

2022-2024 TOBACCO PRODUCTION MANUAL

FLUE-CURED (VIRGINIA)

- Neutral Flavor
- Improved Flavor

AIR-CURED (BURLEY)

- Neutral Flavor
- Improved Flavor R 1
- Improved Flavor R2



BELINDA S. SANCHEZ

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MESSAGE

WE are implementing various programs and projects under the **Sustainable Tobacco Enhancement Program (STEP)**, starting crop year 2022-2023. While we expanded the coverage of our production and livelihood assistance through our farm clustering program, the Tobacco Block Farm, still equally important in our thrust for a sustainable industry is to provide technical assistance to our tobacco growers for quality tobacco production.

Considering the significant factor of quality tobacco leaf in the tobacco prices, it is necessary that the farmers follow the updated package of technology for the production of quality leaves that meet the standards of both the local and global markets, in an environmentally sustainable manner, and get the maximum return from their tobacco farming enterprises.

We developed this latest resource material, the latest edition of the **Tobacco Production Manual (2022-2023)**, to serve as a guide for all extension workers, Science Research Specialists, and other Extension Service Providers in assisting our farmers with updated quality leaf production technology, from seedbedding to field practices, harvesting, and post-harvest operations.

I commend the **Techno-Updating Task Force**, headed by OIC, Deputy Administrator for Operations Dr. Giovanni B. Palabay, for coming out with this latest resource material, in collaboration with private tobacco companies, and input suppliers.

Our vision for a progressive tobacco sector driven by productive and progressive farmers can be realized through this united effort and the combined expertise of our staff and industry partners.

A handwritten signature in black ink, appearing to read 'Belinda S. Sanchez', written in a cursive style.

BELINDA S. SANCHEZ, CPA
Administrator and CEO

FOREWORD



This Tobacco Production Manual is prepared and intended for our Extension Workers as a detailed guide for them in the exercise of their duties and functions in assisting our tobacco farmer-beneficiaries in the production of quality tobacco leaves. This is to address the standards set by both the local and global markets for cured tobacco leaves.

As in previous years, the Techno-Updating Task Force was conducted to identify matured information and technology components that are incorporated in this Techno-Guide. The Task Force members were identified as tobacco production experts from the Branch Office, mostly Senior Middle Managers, in collaboration with technical experts from the private sector. By virtue of Special Order No. 0539 dated August 15, 2022, the members were divided into three (3) Focused Discussion Groups, one for Virginia Tobacco type, with the other two, Burley and Native types. All of them, the Task Force met and have one common aspiration: to attain quality and quantity in the production for the upliftment of the various stakeholders, particularly the tobacco farmers.

Good quality tobacco leaves can only be realized if the package of technology, which is continuously updated, is strictly followed, from seedbedding to post-harvest operations. Thus, extensionists must also be updated on the latest production technology, and this Techno-Guide will serve as their important guidebook for their effective and efficient field works.

It is expected then that the initiatives of our TWG in coming up with this Techno-Guide for our tobacco farmers would be relevant in the implementation of our programs and projects designed in support of the thrusts of the Agency, i.e. to increase tobacco yield levels and income, which would eventually improve the farmers' quality of life.

A handwritten signature in black ink, appearing to read 'Giovanni B. Palabay'.

GIOVANNI B. PALABAY, Ph.D.

OIC, Deputy Administrator for Operations
Chair, Techno-Updating Task Force

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UNIFIED PRODUCTION TECHNOLOGY FOR VIRGINIA NEUTRAL FLAVOR

1. Variety

Reaction to Diseases

	Bacterial Wilt	RKN	Black Shank	Fusarium Wilt	TMV/CMV	PVY
Reams 266		MT	R	R		
DH 48			R		S	
Coker 254		S		S		
Golden Harvest						
Giant Coker		S				
K326	LT	R	R	S	S	S

Legend: R – resistant; MT – moderately tolerant; S – susceptible; LT – low tolerant

Accredited Source of Seeds: NTA and Tobacco Company ONLY

2. Sowing Date: September to October 31. End of sowing date for ULPI is December 6.

Note: Seedbed site assessment is a pre-requisite in early transplanting to determine the suitability of the area for seedbedding especially in low-lying areas that are prone to flooding.

3. Seedling Production Method

Conventional Elevated Seedbed
Semi-Float Seedbed
Seedling Tray

Note: Apply NTA recommended soil conditioner.

4. Transplanting Cut-off Date: December 31.
Cut-off date for ULPI is January 30.

Reminder: Transplanting can be done earlier or delayed given the weather condition.

5. Transplanting Method: Furrow (Recommended with El Niño Phenomenon)
Ridge (Recommended with La Niña Phenomenon)
6. Distance of Planting:
0.90m – 1.00m x 0.42m – 0.50m
7. Number of plants/hectare: 20,000 – 26,455
8. Replanting: Within **5 days** after transplanting (DAT)
9. Fertilizer Rate (Quantity), Source, Method and Time of Application:

Option 1 (62-36-73/48 kg N-P₂O₅-K₂O/ha)

Quantity	Rate & Source	Method and Time
4 bags	10-18-24	basal, single band along furrows, 0 DAT
4 bags	21-0-0	sidedress, single band, 21–28 DAT
1 bag	0-0-50	sidedress, single band, 21-28 DAT

Reminder: Adjust the amount of fertilizer if the total plant population has exceeded 20,000 & 26,455/ha.

Recommended Other Farm Inputs

1. Soil Conditioner

K-Humate Soil Conditioner, 4kg/ha.	
Broadcast/Incorporate 100 g K-Humate per 10 square meter broadcast at seedbed before sowing.	
Mix 3 kg K-Humate per hectare with basal fertilizer at transplanting broadcast evenly along planting furrows.	

2. Biostimulant

CERES Biostimulant Fertilizer, 5-6 bot/ha @ 250 ml/bot.		
40 ml / 16 L water	First Foliar Spray	15 DAT
60 ml / 16 L water	Second Foliar Spray	30 DAT
60 ml / 16 L water	Third Foliar Spray	45 DAT
60 ml / 16 L water	Fourth Foliar Spray	60 DAT (Optional)

3. Plant Growth Enhancer

AMO, 2 sachets/ha. @ 100 g/sachet		
8g / 16 L water	First Foliar Spray	15 DAT
8g / 16 L water	Second Foliar Spray	30 DAT
8g / 16 L water	Third Foliar Spray	45 DAT

4. Liquid Phosphite

VAKSI K Liquid Phospite 3 bot./ha. @ 500 ml/bot.		
45 ml / 16 L water	First Foliar Spray	15 DAT
45 ml / 16 L water	Second Foliar Spray	30 DAT
45 ml / 16 L water	Third Foliar Spray	45 DAT
45 ml / 16 L water	Fourth Foliar Spray	60 DAT (Optional)

10. Watering, Irrigation Method and Schedule

Watering	Method and Schedule
1st	at transplanting @ 1 liter/plant
2nd	5 DAT @ 1 liter/plant
3rd	14 DAT @ 2–3 liters/plant
4th*	21 to 28 DAT, after hilling-up, @3-5 liters/plant
5th*	31 to 38 DAT, @ 3-5 liters/plant
6th*	41 to 48 DAT, @3-5 liters/plant

**in the event that there is scarcity of water such that irrigation is not possible.*

Irrigation	Method and Schedule
1st	21 to 28 DAT, after hilling-up, alternate furrows
2nd	28 to 31 DAT, in alternate furrows
3rd	42 to 45 DAT, all furrows
4th	after 3rd priming, all furrows (Depending on the availability of water)

5th after the 5th priming, depending on soil moisture; alternate furrows (Depending on the availability of water)

11. Crop Protection Agents (CPAs)

Note: The farmers are encourage to apply CPAs based on Economic Threshold Level (ETL) to avoid CPA residues on tobacco, reduce farmers' exposure to CPAs, and prevent insect resistance development.

Note: Annex A List of NTA recommended Crop Protection Agents (CPAs)

Annex B Safe use and management of CPAs

Annex C Integrated Pest Management

*FLOWER HEAD REMOVAL at full bloom and field sanitation are important IPM strategies that can sustainably reduce insect infestation on tobacco.

12. Harvesting

Harvest mature leaves as indicated by the following:

- leaf color changes from light green to yellow-green
- yellowing of the leaf tips
- midrib turns light green

Important:

Harvest as needed.

Haul leaves immediately after harvest and unload under the shade, using cheesecloth, bamboo slats, C48 carton, or buri (*silag*) as matting material.

Pile the harvested leaves PROPERLY with the butt ends down.

Sort, stick, and pile the leaves properly in shaded area and hang the leaves inside the barn within the day.

Start firing within 12 hours after hanging/loading.

