WPKXGTUKF CFG'HGFGTCN'TWTCN'FG'RGTPCODWEQ
FGRCTVCOGPVQ'FG'VGEPQNQI KC'TWTCN
RTQI TCOC'FG'R U/I TCFWC¥ï Q'GO 'GPI GPJ CTKC'CODKGPVCN

O QFGNQU'UWEGUUKQPCN'G'FG'KP F W¥ï Q'TGI GPGTCVKXC'P C

TGEWRGTC¥ï Q'F G'O CVC'EKNKCT'P C\ QPC'FC'O CVC'FG'RGTPCODWEQ

TGEKHG

Rgtpco dweq'ö'Dtcukn

Lcpgktq'/'423:

WPKXGTUKF CF G'HGF GTCN'TWTCN'F G'RGTP CO DWEQ
F GRCTVCO GPVQ'F G'VGEP QNQI KC'TWTCN
RTQI TCO C'F G'R U/I TCF WC¥ï Q'GO 'GPI GPJ CTKC'CO DKGP VCN

O QF GNQU'UWEGUUKQP CN'G'F G'KP F W¥ï Q'TGI GPGTCVKXC'P C
TGEWRGTC¥ï Q'F G'O CVC'EKNKCT'P C'\ QP C'F C'O CVC'F G'RGTP CO DWEQ

NWEKENGKVQP 'NGCP F TQ'F C'UKNXC'F G'O GNQ

Fkuugtvc±¯q" uwdo gvkfc" cq" Rtqitco c" fg" R»u/
I tcfwc±¯q" go " Gpigpjctkc" Co dkgpvcn" rctc"
qdvgp±¯q" fq" v¶wwq" fg" O guvtg" go " Gpigpjctkc"
Co dkgpvcn" f tgc" fg" Eqpegpvtc±¯q<" Eqpvtqng" g"
Tgo gfkc±¯q'fc'Rqnwk±¯q0"

Qtkgpvcfqt<'Rtqh0'Ft0'Hgtpcpfq'Ectvczq'Tqrlo "P gvq"

Eq/qtkgpvcfqtgu<"

"Rtqh0'Ft0'Gi f kq'Dg| gttc'P gvq"

Rtqh0ß'Ft0ß'Cpc'Ectqnkpc'Dqtig u'Nkpu'g"Uknxc"

TGEKHG"

Rgtpco dweq"ó"Dtcukn"

Lcpgktq'/'423: "

NWEKENGKVQP ''NGCP F TQ'F C''UKNXC'F G'O GNQ''

O QF GNQU'UWEGUUIQP CN'G'F G'IP F W¥ï Q'TGI GP GTCVKXC'P C''
TGEWRGTC¥ï Q'F G'O CVC'EINKCT'P C'\ QP C'F C'O CVC'F G'RGTP CO DWE''

Qtkgpvcf qt<''

aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa''

Rtqh0F t0Hgtpcpf q''Ectvczq'Tqnko ''P gvq''

Wpkxgtukf cf g''Hgtgtcn'Twtcn'f g'Rgtpco dweq''/ ''RRGCO D''

Dcpec''gzco kpcf qtc<''

aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa''

Rtqh0F t0O ctewu'O gvtk'Eqtt´c'''

Wpkxgtukf cf g''Hgtgtcn'Twtcn'f g'Rgtpco dweq''/ ''RRGCO D''

aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa''

Rtqh0F t0Tqdgtvq''f c''Dqc''Xkci go ''Rctcj {dc''''

GO TCRC''ó''Tgekhg''

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JANEIRO, 2018

CI TCF GEIO GP VQ"

I quvctkc"f g"gzr tguuct"o gwu"ci tcf geko gpvqu"c"F GWU"r qt"guvct"ugo r tg"eqo ki q."f cpf q"ucÀf g." r ceK ́pekc.'r tqvɟ± ́q"g"o wkxc"fiqt±c"f g"xqpvcf g"r ctc"tqo r gt"eqo "qu"f geitkqu"f c"xkf c0'

C "o kpj c"o ̄g."Xkro c"O ctkc"f c"Ukrxc.'r gnɟ"ectª vgt."cm qt"g"r gnɟ"cr qiq"kpeqpf keiqpcn'r ctc"cvkpi kt" o gwu"qdigvkxqu."s wg"ugo ̄gn'p ̄q"ej gi ctkc"V ̄q"nɟpi g0'

Cqu"s wg"o wkvq"eqpvtkdw¶ƚco "pc"eqprgvc"f g"f cf qu"g"cpª rkug"f qu"tgswncf qu<ɟcq"Xcrf go kt"Ukrxc." Cf tkcpc"O ktcpf c. "O ctu wkpj q. "Tkectf q"Y cpf gtng{. "Tchcgn'Hgtpcpf gu. "Gi ¶f kq"dg¿ gttc"P gvq." Ncwtc"O ckctc"g"Lqu ́ "Dgpkco kp"O cej cf q"Eqgrj q0'

C "o kpj c"gsr quc. "Lqusgro c "F cpkgn "r gnɟu"eqpugnj qu. "eqo r cpj gktkuo q"g"eqo r ggpuɟ q"r gnɟu" o qo gpvqu'kwpvqu'tgpwpekcf qu'r ctc"eqpuvtwɟ ̄ ́q"f gusg"vtcdcnj q0'

Wo "ci tcf geko gpvq"gur gekcn'c"o gw"o gpvqt ɟrkgpvcf qt"Hgtpcpf q"Ectvczq"Tqrko "P gvq. "r gnɟ" eqphkcpɟ±c."g"r gnɟ"g tcpf g"eqpvtkdwkɟ ̄ ́q"j wo cpc"g"V ́ cpkec"r tguvcf c"pc"eqpuvtwɟ ̄ ́q"f guvc"r gus wkuc" f g"o guvrcf q0'

C 'Eqo r cpj kc 'Rgtpco dwecpc'f g'Ucpgco gpvq"–'EQO RGUC.'pc'r gsuuc'f q'Lqus ́ 'Cnf q'f qu'Ucpvqu" *f ktgvqr'f g"ctvkewnc± ́q"g"o gkq"co dkgpvg+'g"Y cnf geg{"Hgttgktc"Hctkcu"Hkrj q"*cuugsuqt'f g"o gkq" co dkgpvg'f c'f ktgvqtkc'f g"ctvkewnc± ́q"g"o gkq"co dkgpvg+.'r gnɟ"rkdgtc±̄ ́q'f c"ª gc"r ctc"guswf qu" ekgpv¶hkequ. "eqpvtkdwkɟ ́q"ní i ¶uvkec"g"qr getkqpcn'eqpegf kf cu'f wtcpvg"q"f gugpxqnxko gpvq"f cu" cvkxkf cf gu'f g"eco r q0'

