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Semester: Autumn 2026

ALLAMA IQBAL OPEN UNIVERSITY, ISLAMABAD

(Department of Computer Science)

Course: Economics of Forestry (2508)

Level: MSc Forestry Extension

Semester: Autumn 2026

Assignment No. 2

Total Marks: 100 • Passing Marks: 50 • All questions carry equal 20 marks.

SOLVED ASSIGNMENT GUIDE — For Study & Reference

Note: This guide is prepared for study and reference purposes only. Students are advised to read the relevant units of the course book, understand the concepts, and then write the assignment in their own words. Do not copy this guide word for word.

Question 1: Special Property Taxes Applied to Forests (20 Marks)

Q.1 Enlist various types of special property taxes being applied to forests. Briefly discuss any two of them. (20)

Introduction

Taxation touches forestry differently from almost every other land use, because a forest is property that may produce cash income only once in several decades while occupying valuable land every year in between. A tax system designed for shops or annual crops can therefore ruin forestry if it is applied without adaptation: heavy annual charges on standing timber force owners to fell early, discourage planting, and convert forest land to quicker-paying uses. Forest

taxation has consequently developed special forms of property tax that take account of the long rotation, the distinction between land and growing stock, and the public interest in keeping land under trees. A property tax, in general, is a tax on the ownership of wealth — on land, buildings or standing assets — rather than on income when it is earned or on goods when they are sold. This answer first enlists the main types of special property tax applied to forests, and then discusses two of them in detail: the site-value (land) tax and the yield tax, which between them illustrate the two opposite philosophies of forest property taxation.

Types of Special Property Taxes Applied to Forests

The principal types recognised in forest taxation literature and practice are as follows. (1) The general property tax on assessed capital value, under which forest land and standing timber are valued together and taxed annually at a rate on that combined value; this is the ordinary property tax extended to forests and is widely criticised for penalising the patient owner whose timber value grows each year. (2) The site-value or bare-land tax, levied annually only on the value of the forest land itself, excluding the growing stock standing on it. (3) The yield tax (also called a harvest or severance-related property charge in some systems), levied not annually but at the time of felling, as a percentage of the value or volume actually harvested. (4) The productivity or site-class tax, in which land is classified by its productive capacity — site quality classes — and a fixed annual charge per hectare is applied according to class rather than to the individual owner's actual stocking or management. (5) The area tax, the simplest form, a flat annual charge per hectare of forest land regardless of value, quality or stocking. (6) The growing-stock or inventory tax, levied annually on the assessed value of the standing timber alone, sometimes applied only above a certain age or volume. (7) Preferential or use-value

assessment, technically a special method of property taxation under which forest land is assessed at its value in forest use rather than at its (usually higher) market value for development, often combined with a rollback or penalty tax if the land is converted to a non-forest use. (8) An abatement or exemption arrangement for young plantations, under which newly planted forest is exempt from property tax for an initial period of years — not strictly a separate tax, but a standard special provision modifying all the above. Students should note that real systems usually combine several of these: for example, a modest site tax during the rotation plus a yield tax at harvest, with exemption in the earliest years.

- General property tax on combined land + timber capital value (annual).
- Site-value (bare-land) tax — annual, on land value only.
- Yield tax — at harvest, on value/volume actually felled.
- Productivity / site-class tax — annual per hectare by site quality class.
- Area tax — flat annual charge per hectare.
- Growing-stock (inventory) tax — annual, on standing timber value.
- Use-value (preferential) assessment, with conversion/rollback tax.
- Young-plantation exemption or abatement period.

Table 1: Special forest property taxes at a glance

Tax type	Tax base	When paid
Site-value tax	Value of bare forest land only	Annually
Yield tax	Value or volume harvested	At felling / harvest

Productivity tax	Site quality class, per hectare	Annually (fixed by class)
Area tax	Area held (per hectare)	Annually (flat)
Growing-stock tax	Value of standing timber	Annually
Use-value assessment	Value in forest use (not development value)	Annually, with rollback on conversion

