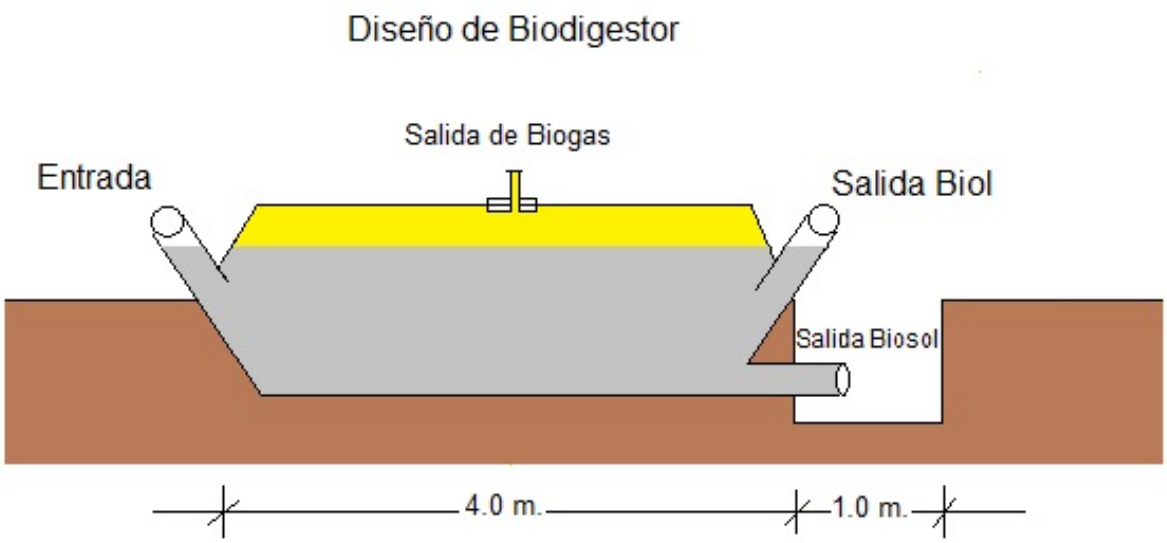
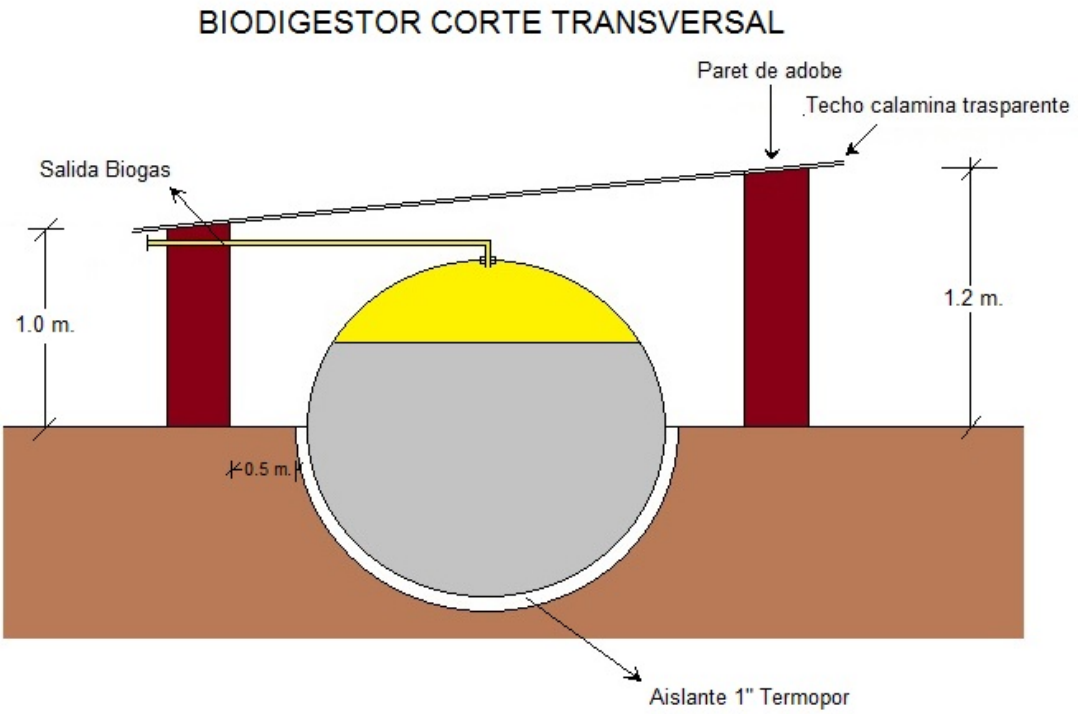
**1. Objetivo:** El presente documento tiene como finalidad describir al detalle las características técnicas en el diseño de un "biodigestor familiar", de 2 m³ de volumen total.