Cqu"o go dtqu"f c"dcpec"gzco kpcf qtc. "RtqhɟF tc0'O ctecu"O gvtk'g"F t0'Tqdgtvq"Rctc{dc."r gnɟu" xcrqtqucu'eqpvtkdwkɟ¿ gu0'

G'r qt'hko .'r qt²o .'p ̄q'o gpqu'ko r qtvcpvg."cqu'r tqhguuqtgu.'hwpekqpªtkqu'g'eqqtf gnɟ ́q'f q'ewtuq' f g"R»u/i tcf wɟ± ́q"go "Gpi gpj ctkc "Co dkgpvcn'f c"Wpkxgtukf cf g"Hgf gtcn'Twtcn'f g"Rgtpco dwcq." r gnɟ"go r q. "f gf kecɟ± ́q.."eqpj geko gpvqu"eqo r ctvkhj cf qu"g"eqpvtkdwkɟ ́q"f g"hqto c "ukpi wrct"pc" o kpj c"r gus wkuc0""

TGUWO Q"

F kcpvg'f c"rtqqewrc±¯q'fg'gpvgpfgt"c"fkp¬o kcc"fcu"ª tgcu"go "rtqeguuq'fg'tguvcwtc±¯q."c"rctvkt"
fq "wuq"fg"kpfkecfqtgu"geqﬂi kecqu."q"rtgugpvg"guwfq"vgxg"eqo q"qdjgvkxq"rtkpekrcﬂ'cdvgt"wo "
fkci p»uvkcq"cwwcﬂfq"rtqeguuq'fg'tguvcwtc±¯q"hﬂqtguvcﬂgo "ª tcu"ekﬂkctgu"fc"Dcttci go "fq "Ukﬂkﬂk"
go "Rgtpco dweq0'Pguug"ugpvkfq."hqtco "ugﬂgekqpcfcu"fwcuª tcu"go "rtqeguuq'fg'tguvcwtc±¯q"
hﬂqtguvcﬂ'ugpfq "wo c"pq"O qf gﬂq"Uweguukqpcrﬂ'*O U¶"g"c"qwwtc"pq m qf gﬂq'fg'Kpf w±¯q"'*M K."swg"
hc| go "rctvgu'fc'tguvcwtc±¯q"hﬂqtguvcﬂfc"dcttci go "eqo q"wo "vqfq0'Rctc"c"cxcﬂkc±¯q."hqtco "
ugﬂgekqpcfqu"kpfkecfqtgu"geqﬂi kequ'fgpvtq'fg'ekpeq'i tcpfgu'i twrqu<'rﬂcuci go ."eqo r qukﬂq."
guvtwwtc."uqﬂq"g"fwp±¯q."swg'rgto kﬂtco "kphgtkt"uqdtg'q'rtqeguuq'fg'tguvcwtc±¯q'fcu'tghgtkfcu'
ª tcu0'Hqtco "kpuvcﬂfcu'42"rctegﬂcu'rgto cpgpvgu'fg'322o ."go "ecf c"wo "f qu'f qku'cm dkgpvgu'
f g"guwf q."ugpf q"wkﬂk| cf c"c"o guo c"o gvqf qﬂqi kc'rctc"qdvgp±¯q'f qu'f cf qu0'Vco d²o ."hqtco "
cxcﬂkcfcu'c'f gpukf cf g'f q"uqﬂq"g"guvcdkﬂkf cf g'f g"ci tgi cf qu"pcu"eco cf cu'f g"2/32."32/42"g"42/62"
eo 0'Eqo q'tguwﬂcf q."qdugtxqw/ug'f khgtgp±cu'f q"O U'r ctc'q"O K'r tkpekr cﬂo gpvg'pc"guvcdkﬂkf cf g"
f g"ci tgi cf qu."tgi gpgtc±¯q"g"pc"eqo r qukﬂq"hqt¶wﬂvkc."r qt²o ."cr tgugpvco "ugo gﬂj cp±cu"go "
tgﬂc±¯q"«'guvtwwtc"g"cﬂi wpu'r tqeguuqu'geqﬂi kequ'«¯q'eqo wpu'pguugu"co dkgpvgu0'

Rcﬂcxtcu"ej cxg<'O cvc'ekﬂkct."'kpfkecf qtgu'geqﬂi kequ."gequukvgo c'f g'tghgt´pekc0'

O GNQ."NWEKENGKVQP "NGCP FTQ"FC"UKNXC"FG0**O qf gnu'Uweguukqpcn'g'f g'Kpf w±¯q"
Tgi gpgtcvkxc'pc'Tgewrgtc±¯q'f g'O cvc'Ekkkct'pc'\ qpc'f c'O cvc'f g'Rgtpco dweq0'423:0'**
Qtkgpvcfqt<'Hgtpcpfq"Ectvczq"Tqko "Pgvq0'Eq/qtkgpvqtgu<'Gi¶fkq"Dg|ttc"Pgvq"g"Cpc"
Ectqnkpc'Dqti gu'Nkpu'g'Uknxc0'

CDUVTCEV"

"