Discussion of Two Taxes: (i) The Site-Value Tax

Under the site-value tax, the assessor values the forest land as if it were bare — by its location, soil productivity and earning capacity under forestry — and charges tax each year on that land value alone; the trees standing on it, however valuable, are not taxed until they are harvested and turned into income, which is then dealt with under income or yield provisions. Its great merit is neutrality toward good management: the owner who plants promptly, tends carefully and lets his crop grow to a valuable size pays no more annual tax than the neglectful owner of identical land, so the tax does not punish the accumulation of growing stock and does not press the owner toward premature felling. It also gives the revenue authority a stable, predictable annual income and gives the owner a steady incentive to keep the land productive, since the tax is due whether the land is used well or badly — idle forest land is discouraged without penalising improvement. Its difficulties are practical and financial. Assessing bare-land values for forest sites is technically demanding where land sales are rare, and the annual charge, though modest, must be paid out of pocket for decades before a young plantation yields anything, which can strain small owners unless combined with an initial exemption period or

deferment. On very poor sites the site value is low, so the tax is automatically light, which is equitable; on valuable peri-urban forest land the bare-land value may reflect development hopes rather than forestry earning power, in which case use-value assessment is needed to prevent the tax itself from driving conversion. On balance, forest economists generally regard a moderate site-value tax as one of the soundest property taxes for forestry because it taxes the permanent factor — land — and leaves the crop, the reward of patience and good husbandry, untaxed while it grows.

Discussion of Two Taxes: (ii) The Yield Tax

The yield tax reverses the timing: nothing, or very little, is charged during the long growing period, and tax is collected once, at harvest, as a stated percentage of the stumpage value or volume of timber actually cut. Its first merit is that it matches the owner's ability to pay: the tax falls due exactly when the forest finally produces cash, so it removes the liquidity burden that makes annual taxes so heavy for small forest owners and new planters. Second, it is simple to administer where harvesting is licensed or passes through check-posts and depots, because the taxable event is visible and measurable — timber is scaled, graded and valued at felling or removal. Third, at a moderate rate it does not discourage planting as strongly as an annual tax on growing stock, since the planter knows no charge will accumulate against his young crop year after year. Its disadvantages must also be faced honestly. Revenue from a yield tax is irregular for the government, arriving in lumps when forests are felled and disappearing in years of low harvest. At the margin it raises the cost of harvesting and can tip a borderline stand into being left unharvested, or, if the rate is expected to rise, can provoke owners to fell early to beat the increase; if the rate is high it may also encourage under-reporting of volume

and illegal felling to evade the charge. Unlike the site tax, it gives no pressure to use idle land productively, because unused land pays nothing. For these reasons many specialists recommend the yield tax not alone but in combination: a small annual site or area charge to discourage idle holding and fund local services, plus a moderate yield tax at harvest to collect the main revenue when the owner can pay. That combination respects both the biology of forestry and the needs of the exchequer.

Conclusion

To conclude, the special property taxes applied to forests — site-value, yield, productivity-class, area, growing-stock and general capital-value taxes, together with use-value assessment and young-plantation exemptions — are all attempts to solve one problem: how to raise fair revenue from an asset that occupies land continuously but yields cash only rarely. The site-value tax taxes the permanent land factor annually and leaves the growing crop free, rewarding good management but demanding payment before income arrives. The yield tax waits until harvest and matches tax to cash in hand, at the cost of irregular revenue and weaker pressure against idle land. A balanced combination of the two, with relief for young plantations and protection against development-value assessment, is generally the most defensible settlement, because it neither forces premature felling nor lets forest land escape its fair contribution to public revenue.

Question 2: Stages and Characteristics of Social Planning for the Forest Economy (20 Marks)

Q.2 Enlist the main stages of social planning. Also, explain the basic characteristics of social planning for the forest economy. (20)

Introduction

Social planning means the deliberate, organised effort by society — through government and community institutions — to set collective goals and to arrange resources so that those goals are reached for the welfare of the whole community rather than by the uncoordinated decisions of individuals alone. In the forest economy the case for such planning is exceptionally strong: forests protect watersheds used by millions of downstream people, take decades to grow, and produce benefits that no single owner can sell, so leaving their future entirely to individual short-term calculation would systematically under-provide them. This answer first enlists the main stages through which any sound social plan passes, and then explains the basic characteristics that social planning takes on when it is applied specifically to the forest economy.

Main Stages of Social Planning

The main stages, in their logical order, are the following. First, survey and diagnosis: collection of facts about the present position — resources, population, needs, problems and their causes — because a plan built on wrong facts will fail however elegant it looks. Second, formulation of objectives: deciding, in order of priority, what the plan is to achieve, in terms as definite and

measurable as the subject allows. Third, assessment of resources and constraints: estimating the money, staff, land, materials and time actually available, and the legal and social limits within which the plan must work. Fourth, formulation of the plan itself: selecting programmes and projects, comparing alternatives, fixing targets for each period, and coordinating the parts so that they support rather than obstruct one another. Fifth, public discussion, approval and legal authorisation, including allocation of the budget, so that the plan becomes an official commitment and not merely a report. Sixth, implementation: assigning responsibilities to agencies and officers, releasing funds on schedule, and organising the field work. Seventh, supervision and monitoring during execution, comparing actual progress with the targets so that delays and defects are caught early. Eighth and finally, evaluation and feedback: judging at the end of the period what was achieved, what it cost, and what lessons must be carried into the next plan, which then begins again with a fresh survey. Planning is thus a cycle, not a single act.