13. Sorting before Sticking

Sort and Stick leaves according to:

- Ripeness
- Injury
- Length

14. Flue-Curing Barn

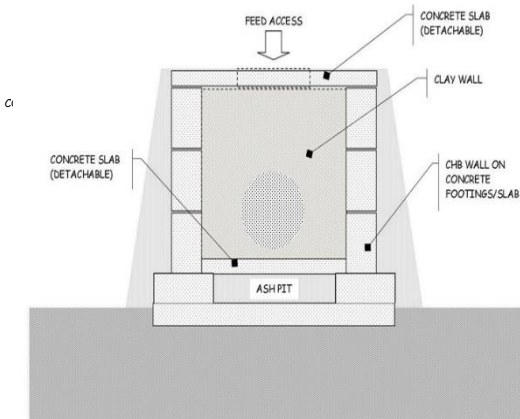
Dimension and Fixtures

Particulars	0.5 ha-capacity barn	1.0 ha-capacity barn
Inside dimension	L = 3.8 m; W = 3.0 m; H = 5.7 m	L = 3.75 m; W = 3.75 m; H = 5.7 m
Height of the first tier	1.8 m	1.8 m
No. of tiers	5 + additional tier at the ridge (2 hangers)	5 + additional tier at the ridge (3 hangers)
No. of rows	4	5
Distance between tiers	0.75 m	0.75 m
No. of bottom vents	8 (2 per side)	8 (2 per side)
Size of bottom vents	L = 30 cm; W = 15 cm, with adjustable up and down cover	L = 30 cm; W = 15 cm, with adjustable up and down cover
Top vent	Ridge type; L = 3.6 m; W = 0.3 m	Ridge type; L = 3.6 m; W = 0.3 m
Flue-tube	Single passing	Double passing
Capacity	812 sticks	1,100 sticks
Length of stick	60 cm	60 cm
Number of leaves per stick	46	46
Distance bet. poles	10 – 15 cm	10 – 15 cm

Reminder: Plant only according to the capacity of the existing barn.

Furnace Type

Modified Anawang furnace



FRONT VIEW - PARTIAL DETAIL

Figure 1. Front view of the modified Anawang furnace

Modified Venturi furnace

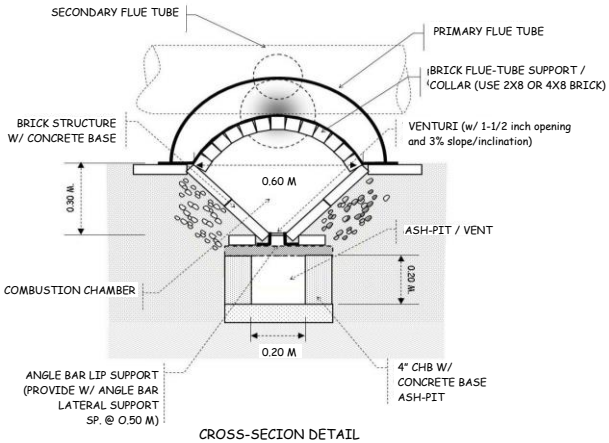
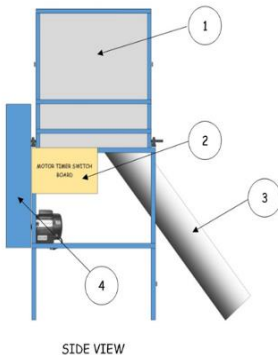


Figure 2. Front view cross-section detail of the modified Venturi furnace

Non-traditional or Additional Fuel

Biomass (Corn cob, ricehull, coconut husk, tobacco stalks)

Automated corn cob/ricehull dispenser



INDEX:

- 1 HOPPER
- 2 MOTOR TIMER SWITCH
- 3 CHUTE/SPOUT
- 4 PROTECTIVE COVER
- 5 AUGER CONVEYOR
- 6 ELECTRIC MOTOR
- 7 PULLEY
- 8 DRIVE BELT
- 9 STEEL FRAMED BASE

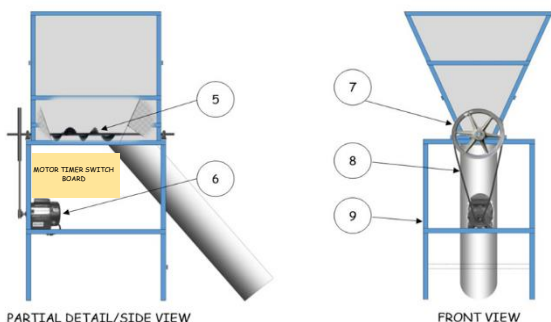


Figure 3. Schematic diagram of the automated corn cob/ricehull dispenser

Fixture

Removable chicken wire mesh 15 cm below the leaves on the first tier.

Insulator-like C48 carton in case of barn with GI wall.

Psychrometer to monitor temperature and relative humidity inside the barn.

Curing graph/chart guide.

Automated corn cob/ricehull dispenser for Anawang furnace.

15. Curing

Start firing within 12 hours after hanging/loading.

Follow strictly the Curing Graph (see *pages 18-19*).

16. Classification of Cured Leaves

The cured leaves must be classified based on the following: **Leaf position, Color, Length, Injury**

17. Baling System

I. Straight Laid Open Bale (SLOB) System

- Size varies according to the requirement of the company in relation to the size of their grading ramp but the weight should not be more than 50 kg.
- Pre-classify the leaves by leaf position.
- Put leaves of the same stalk position and quality in a bale.

II. Bundled Tobacco

- Size varies according to the requirement of the company in relation to the size of their grading ramp but the weight should not be more than 50 kg.
- Pre-classify the leaves by leaf position.
- Bundle into 2-2.5 inches diameter for further verification with TMI.
- Put leaves of the same stalk position and quality in a bale.

Reminder: The moisture content of the leaves must not exceed 18%.

18. Target Yield (kg/ha) and grade distribution: **2,000 (+10%)**

Quality	Grades	% distribution
HIGH	AA-C	70
MEDIUM	D-F	20
LOW	R	10

Note:

REFER TO THE NTA HARMONIZED GRADES OF LOCALLY GROWN VIRGINIA

REFER TO ANNEX D FOR THE ELIMINATION OF NON-TOBACCO RELATED MATERIALS (NTRM)

UNIFIED PRODUCTION TECHNOLOGY FOR VIRGINIA IMPROVED FLAVOR

1. Variety

	Bacterial Wilt	RKN	Black Shank	Fusarium Wilt	TMV/CMV	PVY
NC 2326	S	S	LT	S	S	
K326	LT	R	S	S	S	
CC 67	R	R	HR		R	
PVH 2254	HT	R	HR	S	R/HR	HR
PVH 2233	LT	R	HR	M	R/MT	R
PVH 2310		R	R	M	R	R

Legend: R - resistant; HR - highly resistant; HT - highly tolerant; MT - moderately tolerant; S - susceptible; LT - low tolerant; M - medium

Accredited Source of Seeds: NTA and Tobacco Company ONLY

2. Sowing Date: September to October 31. End of sowing date for ULPI November 20.

Note: Seedbed site assessment is a pre-requisite in early transplanting to determine the suitability of the area for seedbedding, especially in low-lying areas that are prone to flooding.

3. Seedling Production Method:

Conventional Elevated Seedbed; Semi-Float Seedbed; Seedling Tray

4. Transplanting Cut-off Date: December 31. Cut-off date for ULPI is January 14. (Not later than 45 days after sowing (DAS) and not later than sixty (60) DAS depending on the seedling stand.

5. Transplanting Method: Furrow (Recommended with El Niño Phenomenon) or Ridge (Recommended with La Niña Phenomenon).

6. Distance of Planting

1.2 m x 0.45 m	1.2 m x 0.5 m	1.1 m x 0.45	1.0 m x 0.5 m
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7. Number of Plants per ha.

18,519	16,667	20,202	20,000
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8. Replanting: Within **5 days** after transplanting

9. Fertilizer Rate, Source, Method and Time of Application:

Option 1: (103-72-146 kg N-P₂O₅-K₂O/ha)

Quantity	Rate & Source	Method and Time
8 bags	10-18-24	basal, single band along furrows, 0 DAT
2 bags	0-0-50	basal, single band along furrows, 0 DAT
4 bags	21-0-0	sidedress, single band, 10–14 DAT
2 bags	21-0-0	sidedress, single band, 25– 28 DAT

Option 2: (88.5-92-150 kg N-P₂O₅-K₂O/ha)

Quantity	Rate & Source	Method and Time
4 bags	18-46-0	basal, single band along furrows, 0 DAT
2 bags	0-0-50	basal, single band along furrows, 0 DAT
4 bags	0-0-50	sidedress, single band along furrows, 18 – 21 DAT
5 bags	21-0-0	sidedress, single band along furrows, 18 – 21 DAT

Reminder: Adjust the amount of fertilizer if the total plant population exceeds the recommended plant population (16,667, 18,519, 20,000 & 20,202).

Recommended Other Farm Inputs

1. Soil Conditioner

K-Humate, 4kg/ha.	
Broadcast/Incorporate 100 g K-Humate per 10 square meter broadcast at seedbed before sowing	
Mix 3 kg K-Humate per hectare with basal fertilizer at transplanting broadcast evenly along planting furrows	

2. Biostimulant

CERES Foliar Fertilizer, 5-6 bot./ha. @ 250 ml/bot.		
40 ml/16L water	First Foliar Spray	15 DAT
60 ml /16L water	Second Foliar Spray	30 DAT
60 ml /16L water	Third Foliar Spray	45 DAT
60 ml /16L water	Fourth Foliar Spray	60DAT (Optional)

3. Plant Growth Enhancer

AMO, 2-3 sachets/ha @ 100g/sachet		
8 g / 16L water	First Foliar Spray	15 DAT
8 g / 16L water	Second Foliar Spray	30 DAT
8 g / 16L water	Third Foliar Spray	45 DAT

4. Liquid Phosphite

VAKSI K, 3 bot./ha. @ 500ml/bot.		
45 ml/16L water	First Foliar Spray	15 DAT
45 ml/16L water	Second Foliar Spray	30 DAT
45 ml/16L water	Third Foliar Spray	45 DAT
45 ml/16L water	Fourth Foliar Spray	60DAT(Optional)

10. Watering, Irrigation Method and Schedule

Watering	Method and Schedule
1st	at transplanting @ 1 liter/plant
2nd	5 DAT @ 1 liter/plant
3rd	10-14 DAT @ 2-3 liters/plant

Irrigation

1st	18 to 28 DAT, alternate furrows, 50% water level of the ridge after re-ridging
2nd	25 to 38 DAT, in alternate furrows at 50% water level of the ridge
3rd	32 to 48 DAT, all furrows at 50% water level of the ridge
4th	after 2nd priming, all furrows at 20% water level of the ridge
5th	after 4th priming, all furrows at 10-15% water level of the ridge
6th	case to case depending on soil moisture.