Hcegf "y kj "yj g"eqpegtp"vq"wpfgtuvcpf "yj g"f{pco keu"qh'tguvqtcvkqp"ctgcu."dcugf "qp"yj g"wug"qh'
geqmi kecn'kpf kecvqtu."yj g"o ckp"qdlgevkxg"qh'yj ku"uvwf{"y cu"vq"qdvckp"c"ewttgpv'f kci pquku"qh'yj g"
hqtguv'tguvqtcvkqp"r tqeguu"kp'tkr ctkcp"ctgcu"qh'yj g"Uktkkk'F co ."kp'Rgtpco dweq0'Kp'yj ku"ugpug."y o"
ctgcu"kp'yj g"r tqeguu"qh'hqtguv'tguvqtcvkqp"y gtg"ugngevgf ."qpg"dgkpi "yj g"Uweeguukqp"O qf gn'*UO +"
cpf "yj g"qyj gt"yj g"Kpf wevkqp"O qf gn'*KO +."yj kej "o cmg"r ctvu"qh'yj g"hqtguv'tguvqtcvkqp"qh'yj g"f co "
cu"c"yj qng0'Hqt"yj g"gxcnwcvkqp."geqmi kecn'kpf kecvqtu'y gtg"ugngevgf "yj kej "kp'hkxg"o clqt"i tqwr u<'
ncpf uecr g." eqo r qukkqp." uvtwewwtg." uqkn' cpf " hwpevkqp." y j kej " cmqy gf " vq" kphgt" cdqww" yj g"
tguvqtcvkqp"r tqeguu"qh'yj gug"ctgcu0'Vy gpv{"r gto cpgpv'r mqvu"qh'322"o   "y gtg"kpuvcmgf "kp"gcej "qh'
yj g"yy q"uwf{"gpxktqpo gpvu."wukpi "yj g"uco g"o gyj qf qmqi {"vq"qdvckp"yj g"f cvc0'Uqkn'f gpukv{"cpf "
ci i tgi cvg"uvcdkkkv{"y gtg"cmuq"gxcnwcvgf "kp"yj g"2/32."32/42"cpf "42/62"em "nc{gtu0'Fkhhgtgpegu"
y gtg"hqwpf "dgvy ggp"UO "cpf "KO ."o ckpn{"kp"ci i tgi cvg"uvcdkkkv{."tgi gpgtcvkqp"cpf "hqtguvt{"
eqo r qukkqp."dww'yj g{"j cxg"uko knctkkgu"vq"yj g"uvtwewwtg"cpf "uqo g"geqmi kecn'r tqeguugu"ctg"
eqo o qp"vq"yj gug"gpxktqpo gpw0'

"

Kg{"y qtf u<'tkr ctkcp"hqtguv."geqmi kecn'kpf kecvqtu."tghgtgpeg"gequ{uvgo 0'
"

UWO ƒ TKQ

NKUVC'F G'HKI WT CU"

NKUVC'F G'VCDGNCU"

Vcdgnc"30'Kpf kecf qtgu"geqn»i kequ"gueqnj kf qu"r ctc"cpªnkug"f cu"ªtgcu"f g"o cvc"eknkct"go "r tqeguuq"f g" tguvcwtc±¯q.'pc"dcttci go "f q"Uktklk"Xke´pekc"ó"RG0000000000000000000000000000000000000000000000000000048"

Vcdgnc" 40' Nkuvc" f cu" gur²ekgu" eqpvcdknk cf cu" pcu"ªtgcu" go "r tqeguuq" f g" tguvcwtc±¯q" *O U" g" O K." nqecnk cf cu"pq o wpke¶ kq"f g"Xke´pekc"ó"RG. "dcttci go "f q"Uktklk"*ugpf q<"QT<"qtki go ."P <"pcvkxcu."G<" gz»vkecu."I G´i twr q"geqn»i keq."Rk´"r kqpgktc."Uk´"ugewpf ª tkc"kpkekcn"Uv<"ugewpf ª tkc"vctf kc."Ue<"go " ectcevgtk c± q="UF<"u¶pf tqo g"f g"f kur gtu¯q."Cdkq<"cdk»vkec."Cwv<"cwvqe»tkec="Cpg<"cpgo qe»tkec="\ qqe<" | qqe»tkec+0000000000000000000000000000000000000000000000000000000000000000000000000005: "

Vcdgnc"50'Gunko cvkxcu"f qu"¶pf kegu"f g"f kxgtukf cf g"r ctc"cuªtgcu"go "tguvcwtc±¯q"*O U"g"O K."nqecnk cf cu" pc"dcttci go "f q"Uktklk"o wpke¶ kqu"f g"Xke´pekc"ó"RG0000000000000000000000000000000000000000000000000063"

Vcdgnc"60'Hkxquugekqnqi kc"f q"eqo r qpgpvg"ctd»tgq"f q"o qf gnq"uweguukqpcn"*O U+."nqecnk cf c"pc"dcttci go " f q"Uktklk0'Xke´pekc"ó"RG"*ugpf q<"P K"pÀo gtq"f g"kpf kx¶f wqu="F C<"f gpukf cf g"cduqnwvc="F T<"f gpukf cf g" tgncvkxc="HC<"htgs w´pekc" cduqnwvc="Ht<"htgs w´pekc"tgncvkxc="FqC<"f qo kp»pekc"cduqnwvc="FqT<" f qo kp»pekc'tgncvkxc'g"XK´'xcnqt"f g"ko r qtv»pekc00000000000000000000000000000000000000000000000000064"

Vcdgnc" 70' Hkxquqekqnqi kc" f q" eqo r qpgpvg" ctd»tgq" f q" o qf gnq" f g" kpvu±¯q" f c" tgi gpgtc±¯q" *O K." nqecnk cf c"pc"dcttci go "f q"Uktklk0'Xke´pekc"ó"RG"*ugpf q<"P K"pÀo gtq"f g"kpf kx¶f wqu="FC<'f gpukf cf g" cduqnwvc="FT<'f gpukf cf g"tgncvkxc="HC<'htgs w´pekc'cduqnwvc="Ht<'htgs w´pekc"tgncvkxc="FqC<'f qo kp»pekc" cduqnwvc="F qT<'f qo kp»pekc"tgncvkxc'g"XK´'xcnqt"f g"ko r qtv»pekc+0000000000000000000000000000000000000065"

Vcdgnc"80'Cu"ekpeq"gur²ekgu"o cku"tgr tgugpvcvkxcu"go "vgto qu"hkxquqekqn»i kequ"f cu"ªtgcu"go "r tqeguuq" f g'tguvcwtc±¯q"pcu"o qf gnqu"*O U"g"O K."nqecnk cf qu"pc"o cvc"eknkct"f c"dcttci go "f q"Uktklk"pq"o wpke¶ kq" f g"Xke´pekc"ó"RG0000000000000000000000000000000000000000000000000000000000000000000000000000067"