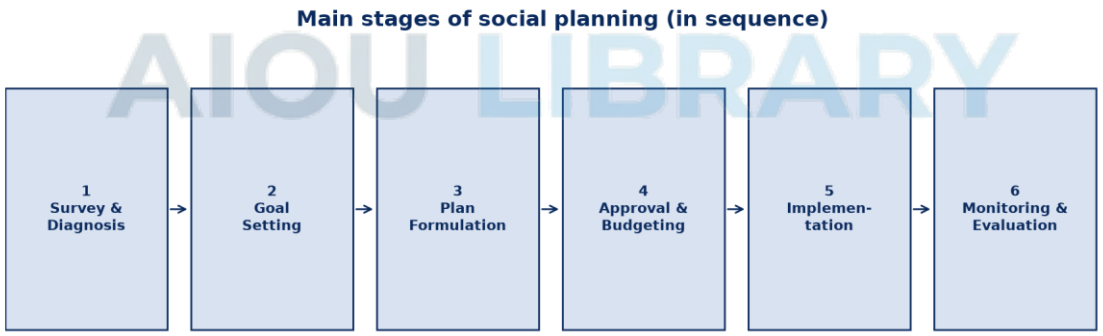


Figure 1: The main stages of social planning form a continuing cycle: evaluation of one plan feeds the survey on which the next plan is built.

- 1. Survey and diagnosis of the existing situation.

- 2. Formulation of objectives and priorities.
- 3. Assessment of resources and constraints.
- 4. Formulation of programmes, projects and targets.
- 5. Discussion, approval and budgetary authorisation.
- 6. Implementation through assigned agencies.
- 7. Monitoring and supervision during execution.
- 8. Evaluation, feedback and preparation of the next plan.

Basic Characteristics of Social Planning for the Forest Economy

When social planning is applied to forestry, it acquires several distinctive characteristics. The first is a very long planning horizon. Because a plantation plan made today determines timber supply thirty or fifty years ahead, forest social planning must look further into the future than almost any other sector, and it works through nested periods: long-term national forest policy, medium-term development plans, and ten-year working plans for individual forests, each level guiding the one below. The second characteristic is the primacy of social over purely commercial objectives. A private plan asks what will pay the owner; a social plan for forests asks what will protect the catchment, supply fuelwood to poor households, create rural employment, conserve wildlife and still produce industrial timber in fair proportions, and it will deliberately accept a lower cash return on some areas — for example protection forests on steep catchments — because their social return is high. Third, forest social planning is necessarily area-based and resource-inventory based: it rests on forest surveys, growing-stock enumeration and site classification, and its targets are expressed in hectares planted, protected

and brought under sustained-yield management as much as in money spent. Fourth, it is characterised by continuity and legal backing: working plans have the force of an approved prescription, felling is regulated by annual allowable cut, and a new officer inherits the plan rather than inventing his own, because discontinuity of treatment is itself a cause of forest decline.

Fifth, social planning for the forest economy is participatory in a special degree. Forests are surrounded by communities that graze animals in them, collect fuelwood and fodder from them and sometimes encroach upon them; a plan that ignores those people will be defeated on the ground, so modern forest planning builds in village organisations, joint forest management arrangements, benefit-sharing and employment for local people as planned components, not as charity. Sixth, it is multi-sectoral: forest plans must be coordinated with agriculture, livestock, water, energy and land-use planning, because the pressures that destroy forests usually originate outside the forest department — in fuelwood demand, grazing pressure and agricultural expansion — and can only be relieved by action in those sectors, such as distributing efficient stoves or developing fodder resources. Seventh, it is adaptive and sustained-yield bound: the plan sets a ceiling on harvest equal to what the forest can produce permanently, monitors growing stock, and revises prescriptions when monitoring shows the resource changing. Eighth, it has a strong distributive character: social forestry and farm-forestry programmes deliberately direct seedlings, credit and technical help to small farmers and landless users, so that planning is used as an instrument of equity as well as of production.