11. Crop Protection Agents (CPAs)

Note: The farmers are encouraged to apply CPAs based on Economic Threshold Level (ETL) to avoid CPA residues on tobacco, reduce farmers' exposure to CPAs and prevent insect resistance development.

Note: **ANNEX A** List of NTA recommended crop protection agents (CPAs)

ANNEX B Safe use and management of CPAs

ANNEX C Integrated Pest Management

12. Topping Time

Number of leaves
16 – 22


Time of Topping
Bud-top when 30%-50% of the total population is at button stage.

(depending on the crop stand and market requirement)

13. Suckercide

Active Ingredients	Brand name	AI Concentration	FPA Toxicity Category	Target	Vol/ha (li) *	Vol/li water (ml)	Solution/plant (ml)
Flumet-ralin	Flupro 14 EC	138 g/li	III	suckers	3-4	15-20	10-15
	Flumex 15 EC	144 g/li	III	suckers	3-4	15-20	10-15

Legend: EC- Emulsifiable concentrate

 - moderately hazardous

* - depending on plant population

Note: Suckercides SHOULD be applied within 24 hours after topping.

14. Harvesting

Harvest mature leaves as indicated by the following:

- leaf color changes from light green to yellow green
- yellowing of the leaf tips
- midrib turns light green

15. Sorting before sticking

Sort and Stick Leaves according to:

Ripeness, Injury, Length

Important:

Harvest as needed, do not wait until topping is done. Haul leaves immediately after harvest and unload under the shade, using cheesecloth, bamboo slats, C48 carton, and buri "silag" as matting material. Pile the harvested leaves PROPERLY with the butt ends down.

Sort, stick and pile the leaves properly in shaded area and hang the leaves inside the barn within the day.

16. Curing

Start firing within 12 hours after hanging/loading.

Follow strictly the Curing Graph (see *pages* 18-19).

17. Flue-Curing Barn

Dimension and Fixtures

Particulars	0.5 ha-capacity barn	1.0 ha-capacity barn
Inside dimension	L = 3.8 m; W = 3.0 m; H = 5.7 m	L = 3.75 m; W = 3.75 m; H = 5.7 m
Height of first tier	1.8 m	1.8 m
No. of tiers	5 + additional tier at the ridge (2 hangers)	5 + additional tier at the ridge (3 hangers)
No. of rows	4	5
Distance between tiers	0.75 m	0.75 m
Number of bottom vents	8 (2 per side)	8 (2 per side)
Size of bottom vents	L = 30 cm; W = 15 cm, with adjustable up and down cover	L = 30 cm; W = 15 cm, with adjustable up and down cover
Top vent	Ridge type; L = 3.6 m; W = 0.3 m	Ridge type; L = 3.6 m; W = 0.3 m
Flue tube	Single passing	Double passing
Capacity	812 sticks	1,100 sticks
Length of stick	60 cm	60 cm
Number of leaves per stick	46	46
Distance bet. poles	10 -15 cm	10 - 15 cm

Reminder: Plant only according to the capacity of the existing barn.

Furnace Type

Modified Anawang furnace (see Fig. 1, *page* 6)

Modified Venturi furnace (see Fig. 2, *page* 7)

Non-traditional or Additional Fuel

Biomass (Corn cob, ricehull, coconut husk, tobacco stalks)

Fixture

Removable chicken wire mesh 15 cm below the leaves on the first tier.

Insulator-like C48 carton in case of barn with GI wall.

Psychrometer to monitor temperature and relative humidity inside the barn.

Curing graph/chart guide.

Automated corn cob/ricehull dispenser for Anawang furnace (see Figure 3, *page 8*)

18. Classification of Cured Leaves

The cured leaves must be classified based on the following: **leaf position, color, length, and injury/damage.**

19. Straight Laid Open Bale (SLOB) System

The size of the bale box varies according to the requirement of the company in relation to the size of its grading ramp but the weight should not be more than 50 kg.

Pre-classify the leaves by leaf position.

Put leaves of similar size and quality in a bale.

Reminder: The moisture content of the leaves must not exceed 18%.

20. Target Yield (kg/ha) and Grade Distribution:
2,500 (± 10%)

Quality	Grades	% distribution
HIGH	AA-C	70
MEDIUM	D-F	20
LOW	R	10

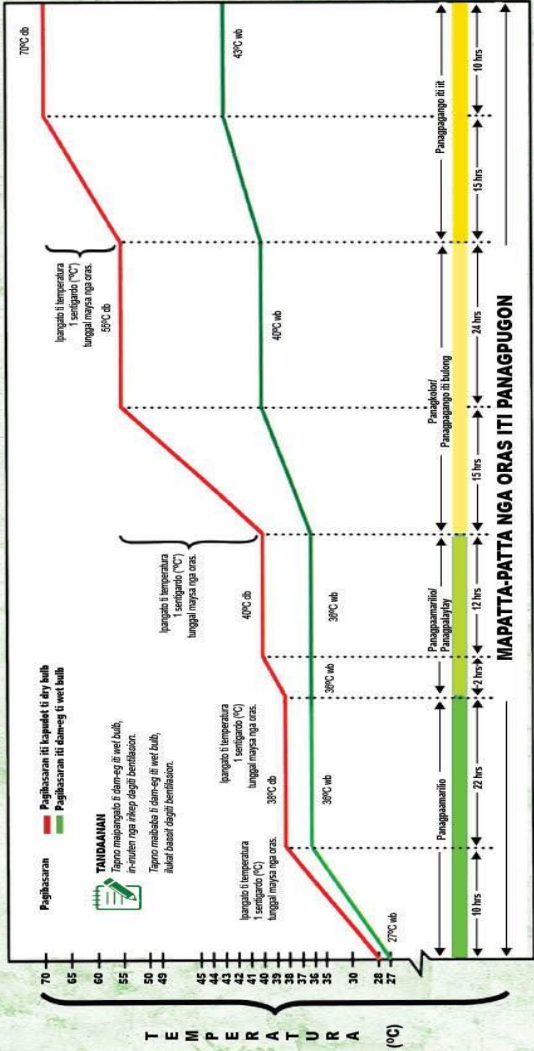
Note:

REFER TO THE NTA HARMONIZED GRADES
OF LOCALLY GROWN VIRGINIA

REFER TO ANNEX D FOR THE ELIMINATION
OF NON-TOBACCO RELATED MATERIALS
(NTRM)

CURING GRAPH

PAGIBASARAN ITI UMNO A PANAGBASA ITI DRY KEN WET BULB ITI PANAGPAGANGO ITI BULONG TI BIRHINIA A TABAKO ITI KADAWYAN A PANAGPUGON



TEMPERATURA

Kaipasan a makagaan ti pugon, ipangato ti temperatura, ti uneg ti pugon ti 1 sentigrado (°C) iti kada oras, agingga ti 38 sentigrado ti dry bulb.

ZANDAANAN

Mabalina a balilwan ti kaputi nga oras ti kada addang ti panagpugon, ngem depende daytoy ti panagbaliw ti maris dagiti bulong. Ti makita a langa wemmo maris dagiti bulong kabayatan ti panakapugonda ti mangbaga no ania ti kasapulan a temperatura ti dry bulb wemmo wet bulb.

BENTILASION/PAGPASNGAWAN

Iluakat wemmo inkep ti bentilasion wemmo pagpasngawan tapno mamantiner ti 36 sentigrado (°C) a temperatura ti wet bulb.

Tapno mamantiner ti 36 sentigrado (°C) ti dam-eg ti wet bulb, iluakat wemmo inkep ti bentilasion wemmo pagpasngawan.

Ipargato ti temperatura ti dry bulb agingga ti 40 sentigrado (°C). Masapul a dagiti bulong a nadanum wemmo natuduan ket mapalaylay, ti 43 sentigrado (°C) ti dry bulb.

No agamanilo aminen a bulong ken husto ti panakapalaylay dagitoy, in-nulien nga ipangato ti temperatura ti dry bulb ti 1 sentigrado (°C) iti kada oras agingga ti 55 sentigrado (°C).

No nagatgo aminen dagiti bulong, ti uneg ti pugon, ipangato ti temperatura ti dry bulb ti 1 sentigrado (°C) iti kada oras agingga ti 70 sentigrado (°C).

No saan la keidi nga aglabes ti 43 sentigrado (°C) ti kaputi, ti wet bulb, mabalilwan nga in-nulien nga inkep dagiti bentilasion.

IMANTINER A PUDOT

Mantineren ti 38 sentigrado (°C) ti dry bulb ken 36 sentigrado (°C) ti wet bulb agingga nga agamanilo dagiti bulong, wemmo sumagmamano laengen ti berde kadagiti uratda, kadagiti adda ti kababaan a pagsad-ayan.

Mantineren ti 40 sentigrado (°C) ti dry bulb ken 36 sentigrado (°C) ti wet bulb agingga nga agamanilo wemmo manglayayen amin a bulong ti kababaan a pagsad-ayan.

