

Irob Wereda

Project Proposal

On

**Building Technical and Vocational Education & Training
Center with main focus on Metal and Wood Furniture
Production**

In Irob Wereda of Eastern, Tigray, Ethiopia

**Irob wereda -Dawhan
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1. Project summary

Project Title: Building Technical and Vocational Education & Training Center with main focus on Metal and Wood Furniture Production in Irob Wereda of Eastern Tigray, Ethiopia

Project location: Irob district of Eastern Zone, Tigray Region, Ethiopia.

General Objective: To create competent and self-reliant citizens to contribute to the economic and social development of the country, thus improving the livelihoods of targeted community and sustainably reducing poverty.

Specific objective: To provide access to technical and Vocational education and training center to the community in Irob district.

Project budget: The total initial investment cost of the project including working capital is estimated at Birr **122,528,430.00**

Project Implementer: Irob Wereda Administration

Project beneficiary: The project is expected to benefit the **1, 216** returnees, and **1, 420** drop out students in different areas in near future. Besides this center will also provide short term trainings to young farmers who are interested in rural business development.

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2. Background Information

2.1 Regional profile

Tigray is one of the national regional states of Ethiopia which is located in the Northern part of the country between 12° 15'N and 14° 57'N latitude and 36° 27'E and 39° 59' E longitude. It is bordered by the Amhara region to the south and south-west, the Afar region to the east, Eritrea to the north and north-east and the Sudan to the west. The total land area of the region is about 54,572 sq. kms consisting of high plateau and mountains. According to the population and housing census of 2007, Tigray has a population of 4.314 million, consisting of 49.2% male and 50.8% female population. 19.5% of the total population is estimated to be urban inhabitants while the remaining are rural inhabitants. The population of the region is growing at a rate of 2.5% annually and the average population density stands at 76.7 persons per sq. km.

2.2. Project location profile

Irob Wereda (district) is located between 14°07' to 14°10' N latitude and 39° 30' to 40°00' E longitude at about 150 kms North of Mekelle, the capital of Tigray Region. The total area of the Woreda is estimated to be 850 km², with a landscape consisting of rugged mountains, hills, high plateaus & deep valley bottoms. Currently, the area under cultivation is about 1,200 hectares (1.4% of the total area of the Woreda). About 35,700 hectares (40%) are covered by short bushes and forests and about 28,050 hectares (33%) are covered by *Opuntia ficus indica*. The remaining 27% covered by grazing land and rocky outcrops. The altitude varies from 900 meters above sea level at 'Endeli' valley to the peak mountain 'Asimba' 3200 meters above sea level. The average annual rainfall and temperature of the area are less than 300mm and 20°C, respectively. The total population of the wereda is estimated to be 33,912 of which 16,692 are male and 17,220 (50.78%) are female. Total household is about 7,071 of which (2,838)40.14% are female headed households.¹

2.3 Technical Vocational Education development in Ethiopia

The Ministry of Education and the Regional Education Bureaus have shown their commitment to improving access to Technical Vocational Education and Training. After the introduction of the Education and Training policy in 1994, the number of formal and non-formal TVET provision centers has mushroomed. The Ethiopian government has recognized the importance and the need for establishing a large number of TVET institutions in the effort to promote economic and technological development in the country. Within a short period it has managed to increase the number of TVET centers from 15 in 1994 to 388 in 2006/7. Realizing the importance of linking education and the world of work has finally bear fruit in Ethiopia, districts are requesting for the provision more and more TVET centers. However, currently over the 200 districts don't have TVET centers. Similarly Non- Formal TVET mapping survey report showed that Non- formal TVET is provided in over 400 government, Private, community and non-governmental organizations.

¹ Wereda Irob Agriculture and Rural Development office (2013)

Besides around 35 million people of the Ethiopian work force are characterized by low skill levels and very low average educational attainment. 2. TVET (formal and non formal) Realizing the need for skilled human power, it has been envisaged that; to create competent and self-reliant citizens to contribute to the economic and social development of the country, thus improving the livelihoods of all Ethiopians and sustain ably reducing poverty.”

Formal, Non-formal and informal TVET sector in Ethiopia: TVET is seen as an overarching term to describe all modes of formal, non-formal and informal training and learning below higher education provided by all government and non government providers. The TVET aims to provide more TVET opportunities to a wide range of different groups including, school leavers, dropouts, people without formal education including illiterates, entrepreneurs and employees, farmers and their families, people from marginalized ethnic groups and other groups.

The Formal TVET Sector: According to the Education and Training Policy (ETP), the formal TVET system of the country requires completion of a tenth-grade education to obtain certificate, diploma and advanced diploma upon completion of the levels 10+1, 10+2 or 10+3 of the TVT program. In order to provide options for the increasing number of school leavers, the Government embarked upon a massive expansion of formal TVET since 1993. Between 1996/7 and 2006/7, the number of TVET institutions providing formal and non-agriculture TVET increased from 17 to 388, and enrolment from 3,000 to 191,151.

The Non-formal TVET: For decades short-term non-formal technical and vocational training has been provided to different groups of youths and adults. Community Skill Training Centers (CSTC), prisons, farmers training centers, rural appropriate technologies, etc are known non-formal TVET training centers. The government, NGOs and the private sector have been running the different training programs. The purpose of all these organizations has been to build the capacity of the workforce and to alleviate poverty by providing skill trainings of the poor and improving their livelihood. Unfortunately the scale at which training has been given was so small that it has not made substantive change on the life of the majority of the poor.