**2. Características:** nuestro biodigestor, tiene un diseño tipo "Salchicha" elaborado con doble capa de manga plástica de 3.0 m. de circunferencia, logrando un diámetro de 0.95 m. y con 4 metros de largo. Con tuberías para entrada y salidas de un diámetro de 6 pulgadas y con salida de ½ pulgada para el biogás.

*"Modelo de biodigestor tipo Salchicha con doble manga de plástico".*






## 3. Presupuesto:

| RUBRO | UNIDAD DE MEDIDA | CANTIDAD POR HA. | PRECIO UNT S/. | COSTO TOTAL S/. |
|---|---|---|---|---|
| **I. COSTOS TOTAL** | | | | **420.00** |
| **INSUMOS** | | | | |
| **Materiales** | | | | **390.00** |
| Plástico Negro 1.5m ancho. | m. | 12 | 6.00 | 72.00 |
| Unión 1/2 en hidro | und. | 2 | 2.00 | 4.00 |
| Llave de bola 1/2, en plástico | und. | 1 | 15.00 | 15.00 |
| Tarraja de ½ | und. | 1 | 15.00 | 15.00 |
| Cinta Duck tape | und. | 1 | 15.00 | 15.00 |
| Cinta teflón | und. | 2 | 2.00 | 4.00 |
| Planchas de Termopor 1 pulgada | und | 2 | 15.00 | 30.00 |
| Calamina Plástica | und. | 2 | 25.00 | 50.00 |
| Cámara usada | und. | 1 | 35.00 | 35.00 |
| Filtros | und. | 2 | 35.00 | 70.00 |
| Manguera reforzada 1/2 | und | 10 | 5.00 | 50.00 |
| Listones de madera | und. | 10 | 3.00 | 30.00 |
| **OTROS GASTOS** | | | | **30.00** |
| Trasporte de materiales | und. | 1 | 30.00 | 30.00 |

## 4. Cronograma

| Mes | Octubre | | | | Noviembre | | | | Diciembre | | | | Enero | | | | Febrero | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Actividad / semana | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Diseño y presupuesto | | x | x | | | | | | | | | | | | | | | | | |
| Excavaciones | | x | x | x | | | | | | | | | | | | | | | | |
| Compra de materiales | | | | x | x | | | | | | | | | | | | | | | |
| Instalación | | | | | | x | | | | | | | | | | | | | | |
| Llenado de material / Fermentación | | | | | | | x | x | x | x | x | x | x | x | X | x | x | x | x | x |
| Producción de biogas | | | | | | | | | | | | | x | x | X | x | x | x | x | x |
| Producción de Biol | | | | | | | | | | | | | x | x | X | x | x | x | x | x |
| Producción de Biosol (solidos) | | | | | | | | | | | | | | | | | | | | x |

**5. Avances:** según el cronograma, se tiene ya avanzados: el diseño, excavaciones y se cuenta con el total del presupuesto.

"Hydroponic Green Forage - A fodder solution for Livestock in regions with water or lanc

| Theme | Workshop | Responsable |
|---|---|---|
| | Awareness raising | Edgar |
| Hydroponic Green Forrage (HGF) | 1. Production of HGF 1 | Hugo |
| | 2. Use of HGF in animal feed | Hugo |
| Guinea pig breeding and fattening | 1. Genetics | Hugo |
| | 2. Feeding | Hugo |
| | 3. Health care and sanitation | Hugo |
| | 4. Handling | Hugo |
| | 5. Marketing | Hugo |
| Sheep breeding and fattening | 1. Genetics | Edgar |
| | 2. Feeding | Edgar |
| | 3. Health care and sanitation | Edgar |
| | 4. Handling | Edgar |
| | 5. Marketing | Hugo |
| Enterprise development | 1. Identification of business opportunities | Hugo |
| | 2. Production in an enterprise | Hugo |
| | 3. Marketing. | Hugo |
| | 4. Enterprise tools | Hugo |
| Motivational sessions | | |
| S1 | First motivational session | Edgar |
| S2 | | Edgar |
| S3 | | Hugo |
| S4 | | Hugo |
| Workshop for parents about the potential impact of herding on the health and education of children | Workshops 1 | Daniel |
| | Workshop 2 | Daniel |
| Workshop about health and hygiene at home | Workshop 1 | MINSA - Tuco |
| | Workshop 2 | MINSA - Tuco |
| | | |