Mantineren ti 55 sentigrado (°C) ti dry bulb ken 40 sentigrado (°C) ti wet bulb agingga a maganggo amin dagiti bagi ken lamina dagiti bulong kadagiti kababaan a pagsad-ayan.

Mantineren ti 70 sentigrado (°C) agingga a maganggo amin dagiti bulong nga adda ti kangatuan a pagsad-ayan.

BALLAAG

Saan a baybay-an a bumaba ti 35 sentigrado (°C) ti temperatura ti wet bulb tapno saan nga agbalm a dumuyaw a berde wemmo kasla saput ti lawlawawna ti panamakolor dagiti bulong.

No saan pay a napalaylay amin a bulong, ipangato ti 43 sentigrado (°C) ti temperatura ti dry bulb tapno naan-anayen ti panagpalalaylay ken tapno agamanilo amin a bulong.

No ipangato ti temperatura ti nangatgato ngem 55 sentigrado (°C) ti dry bulb ken 40 sentigrado (°C) ti wet bulb sakbay ti panakaganggo dagiti lamina dagiti bulong kadagiti kababaan a pagsad-ayan, mabalina pay laeng a lumalal dagitoy.

Makset ti bulong no nangatgato ngem 70 sentigrado (°C) ti temperatura a kas makita ti panaglabbaga dagiti lamina wemmo bagi dagiti bulong.



UNIFIED PRODUCTION TECHNOLOGY FOR BURLEY NEUTRAL FLAVOR

1. Variety

Reaction to Diseases

	Bacterial Wilt	RKN	Black Shank	Fusarium Wilt	TMV/CMV
TN 90	S	S	MT	S	R
CC812G	HR	S	R	MR	S
NC 7	S	HR	R	HR	R
KT 206	S	S	HR	S	R
GF 1888	HR	R			R
HB5588P	S	R	R	LT	R

Note: HR – highly resistant; R – resistant; MR – moderately resistant; MT – moderately tolerant; S – susceptible; LT – low tolerant

Accredited Source of seeds: NTA and Tobacco Company ONLY

2. Sowing Date: September to October 31.
End of Sowing Date for ULPI - December 6.
3. Seedling Production Method
 - Conventional Elevated Seedbed
 - Semi-Float Seedbed
 - Seedling Tray

Note: Apply NTA-recommended soil conditioner.
4. Transplanting Cut-off Date: January 15. Cut-off date for ULPI is January 30.
5. Transplanting Method: Furrow Planting / Ridge Planting wherever applicable
6. Distance of Planting: (0.80m x 0.45m); (0.8 m x 1.0 m); (1.0m x 0.45m); (1.0 m x 0.50 m)
7. Number of plants/hectare: 24,000 – 30,000
8. Replanting: Within **5 days** after planting

9. Fertilizer Rate, Source, Time and Method of Application:

Option 1 –R1 (235-54-72 kg N-P₂O₅-K₂O/ha)

Quantity	Source	Method and Time
6 bags	10-18-24	band application along planting furrows at transplanting
8 bags	46-0-0	sidedress as band along the furrows after off-barring at 10–14 DAT
1 bag	21-0-0	sidedress as band along the furrows during hilling-up at 25–28 DAT
1 bag	21-0-0	fertigation at 35–40 DAT
2 kg	Foliar (17-8-17)	apply as spray starting at 10 DAT applied at weekly interval until topping time

Option 2 – (235-54-122 kg N-P₂O₅-K₂O/ha)

Quantity	Source	Method and Time
6 bags	10-18-24	band application along furrows at transplanting
2 bags	0-0-50	band application along furrows at transplanting
8 bags	46-0-0	sidedress as band along the furrows after off-barring at 10-14 DAT
1 bag	21-0-0	sidedress as band along the furrows during hilling-up at 25-28 DAT
1 bag	21-0-0	Fertigation at 35-40 DAT
2 kg	Foliar (17-8-17)	apply as spray starting at 10 DAT applied at weekly interval until topping time

Option 2 – R1 (198-54-72 kg N-P₂O₅-K₂O/ha)

Quantity	Source	Method and Time
6 bags	10-18-24	band application along furrows at transplanting
4 bags	21-0-0	Sidedress at 10-14 DAT
6 bags	21-0-0	Sidedress at 21 DAT
6 bags	21-0-0	sidedress at 30-35 DAT

Option 3 – R2 (255.50-50-50 kg N-P₂O₅-K₂O/ha)

Quantity	Source	Method and Time
5 bags	16-20-0	band application along planting furrows at 0 DAT
2 bags	0-0-50	band application along planting furrows at 0 DAT
8 bags	46-0-0	sidedress as band along the furrows after off-barring at 10–14 DAT
3 bags	21-0-0	sidedress as band along the furrows during hilling-up at 25–28 DAT

Reminder: Adjust the amount of fertilizer if the total plant population has exceeded 25,000.

Recommended Other Farm Inputs

1. Soil Conditioner

K-Humate, 4 kg/ha.	
Broadcast/Incorporate	100 g K-Humate per 10 square meter seedbed before sowing
Mix	3 kg K-Humate per hectare with basal fertilizer at transplanting broadcast evenly along planting furrows

2. Biostimulant Foliar

CERES Foliar Fertilizer, 5-6 bot./ha @ 250ml/bot.		
40ml/16L water	First Foliar Spray	15 DAT
60ml /16L water	Second Foliar Spray	30 DAT
60ml/16L water	Third Foliar Spray	45 DAT
60ml/16L water	Fourth Foliar Spray	60 DAT

3. Plant Growth Enhancer

AMO, 2-3 sachet/ha@ 100g/sachet		
8g / 16L water	First Foliar Spray	15 DAT
8g / 16L water	Second Foliar Spray	30 DAT
8g / 16L water	Third Foliar Spray	45 DAT
8g / 16L water	Fourth Foliar Spray	60 DAT

4. Liquid Fertilizer Phosphite

VAKSI K, 3 bot./ha @500 ml/bot.	
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45ml / 16L water	First Foliar Spray	15 DAT
45ml / 16L water	Second Foliar Spray	30 DAT
45ml / 16L water	Third Foliar Spray	45 DAT
45ml / 16L water	Fourth Foliar Spray	60 DAT

10. Cultivation/Weeding

Off-barring 10 – 14 DAT

Hilling-up 1 25 – 28 DAT

Hilling-up 2 35 – 40 DAT

Manual weeding, if necessary

11. Irrigation Method and Schedule

Watering Method and Schedule

1st at transplanting @ 1 liter/plant

2nd 5 DAT @ 2 liters/plant

Irrigation

1st 10 to 14 DAT all furrows

2nd 26 to 29 DAT all furrows

3rd 35 to 42 DAT all furrows

4th after 1st priming, alternate furrows

5th after 3rd or 4th priming, depending on soil moisture, alternate furrows

12. Crop Protection Agents (CPAs)

Note: The farmers are encouraged to apply CPAs based on ECONOMIC THRESHOLD LEVEL (ETL) to avoid CPA residues on tobacco, reduce farmers' exposure to CPAs and prevent insect resistance development.

Note: ANNEX A List of NTA recommended crop protection agents (CPAs)

ANNEX B Safe use and management of CPAs

ANNEX C Integrated Pest Management

“TOPPING before full bloom and field sanitation are important IPM strategies that can sustainably reduce insect infestation on tobacco.”

13. Other Crop Protection Measures

Use of bird perch at strategic locations in the field and plant repellants (e.g., MARIGOLD) and attractants at field boundaries.

14. Harvesting and Handling

Harvest ripe and mature leaves.

Important:

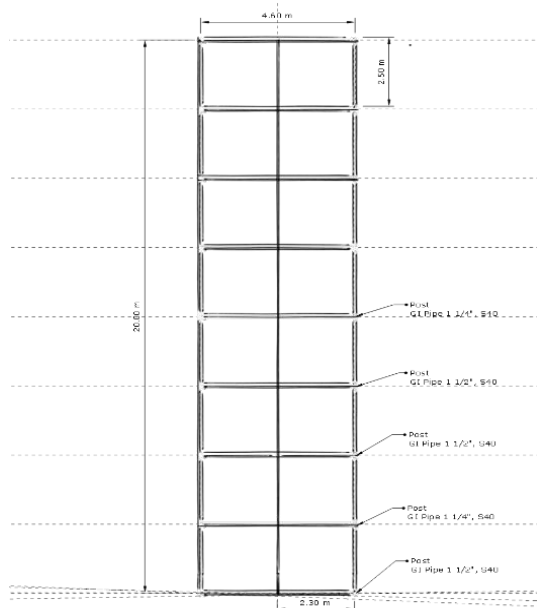
Haul leaves immediately after harvest and unload under the shade, using cheesecloth, bamboo slats, C48 cartons and buri (*silag*) as matting material.

Pile the leaves upright with the butt ends down. Sort, stick, and hang the leaves within the day.