Some skill training includes woodwork, metalwork, tailoring, embroidery, weaving, typing, computer training, driving, etc. These trades have been given in institutions like Community Skill Training Centers (CSTC), prisons and other government institutions. However experiences vary across regions in the country and in other countries regarding the types of trainings given and the modality under which it is given. From the general economic development and the demand for better livelihood point of view, NF-TVET is considered a broad area of learning that accommodates learning/training needs of various target groups both in content, scope and depth and goal orientations. It also includes informal training, e.g. learning on the job or self-learning.

² Technical Vocational Education and Training in Ethiopia Mapping, January 2009 Addis Ababa

- Training over different periods of time – from short-term courses of a few days to long-term programs of up to 6 months,
- Training through different modalities: (institutional, community based, mobile, link and apprenticeship)
- Life skills or add-on components for
- Training for a wide range of target groups:
 - Unemployed, youth and adults,
 - School dropouts and those with grade 8 - education or lower including illiterate people,
 - People potential /active in the informal economic sector,
 - People from urban and rural areas,
 - Landless poor, and
 - Disadvantaged groups
 - People with disabilities

Non-formal TVET differs from formal TVET in the following respects:

- The educational background of the target groups is different and very diverse.
- Teachers/trainers/instructors are so far usually not certified or examined.
- There are no standardized curricula to be used in non-formal TVET provision.
- The duration of training is usually shorter and varies widely.
- Non-formal TVET is more cost effective than formal TVET.

Guiding principles in development and implementation are: Equal access and equal opportunity: Increasing access to learning opportunities for all target groups while ensuring quality, Demand orientation i.e. consideration of responding to the competence needs and qualification requirements in the labour market, Quality relevance: Striving for the highest quality and relevance of TVET provisions, Equal access and equal opportunity: Increasing access to learning opportunities for all target groups while ensuring quality , Pathways: Creating the possibilities of career progression and continuation of learners, Flexibility responding to the changing occupational requirement and accommodating different demands of various groups, and Life long learning: Extending opportunities for all time learning.

3. Project Rationale and justification/ Benefits from the project

3.1. Economic benefits of the project

Perhaps the major source of most social discontent is the issue of long term unemployment and limited livelihood options. It has been shown that populations with long term underemployment also tend to be those with higher crime rates and other social discontents. Many revolutions throughout history have been blamed on unemployment. Full employment makes a peaceful society much more possible as there is less reason for citizens to feel discontent. This project creates job opportunity to the young & contributes to social harmony & stability in the area. Generally speaking poverty reduction and food security are the main policy priorities for developing countries like Ethiopia. Ethiopia faces complex challenges of food insecurity, overpopulation, drought, political instability, ethnic conflict and large scale out-migration flows. Apart from war and political violence, ecological degradation, drought, and poverty are historically among the major causes of migration in Ethiopia.³ Rural households in the area earn income from diverse allocation of their natural, physical, financial and human capital assets among various income generating activities. Since households in the area are vulnerable to risks due to different impediments like drought, shortage of rainfall, scarcity of farm and grazing land, high soil erosion and infertility, war and lack of infrastructural facilities.

They are forced to pursue diverse income generating livelihood strategies that helps them to cope with those challenges on the one hand and to accumulate their way of living standard on the other hand. Because Irob wereda rural population livelihood depends predominantly on rain fed subsistence mixed agriculture with limited crop cultivation and mainly livestock husbandry. Even though economically the district population is based on agriculture, the most common practice is animal farming which includes small ruminants like goat/sheep, bee keeping, cattle farm and poultry. The total population of the wereda is estimated to be 33,912 of which 16,692 are male and 17,220 (50.78%) are female. Total household is about 7,071 of which (2,838)40.14% are female headed households. The age group between 15-64 years is about 47.02 percent while the old age (65 and above) population accounts 3.25 percent. ⁴ Geographically set up of the district is high land and plateau interspersed in low-lying hills and flat lands. The topography of Irob district is characterized by extremely rugged steep-slope terrain and deep narrow valleys.

Besides, the project can create also employment for 60 persons in the center. In addition to supply of the domestic needs, the project will generate Birr 15 million in terms of tax revenue. Moreover, the Regional Government can collect employment, income tax and sales tax revenue. The establishment of such factory will have a foreign exchange saving effect to the country by substituting the current imports. The community may use the knowledge from furniture production to the other related product development.

³ Source: Kloos et al., 1990; Berhanu and White, 2000; De Waal, 1991; Ezra, 2001; Ezra and Kiros, 2001

⁴ Wereda Irob Agriculture and Rural Development office

3.2. Political & Social benefits of the project

Currently, high illegal youth migration to Saudi-Arabia is the dominant livelihood strategy of the people in the area, exposing migrants to severe and complex problems. While intermediaries get significant amounts of money by trafficking migrants, exposing migrants to untold suffering has psychological and socio-economic impact on the livelihood of families and the community in particular and the country at large. The study indicated that poor households who lack social networks, have low level of education, are far from market centre, own less financial capital, and are landless and jobless were the dominant illegal-out migrants rarely enjoy the same access to remunerative opportunities as do educated males with strong social networks in the community. This indicated that the rich has greater opportunity to choose among wider range of options than the poor who has little option but could diversify out of farming into unskilled off-farm.