Vcdgnc"90'Gur²ekgu"tgi gpgtcpvgu"pcu"f wcs"ªtgcu"go "r tqeguuq"f g"tguvcwtc±¯q"*O U"g"O K."nqecnk cf qu"pc" o cvc"eknkct"f c"dcttci go "f q"Uktklk"pq"o wpke¶ kq"f g"Xke´pekc"ó"RG"*ugpf q<P <"pcvkxcu="I G´'i twr q" geqn»i keq="Rk´"r kqpgktc="Uk´"ugewpf ª tkc"kpkekcn"Uv<"ugewpf ª tkc"vctf kc="Ue<"go "ectcevgtk c± q="UF <" u¶pf tqo g"f g"f kur gtu¯q="Cdkq<"cdk»vkec="\ qq<'| qqe»tkec+0000000000000000000000000000000000000000000006; "

Vcdgnc": 0'Hkxquqekqnqi kc"f c"tgi gpgtc±¯q"pcvwtcn"f c"ªtgc"go "tguvcwtc±¯q"f q"O U."nqecnk cf cu"pc"o cvc" eknkct"f c"dcttci go "f q"Uktklk"pq"o wpke¶ kq"f g"Xke´pekc"ó"RG"*ugpf q<P K"P Ào gtq"f g"Kpf kx¶f wqu="FC<' F gpukf cf g" cduqnwvc" *kpf |)c⁄3"⁼"F T<" F gpukf cf g" tgncvkxc" *" ⁼" HC<" Htgs w´pekc" cduqnwvc" *" ⁼" HT<" Htgs w´pekc"tgncvkxc"*" ⁼"FqC<"Fqo kp»pekc"cduqnwvc"*o (kpf)c⁄3"⁼"FqT<"Fqo kp»pekc"tgncvkxc"*" ⁼"XK´" Xcnqt'f g"ko r qtv»pekc"** +0000000000000000000000000000000000000000000000000000000000000075"

Vcdgnc"; 0'Hkxquqekqnqi kc"f c"tgi gpgtc±¯q"pcvwtcn'f c"ªtgc"go "tguvcwtc±¯q"f q"O K"nqecnk cf c"pc"o cvc" eknkct'f c"dcttci go "f q"Uktklk"pq"o wpke¶ kq"f g"Xke´pekc"ó"RG"*ugpf q<P K"P Ào gtq"f g"Kpf kx¶f wqu="FC<' F gpukf cf g"cduqnwvc"*kpf|)c⁄3⁼"FT<'Fgpukf cf g"tgncvkxc"*" ⁼"HC<"Htgs w´pekc"cduqnwvc="HT<"Htgs w´pekc" tgncvkxc"*" ⁼"FqC<'Fqo kp»pekc"cduqnwvc"*o (kpf)c⁄3⁼"FqT<'Fqo kp»pekc"tgncvkxc"*" ⁼"XK´"Xcnqt'f g" ko r qtv»pekc"*" +0000000000000000000000000000000000000000000000000000000000000000000076"

Vcdgnc"320'Eqpegpvtc±¯q"f g"pwvtkgpvgu"pc"ugttcr knj gkc"f qu"co dkgpvgu"go "tguvcwtc±¯q"*O U"g"O K." nqecnk cf qu"pc"o cvc"eknkct'f c"dcttci go "f q"Uktklk"pq"o wpke¶ kq"f g"Xke´pekc"ó"RG000000000000000000000078"

Vcdgnc" 330'F gpukf cf g" g" n¶xgn'f g"ci tgi c±¯q"f q"uqnq"pqu"co dkgpvgu"go "tguvcwtc±¯q"*O U"g"O K." nqecnk cf qu"pc"o cvc"eknkct'f c"dcttci go "f q"Uktklk"pq"o wpke¶ kq"f g"Xke´pekc"ó"RG"*F O R"ó"F k~o gvtq" o ²f kq'r qpf gtcf q=F O I "ó'F k~o gvtq"o ²f kq'i go o ²vtkeq+0000000000000000000000000000000000000000000000007:

30 KPVTQFWÏQ'''

"

C"f gxcuvc±ⁿq"f cu"hqtguvcu"pq"Dtcukn"pc"uwc"i tcpf g"o ckqtïc."hqi'kpvgpukhkecf c"r gnc" gzr cpuⁿq"f cu"htqpvgktcu"ci t¶qncu."r gcwªtkc"g"wtdcpc0'Qu"ekenqu"geqn½o kqu"xkxgpekcf qu"pq" Dtcknl'f gkzcxco "eqo q"r cpq"f g"hwpf q."i tcpf gu"ªtgcu"f g"hqtguvcu"pctkxcu"f gi tcf cf cu" *UCP VQU'et al0'422: +'g'uqdtguwkf q"ªtgcu's wg'r gtf gtco "uwc'ecr ckf cf g'f g'tgukⁿpekc0'

Cu"o cvcu"ekrkctgu."s wg"x´o "ugpf q"htci m gpvcf cu."uqdtguwf q."r gnc"gzr cpuⁿq'f cu"ªtgcu" ci tkewⁿ xgku."uⁿq"g"ecquukuwgo cu"pcwtcku'f g"gzvtgo c"ko r qtv±pekc"r ctc"uqdtgxkxᴧpekc'f qu" ewtuqu'f∅i wc."ugpf q"gpⁿq."uwc'f gi tcf c±ⁿq"wo "tkueq'r ctc"uqdgtcpkc"j ¶tkec0'Rqt'f ghkpk±ⁿq" uⁿq"eqpegkwcf cu'eqo q"hqto c±¿gu"hqtguvcku'qeqttgpvgu'cq"nqpi q'f qu"ewtuqu'f g"tkqu."go " ªtgcu"vgo r qtcrkco gpvg"kpwpf cf cu."go "pcuegpvgu"g"qnj qu'f∅i wc"*UQW\ C"et al0"4225㵳 HGTTGKTC"et al0"4229+0'

Eqo "q"etguegpvg"ko r cevq"s wg"xgo "uqhtgpf q"c"o cvc"ekrkct."guvg"tgewtuq"vgo "tgegdkf q" o ckqt"pqvqtkgf cf g."r tkpekr cm gpvg."r gnq"ugw"guvcf q"et¶ikeq'f g"f gi tcf c±ⁿq"*TQFTKI WGU㵳 I CPFQNHK"4226+0'C"f ko kpwk±ⁿq'i tcf cvkxc"go "ªtgc'f cu"hqtguvcu'tqr kecku"htci km|c"uwc" eqpgevkxkf cf g." hwpekqpcrkf cf g" g" uwuvgpvcdkrkf cf g0' Cn¶o " f kuuq." c" c±ⁿq" cpt»r kec" f g" htci m gpvc±ⁿq'f q'j cdkvcv'o qf khkec"c"guttwwwtc'f c"r ckuci go ."tguwwncpf q"go "o wf cp±cu"pc" eqo r quk±ⁿq'g'f kxgtukf cf g'f cu'eqo wpkf cf gu'*O GV\ I GT."3; ; ; +0'