Conclusion

In conclusion, social planning everywhere proceeds through the same disciplined stages — survey, objectives, resource assessment, formulation, approval, implementation, monitoring and evaluation — but in the forest economy those stages take on a special character: an unusually long horizon, social and protective objectives placed alongside commercial ones, dependence on resource inventory and sustained-yield regulation, legal continuity through working plans, participation of forest-dependent communities, coordination with other land-using sectors, and a deliberate concern for equitable distribution. A forest plan that lacks any one of these characteristics may still be a planting programme, but it is not yet social planning for the forest economy in the full sense. For Pakistan, where catchment protection and fuelwood supply are national questions, planning of exactly this character is the bridge between the small forest estate the country possesses and the large services its people require from it.

Question 3: Wood Marketing Agencies and the Mechanism of Wood Marketing in Pakistan (20 Marks)

Q.3 Discuss briefly the wood marketing agencies in Pakistan. Also, discuss the mechanism of wood marketing in our country. (20)

Introduction

Production is only half of forest economics; the other half is marketing — moving wood from the stump, often in a remote mountain valley, through conversion and transport, into the hands of builders, furniture makers, fuel users and industries at a price that rewards every

honest handler without exploiting the final consumer or the grower. In Pakistan wood marketing is a mixed system in which government forest departments, public corporations, private contractors, commission agents, wholesalers, retailers and a vast number of small farm growers all play a part. Weaknesses in this chain — many middlemen, poor information about prices, lack of grading and seasonal gluts of farm timber — are frequently complained of by both growers, who receive a small share of the final price, and consumers, who pay a high one. This answer describes the main marketing agencies operating in the country and then explains the mechanism, that is, the step-by-step process by which wood actually travels from forest to final user.

Wood Marketing Agencies in Pakistan

The first agency is the provincial Forest Department itself. As owner of state forests, the department marks and sells standing trees or felled timber, conducts auctions at depots, issues transit passes that legalise the movement of timber, and in this way acts both as the largest primary seller of natural-forest timber and as the regulator of the whole trade. Closely associated is the harvesting and marketing work done through government arrangements and registered forest contractors and purchasers, who buy standing lots at auction, fell, convert and extract the timber at their own cost and risk, and carry it to the market; in the northern conifer forests this contractor or purchaser system has historically been the main channel for departmental timber. The second group of agencies consists of the timber markets and their intermediaries: wholesale timber merchants concentrated in recognised mandis and timber markets in cities such as Karachi, Lahore, Rawalpindi, Peshawar and other trading centres, together with commission agents (arhtis) who bring buyers and sellers together for a

commission, brokers who negotiate lots, and depot holders who store and season timber. The third group is the converting and retailing trade: sawmills, which buy logs and sell sawn sizes; veneer and plywood, particleboard, pulp and paper and match industries, which buy specified raw material in bulk; and retail timber dealers, furniture workshops and building-material shops that sell to the final user. The fourth and now very large agency is the private farm-forestry channel: farmers growing poplar, eucalyptus, shisham and other trees on their land sell standing trees or harvested poles either directly to sawmills and industries — poplar to the match, plywood and sports-goods industries around Gujranwala, Sialkot and other centres is a well-known example — or through local village-level traders and transporters who assemble small lots into truckloads. Finally, public and semi-public bodies such as cantonment boards, railways, WAPDA and large construction organisations appear on the buying side as institutional purchasers, often by tender, while imported timber enters through Karachi port merchants and supplements domestic supply, especially for species and qualities in short supply at home.

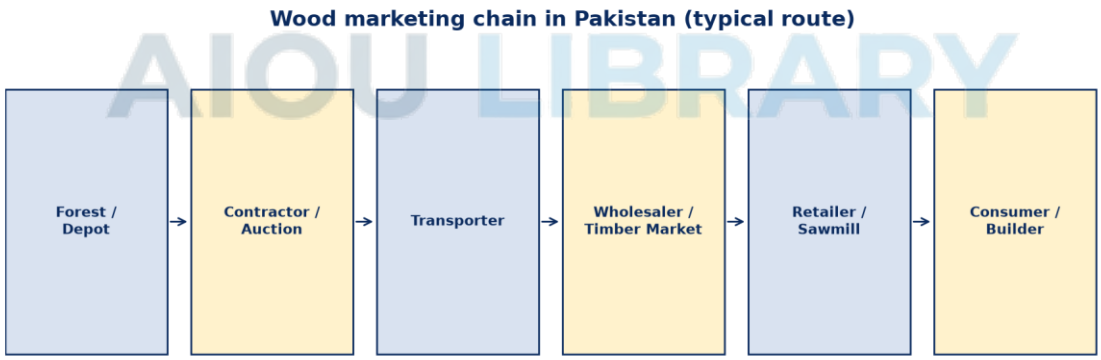


Figure 1: The typical wood marketing chain in Pakistan, from forest or farm to final consumer. Each stage adds transport, conversion or handling cost and a margin.