The youth in Irob woreda are particularly disadvantaged due to the location of the area on the boarder of two countries which do not have peaceful relation. The two countries are in no war no peace state of relationship. The military of both sides are on perpetual alert. This kind of situation which has been there for more than a decade now and it fuels despair and lack of opportunities in many ways among the youth/young people in the area. The other thing is nothing is produced in the area that can support their income and their hope of growing by their own effort. Everything that is used for living, except water and wood is brought from somewhere else while they don't have anything reliable to sell and get income to be able to buy things they want for their living and wellbeing. The living condition of people remain the same for years if not worse in Irob woreda and more so for young people.

It is due to such conditions the young people were capsized in the Red Sea in hope of getting some green pasture in Saudi Arabia and taking long journey to Israel and European countries. There are some in Yemen and others in Somalia deserts. The second and the dreading trend now is that the young people from this area are flocking to Israel through harsh deserts of Sudan and Egypt through very precarious smuggling process. Many young girls are subjected to rape and other physical harassments which all further jeopardize their physical and psychological health. Some have died in the prisons in Egypt or in Israel. Some had been shot dead around the boarder. This is has taken a worrying trend at the moment. Some young people are also running away to Eritrea just out of despair. Although, remittance received from migrants has paramount importance to cope from risks like drought, its negative consequences are worse than its benefit. Furthermore, the reasons that enforced people to out-migrate illegally rather than legally are lack of social capital such as poor networking /less contact with peoples living abroad, less access to formal migration as skilled labor.

Major problems can be summarized as

- Illegal migration (loss life , wealth)
- Drop outs from schools (High droop out of students from grade 8 and 10)
- Very limited livelihood options
- Very limited access to short term training centers

- Limited access to working starting capital
- Very limited access to vocational skills to boost rural and small business
- Many landless people

3.3. Targets of the project

Accordingly this project is aimed to address one of the top problems existing in the area; it will help to give short term training to school drop outs, to returnees of from Saudi Arabia, Israel and other countries, farmers, and to landless youth in the district. The training subject will be determined according to the need of the locality up on the grades of the students and capacity of the district. Currently, out illegal migrants 1850 (male 1312 and female 538) in the district 1,216 (male 924 and female 292) youth returned to their mother land. ⁵ The Returnees young people returned from Saudi Arabia & Israel have very limited livelihood option to participate in the work force. Besides in the district the last five year data including this year shows there is big number of school drop outs 1,420 students. ⁶ Therefore this project will build Technical and Vocational Education and Training Center (TVET center) In Dawhan, in Irob Wereda and expected to benefit and target 1, 216 returnees, and 1, 420 drop out students in different areas. Besides this center will also provide short term trainings to young farmers who are interested in rural business development.

4. Integrated working system Approach (Vertically & Horizontal)

The center will promote cluster based micro economic system procures specialized resources that are integrated into the production system to address effective integration processes. The center will provide end-to-end capabilities from display design ideas build ship and service to a complete packaged product for the market. These vertically integrated services increase customer competitiveness by delivering improved product quality, leading manufacturability, improved performance, and faster time-to-market and reduced costs.

To address the existing problems like illegal migration, anti illegal migration campaigns are very important at all levels which needs interventions at schools, in the community at grass root level and in all forms as cross cutting issue. Similarly in the rural areas, the proportion of landless people is significant. Therefore, giving due attention to these segment of the population is important to fully address the existing problem. Therefore this project will build Technical and Vocational Education and Training Center, The center will work with different actors on the issues of; Anti illegal migration campaign, Creating opportunities for the youth, providing vocational trainings, Improving access/ linkages to financial capital to youth, and forming youth cooperatives in different rural micro enterprises like frost farming, bee keeping, animal feed production and like Besides the center will organize community meetings in all targeted tabias on the issue of landless households.

⁵ Wereda Irob Administration & Wereda Youth and sport affairs office

⁶ Wereda Irob Education office

The possibility for landless people to organize themselves and establish rural micro-enterprises will be presented and discussed during these meetings. Landless households will have to be organized in small groups of people who trust each other and want to work together in a micro-enterprise on the activity of their interest. It is expected that each rural micro-enterprise will be managed by a group of around 5 to 10 landless households, depending on the activity in which they engage. The 'grouping' process will be accompanied by the local Tabia Administrations (who have to confirm that all participants are really landless) and the Woreda Bureau for Youth Affairs. The center will like to the youth to micro-enterprises with realistic and feasible business plans. For most rural micro-enterprises, specific skills are required. Often, it takes several weeks to acquire the basic skills necessary to start an enterprise. This is expected create opportunity for self employment of TVET trainees. Creating access to physical facilities of TVET will create opportunities to the district to reduce the problems which exist around the particularly in terms of short term training. Facilities in the training centers are expected to be provided after building of the center. In the beginning basic Equipments is expected to purchase for the center.

Wood furniture manufacturing: This project planed to integrate production with vertical & horizontal production of products. For instance wood furniture manufacturer will be integrated with fast growing trees plantation in the area to promote green economy that feeds the woodwork industry locally. Similarly the TVT graduate will be horizontally integrated with bee have production get market access in the locally because the area is honey production corridor known for its best honey.

Metal work production workshop: With regard to metal work production workshop; the center will hunt for markets around the area & will integrate the small group based welders producers to jointly produce metal work products & supply to the needs of market to get adequate benefits.

5. Project Description

5.1 General objective:

- To create competent and self-reliant citizens to contribute to the economic and social development of the country, thus improving the livelihoods of targeted community and sustainably reducing poverty.

5.2 Specific objective:

- To provide access to technical and Vocational education and training center to the community In Irob district.