P guvg"eqpvgzvq."c"xgi gvc±ⁿq"ekrkct'f gugo r gpj c"wo "r cr gn'f g"i tcpf g"ko r qtv±pekc"pc" r tqvg±ⁿq'f qu"eqtr qu'f∅i wc."ugpf q"gng co gpvg'r tqvgikf cu'eqo q"õªtgcu'f g"r tgugtxc±ⁿq" r gto cpgpvgö'f guf g"3; 870'Fgpvtg"qu"dgpghᵷekqu."c"r tgugp±c'f c"o cvc"ekrkct'f ko kpwk'c" kpekf´pkc'f g"tgqⁿq'f q'uqnq'g'cuuqtgco gpvq'f qu'eqtr qu'f∅i wc"*NKO C."3; ; ; 㵳O CEJ CFQ" et al.." 4225+." eqpttkdwkpf q'vco d²o "eqo q'ekeq'f g"pwttkgpvgu'f c"dcekc"j kf tqi ᵃhkec" *XKVCN." 4226+." cvgpwcpf q"c"kpekf´pkc"f g"tcf kc±ⁿq"uqnct." *NGO MG/F G/ECUVTQ" (" I WGTTC."4232+."cwzkrkcpf q"pc"r tqvg±ⁿq'f c"s wcrkf cf g'f c"ªi wc"*DQTVQNW\ K"4228㵳 RKPJ Q"gv'cn0"4228+'g'hwpekqpcpf q"eqo q"eqttgf qt'geqn»i keq"*NKO C"("\ CMIC."4227+0'

P qu'Àmlo qu'cpqu."f gxkf q'«u'cmgtc±¿gu"pq'Eˮ ki q'Hqtguvcl'Dtcukngktq"*DTCUKN."4234+." pqvc-ug"wo c"o ckqt"eqpuekgpvk|c±ⁿq"pq"ugpvkf q'f g"ug"r tqvgigtgo "cu"o cvcu"ekrkctgu."dgo " eqo q'f g"ug'tgxgi gvctgo "ªtgcs'f gi tcf cf cs'pq'r cuucf q0'C"tgeqo r quk±ⁿq'f cs'o cvcs"ekrkctgs'² " f g"gzvtgo c"ko r qtv±pekc"r ctc"c"r tqvg±ⁿq'f cs"ª i wcs0'Wo a"xg| "s wg'q'r ncpgc"gphtgpvc"wo c" i tcpf g" guecuug| " f guug'dgo ." dqc"r ctvg'f qs"tgewtuqs"j ¶tkqus"guvⁿq"eqpvco kpcf qs"g"c" r qr wnc±ⁿq'eqo g±c'c'r tgegdgt's wg'guug'² 'wo 'tgewtuq'hkpkvq"*TKI WGKTC"PGVQ."4235+0'

Guucs'hqto c±¿gu'hqtguvcku's wg'o cti kco 'qs"ewtuqs'f∅i wc'uⁿq'ko r qtvcpvgs'tgi wncf qtgs" f c"xc|ⁿq'f qs'tkqs."pc'r tgugtxc±ⁿq'f g'ugr²ekgs"cpko cks'g'xgi gvcks"*NKO C"("\ CMIC."4227㵳

MCI G[COC"("I CP F CTC."4222+"g"o guo q"ugpf q"r tqvgi kf cu"r qt"rgk"u⁻q"cnxqu"f g" kpvgpuc"f gi tcf c±¯q"g"gzr nqtc±¯q."vgpf q"eqo q"eqpugs ́pekc"xª tkqu"r tqdrgo cu"co dkgpvcku" s wg"gzki go "xª tkcu"c±¿ gu"eqttgvkxcu"f cu"o cku"f khgtgpvgu"hqto cu0'

P guug"r cpqtco c."wo c"ª tgc"f gi tcf cf c"⁰ "cs wgnc"s wg."f gr qku"f g"ugt "ecqo gvkf c"r qt"wo " hqt vg"ko r cevq."r gtf g"uwc"ecr cekf cf g"f g"cwqttgi gpgtc±¯q."r qku"r gtf gw"uwc"ecr cekf cf g"f g" tgvqtpct "cq"guvcf q"qtki kpcn"qw"c"wo "gs wknïdtkq"f kp¯o keq."qw"uglc."r gtf gw"uwc"tgukníˊpekc" *O CT VKP U."4235+."vqtpcpf q/ug"wo c"ª tgc"ko r qf wvkxc"ugo "c"ecr cekf cf g"geqn›i kec"f g" tgr qt"o cv²tkc"qti ⁻pkec"f q"uqnq."dkqo cuuc."pwvtkgpvgu"g"dcpeq"f g"ugo gpvgu."hcvqtgu"guugu" ko r qtvcpvgu"r ctc"q"gs wknïdtkq"f q"gequukuvgo c0'

Rctcngnco gpvg"cq"cwo gpvq"f guuª tgcu"f gi tcf cf cu."etgueg"q"kpvgtguug"r gnc"tguvcwtc±¯q" geqn›i kec"*UKNXC."4239+."r qku"cu"o cvcu"eknkctgu."go "xktwf g"f g"uwc"ko r qtˆpekc"geqn›i kec" r ctc"dkqf kxgtukf cf g"g"tgewtuqu"j ¶f tkequ."hwpekqpco "eqo q"hknvtqu."eqttgf qtgu"geqn›i kequ"g" ckpf c" r tqvgi g" q" uqnq" eqpvtc" r tqeguuqu" gtqukxqu." vqtpcpf q/ug" co dkgpvgu" f g" i tcpf g" ko r qtˆpekc"r ctc"tguvcwtc±¯q"geqn›i kec"*O CT VKP U."4232ː"CXKNC"gv"cn0"4233+0'