The Mechanism of Wood Marketing in Pakistan

The mechanism can be followed as a sequence of operations. It begins with the offer of material: the Forest Department advertises lots of standing trees or depot timber and sells them by open auction or tender to the highest bidder, announcing species, estimated volume and conditions; farm growers, by contrast, usually negotiate privately, and their price discovery is weaker because they may know only the offer of the one trader who visits the village. The second step is harvesting and conversion: the purchaser fells the trees under departmental marking rules where state forest is involved, converts stems into logs, scantlings, poles or fuelwood, and pays royalty, price instalments and other dues as prescribed. The third step is extraction and transport: timber is dragged or carried to a roadside, loaded on trucks, and moved under cover of a transit pass or rahdari documentation which check-posts may verify, because control of illegal movement is exercised through the transport stage. The fourth step is wholesale distribution: consignments reach the timber market, where commission agents display or negotiate lots, grading is mostly by visual inspection and customary sizes rather than by formal national grades, and wholesalers break bulk, hold stock and extend credit to retailers and mills. The fifth step is processing and retailing: sawmills convert logs into standard market sizes, seasoning is done where facilities exist, and retailers, furniture makers and builders buy according to their needs; industrial buyers may bypass several stages by contracting directly with departments, contractors or growers' groups, which is why their raw-material cost is usually lower. The final step is payment and price formation through the whole chain: the consumer's price must cover stumpage or tree price, felling and conversion, transport (often the largest single addition for bulky wood from distant forests), market charges and

commissions, financing cost and each handler's margin. When any link is monopolised, uninformed or inefficient, its cost is pushed either backward onto the grower in a lower tree price or forward onto the consumer in a higher market price — the two standing grievances of Pakistani wood marketing.

Table 1: Stages of the wood marketing mechanism

Stage	What happens	Main actor
Offer and sale	Auction/tender of departmental lots; private negotiation for farm trees	Forest Department; growers
Harvesting and conversion	Felling, logging, conversion to logs, poles, fuelwood	Purchaser / contractor
Extraction and transport	Movement to market under transit documentation	Transporters; check-posts
Wholesale	Bulk breaking, storage, credit, price negotiation	Wholesalers; commission agents
Processing and retail	Sawmilling, seasoning, sale to users and industries	Sawmills; retailers; industries

Conclusion

In conclusion, wood marketing in Pakistan works through a chain of agencies — the Forest Department as owner-seller and regulator, purchasers and contractors who harvest, wholesalers and commission agents in the established timber markets, sawmills and wood industries that convert, retailers who serve the final user, and the growing farm-forestry channel that now supplies a major share of the country's wood. The mechanism linking them — public auction or private negotiation, licensed harvesting, documented transport, wholesale distribution and retail sale — functions, but at a cost: too many handling stages, weak grading and price information, and heavy transport charges for a bulky commodity. Reforms generally recommended by forest economists follow directly from this description: publish market prices so growers can bargain, encourage direct sale from growers' groups to industries, develop simple grading rules, reduce unnecessary handling, and keep the department's role focused on fair auction and honest transit control. A marketing system so improved would raise the grower's share, lower the consumer's price, and give tree planting the price reward it needs if Pakistan's wood supply is to grow.

Question 4: Origin of Tenure Rights and Forms of Land Tenure (20 Marks)

Q.4 What do you know about the origin of tenure rights and forms of land tenure in our country? (20)

Introduction

Land tenure means the terms and conditions on which land is held: who may occupy and use it, for how long, what they must give or do in return, what rights they may transfer to others, and what happens when the holding ends. Tenure rights are therefore not a dry legal topic; they decide who plants trees and who cuts them, who protects a forest and who plunders it, because no one invests labour and money for thirty years in land from which he may be evicted next season. In Pakistan the present pattern of tenure is the product of a long history: tribal and communal customs, the revenue systems of Muslim rulers and the Mughal Empire, Sikh rule in the north-west, and above all the British colonial land settlements, which recorded rights, fixed the state's revenue demand, and created the record-of-rights system that independent Pakistan inherited and has since reformed only in part. This answer traces the origin of tenure rights stage by stage and then describes the main forms of land tenure found in the country today, with particular attention to what each form means for forestry.