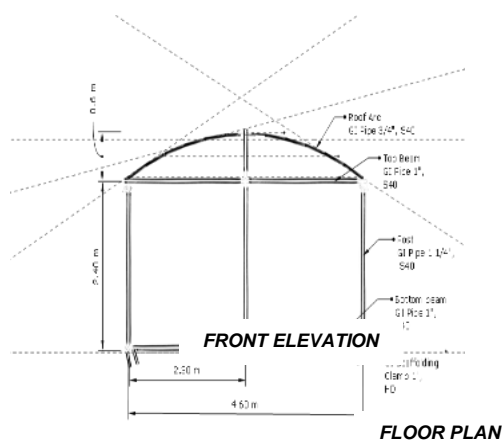
15. Air-Curing Shed: **Dimension (Collapsible)** with **black plastic roofing**

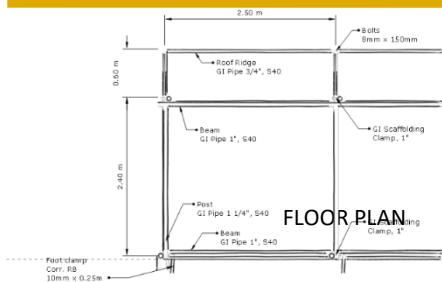
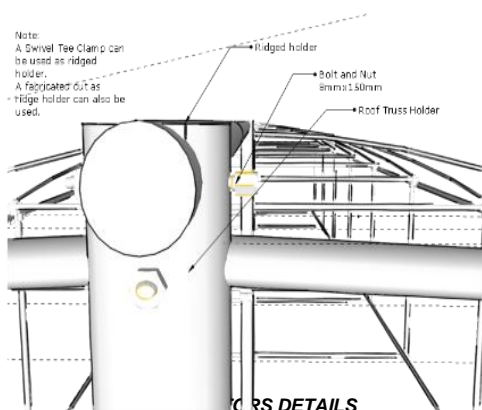
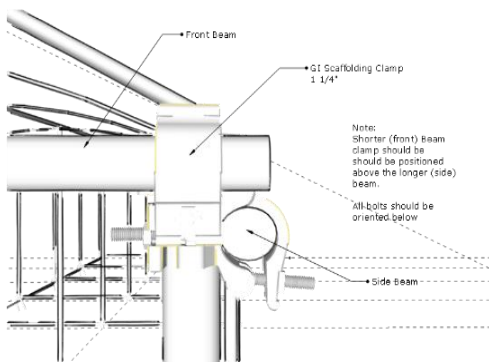
Particulars	OPTION I	OPTION II
Floor	20.0m L x 4.5m W	20.0m L x 4.5m W
Height	3.0 m	4.5m
No. of tiers	3	3
Distance of tiers from the ground	0.85 m	0.85 m
Number of units/ha	3	2

Barn Fixture: Hygrometer is needed to monitor relative humidity and temperature inside the shed.



Collapsible Air Curing Shed Design



**SIDE ELEVATION**

16. Air Curing

Hang stucked leaves at 15 cm apart for good air circulation inside the barn.

Maintain closed walls until yellowing is completed.
Open walls when RH is above 70%

17. Sorting and Bundling

Sort and bundle according to: **Leaf position, Color, Length, and Injury/Damage.**

18. Straight Laid Open Bale (SLOB) System/Bundling

Prepare/bale tobacco leaves according to market tie-up specifications.

Bundle tobacco at 2-inch diameter.

Reminder: The moisture content of the leaves must not exceed 18%.

19. Target Yield (kg/ha): at least **2,200 (\pm 10%)**

Quality Index	Grades	% distribution
HIGH	A-C	70
MEDIUM	D-F	20
LOW	R	10

Note:

REFER TO THE NTA HARMONIZED GRADES OF LOCALLY GROWN BURLEY

REFER TO ANNEX D FOR THE ELIMINATION OF NON-TOBACCO RELATED MATERIALS (NTRM)

UNIFIED PRODUCTION TECHNOLOGY FOR BURLEY IMPROVED FLAVOR FOR REGION 1

1. Variety

Reaction to Diseases

	Bacterial Wilt	RKN	Black Shank	Fusarium Wilt	TMV/CMV	PVY
TN 90	S	S	MT	S	R	
CC812G	HR	S	R	MR	S	
NC 7	S	HR	R	HR	R	
KT 206 LC	S	S	HR	S	R	
GF 1888	HR				R	
HB-4488P (TMI)	S	R	R	LT	R	R
HB-4155P (TMI)	MT	S	R	MT	R	R

Note: HR – highly resistant; R – resistant; MR – moderately resistant; MT – moderately tolerant; S – susceptible; LT – low tolerant

Accredited Source of seeds: NTA and Tobacco Company ONLY

2. Sowing Date: September to October 31
ULPI – Up to November 26

3. Seedling Production Method:

Conventional Elevated Seedbed
Semi-Float Seedbed
Seedling Tray

Note: Apply NTA-recommended soil conditioner.

4. Transplanting Cut-off Date: January 30

5. Transplanting Method: Furrow Planting / Ridge
Planting wherever applicable

6. Distance of Planting: 1.0 m x 0.40 – 0.45 m
7. Number of Plants/hectare: 22,200 to 25,000
8. Replanting: Within **5 days** after planting
9. Fertilizer Rate, Source, Time and Method of Application:

Option 1 – 265-108-194 kg N-P₂O₅-K₂O/ha

Quantity	Source	Method and Time
12 bags	10-18-24	band application along planting furrows, then cover with ridge, 0 DAT
2 bags	0-0-50	band application along planting furrows, then cover with ridge, 0 DAT
8 bags	46-0-0	band application, 10–14 DAT
1 bag	21-0-0	band application after off-barring, 25–28 DAT
1 bag	21-0-0	fertigation, at 35–40 DAT
3 kg	Foliar (17-8-17)	Apply as spray starting at 10 DAT applied at weekly intervals until topping time

Option 2 – 228-108-194 kg N-P₂O₅-K₂O/ha

Quantity	Source	Method and Time
12 bags	10-18-24	band application along planting furrows, then cover with ridge, 0 DAT
4 bags	21-0-0	band application, 10–14 DAT
2 bags	0-0-50	band application at 21 DAT
6 bags	21-0-0	band application after off-barring, 21 DAT
6 bags	21-0-0	band application after hilling-up, 30–35 DAT

Reminder: Adjust the amount of fertilizer if the total plant population has exceeded 25,000.

Recommended Other Farm Inputs

1. Soil Conditioner

K-Humate, 4kgs/ha
Broadcast/Incorporate 100 g K-Humate per 10 square meter seedbed before sowing
Mix 3 kg K-Humate per hectare with basal fertilizer at transplanting broadcast evenly along planting furrows

2. Biostimulant Foliar

CERES Foliar Fertilizer, 5-6 bot./ha @ 250ml/bot.		
40ml/16L water	First Foliar Spray	15 DAT
60ml /16L water	Second Foliar Spray	30 DAT
60ml /16L water	Third Foliar Spray	45 DAT
60ml /16L water	Fourth Foliar Spray	60 DAT

3. Plant Growth Enhancer

AMO, 2-3 sachets/ha @100g / sachet		
8 g /16L water	First Foliar Spray	15 DAT
8 g /16L water	Second Foliar Spray	30 DAT
8 g /16L water	Third Foliar Spray	45 DAT
8 g /16L water	Fourth Foliar Spray	60 DAT

4. Liquid Phosphite

VAKSI K Liquid Phosphite 1.5 Vaksi K per hectare		
45 ml /16L water	First Foliar Spray	15 DAT
45 ml /16L water	Second Foliar Spray	30 DAT
45 ml /16L water	Third Foliar Spray	45 DAT
45 ml /16L water	Fourth Foliar Spray	60 DAT

10. Cultivation/Weeding

- Off-barring 10 – 18 DAT
- Hilling-up 1 25 – 28 DAT
- Hilling-up 2 35 – 40 DAT
- Manual weeding, if necessary

11. Irrigation Method and Schedule

Watering

- 1st at transplanting @ 1 liter/plant
- 2nd 5 DAT @ 3 liters/plant

Irrigation (TMI & ULPI)

- 1st at 10 – 18 DAT, after first fertilizer sidedress, alternate furrows
- 2nd at 25 – 28 DAT, after the second fertilizer sidedress, alternate furrows
- 3rd at 35 DAT, after third fertilizer sidedress, alternate furrows

4th and succeeding irrigation will be as needed, depending on soil moisture and weather condition. Irrigate every two weeks if harvesting is by priming; if stalk-cut, irrigate 7–10 days intervals before stalk cutting.

Time of irrigation will follow the sidedressing schedule.

12. Crop Protection Agents (CPAs)

Note: The farmers are encouraged to apply CPAs based on ECONOMIC THRESHOLD LEVEL (ETL) to avoid CPA residues on tobacco, reduce farmers' exposure to CPAs and prevent insect resistance development.

Note:	ANNEX A	List of NTA recommended crop protection agents (CPAs)
	ANNEX B	Safe use and management of CPAs
	ANNEX C	Integrated Pest Management

TOPPING before full bloom and field sanitation are important IPM strategies that can sustainably reduce insect infestation on tobacco.

13. Other Crop Protection Measures

Use of birds' perches at strategic locations in the field and plant repellants (e.g., MARIGOLD) and attractants at field boundaries.

14. Topping


Number of leaves
18 – 22

Time of Topping
Bud-top when 30% of the total population reach button stage

15. Suckercide

Active Ingredients	Brand name	AI Concentration	FPA Toxicity Category	Target	Vol/ha (li)	Vol/li water (ml)	Solution /plant (ml)
Flumetralin	Flumex 14 EC	138 g/li	III	suckers	3-4	10-20	10-15
Flumetralin	Flupro 15 EC	150 g/li	III	suckers	2-4*	12.5	10-15

Legend: EC- Emulsifiable concentrate

 - moderately hazardous

* - depending on plant population

Note: Suckersides SHOULD be applied within 24 hours after topping.

16. Harvesting

For Stalk-Cut Tobacco: Prime twice with 2-3 mature leaves at 55 and 65-70 DAT; stalk cut at 84-90 DAT.