5.3 Intermediate results:

- One TVET center with main focus on Metal and Wood Furniture Production built
- Necessary equipments and facilities purchased provided to TVET center
- Necessary training needs identified unproved for implementation by education office the district
- Training manuals, tools and equipment prepared to the center
- Linkages to Employment opportunities created at the district

6. Management, Monitoring & Reporting Activities of the Project

To implement the planned project activities the main stakeholders of the project are the community (beneficiaries), wereda administration, wereda education office and wereda youth and sports affairs office and, especially Irob wereda administration as legal holder of the project is the main management body. While expected main funding partners include Hibret manufacturing and machine building industry, wereda administration, Tigray regional administration, Irob development association (IDA), Adigrat university, ECC-SDCOA, regional education bureau & regional TVT. Local authority, wereda administration will be responsible for the mobilization of local communities for local resource contribution and securing land for construction the facilities.

The funding partner of the project, will be responsible in disbursing the project budget on semi-annual basis, ensuring the project expenses are according to the agreed project budget line items and within the project financial plan, regular supervision to ensure the program quality as well as to provide technical assistance for the staff of directly implementing partner, and organizing auditing of yearly expenses and reported activities. With regard monitoring and reporting mechanism, all activities accomplished (services provided) and financial expenditures incurred by the project will be recorded on monthly basis. Using standard formats developed, all the monthly-recorded information will be compiled on quarterly, semi-annual and annual basis. Therefore, regular reports to all concerned stakeholders on quarterly, semi-annual and yearly basis will be presented. The specific information to be included in the report are: activities planned vis-à-vis accomplished in the reporting period, if the activities are accomplished in time frame specified, if budget is spent as planned, if any change needed in implementation, specific problems encountered in implementing the planned activities, if work plan needs modification and other relevant issues pertaining to the program activities.

7. Project overview. Working system and annual work time, and Production technology and process

7.1 Project overview.

- Representative basic model: LB-B01 steel clothe cabinet
- Dimension: 1800x850x390mm
- Material: 0.6mm cold rolled steel sheet
- Metal locks with high quality ABS engineering plastic fittings

7.2 Working system and annual work time

According to actual situation in Ethiopia, work system is as follows: Single shift production, 8 hours / shift, 254 days / year, 8 hours / day; Annual work time: 2032 hours

7.3 Production plan

- Annual output: comprehensive 35000 (sets),
- (Take basic model into account, others varieties counted as equivalent size to the basic model)
- Daily capability: $50,800 / 254 = 200$ sets
- Daily need to use 0.6mm steel sheet: 0.45~0.68t
- Daily need to use wood boards: $2M^3$

7.4 Plant construction principle

Independent plant main facilities include workshop, public facilities, office building, road, greenbelt, entrance guard, walls, etc. According to the 9500 square meters of main factory, the total independent plant area shall not less than 2 hectares.

The main workshops are all of steel structure type, totally 3 columns with 18m long. As the middle column of workshop contains electrostatic powder coating lines, so water treatment and dust removal system is affiliated. Due to the total layout and environment requirement, the last assembly and finished products workshop column was separately emplaced with hanging chain corridor connect to the other one. Public facilities including water, electricity, compressed air and gas. A small amount of sewage is required to be discharged after treatment.

7.5 Production technology and process

- Cut the cold rolled steel plate into different size according to different parts (such as door, a side plate, the top, a bottom plate, a baffle plate) by laser cutting machine or cutting machine.
- rim, chamfer, pierce the different cut cold rolled plates to different parts (such as door, a side plate, the top, a bottom plate, a baffle plate) at the punching machine,
- Bend the parts accordingly with the bending machine.
- Use no trace spot welding machine to weld the plates (side, top, middle, bottom, back), slide, and vertical beams with smooth surface which need no burnish and putty.
- Pickling and phosphating to clean the surface of the whole cabinet.
- Spray with electrostatic powder in the spray workshop to make sure the product is environmental friendly.
- High temperature (180-200 °C) treatment is carried out to cabinet then. Different color for different product during powder coating process is more convenient. It not only can meet personalized customer demand, but also convenient for various knock-down cabinets.
- Assemble the cabinet in the assembly workshop which including mounting clapboard, slide, drawer, doors and debugging etc. Pack them after quality inspection.
- Store the finished products into finished products warehouse.

7.6 Process description

- Put work piece prepared
- Washing: Manually wash the workpiece with water(W1)
- Degreasing: Cleaning the greasy dirt by adding an alkali solution(W2)
- Washing: wash the alkali solution with water(W3)
- Acidification: remove hardening layer in acidic solution so that to improve the quality of phosphating. (W4)
- Washing: wash the acidic solution with water(W3)
- Surface conditioning: form membrane with colloid titanium phosphate aqueous solution which can fasten phosphating speed and increase phosphate crystallization by refining crystallization.
- Phosphating: forma phosphating film by putting the pre-treated workpiece into thephosphating solution.
- Washing: wash and clean the workpiece with water to prevent the residual phosphate involve in electrochemical corrosion in the future embalming process. (W7)
- Drying: dry up the washed workpiece with natural gas or coal gas burning furnace.
- powder spraying: spray electrostatic powder in the powder spraying chamber.(G1, N3)

Working method: a high-voltage corona discharge electric field is formed between the gun, and workpiece, when the powder particle is ejected from the spray gun nozzle through the discharge zone, it will capture a large number of electrons and become negatively charged particles. The particles will be adsorbed to the positively charged workpiece as electrostatic attraction. When the workpiece attached to a certain thickness, because of poles repel, it cannot absorb powder anymore, so that each part of the powder layer thickness is even. After heating in the oven, the particles will melting and leveling and become uniform film.