Origin of Tenure Rights

In the earliest period, land in this region was effectively abundant and labour scarce, so rights were mainly rights of use held through membership of a family, clan or tribe: the group that cleared and occupied land used it, grazing and forest areas were held in common, and the idea of an individual, transferable freehold in the modern sense was largely absent. Forest and waste were typically an open common resource of the settled community, which is the distant root of the shamilat (village common land) still recognised in revenue records. As states formed, rulers claimed a share of the produce as land revenue and, in theory, an ultimate

overlordship of land, while leaving actual cultivators in possession so long as revenue was paid. Under the Mughal system this was systematised: land was assessed, revenue demand was fixed through measurement and crop-sharing or cash rates, intermediaries such as zamindars collected revenue in many areas, and grants of revenue (jagirs, madad-i-maash and similar assignments) rewarded service without necessarily conferring modern ownership of the soil. Cultivators held hereditary occupancy in many regions by custom, forests were retained in places as royal hunting reserves (shikargahs) or remained village commons, but no uniform, registered individual title existed across the country. Sikh rule in Punjab continued revenue farming and heavy demand without creating a new system of recorded rights, and in tribal and frontier areas customary (riwaj) tenure under tribal authority survived largely untouched — a survival that continues today in parts of the merged districts, Balochistan and the northern areas.

The decisive change came with British rule in the nineteenth century. After annexing Sindh (1843), Punjab (1849) and the frontier regions, the British conducted regular land settlements: fields were surveyed and mapped, a record of rights was prepared village by village, the state's revenue demand was fixed for a term of years, and the person recorded as owner or occupancy tenant acquired a defined, legally enforceable and transferable right. Different settlement philosophies produced different tenures in different provinces: broadly, peasant (ryotwari-style) dealing directly with the state predominated in much of Punjab and Sindh's surveyed areas, while large zamindari and jagirdari estates survived in parts of Sindh, Balochistan (sardari system) and elsewhere, creating the sharp inequality of holdings for which the region became known. Alongside private holdings, the colonial state reserved to itself extensive forests under

the Forest Acts, classifying them as reserved and protected forests, and recognised or curtailed local rights of grazing, fuelwood and timber in settlement reports — the legal origin of the present state forest estate and of many continuing disputes about community rights in guzara and communal forests in Khyber Pakhtunkhwa. After independence in 1947, Pakistan retained the record-of-rights, settlement and forest-law framework essentially intact. Land reform programmes in 1959, 1972 and 1977 imposed ceilings on holdings and resumed and redistributed excess land, but their reach was limited by exemptions, transfers within families and litigation, so the broad tenure structure — a minority of large owners, a majority of small owners, and a large class of tenants — persists. Evacuee property arrangements after Partition, canal-colony grants in Punjab and Sindh, and allotment of state waste for cultivation added further layers of conditional grants under which the state retained conditions about land use for many years.

Forms of Land Tenure in Pakistan

The main forms found today are these. First, owner-cultivation or peasant proprietorship: the recorded owner holds full rights to use, mortgage, sell and bequeath the land, pays land revenue (now very light or abolished as a significant charge in many areas, though record and local cesses remain), and cultivates with family labour; this is the most secure tenure and the one most favourable to tree planting. Second, tenancy: a tenant (muzara or hari in Sindh, bataidar where crop-sharing is specified) cultivates another's land under an oral or written agreement, most commonly sharing the produce — frequently half and half, with cost-sharing varying by province and custom. Tenancy legislation in the provinces gives occupancy and protected tenants varying degrees of security, but the ordinary sharecropper's position remains

insecure, discouraging long-term improvement. Third, large estates and absentee ownership, in which big owners let out land to many tenants through managers; fourth, state tenure: government land leased, granted conditionally (for example under tree-planting or tubewell conditions in some grants), or allotted for a term, where breach of conditions can lead to resumption. Fifth, communal and customary tenure: shamilat village commons, guzara forests owned by communities or defined right-holders in parts of Khyber Pakhtunkhwa, communal forests in Gilgit-Baltistan and Chitral governed partly by custom, and tribal collective tenure where the tribe or clan allocates use and the individual has use rights rather than alienable title. Sixth, forest-department tenure: reserved forests are state property with rights settled and recorded at reservation, protected forests carry recorded rights of varying extent, and unclassed or government wasteland may be under departmental control without full settlement — the category most exposed to encroachment disputes. Religious and institutional tenure, notably waqf land held permanently for religious or charitable purposes and administered by Auqaf departments or mutawallis, forms a smaller but distinct seventh category.