C" tguvcwtc±¯q" tcvc/ug" f g" wo " eqplwpvq" f g" r tqegf ko gpvqu" xqnvcf qu" r ctc" q" tgguvcdgngeko gpvq"i tcf wcn"f q"gequukuvgo c."f cpf q"eqpf k¿ gu"r ctc"f gugpxqnxko gpvq"f g"uwc" dkqf kxgtukf cf g"g"eqpvtkdwkpf q"r ctc"q"hwpekqpco gpvq"f qu"r tqeguuqu"geqn›i kequ"tgur qp‖xgku" r gnc"uwuvgpvcdknkf cf g"g"eqpugtxc±¯q"f c"hnqtguvc"go "hqto c±¯q"*TQF TKˊWGU"et al.."4229ː HQP UGEC."4235+0'

Q"o qf gnq"qw"v² epkec"r ctc"c"tguvcwtc±¯q"hnqtguvcn"f g"wo c"ª tgc"f gi tcf cf c."xck"f gr gpf gt" f g"ectcevgtïuvkecu"gf chqekoªvkcu"g"eqpf k¿ gu"geqn›i kecu"f c"ª tgc."guvcf q"f g"f gi tcf c±¯q." curgevq" f c" r ckuci go " tgi kqpcn" f kur qpkdknkf cf g" f g" o wf cu" g" ugo gpvgu." g" p¶kgn" f g" eqpj geko gpvq"geqn›i keq"uknxkewnwtcn"*QNKXGKT C."4236+0'

Rctc"O ctvkpu"*4229+."jª "wo c"f kxgtukf cf g"f g"o qf gnqu"f g"tgewr gtc±¯q"f g"ªtgcu"eknkctgu" f gi tcf cf cu"f kur qpïxgku."gpvtgvcpvq."cu"eqpf k¿ gu"gf chqekoªvkcu"f g"ecf c"co dkgpvg"eqnhgtg" c"ecf c"ª tgc." go "r tqeguuq" f g"tguvcwtc±¯q."wo c"eqphki wtc±¯q"qw"o qf gnq"gur ge¶keq"f g" tgewr gtc±¯q"r qku."cu"xctiª xgku"co dkgpvcku"r qf go "kpvgthgtkt"pq"eqo r qtvco gpvq"f cu"gur ²ekgu" go "wo "f gvgto kpcf q"uïkq"qw"o qf gnq0'

F gpvtg"qu"o qf gnqu"f g"tgewr gtc±¯q"hnqtguvcn"q"uweguukqpcn"f gpvtq"f q"eqpvgzvq"f guuc" r gus wkuc."vgo "eqo q"r tkpe¶kq"c"eqo dkpc±¯q"f g"gur ²ekgu"f g"f khgtgpvgui twr qu"geqn›i kequ." qw"uglc."cu"gur ²ekgu"f g"kp¶ekq"f g"uweguu⁻q."kpvqtgcpvgu"«uqo dtc"g"f g"etgueko gpvq"tªr kf q." r tqr qtekqpco " eqpf k¿ gu" geqn›i kecu" hcxqtªxgku" cq" f gugpxqnxko gpvq" f g" gur ²ekgu" ugewpfªtkcu"kpkekcku."vctf kcu"g"en¶o cz"*QNKXGKTC."4236+0'

Ecdg"ucrkgpvct."swg"uqo gpvg"q"fgugpxqnxko gpvq"fg"rtqlgvq"fg"tguvcwtc±ˉq"p¯q"i ctcpvktª "q"uwgeuuq"fc"tgewrgtc±ˉq"geqn»i kec."ugpfq"pgeguuªtkq"ug"fghpkt"c"hqto c"fg"cxcnkc±ˉq"g"q"o qpkqtco gpvq"qu'swcku'u¯q'vgtm ½o gvtqu'r ctc"kphgtkt"ug"cu"o gvcu"g"qdlgvkxqu"fc"tguvcwtc±ˉq"guˉq" ugpfq" crecp±cfqu0' P guvg" ugpvkfq." guˉq" ugpfq" rtqr quvqu" q" wuq" fg" kpfkecfqtgu" geqn»i kequ"pc"cxcnkc±ˉq"fg"ª tgc"go "rtqeguuq"fg"tguvcwtc±ˉq"geqn»i kec."q"swg"r quukdknkvc"ug" eqpj gegt"c"ukwc±ˉq"cwcn'fc"ª tgc"go "tguvcwtc±ˉq."r gto kkpfq"eqpcwkt"uqdtg"uwc"vtclgv»tkc" geqn»i kec"g"ckpfc"ug"cxcnkct"c"pgeguukfcfg"fg"kpvgthgtkt"pq"rtqeguuq"eqo "c±¿gu"eqttgvkxcu" *UKNXC."4239+0'

40 QDLGVKXQU"

40ß I GTCN"

Qdvgt"wo "fkci p»uvkeq"ukwcekqpcn'fqu"rtqeguuqu"geqn»i kequ"guvcdgngekfqu"go "o qfgnqu" fg" tgewr gtc±ˉq" fg" hqtguvcm "pc" o cvc" ekkct" fc" dcttci go " fq" Tkq" Uktkk" pq" o wp¶ekrkq" fg" Xke´pekc."go ˜Rgtpco dweq0'

"

404 'QDLGVKXQU'GURGE˘HIEQU"

"

Cxcnkct"c"guvtwwwtc"g"eqo r quk±ˉq"fc"xgi gvc±ˉq"r tgugpvg"r qt"o gkq"fg"fqku"o qfgnqu"fg" tguvcwtc±ˉq"hqtguvcm‹q"O qfgnq"Uweguukqpcn'*O U+"g"q"O qfgnq"fg"Kfw±ˉq"fc"Tgi gpgtc±ˉq" *O K0"

Cpcnkuct"swcn'c"kphnwˊpekc"fc"r ckuci go ."uqo q"g"fcu"kpvgthgt´pekcu"cpt»rkecu"uqdtg"cu" ª tgcu"go "tguvcwtc±ˉq‹"

50 J KR˘VGUGU"

"

C"fkuwtkdwk±ˉq"gurcekcn'fg"kpfkx¶fwqu"ctd»tgqu"go "nkpj c."eqo "fkxgtukfcfg"fg"gur²ekgu" hqtguvcku" g" eqo dkpc±ˉq" fg" ectcevgt¶uvkecu" geqhkukqn»i kecu" fcu" o guo cu." hcekikc" q" guvcdgneko gpvq"g"tgewr gtc±ˉq"fg"rtqeguuqu"geqn»i kequ"