- Solidification: melting, leveling and solidifying the layers in high temperature (about 200 DEG) oven.
- Finish

The Main protective measures of electrostatic powder spraying technology

- Wastewater (W)
 - Degreasing, acidification, surface conditioning, phosphating treatment liquids need to be changed after a certain period of time.
- Exhaust gas
 - Part of powder (usually 50% to 70%) sprayed will be absorbed to the surface of the work piece,the rest naturally subsided to the bottom of the spraying chamber and will be pumped to the rotary screen to use again. A small amount of dust will be emitted with the gas. This dust will be absorbed by water when it passes through the tank which mounted 5 meters high and will be used again after dried.

Table Equipment list

No.	Name	Specification	Quantity	Remark
1	Cutting Line (Uncoiling & leveling)		1set	
2	Laser cutting machine		1set	
3	Shearing machine	2500Model	1set	
4	Shearing machine	2000Model	1set	
5	Shearing machine	2000Model	1set	
6	Open press machine	63T	1set	
7	Open press machine	40T	1set	
8	Open press machine	16T	1set	
9	Open press machine	16T	1set	
10	Open press machine	16T	1set	
11	Open press machine	16T	1set	
12	Hydraulic bending machine	2500Model	1set	
13	Hydraulic bending machine	2000Model	1set	
14	Hydraulic bending machine	2000Model	1set	
15	Hydraulic bending machine	2000Model	1set	
16	Folding machine	800Model	1set	
17	Folding machine	600Model	1set	
18	Automatic mash welder		1set	
19	Mash welder	L=1300mm	1set	
20	Mash welder	L=1300mm	1set	
21	Mash welder	L=900mm	1set	
22	Mash welder	L=900mm	1set	
23	Mash welder	L=900mm	1set	
24	Mash welder	L=900mm	1set	
25	Mash welder	L=900mm	1set	
26	Mash welder	L=900mm	1set	
27	Flat welding machine	two guns	1set	
28	Argon arc welding machine	two guns	1set	
29	Argon arc welding machine	two guns	1set	
30	Argon arc welding machine	two guns	1set	
31	Copper drawing platform	2000mmx1000mm	1set	
32	Electrostatic powder spraying line	Non standard	1set	
	Including: Spray pretreatment line		(1set)	
		Various for different		
	Automatic spraying chamber	colors	(1set)	

		Natural gas or coal		
	Burning machine drying chamber	gas	(1set)	
	Suspension conveying line	Including spreader	(1pcs)	
	Powder recovery system		(1set)	
	Affiliated water treatment system		(1set)	
	Affiliated dust removal system		(1set)	
33	Grinding wheel cutting machine		1set	For Pipeline
34	Hydraulic pipe bender		1set	For Pipeline
J01	Bridge crane	Gn=10t, L=16.5m	1set	
J02	Electric single beam crane	Gn=3t, L=16.5m	1set	
J03	Electric single beam crane	Gn=3t, L=16.5m	1set	
J04	Electric single beam crane	Gn=3t, L=16.5m	1set	
J05	Electric single beam crane	Gn=3t, L=16.5m	1set	
	Others			
			complete	
	Assembly tool		set	
	Cutting saw		1set	Timber
	Longitudinal saw machine		1set	Timber
	One side press planer		1set	Timber
	Wide belt sander		1set	Timber
	Dust collector		1set	Timber
	Glass workbench and tools		1set	
	Total		46sets	

7.7 Product and process technology transfer & models fixing

In order to ensure the smooth production, besides product and technology transfer, we also provide a full set of tool and model, but also train costumer company technical personnel when constructing the plant and in the process of trial production.

Content of technology transfer

No.	Items	Content	Concrete carrier
1	Product	11 categories with 113 varieties	Full set of drawings 3 carbon copies and a copy of the electronic version
2	Technology	blanking, punching and bending process documents, electrostatic powder process, assembly process	Full set of process files 3 carbon copies and a copy of the electronic version
3	Tool and model		Provide a full set of tool and model

8. Budgeting & Financial Analysis

8.1 Pricing and Distribution

As a new entrant to the market, the project under study will have an advantage of using latest technology as against the existing domestic producer which will enable to produce at a product at lesser cost and better quality. The recommended price for selected product is Birr 3000 per pc. The product can be distributed by establishing own distribution outlets in strategic towns or by using hired or commissioned agents.

Basic assumptions

Source of finance	100% Loan
Tax holidays	2 years
Bank interest	13.5%
Constriction period	1year
Depreciation	
Building	5%
Machinery	20%
Vehicle	20%
Office equipment	20%

8.2 Total Initial Investment Cost

The total initial investment cost of the project including working capital is estimated at Birr **122,528,430**. The breakdown of the total initial investment cost is shown in Tables below.

Fixed Investment Cost

No	Description	Cost in Birr	Remark
1	Building and civil works	45,000,000	
2	Machinery and equipment	23,000,000	
3	vehicles	4,000,000	
4	Office Furniture and Equipment	2,000,000	
Total		74,000,000	

Initial working capital: The basic raw material required for the project is different types of sheet metal, MDF and HDF. Powder Sprayingare, Pickling phosphating liquid and standard partsalso required for production wood and metal products. Annual raw materials requirement of the plant at full capacity operation and the estimated costs are shown in Table below.