Table 1: Main forms of land tenure in Pakistan

Form	Who holds the right	Security and forestry implication
Owner-cultivation	Recorded owner and heirs	Full and secure; most favourable to planting trees
Tenancy / sharecropping	Tenant (muzara / hari) under	Often insecure; discourages

	owner	long-term improvement
State lease / conditional grant	Grantee or lessee of government land	Conditional; breach can lead to resumption
Communal / customary	Village, tribe or defined community	Common use (shamilat, guzara); needs community rules
State forest tenure	State, managed by Forest Department	Reserved / protected forest; recorded rights of others apply
Waqf	Religious / charitable endowment	Permanent; managed by Auqaf or mutawalli

Conclusion

In conclusion, tenure rights in Pakistan originated in communal and customary use, were overlaid by the revenue claims of successive states, and received their modern recorded form under British settlements, which created individual, transferable titles and reserved state forests while leaving large estates, insecure tenancy and customary commons in place; independence and land reforms modified but did not transform this inheritance. The resulting forms — owner-cultivation, tenancy and sharecropping, state leases and conditional grants, communal and tribal tenure, state forest tenure and waqf — differ chiefly in the security they

give the holder, and that security is the master key to land improvement. For forestry the practical moral is direct: trees will be planted and protected by owners with secure title, by communities whose common rights are clearly defined and defended, and by tenants only when law and agreement guarantee them a share in a crop that matures long after a single season's harvest.

Question 5: Social Forestry, Agro-Forestry and Uses of Forest Products (20 Marks)

Q.5 Define the following: a) Social forestry and Agro-forestry b) Uses of forest products (20)

Introduction

Two of the most important developments in twentieth-century forestry were the realisation, first, that the fuelwood, fodder and small-timber needs of ordinary people would never be met from distant state forests alone, and second, that trees grow perfectly well in combination with farms when the combination is properly designed. Social forestry and agro-forestry are the names given to these two responses, and they now stand at the centre of forest policy in Pakistan and throughout South Asia. The second part of this question turns to the uses of forest products, which range far beyond the sawn timber that first comes to mind: a full account must include fuel, fodder, food, medicine, industrial raw material and the protective services that are also, in the economist's sense, products of the forest. This answer defines each term carefully, explains the difference between social forestry and agro-forestry (which students often

confuse), gives their main components and examples, and then sets out the uses of forest products in an organised classification.

(a) Social Forestry and Agro-Forestry Defined

Social forestry is forestry practised for the benefit of local communities, especially the rural poor, on lands outside the traditional reserved forest — village commons, roadside and canal-side strips, school and institutional land, degraded government land and community land — with the active participation of the people who will use the produce, and with meeting local needs for fuelwood, fodder, small timber, fruit and income as its first objective rather than industrial timber revenue. Its essential marks are purpose (welfare of the local community), place (non-forest and community lands), people (participation in planting, protection and sharing of benefits) and product (goods consumed locally). Social forestry programmes typically include community woodlots, strip plantations along roads, canals and railways, rehabilitation of degraded commons, distribution of free or subsidised seedlings, and extension advice to households and villages. Agro-forestry, by contrast, is defined by the way land is used rather than by who benefits: it is a land-use system in which woody perennials — trees or shrubs — are deliberately grown on the same unit of land as agricultural crops or livestock, in spatial mixture or in sequence, so that there are significant ecological and economic interactions between the tree and non-tree components. Its essential marks are combination (tree + crop and/or animal on the same land), deliberateness (the combination is designed, not accidental) and interaction (shade, nitrogen fixation, fodder, micro-climate and income effects between the components). Well-known agro-forestry systems include trees on farm boundaries and field bunds, scattered parkland trees in crops, home gardens with fruit and timber trees, alley

cropping between rows of nitrogen-fixing trees, silvopastoral systems combining trees with grazing, aqua-forestry around fish ponds, and plantation intercropping (the taungya pattern) in which crops are raised between young trees in the first years. In Pakistan, poplar and eucalyptus on farmland in Punjab and Khyber Pakhtunkhwa, sh sham and babul in Sindh's agro-forestry landscapes, and fruit-timber home gardens in t!e n◦rth are everyday examples.