For Priming: Initial harvesting of 2-3 leaves is done prior of just after topping. Subsequent priming is undertaken starting 21-28 days after topping at weekly interval until all the leaves are harvested.

Haul leaves/stalk immediately after harvest and unload under the shade, using cheesecloth, bamboo slats, C48 cartons and buri (*silag*) as matting material.

Pile the leaves upright with the butt ends down; hang the stalk immediately inside the barn.

Sort, stick, and hang the leaves inside the curing shed within the day.

17. Air-Curing Shed: **Dimension**

Particulars	Option 1 (Priming)	Option 2 (Stalk Cutting)	Adjustable Clamp
Floor	20 m L x 4.5 m W	20 m L x 5m W	18 m x 16 m
Height	3.0 m	2.5 m	2.5 m
No. of tiers	3	1	1
Distance of tier from the ground	0.85 m	n/a	n/a
Height of 1st tier from the ground	1.0 m	1.8 m	1.8 m
Number of units/ha	3	6	3

For harvesting by priming, with 1 priming before/after topping, wait for 21 – 28 days after topping before the next harvest and 7 – 10 thereafter for next priming (hand priming only). No STALK CUTTING).

For stalk cut, with 1 – 2 priming at 2 – 3 leaves per priming when the leaves are mature.

Barn Fixture: Hygrometer is needed to monitor relative humidity and temperature inside the shed.

Collapsible Air Curing Shed Design

(Refer to page 25)

UNIFIED PRODUCTION TECHNOLOGY FOR BURLEY IMPROVED FLAVOR FOR REGION 2

1. Variety

Reaction to Diseases

	Bacterial Wilt	RKN	Black Shank	Fusarium Wilt	TMV/CMV
TN 90	S	S	MT	S	R
CC812G	HR	S	R	MR	S
NC 7	S	HR	R	HR	R
KT 206 LC	S	S	HR	S	R
GF1888	HR	R			R

Legend: HR – highly resistant; R – resistant; MR – moderately resistant; MT – moderately tolerant; S – susceptible

Accredited Source of Seeds: NTA and Tobacco Company ONLY

2. Sowing Date: October to December 10

3. Seedling Production Method

Conventional Elevated Seedbed

Semi-Float Seedbed

Seedling Tray

Note: Apply NTA-recommended soil conditioner.

4. Transplanting Cut-off Date: January 30

5. Transplanting Method: Furrow Planting / Ridge Planting wherever applicable

6. Distance of Planting

1.0 m x 0.42 m 1.10 m x 0.38 m 1.20 m x 0.35 m

7. Number of Plants/hectare: 24,000

8. Replanting: Within 5 days after planting

9. Fertilizer Rate: (kg N-P₂O₅-K₂O/ha) 265-108-194 kg N-P₂O₅-K₂O/ha

10. Fertilizer Source & Time and Method of Application

Quantity	Source	Method and Time
12 bags	10-18-24	basal, band application along the furrow before ridge construction
2 bags	0-0-50	basal, band application along the furrow before ridge construction
4 bags	46-0-0	1st application at 10-14 DAT and second application at 25-28 DAT
4 bags	46-0-0	25-28 DAT perpendicular to the tip of the canopy of the leaf
2 bags	21-0-0	3 rd sidedress, band application after off-barring at 35-40 DAT
4 kg	Foliar (17-8-17)	apply as spray starting at 10 DAT applied at weekly interval until topping time

Reminder: Adjust the amount of fertilizer if the total plant population has exceeded 24,000.

Recommended Other Farm Inputs

1. Soil Conditioner (for seedbedding)

K-Humate, 4 kg / ha.	
Broadcast/Incorporate 100 g K-Humate per 10 square meter seedbed before sowing	
Mix 3 kg K-Humate per hectare with basal fertilizer at transplanting broadcast evenly along planting furrows	

2. Biostimulant

CERES Foliar Fertilizer, 5-6 bot./ha @ 250 ml/bot		
40ml / 16L water	First Foliar Spray	15 DAT
60ml / 16L water	Second Foliar Spray	30 DAT
60ml / 16L water	Third Foliar Spray	45 DAT
60ml / 16L water	Fourth Foliar Spray	60 DAT

3. Plant Growth Enhancer

AMO , 2-3 sachet/ ha @ 100g/sachet		
8 g / 16L water	First Foliar Spray	15 DAT
8 g / 16L water	Second Foliar Spray	30 DAT
1 tbs / 16L water	Third Foliar Spray	45 DAT
1 tbs / 16L water	Fourth Foliar Spray	60 DAT

4. Liquid Phosphite

VAKSI K 1.5 L per hectare, 3 bot/ha@500 ml/bot.		
45ml / 16L water	First Foliar Spray	15 DAT
45ml / 16L water	Second Foliar Spray	30 DAT
45ml / 16L water	Third Foliar Spray	45 DAT
45ml / 16L water	Fourth Foliar Spray	60 DAT

11. Cultivation/Weeding

Off-barring 10 – 14 DAT
 Hilling-up 1 25 – 28 DAT
 Hilling-up 2 35 – 40 DAT
 Manual weeding, if necessary

12. Irrigation Method and Schedule

Watering

1st transplanting at 1 liter/plant
 2nd 5 DAT at 1 liter/plant
 3rd 10-14 DAT at 2-3 liters/plant

Irrigation

1st 17-24 DAT, alternate furrow irrigation
 2nd 25-34 DAT, alternate furrow irrigation
 3rd 35-40 DAT, alternate furrow irrigation
 4th after the first priming, all furrows and
 succeeding irrigations will depend on soil
 moisture

13. Crop Protection Agents (CPAs)

Note: The farmers are encouraged to apply CPAs based on ECONOMIC THRESHOLD LEVEL (ETL) to avoid CPA residues on tobacco, reduce farmers' exposure to CPAs and prevent insect resistance development.

Note: ANNEX A List of NTA recommended crop protection agents (CPAs)
ANNEX B Safe use and management of CPAs
ANNEX C Integrated Pest Management

TOPPING before full bloom and field sanitation are important IPM strategies that can sustainably reduce insect infestation on tobacco

14. Other Crop Protection Measures

Use of birds' perches at strategic locations in the field and plant repellants (e.g., MARIGOLD) and attractants at field boundaries.

15. Topping


Bud-top or when 30% of plants have one open flower.

Topping height: Bud topping at 18 to 22 leaves

16. Suckercide:

ACTIVE INGREDIENTS	BRAND NAME	AI Concentration	FPA Toxicity Category	Target	Vol/ha (li)	Vol/li water (ml)	Solution/plant (ml)
Flumetralin	Flumex 15 EC	150 g/li	III	suckers	2-4	10-20	10-15

Legend: EC- Emulsifiable concentrate

 - moderately hazardous

* - depending on plant population

17. Harvesting and Stalk Cutting/Handling

Hand Priming: Harvest ripe and matured leaves only at weekly interval, prime only what can be stuck in a day.

Stalk-cutting: Initial harvesting by hand priming of 2–3 leaves. Stalk-cut at 85-90 DAT.

Stalk Cut/prime only when the weather is fine.

Important:

Haul leaves/stalk immediately after harvest and unload under the shade, using cheesecloth, and buri

(*silag*) or bamboo slats as matting material during sorting and sticking.

Pile the leaves upright with the butt ends down; hang the stalk immediately inside the barn.

Sort leaves according to length, maturity and insect damage before sticking, and hang the leaves within the day.

Reminder: Stalk-cut 3-7 days after irrigation/rain.

18. Air-Curing Shed Dimension (Collapsible)

	Priming	Stalk Cutting	Adjustable Clamp	Collapsible Shed
Floor	20.0 m L x 4.5 m W	20m L x 4.5m W	18 m x 6 m	20m x 4.60m
Height	3 m	2.5m	2.5m	2.6m
No. of tiers	3	1	1	1
Distance of tier from the ground	0.85 m	n/a	n/a	n/a
Height of 1 st tier from the ground	1 m	1.8 m	1.8 m	1.8 m
Number of units/ha	3	7	3	3

The Black and White Plastic Sheet (BWPS) will be used as roofing materials of the curing shed.

Barn Fixture: Hygrometer is needed to monitor relative humidity and temperature inside the shed.

Collapsible Curing Shed Design (Refer to page 25)

19. Air Curing

Hang stucked leaves at 20 cm apart for good air circulation inside the barn throughout the curing period.

Maintain closed walls until yellowing is completed. Open walls when RH is above 70%.

20. Unloading

Unloading should be done early in the morning.

Pile and condition sticked leaves for 7-10 days prior to sorting.

Pile dried stalked cut leaves for 2-3 days for conditioning of leaves in preparation for stripping.

21. Stripping, Sorting, and Classification

Stripping should be done when midribs are fully dried. Pile the leaves according to the stalk position for conditioning within a period of 2-3 weeks.

When leaves are fully conditioned, classify according to: **color, length, thickness, injury.**

Pile for three days, then bale.

Reminder: Use *buri* mat, cheesecloth, bamboo slats or black plastic as matting material during these activities.

22. Baling/Market Preparation Straight Laid Open Bale (SLOB) System

Pre-classify the leaves by leaf position.

Put leaves of similar size and quality in the bale.

Do not bale leaves with swollen midrib.

Bale weight should not be lower than 20 kgs for the lower leaves, upper leaves are 25 kgs and reject not lower than 10 kg per bale.

Reminder: The moisture content of the leaves must not exceed 18%.