Fundación Strømme

Español

d scarcity"

| | PARTICIPANTS | | |
|---|---|---|---|
| Date | Male | Female | Total |
| 1/15/2014 | 10 | 11 | 21 |
| 1/21/2014 | 9 | 13 | 22 |
| 2/7/2014 | 5 | 10 | 15 |
| 2/21/2014 | 6 | 10 | 16 |
| 4/14/2014 | 6 | 11 | 17 |
| 10/23/2014 | 6 | 8 | 14 |
| 2/20/2014 | 5 | 15 | 20 |
| 12/16/2014 | 3 | 9 | 12 |
| 2/20/2014 | 5 | 15 | 20 |
| 2/21/2014 | 6 | 10 | 16 |
| 12/3/2014 | 2 | 12 | 14 |
| 2/22/2014 | 6 | 10 | 16 |
| | | | |
| 2/7/2014 | 5 | 10 | 15 |
| 11/12/2014 | 4 | 10 | 14 |
| 11/12/2014 | 4 | 10 | 14 |
| | | 0 | |
| | | | |
| | 5 | 11 | 16 |
| | | 0 | |
| | | 0 | |
| | | 0 | |
| 7/14/2014 | 7 | 21 | 28 |
| 11/26/2014 | 7 | 17 | 24 |
| | | | |
| 11/26/2014 | 14 | 21 | 35 |
| | | | |

"Forraje Verde Hidropónico - Una Solución de Forraje Para Ganado, en Regiones con Escasez de Tierra y Agua"

| Rubro | Tema | Responsable | Fecha | Varones |
|---|---|---|---|---|
| Forraje Hidropónico | 1. Producción de Forraje hidropónico 1 | Hugo | 1/21/2014 | 9 |
| | 2. Utilización del FVH en la alimentación animal | Hugo | 2/7/2014 | 5 |
| Crianza de Cuyes | 1. Genética. | Hugo | 2/21/2014 | 6 |
| | 2. Alimentación | Hugo | 4/14/2014 | 6 |
| | 3. Sanidad | Hugo | 10/23/2014 | 6 |
| | 4. Manejo | Hugo | 2/20/2014 | 5 |
| | 5. Comercialización. | Hugo | 12/16/2014 | 3 |
| Crianza de Ovinos | 1. Genética. | Edgar | 2/20/2014 | 5 |
| | 2. Alimentación | Edgar | 2/21/2014 | 6 |
| | 3. Sanidad | Edgar | 12/3/2014 | 2 |
| | 4. Manejo | Edgar | 2/22/2014 | 6 |
| | 5. Comercialización. | Hugo | | |
| Capacidad Empresarial | 1. Identificación de Oportunidad de Negocio. | Hugo | 2/7/2014 | 5 |
| | 2. Producción empresarial | Hugo | 11/12/2014 | 4 |
| | 3. Comercialización. | Hugo | 11/12/2014 | 4 |
| | 4. Herramientas Empresariales. | Hugo | | |
| Seciones de motivacion | | | | |
| S1 | Primera seción motivadora | Edgar | | 5 |
| S2 | | Edgar | | |
| S3 | | Hugo | | |

| | | | | |
|---|---|---|---|---|
| S4 | | Hugo | | |
| 3.2 Taller para padres sobre los efectos del pastoreo en la salud y educación de los niños | 2 Talleres para padres realizado sobre los efectos del pastoreo en los niños 1 | Daniel | 7/14/2014 | 7 |
| | 2 Talleres para padres realizado sobre los efectos del pastoreo en los niños 2 | Daniel | 11/26/2014 | 7 |
| 3.4 Taller sobre salud e higuiene en el hogar diriguido a las familias | 2 Talleres en salud e higuiene | MINSA - Tuco | | |
| | 2 Talleres en salud e higuiene | MINSA - Tuco | 11/26/2014 | 14 |
| | sensibilización | Edgar | 1/15/2014 | 10 |

| ASISTENTES | |
|---|---|
| **Mujeres** | **Total** |
| 13 | 22 |
| 10 | 15 |
| 10 | 16 |
| 11 | 17 |
| 8 | 14 |
| 15 | 20 |
| 9 | 12 |
| 15 | 20 |
| 10 | 16 |
| 12 | 14 |
| 10 | 16 |
| | |
| 10 | 15 |
| 10 | 14 |
| 10 | 14 |
| 0 | |
| | |
| 11 | 16 |
| 0 | |
| 0 | |

| | |
|---|---|
| 0 | |
| 21 | 28 |
| 17 | 24 |
| | |
| 21 | 35 |
| 11 | 21 |