C" eqpfw±ˉq" g" kpfw±ˉq" fc" tgi gpgtc±ˉq" pcwtcn' cr tgugpvc" o ckqt" ecr cekfcfg" g" hcxqtgeko gpvq"«'fkxgtukfcfg'fg'gur²ekgu'hqtguvcku."g'tgewr gtc±ˉq'fg'cvtkdwqu'geqn»i kequ0'

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60 TGXKÏ Q'FG'NKVGTCVWTC"

"

603 O CVC'EKNKCT"

Cu" o cvcu" ekrkctgu" r qf go " ugt" ectcevgtk| cf cu" eqo q" ukuvgo cu" hqtguvcku." hqto cf qu"
pcwtcm gpvg"qw"p¯q." go "hckzcu."«u"o cti gpu"f g"tkqu."tkkej qu."cf lcegpvgu"c"rci qu."tgr tgucu"qw"
pcuegpvgu." gzgtegpf q"hwp±¯q"f g"tgf wqt"f q"cuuqtgco gpvq"g"f c"f gi tcf c±¯q"f q"co dkgpvg"g"
eqo q"gmgo gpvq"pcwtcn'f g"r tqeguuo gpvq"g"vtcphqto c±¯q"f c"f kxgtukf cf g"co dkgpvcn'g"uqdtg"
eqf k±¿gu"f g"kpwf c±¿gu"vgo r qrª tkqu"*ECUVTQ=¨O CTVKP G\ "ECUVTQ=¨UQW\ C."4235+0'

S wcpf q"ge»vqpqu." r qf"guvctgo "gpvtg"f cuª tgcu"f g"tcpuk±¯q."q"gequuuvgo c"vgttguvtg"g"q"
cs w³vkeq." g" kphnwgpekcf cu" r qt"co dcu." ´o " c" hwp±¯q"f g"tgi wct" cu"vtqecu"f g"gpgti kc"g"
pwtkgpvgu"f g"wo "gequuuvgo c"eqo "q"qwvtq"*ECXCNECP VK¨NQEMCD[."4228=¨EQNNKP U"
gv"cn0"4232+0'

Eqo "xgi gvc±¯q"hqtguvcn'cq"nqpi q"f qu"eqtr qu"f ⁰i wc."c"o cvc"ekrkct"cr tgugpvc"xctkc±¯q"
go "vgto qu"f g"guvwwwtc."eqo r quk±¯q"hqt¶ukca g"f kuvtkdwk±¯q"gur cekcn'f cu"gur²ekgu."ug"
ectcevgtk| cpf q"eqo q"wo "o quckeq"f g"eqf k±¿gu"geqn›i kecu"f kuvkpvcu."s wg"ug"f khgtgpeko ."
r ctvkewnto gpvg."r gncu"ectcevgt¶uvkeca'hkukqn½o kecu."hqt¶uvkecu"g"guvwwwtcku"*TQF TK WGU."
4229+0'

C"f gur gkq"f g"gzkuvkt"wo c"kphnkpkf cf g"f g"vgto qu"tgncekqpcf qu"«"o cvc"ekrkct."s wcpf q"ug"
tcvc"f g"tguvcwtc±¯q"hqtguvcn"q"vgto q"o cvc"ekrkct"go "ukf q"co r nto gpvg"wvknk| cf q"r ctc"
ectcevgtk| ct."f g"hqto c"o cetq."qu"xctkcf qu"vkr qu"f g"hqto c±¿gu"hqtguvcku"s wg"qeqttgo "«u"
o cti gpu"f qu"ewtuqu"f ⁰i wc."o guo q"s wcpf q"qb"tgi ko g"f khgtgpekcf q"f g"gngxc±¯q"f q"tkq"qw"
f q"ngp±qn'htg⁰keq."g"qw'f q"vkr q"f g"xgi gvc±¯q"f g"kpvgtnÀxkq"*O CTVKP U."4236+0'

Go "vgto qu"geqn›i kequ"g"f gxkf q"«"gzvgpu¯q"cq"nqpi q"f g"ewtuqu"f g"⁰i wc."cu"xgi gvc±¿gu"
ekrkctgu"´o "ug"o quvtcf q"ghkekgpvgu"eqttgf qtgu"geqn›i kequ."f g"xkvcn'ko r qtv¿pekc"r ctc"q"
o qxko gpvq"f c"hcwpc"cq"nqpi q"f ⁰i wc"g"r ckuci go ."cn'o "f g"r cr gn'r tgr qpf gtcpvg"pc"f kur gt¯q"f cu"
gur²ekgu" xgi gvcku" *NKO C" g" \ CMK." 4223+" wo c" gpvg" f c" eqpgevkxkf cf g" f c" r ckuci go "
*O CTKP J Q¨HKNJ Q=¨I CUVCN."4222+."o cpwgp±¯q"f qu"j cdkvcvu"cs w³vkequ"*DCTTGNC"gv"
cn0"4222+"g"f c"s wcnkf cf g"f c"⁰i wc"*NKO C¨\ CMK."4226=¨NKO C."4232+0'

Eqphqto g"tgncvq"f g"Mtwr gn'g"Hgnumk"*4228+"c"xgi gvc±¯q"ekrkct"f gugo r gpj c"wo "r cr gn'f g"
o cpwgp±¯q"f c"dkqf kxgtukf cf g"vgttguvtg"g"f g"gur²ekgu"cs w³vkecu0'Qu"cwvqtgu"cngtco "s wg"c"
f guvwwk±¯q"f c"o cvc"ekrkct"o qf khkec"q"¶pf keg"f g"nwo kpqukf cf g"kpekf gpvg."c"ectcevgt¶uvkec"

sw¶o kec"g"c"vgo r gtcwvtc"f c"ª i wc."chgvcpfq"f ktgvco gpvg"cu"f khgtgpvgu"gur²ekgu"cs wª kecu"f q"
co dkgpvg0'