Raw material cost

No.	Description	Unit of measure	Required Qty	Unit price	Total
1	metal	ton	174	29,337	5,104,638
2	Wood	M ³	508	15,000	7,620,000
3	Powder Sprayingare	ton	48	146,685	7,040,088
4	Pickling phosphating liquid	ton	24	122,232	2,933,304
5	Standard parts	set	40	73,326	2,930,400
TOTAL					25,628,430

Utilities: The utilities required for the plant comprise electric power and water. The total annual requirement for utilities at 100% capacity utilization rate and the estimated costs are given in table below

No.	Description	Unit of measure	Required Qty	unit price Birr/unit	Cost, (Birr)
1	Electric power	KWh	100,000	22	2,200,000
2	Water	M ³	40,000	5	200,000

Initial investment cost: Total investment cost of the project is thus estimated for the year at **122,528,430** Birr and is the sum of the fixed investment cost and the initial working capital as shows in the table below.

Sr. No.	Cost items	Cost (birr)	Remark
1	Fixed investment		
1.1	Building and civil work	45,000,000	
1.2	Machinery and equipment	23,000,000	
1.3	vehicles	4,000,000	
1.4	Office Furniture and Equipment	2,000,000	
Sub total		74,000,000	
2	Working capital		
2.1	For Erection, Training, drawing, technology transfer and Commissioning	14,000,000	
2.2	For Raw Material	25,628,430	
2.3	Utilities	2,400,000	
2.4	Wages	3,000,000	

2.5	Transportation cost	2,000,000	
2.6	Contingency	1,500,000	
Sub total		48,528,430	
Grand Total		122,528,430	

Loan Repayment Schedule: Repayment of principles is assumed to be equal installment of the outstanding amount of each year ending & interest rate would be assumed 13.5%. Therefore, the loan repayment schedule & interest payable is calculated below

S/N	Year	Principal	Interest	Annual payment	Outstanding balance
					122,528,430
1	End of year 1	22,905,686	15,461,338.05	38,367,024.05	91,622,744
2	End of year 2	22,905,686	12,369,070.44	35,274,756.44	68,717,058
3	End of year 3	22,905,686	9,276,802.83	32,182,488.83	45,811,372
4	End of year 4	22,905,686	6,184,535.22	29,090,221.22	22,905,686
5	End of year 5	22,905,686	3,092,267.61	25,997,953.61	000

Average interest = 9,276,802.83

8.3 Financial Viability

The annual production cost at full operation capacity is estimated at Birr **52,405,232** Table below. The cost of raw material accounts is birr 25,628,430 (50%) of the production cost. The other major components of the production cost are depreciation and average interest.

Annual production cost at full capacity

items	Cost (Birr)	Remark
Raw Material input	25,628,430	
Utilities	2,200,000	
Wages & Salaries	2,000,000	
Transportation cost	2,000,000	
Contingency	1,500,000	
Total operation costs	32,488,430	
Depreciation	10,640,000	
Average interest	9,276,802.83	
Total production	52,405,232	

Project Revenue

S/N	Year	Value (birr)
-----	------	--------------

1	Net sales	106,680,000
2	Sales tax (VAT-15%)	16,002,000
3	Production cost	52,405,232
4	Gross profit	54,274,768
5	Income tax (30%)	16,282,430.4
6	Net profit (birr)	37,992,337.6

8.3.1 Pay-back Period

The pay-back period, also called pay – off period is defined as the period required for recovering the original investment outlay through the accumulated net cash flows earned by the project. Accordingly, based on the projected cash flow it is estimated that the project's initial investment will be fully recovered within 3 years.

$$\text{Pay-back period} = \frac{\text{total investment cost}}{\text{Net profit} + \text{total depreciation}}$$

$$\frac{122,528,430}{(37,992,337.6 + 10,640,000)}$$

3 years

8.3.2 Simple Rate of Return

The internal rate of return (SRR) is the annualized effective compounded return rate that can be earned on the invested capital, i.e., the yield on the investment. Put another way, the internal rate of return for an investment is the discount rate that makes the net present value of the investment's income stream total to zero. It is an indicator of the efficiency or quality of an investment. As we seen from SRR analysis the result bank interest rate.

$$\text{SRR} = \frac{\text{Net-profit} + \text{Av. Bank interest} \times 100\%}{\text{Total investment}}$$

$$\text{SRR} = \frac{37,992,337.6 + 9,276,802.83}{122,528,430}$$

38%

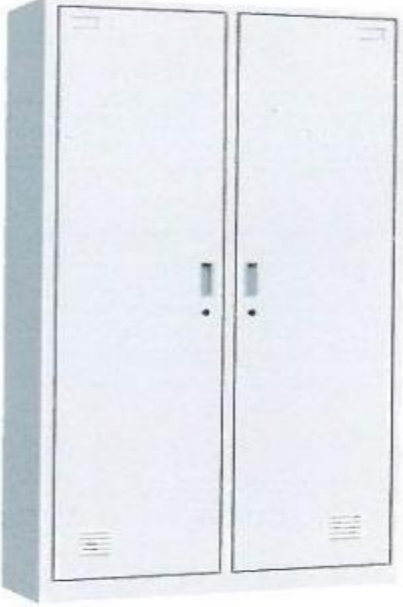

8.3.3 Break even analysis




$$\text{BEP} = \frac{\text{total fixed cost}}{\text{Unit price} - \text{unit variable cost}}$$