23. Target Yield (kg/ha): **2,400 (\pm 10%)**

Quality Index	Grades	Harmonized Grades	% distribution
HIGH	A-C	Grades with subscript 1-3	70
MEDIUM	D-F	Grades with subscript 5	20
LOW	R	ND, Reject	10

Note:

REFER TO THE NTA HARMONIZED GRADES
OF LOCALLY GROWN BURLEY

REFER TO ANNEX D FOR THE ELIMINATION
OF NON-TOBACCO RELATED MATERIALS
(NTRM)

Annex A: LIST OF NTA RECOMMENDED CPAs

GROWTH STAGE	ACTIVE INGREDIENT	BRAND NAME	a.i. CONCENTRATION	FPVA TOXICITY CATEGORY	IRAC GROUP
Seedling	Propamocarb HCl	Proplant, Previcur-N	722 g/li	IV	28
	Organic (Tea Tree Extract)	Timorex Gold	238 g/li	IV	46
	Abamectin ¹	Abamec 1.8 EC, Yichem 1.8 EC, Agriguard 1.8 EC	18 g/li	Ib	6
Vegetative (10-34 DAT)	Indoxacarb	Steward 30 WDG	300 g/kg	III	22
	Cinnamaldehyde	Tarsus XP 60SL	600 g/li	IV	UNE
	Organic (Tea Tree Extract)	Timorex Gold	238 g/li	IV	46
Early Maturity (35-50 DAT)	Bt + Pyridalyl	Dipel WP + Pleo	320 g/kg	IV	11A
			100 g/li		UN
	Chlorantraniliprole	Prevathon 5 SC, Elicor 5 SC	50 g/li	IV	28
	Indoxacarb	Steward 30 WDG	300 g/kg	III	22
	Acephate	Blackhawk 40SL	400 g/li	III	1B
Cinnamaldehyde	Tarsus XP 60SL	600 g/li	IV	UNE	
Maturity (60 DAT) until the 3 rd or 4 th harvest depending on insect population and crop stand	Bt + Pyridalyl	Dipel WP + Pleo	320 g/kg	IV	11A
			100 g/li		UN
	Indoxacarb	Steward 30 WDG	300 g/kg	III	22
	Chlorantraniliprole ¹	Prevathon 5 SC, Elicor 5 SC	50 g/li	IV	28

CHEMICAL GROUP	MODE OF ACTION	TYPE OF ACTIVITY	TARGET PESTS	DOSAGE PER 16 L
Carbamate	Lipid synthesis inhibitor	systemic	Pythium spp	
Liquid organic	Spore germination inhibitory	broad spectrum	damping off & leaf spots	25-50 ml
Avermectin	Glutamate-gated chloride channel (GluCl) allosteric modulators	contact	cutworm, budworm	15 ml
Oxadiazine	Voltage-dependent Sodium channel blocker	contact, stomach, ovicidal	cutworm, budworm, loopers, leaf miners	4 g
Biorational	Botanical essence including synthetic, extracts and unrefined oils with unknown or uncertain MOA	contact	thrips, whitefly	8-16 ml
Liquid Organic	Spore germination inhibitory	broad spectrum	Damping off & leaf spots	40-80 ml
Bt-organic	Microbial disruptors of insect midgut membranes	systemic	cutworm, budworm, loopers	30 g + 20 ml
Pyridalyl-synthetic	Compounds of unknown or uncertain MOA			
Diamide	Ryanodine receptor modulator: modulating release of Ca ultimately preventing muscle contraction	systemic	cutworm, budworm, loopers	25 ml
Oxadiazine	Voltage-dependent Na channel blocker	contact, stomach, ovicidal	cutworm, budworm, loopers, leaf miners	4 g
Organo-phosphate	Acetylcholinesterase (AChE) inhibitors. Nerve Action [Strong evidence that action at this protein is responsible for insecticidal effects.]	contact, stomach, systemic	Budworm, aphids	30 ml
Biorational	Botanical essence including synthetic, extracts and unrefined oils with unknown or uncertain MOA	contact,	Thrips, whitefly	8-16 ml
Bt-organic	Microbial disruptors of insect midgut membranes	systemic	cutworm, budworm, loopers	30 g + 20 ml
Pyridalyl-synthetic	Compounds of unknown or uncertain MOA			
Oxadiazine	Voltage-dependent Sodium channel blocker	contact, stomach, ovicidal	cutworm, budworm, loopers, leaf miners	4 g
Diamide	Ryanodine receptor modulator: modulating release of Ca ultimately preventing muscle contraction	systemic	cutworm, budworm, loopers	25 ml

Annex A ... (con't)

PRODUCT VOLUME	NO. OF SPRAYINGS	Maximum Tankload/ (L for seedbed) per ha.	PRE-HARVEST INTERVAL (days)	REENTRY PERIOD (hours)
50-100 ml	drench & spray	10 sqm bed	No PHI limitation	No re-entry limitation
22.5 ml	3	0.5		When spray deposit has dried
48 g	2	6	7	24
288-576 ml	3	12	No PHI limitation	No re-entry limitation
160-320 ml	2	2	No PHI limitation	No re-entry limitation
330 g + 220 mL	1	11		
200 ml	1	8	7	24
40 g	1	10	7	24
360 ml	1	12	14	When spray deposit has dried
288-576 ml	3	12	No PHI limitation	No re-entry limitation
360 g + 240 ml	1	11		
40 g	1	10	7	12
300 ml	1	12	7	24

Legend:

Ib – extremely hazardous; toxic
II – highly hazardous; harmful
III – moderately hazardous; caution
IV – slightly hazardous; no warning statement

Legend:

SP - Soluble Powder
SL - Soluble Liquid
SC - Suspension Concentrate
WP - Wettable Powder
WDG - Water Dispersible Granule
EC - Emulsifiable Concentrate

Annex B: SAFE USE AND MANAGEMENT OF CROP PROTECTION AGENTS (CPAs)

What do CPAs contain?

CPAs = active ingredient + filling material + other substances

Active ingredient	The poisonous element, the ingredient which actively kills the target pest.
Filling material	Material carrying the active substance or ingredient and determining the composition of the CPA (solid, liquid, granule, powder, etc.).
Other substances	Substances which increase the effect of CPA, facilitate its holding on to the leaf, increase shelf-life and prevent foaming, colors.
Application dosage	The quantity effective on the target disease or pest.

Using CPAs more than recommended dose does not increase their effect.

Re-entry period: Refers to the period of time immediately following the application of a pesticide during which unprotected workers should not enter a field.



Re-entry period warning signage installed in farm application of CPA

Pre-harvest interval: The recommended period between the final application of CPA and the harvesting time. The value is indicated on the CPA's label.

Residue: Any quantity of CPAs remaining on agricultural crops following CPA application. CPA residue levels decline over time after an application. When CPAs are used

carelessly and more than the required amount, residues on tobacco will be higher. There are residue limits set for each CPA. For this reason, tobacco sample should be taken regularly from tobacco farmers for residue analysis.

In order to prevent unacceptable residues:

- Registered CPAs should be used only for specific target pests of tobacco, i.e., Indoxacarb, should only be used to control budworms and cutworms.
- Compliance with application dosage indicated on the label is required.
- Compliance with the number and time of application of the CPA is required.
- CPAs should not be misused.
- Compliance with the pre-harvesting interval is required.

Tobacco with CPA residues above the acceptable limits has no commercial value. Application dosage and pre-harvest interval must be in line with the label instructions.

Toxicity classification: The toxicity of CPAs to humans and the environment must be well understood. The degree of toxicity of CPAs is divided into four categories. When using CPAs, choose those that cause minimum harm to human health and the environment.

Category I	EXTREMELY HAZARDOUS
Category II	HIGHLY HAZARDOUS
Category III	MODERATELY HAZARDOUS
Category IV	SLIGHTLY HAZARDOUS

Selection, Preparation and Application of CPAs

- Observations should be made regularly in the seedbed and field, and disease and pest levels should be determined precisely.
- CPA applications should be carried out only when required and the appropriate CPAs should be used for pests and diseases.
- It is recommended to wait for the level of pests to reach the economic threshold level to necessitate pest

control; otherwise, applications may be made unnecessarily and entail extra cost to the farmers.

- The label of the CPAs should be read carefully and compliance with the instructions is required.
- Before applying CPAs, children and pets should be taken away from the site.
- When preparing the CPA, kitchen utensils, and laundry materials should not be used.
- The CPAs should be well stirred.
- The materials to be used for the CPA application should be carefully selected and checked.

During the preparation and application of CPAs, appropriate Personal Protective Equipment (PPE) or clothing should be used as follows: rubber gloves, masks, goggles, rubber boots or shoes, long-sleeved shirts, and long pants.

- Should any of the CPAs come in contact with the body during the application, wash with soap and water.
- Applications should not be made on windy or rainy days.
- Obstructed nozzles and hoses should never be unclogged by blowing.
- The CPAs should be applied so as to cover all parts of the plant. The CPA particles and vapor should not be breathed in.
- Persons suffering from colds, bronchitis, and stomach disorders, or those having cracks and lesions on their hands are more sensitive to toxic substances. Such persons should not apply CPAs.
- Nursing mothers, pregnant women, children under 18, and sick or disabled persons should not be involved in CPAs' application.



Farmer wearing complete set of PPEs

- Any spilled CPAs should be carefully cleaned up.
- After each application, the hands, face, and PPE should be washed with plenty of water.
- Any remaining CPA mixture should be applied to the crop. It should never be poured out to the environment.