The difference between the two terms should now be clear. Every agro-forestry programme run with village participation for local welfare is also social forestry, but the concepts answer different questions: social forestry answers 'for whom and where?', agro-forestry answers 'in what combination?'. A canal-side community plantation with no farming component is social forestry but not agro-forestry; a large commercial farm combining poplar with wheat purely for the owner's profit is agro-forestry but not, in the strict sense, social forestry. Both differ from conventional production forestry in state reserved forests, which is managed by the department primarily for sustained timber yield and catchment protection. The economic virtues claimed for agro-forestry — fuller use of sunlight, water and nutrients across different rooting depths and seasons, risk-spreading between crop and tree income, improved soil through litter and nitrogen fixation, and cash from trees in years when crops fail — are real but not automatic: badly chosen trees compete with crops for light and water and reduce food output, so species choice, spacing and pruning must be fitted to local conditions, a caution that good extension work always includes.

Table 1: Social forestry and agro-forestry distinguished

Aspect	Social forestry	Agro-forestry

Defined by	Purpose and beneficiaries (community welfare)	Land-use combination (tree + crop / livestock)
Typical land	Commons, strips, institutional and degraded land	Farmland: boundaries, fields, pastures, home gardens
Main objective	Fuel, fodder, small timber and income for local people	Combined, interacting production from one land unit
Participation	Central: community plants, protects and shares	Farmer-managed; participation varies

(b) Uses of Forest Products

Forest products divide into wood products, non-wood (minor) products, and services. Among wood products, the first use is construction and structural timber: deodar, kail, fir, chir, shisham and other species supply beams, planks, doors, windows and roofing for houses and public works, chosen for strength, durability and appearance. Second is furniture and joinery, for which shisham is Pakistan's classic cabinet wood, and veneer, plywood, blockboard and particleboard manufacture, which convert logs and residues into panels for furniture and interiors. Third is the pulp, paper and board industry, which uses softwoods, eucalyptus, poplar and agricultural residues for paper, newsprint and packaging. Fourth, specialised industries: the match industry (poplar and other soft light woods), sports goods (notably willow and mulberry-

based manufacture centred on Sialkot), tool handles, agricultural implements, carts, boats, railway sleepers and transmission poles. Fifth, and by volume the largest use of all in Pakistan, is fuelwood and charcoal: a majority of rural households and many urban poor still cook and heat with wood, and this single use drives more felling than all industrial uses combined — which is precisely why social forestry and farm forestry concentrate on fuel species. Sixth are wood residues used as industrial fuel, mulch and raw material, increasingly important as efficient utilisation improves. Non-wood products include resin from chir pine (for rosin and turpentine), tannin, gums and dyes, medicinal and aromatic plants, wild honey and beeswax, mazri and grasses for matting, rope and paper, bamboos and canes where grown, wild foods — chilgoza and other nuts, fruits, mushrooms and fodder from leaves and grazing — and silk and lac rearing associated with host trees.

The services of the forest, although not harvested like a log, are uses in the full economic sense and must conclude the account. Forests protect watersheds, regulating stream flow, reducing floods and preventing the silt that shortens the life of Pakistan's great reservoirs; they conserve soil on steep slopes, shelter farmland from wind, moderate local climate, and provide habitat for wildlife that supports hunting under licence, recreation and tourism. They store carbon and therefore serve the global interest in climate stability, provide employment at every stage from nursery to sawmill, and offer educational, scientific and cultural value — sacred groves, historic plantations and national parks among them. A student who lists only commercial timber as the 'use' of forest products has missed both the largest physical use (fuelwood), the livelihood uses on which poor households depend daily (fodder, food, fibre and medicine), and the protective services whose loss would cost the national economy more than the entire recorded timber

trade. Modern forest economics therefore insists that management plans account for all three classes together.

Conclusion

To conclude, social forestry is community-benefit forestry practised mainly outside reserved forests with the participation of local people, while agro-forestry is the deliberate combination of trees with crops or livestock on the same land unit so that the components interact to the farmer's advantage; the two overlap in practice but are defined by different tests. The uses of forest products extend from construction timber, furniture, panels, paper, matches and sports goods, through fuelwood — the largest use of all — and a rich list of non-wood products such as resin, honey, mazri, medicines and chilgoza, to the indispensable services of watershed protection, soil conservation, climate moderation, habitat and recreation. Together, these definitions and uses explain the direction of modern policy in Pakistan: to grow more trees where people live and farm, and to value the forest for everything it yields, not for timber alone.