74,000,000
3,000 – 640
31,356 unit



9. Annexes

Annex 1 Products list

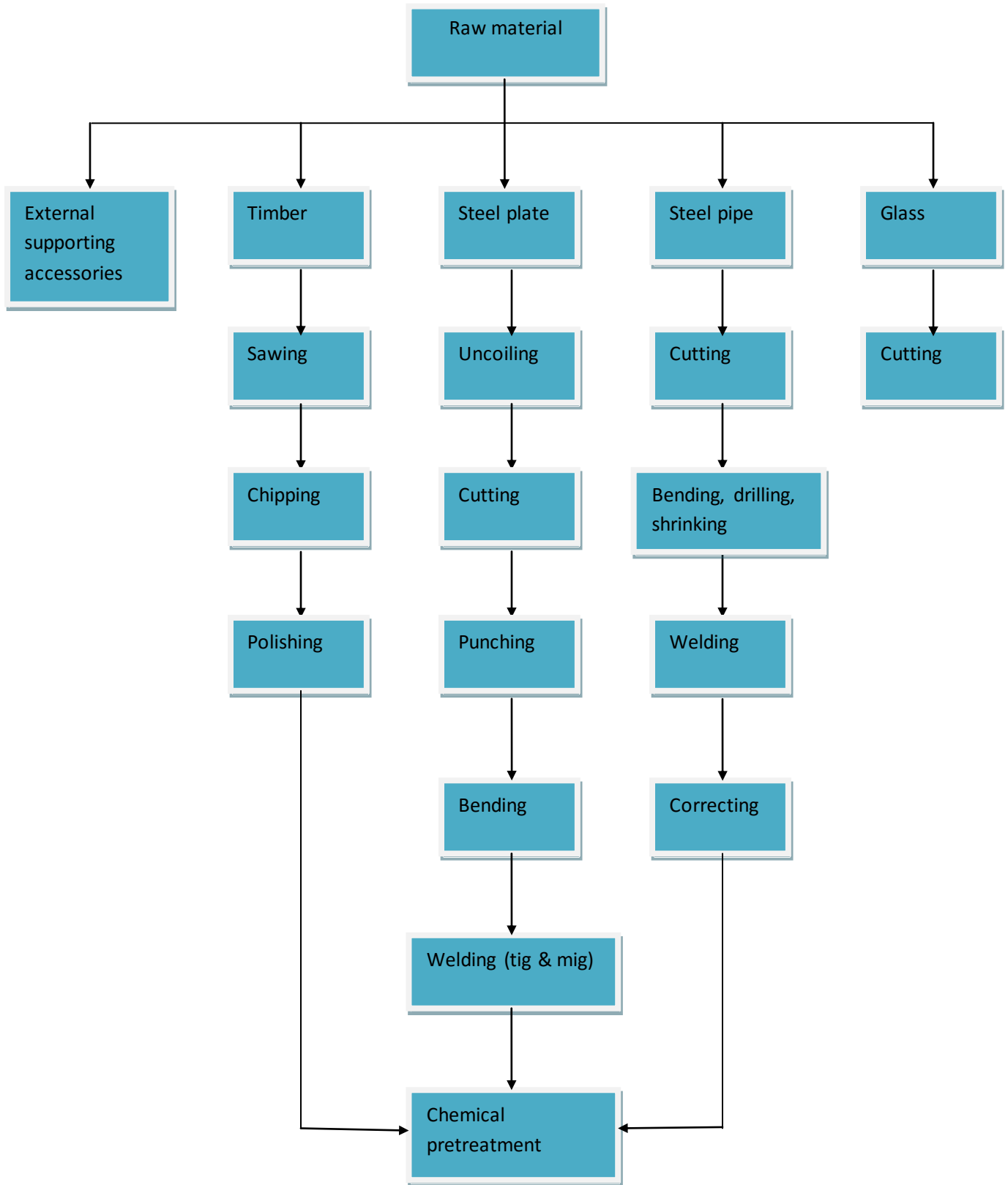
No.	Product category	Basic model view
1	Clothes cabinet	
2	Glass cabinet	

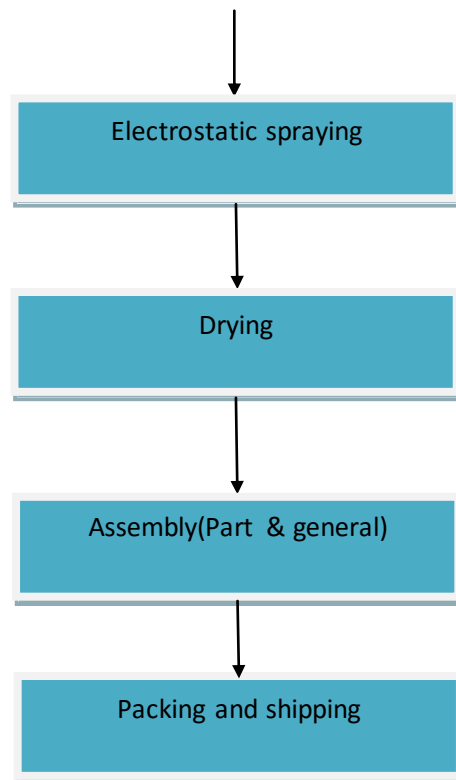
3	Knock down cabinet	
4	Office table	
5	Office table	