After CPA Applications

- Empty CPA container should never be used for other purposes and should not be left around the seedbed



Empty CPA sachets left in the field



Empty CPA bottles left in the field



Empty CPA containers stored inside the CPA lock-up storage



Proper segregation of empty CPA containers for disposal

or field.

Disposal of Empty CPA Containers

- Empty CPA containers should be rinsed out with clean water at least three times and this rinsing water should be poured into the prepared CPA solution.

Triple rinsing:

Empty CPA containers should be crushed and punctured, then stored in closed bags off the ground and out of reach of children. Empty CPA containers may be returned to CPA suppliers for proper disposal.



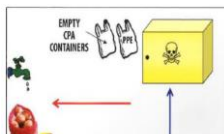
Butasan ang basyo upang hindi ito muling magamit at ipadala sa aprubadong taga-recycle ng basyo.

Storage of CPAs

- CPAs should be stored in their original containers, tightly closed, away from children, and locked in a cool, dry place.
- CPAs should always be kept in their original packages and not be transferred to other containers.
- CPAs should not be stored or prepared in living quarters such as kitchens, bedrooms, and stables.

Safekeeping of CPA containers inside the CPA lock-up storage

- There should be no foodstuff and drinks in places where CPAs are stored.
- Warning signs should be placed



HUGASAN NG TATLONG (3) BESES ANG BASYO NG INYONG PESTISIDYO!

Tandaan: Ubusin muna ang laman ng basyo ng pestisidyo sa pamamagitan ng pagtaob nito sa strainer ng knapsack sprayer.

Sundin ang mga sumusunod na hakbang ng 3 beses (triple-rinse):



1
Lagyan ng ½ na dami ng tubig ang baso.



2
Isarang mabuti ang basyo at alugin sa loob ng 30 segundo.



3
Alisin ang tubig sa basyo sa pamamagitan ng pagtaob sa strainer ng knapsack sprayer sa loob ng 30 segundo.

Butasan ang basyo upang hindi ito muling magamit at ipadala sa aprubadong taga-recycle ng basyo.



Ulitin ng tatlong beses ang proseso.

Laging magsuot ng damit pamproteksyon (PPE) kung hahawak ng pestisidyo.

where CPAs are kept.



Annex C: INTEGRATED PEST MANAGEMENT

INTEGRATED PEST MANAGEMENT

INSECT SCOUTING – the process of determining insect pest damages and their population in the tobacco field in order to know if there is a need to spray, and what kind of pesticide to spray. The need to spray will always depend on the **ETL** for specific pests.

Scouting Procedure:

1. Determine the area of the tobacco field to be scouted and make an outline. Take samples in **N or Z pattern across the field**. Do not sample the same plants each week.
2. Choose **10 sections** in each field.
3. Randomly sample **5 consecutive plants in each section**. These are the counts mostly used to determine if the economic threshold has been reached.
4. Sample **5 additional consecutive plants** in each outside row. This will help identify which pests are moving into the field.
5. Examine tobacco plants for insect presence, number and damage. Make counts and record the data (Refer to the Scouting Form).
6. After scouting is completed, compare the results with the treatment thresholds. *Avoid the temptation to make decisions on several fields based only on information from 1 or 2. Insect levels may vary greatly, even among similar fields.*

ECONOMIC THRESHOLD

- The density of pest at which a control treatment will provide an economic return.

INSECT PESTS	ECONOMIC THRESHOLD LEVEL
Cutworm, Mole Crickets	Treat when 5% of small plants are cut-off (recent damage).
Aphids	Treat when 10% or more of plants have as many as 50 aphids on any upper leaf before topping. At or after topping, treat when 20% or more of plants are infested.
Budworm	Before flowering, treat when 10% or more of the plants checked are infested with live budworms of any size. Do not count plants that have damage but no live worms.
Hornworm	Treat when at least one worm larger than 1 inch without parasitic cocoons is found per 10 plants (10%).
Katydid	Treat when 10 katydids are seen per 50 plants.
Cabbage Looper	Treat when 10% or more of the plants checked are infested with live worms of any size.
Army worm	Treat when 10% or more of the plants checked are infested with live worms of any size.

Annex D: ELIMINATION OF NON-TOBACCO RELATED MATERIALS (NTRMs)

NTRM is anything that is **NOT** tobacco. It is an important issue because its presence may jeopardize the **integrity** and **quality** of tobacco. NTRM is a major industry concern and must be addressed effectively.

Most of the NTRMs originate at the farm level and, therefore, this is where most of the efforts should be concentrated. NTRMs are categorized as follows:

CATEGORIES

1A	1B	2A	2B	3	4
ARTIFICIAL "Controllable"	NATURAL "Limited Control"	ORGANIC "Man-made"	ORGANIC "Natural"	METALS	ROCKS/ MULTI- MATERIALS
Foams (Styrofoam) Nylon strings/netting Rubber Plastics Leathers Unknown materials Cigarette butts	Feathers Cocoons Insects	Cigarette papers Cotton Cotton strings Burlap Burlap strings Manufactured woods Papers Metallic papers	Grass Herbs Natural woods Fruits	Nails Clips Metal shavings Bolts Nuts Blades (knife, razor)	Rocks Stones Multi-materials

Examples of Sources of Common Non-Tobacco Related Materials



Other Non-Tobacco Related Materials



Feathers



Cocoons



Jute sack strings



Stones



Metals



Grasses

We must ensure that an effective NTRM elimination program is implemented and it should cover all the activities from the field until the cured tobacco leaves are delivered to the buying stations.

NTRM can be eliminated from tobacco by practicing the following at different stages of the crop:

Growing period

- Always keep the field weed-free and free from synthetic and non-biodegradable wastes especially plastics and rubber materials.
- Never dispose of garbage, especially plastic wastes, into the field or near the field.

Harvesting and hauling

- Use cheesecloth or jute sacks and other non-fibrous, non-treated biodegradable materials as leaf wraps during harvesting, hauling, and transport.
- Never use woven plastic sacks as leaf wrap during hauling and transport of leaves.

Sticking, sorting and baling

- Never eat and smoke at all times in the work area.
- *Buri* mat, bamboo slats, C48 cartons, cheesecloth and jute sacks can be used as matting during sticking, stripping, sorting, and baling.
- Farmers must use natural, non-treated materials for stringing and baling.
- Do not allow any fowl or domestic animals to roam around the curing sheds and work areas during the tobacco season to prevent introduction of feathers and waste matters to the tobacco.
- Never use polypropylene fabrics as temporary roofing as the material disintegrates once it gets brittle due to exposure to weather elements.
- Remove all biodegradable and non-biodegradable materials like animal manure, weeds and other plant debris, feathers, plastic wrapper, etc., in the work area.
- Put all garbage/trash bins very far away from the work area.

Annex E: REGISTERED TOBACCO VARIETIES AND HYBRIDS

Bureau of Plant Industry National Seed Industry Council

Year	Registry Number	Type	Local Name	Registrant
1997	PSB-1997 TC 1	Virginia-Improved	FCH 1	NTA
	PSB-1997 TC 2	Virginia-Improved	FCH 2	NTA
	PSB-1997 TC 3	Virginia-Improved	NC 2326	NTA
2000	PSB-2000 TC 4	Burley	BAC 2	NTA
	PSB-2000 TC 5	Virginia	K 326	NTA
2001	PSB-2001 TC 6	Virginia	DH 48	NTA
2004	NSIC-2004 TC 7	Burley	TN 90	Lancaster Phil., Inc.
	NSIC-2004 TC 8	Burley	KY 160	Lancaster Phil., Inc.
2007	NSIC-2007 TC 9		W 608	ULPI
	NSIC-2007 TC 10	Virginia	PVH 09	ULPI
	NSIC-2007 TC 11	Burley	BA 2018	ULPI
	NSIC-2007 TC 12	Burley	BA 2021	ULPI
	NSIC-2007 TC 13	Burley	BA 1012	ULPI
2015	NSIC-2015 TC 14	Burley-Improved	CC8 12G	ULPI
	NSIC-2015 TC 15	Burley-Improved	KT 206 LC	ULPI
	NSIC-2015 TC 16	Burley-Improved	NC 7	ULPI
2016	NSIC-2016 TC 17	Virginia-Improved	PVH 2254	PMFTC
	NSIC-2016 TC 18	Virginia-Improved	HB 4488	PMFTC
2017	NSIC-2017 TC 19	Virginia-Improved	PVH2310	PMFTC
	NSIC-2017 TC 20	Virginia-Improved	PVH2233	PMFTC
2018	NSIC-2018 TC 21	Virginia	CC 67	ULPI
	NSIC-2018 TC 22	Burley	GF 888	ULPI
	NSIC-2018 TC 23	Burley	PD 7318LC	ULPI
2020	NSIC-2020 TC 24	Native Batek	Pimminyaya	NTA



The **TECHNO-UPDATING TASK FORCE** of the National Tobacco Administration conducted workshops for its members to update information and technology components that are incorporated in this Tobacco Production Manual for Crop Year 2022-2024. The Task Force identified mature information and technology derived for the following sources: **NTA Research and Development (R&D)**, private sector **R&D**, protocol research, adaptability trials of Seed Industry Council, and farmers' best practices as validated by NTA. Unlike in previous techno-updating, this time the task force involved more officials, experts, and researchers for maximum inputs.

This Tobacco Production Manual for Flue-Cured (Virginia) and Air-Cured (Burley) is an important tool for the agency's TPROs and Agriculturists, Science Research Specialists and other Extension Service Providers in helping the tobacco farmers get the maximum return from their tobacco farming enterprises.



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