6	Book shelf	
7	School table	
8	Bed	

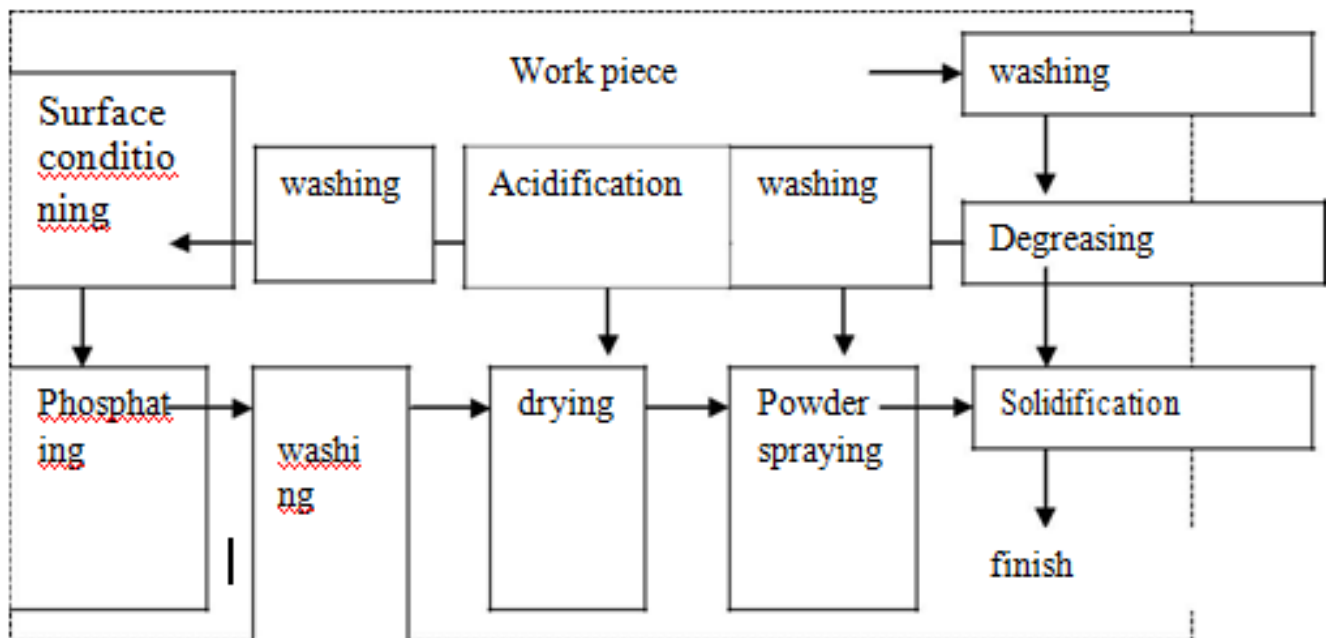
9	Double bed	
10	Goods shelf	

Annex: 2 Production process flow chart





Electrostatic powder spraying Process flow chart



Annex 3 Tool and model list

No	Name	Quantity	Remark
	File cabinet series		
1	Bottom die	1	
2	Press die	1	
3	Middle opening die	1	
4	Side handle	1	
5	round triangle	1	
6	Squareblanking	1	
7	Squarepress	1	
8	baffle	1	
9	Door	1	
	File cabinet, glass cabinet series		
11	Top die	1	
12	70 lower angle	1	
13	70 glass door	1	
14	Bolt hole	1	
15	locking claws	1	
16	glass frame model	1	
17	26 door angle die	1	
18	automatic mash welder	1	
19	Side 30 bottom die	1	
20	Conventional active angle mode	1	
21	Bucket confining pressure	1	
22	Bucket cover pressure	1	
23	locking hole	1	
24	linkage locking hole	1	
25	Vertical die	1	
26	70 bottom die	1	
27	Glass stopper	1	
28	Side press die	1	
29	Bottom die	1	
30	slide hole	1	
31	Middle opening die	1	
32	Linkage locking lifter	1	
33	Aluminum Alloy handle	1	
34	Iron Cross die	1	
35	Shutter mode	1	
36	Wind window	1	

Bending ruler			
37	Bottom block	1 set	
38	block stalls	1set	
39	block door	2sets	
40	top	3sets	
41	side ruler	2sets	
42	waist ruler	4sets	
43	boundary ruler	2sets	
44	26 door	3sets	
45	live pluck	3sets	
46	70 bottom	1set	
47	30 bottom	1set	
48	surface pluck	2sets	
49	Side block head	1set	

Comprehensive cost

Comprehensive quotation						
No	Name	Qty.	unit	Unit/USD	Total/USD	Remark
	Production line equipment					
1	Cutting Line (Uncoiling& leveling)	1	set			
2	Laser cutting machine	1	set			
3	Shearing machine	1	set			
4	Shearing machine	2	sets			
5	Open press machine	1	set			
6	Open press machine	1	set			
7	Open press machine	4	set			
8	Hydraulic bending machine	1	sets			
9	Folding machine	3	set			
10	Automatic mash welder	1	set			
11	Mash welder	1	set			
12	Automatic mash welder	1	sets			
13	Mash welder	2	sets			
14	Mash welder	6				
15	Flat welding machine	1				
16	Argon arc welding machine	3				
17	Copper drawing platform	1				
18	Electrostatic powder	1				

	spraying line					
19	Grinding wheel cutting machine	1				
20	Hydraulic pipe bender	1				
21	Bridge crane	1				
22	Electric single beam crane	1				
23	Electric single beam crane	1				
24	Electric single beam crane	1				
25	Electric single beam crane	1				
26	Others(Assembly tool and timber machines)					
Sub-total			Complete set			
26	Equipment installation, commissioning, training					
27	Product drawings and technology transfer					
28	Full set of tool and model					
29	11 categories with 113 varieties		Varieties pcs			
30	Debugging material					
	0.6 Steel Plate	20				
	Powder Spraying(3 colors)	6(each color 2 tons)	ton			
	Pickling phosphating liquid	3	ton			
	Standard parts	5	ton			
Total						