Cu"o cvcu"ekrkctgu"r qf go "ugt"ectcevgtk| cf cu"eqo q"hkrwtqu."f gxkf q"«"uwc"ecr cekf cf g"f g"
tgvgt"r qnwgpvgu."swg"ugtkco "ecttgcf qu"r ctc"qu"ewtuqu"f øª i wc."o cpvgpf q"c"s wcnkf cf g"f c"
ª i wc=' gzgtegpf q"q" r cr gn' f g" eqttgf qtgu" geqn»i kequ." hcekrkcpf q" q" hnwzq" i´pkeq" g" q"
f gunqeco gpvq"f c"hcwpc."cn²o "f g"r tqvgi gt"q"uqnq"eqpvtc"r tqeguuqu"gtqukxqu"*O GF T Kgv"cn0"
4233=′O CT VKP U."4236+0'

Rctc"Uqw| c"et al0*4232+'co dkgpvgu"eqo "f khgtgpvgu"guª i kqu"f g"uweguu"q"qw"go "r tqeuuq"
f g"tgewr gtc±² q"hnqtguvcn'r qf go "vgt"o ckqt"pÀo gtq"f g"r tgucu"f gxkf q"cq"gngxcf q"pÀo gtq"f g"
gur²ekgu"xgi gvcku."cwo gpvcpf q"f guuc"hqtm c"c"f kxgtukf cf g"f g"xgur cu"uqekcku0'Chkro c±² q"
eqttqdqtcf c"r qt" Ucpvqu et al." *422; c+."swg"tgncekqpctco "c" tkswg| c."cdwpf¬pekc"g"c"
f kxgtukf cf g"f g"xgur cu"uqekcku"«"eqo r ngzkf cf g"guvtwwvtcn'f q"co dkgpvg"g"f g"tgewtuqu"
crko gpv¶ekqu0'

C"grko kpc±² q"f cu"o cvcu"ekrkctgu."cuuqekcf c"«"htci o gpvc±² q"f cu"hnqtguvcu."v´o "ecwucf q"
wo "cwo gpvq"ukipkhkecvkxq"f qu"r tqeguuqu"f g"gtquq"f qu"uqnqu."eqo "r tgjw¶| q"«"j kf tqnri kc"
tgi kqpcn"«"dkqf kxgtukf cf g"g"«u"eqpf k¿gu"gf chqrko ª kecu"f g"ª tgcu"uwdo gvkf cu"c"guucu"
c±¿gu"cpvt»r kecu0'C"grko kpc±² q"f c"o cvc"ekrkct"go "hwp±² q"f g"cvkxkf cf gu"ecwucf cu"r gnq"
j qo go ."f khkewnc"c"ko r ngo gpvc±² q"f g"guvtc²i kcu"f g"eqpugtxc±² q"f qu"tgewtuqu"j ¶f tkequ."
wo c" xg| " swg"r ctc" cuugi wtct" c"o cpwvgp±² q"f g"swcnkf cf g"f q" ecquukuvgo c"cs wª vkeq"²"
guugpekcn'c'r tgqewr c±² q"eqo "q'geckuukvgo c"tkr ª tkq"*P WP GU=′RKP VQ."4234+0'

F gf g"c"f ²ecf c"f g"ekps wgpvc."hckzcu"f g"xgi gvc±² q"pcvkxc"cq"nqpi q"f g"ewtuqu"f g"ª i wc"
v´o " ukf q" wvkrk| cf cu"r ctc" o kkik ct" qu" ghgkvqu"f c" cvkxkf cf g" hnqtguvcn0' Gpvtgvcpvq." c" dcug"
ekgpv¶hkec"r ctc" f gkzct" f gvgto kpcf c" nci wtc" ug" qtki kpqw' f g" qdugtxc¿gu" pcu" hnqtguvcu"
vgo r gtcf cu'equvgktcu'f q'qguvg'f c'Co ²tkec'f q'Pqtvg'*RKJCT F UQP=′CKO CP=′DKUUQP ."
4234+0'

P qu"cpqu"f g"3; 72"g"3; 82"hqk"kpkekcf c"c"etkc±² q"f g"pqto cu"r ctc"cu"o cvcu"ekrkctgu"go "
f geqtr´pekc"f g"cpqu"cq"j cdkvcv'f qu"r gkzgu"g"co d²o "«"swcnkf cf g"f c"ª i wc."hcvqu"swg"
ngxctco "c"ug"eqpukf gtct"c"r tqvg±² q"f qu"e»ttgi qu"g"ncj qu"eqo q"cuuwpvq"co dkgpvcn0'P guug"
r gr¶qf q"q"wuq"f g"hckzcu"f g"r tqvg±² q"f g"o cvc"ekrkct."r ctc"r tqr qtekpct"wo dtc"g"o kpko k| ct"
r tqeguuqu" gtqukxqu." guvcxc" ugpf q" kpegpvkxcf q" pc" tgi k²q" qguvg" f c" Co ²tkec" f q" Pqtvg"
*DT QUQHUMG'gv'cn0'3; ; 9=′PCKO CP =′F GEJ CO RU=′O cENCKP ."4227+0'

Eqo "wo "p¶xgn'f g"ko r cevq'ci tguukxq'cq"co dkgpvg."cu'cvkxkf cf gu'hnqtguvcku'pc'f ²ecf c'f g'
3; 72"ug"vqtpctco "cnvq"f g"cvkxkuvcu"co dkgpvcku'swg"ugpvkco "c"pgeguukf cf g"f g"r tqvgi gt"c"
o cvc"ekrkct" *J KEMU" et al.." 3; ; 3+." g"cni wpu"guvwf qu"f go qpuvtctco "swg"f gkzct"o cvcu"

vcpi gpekcpf q''qu''ewtuqu''f g''ª i wc''cvkpi ktkc "qu''qdlgvkxqu''co dkgpvcku''*O GNNKª C¨J KP EJ ."
422; ¨'UGO NKVUEJ "gv'cn'0"422; +0'

F gxkf q''«''hqtvg''vgpf´pekc''f g''r tgugtxc±¯q''f cu''o cvcu''ekrkctgu''cq''tgf qt''f q''o wpf q.''c''hckzc''
eqo "52''o gvtqu''f g''ncti wtc''pcu''o cti gpu''f qu''ewtuqu''f g''ª i wc''vqtpqw/ug''eqo wo gpvg''cf qvcf c''
cpvgu''f g''s wcnswgt''gxkf ´pekc''f g''s wg''guuc''o gvtci go "ugtkc''uwhkekgpvg''r ctc''cnecp±ct''qu''
qdlgvkxqu''co dkgpvcku''r tgvgpf kf qu''*T KEJ CTF UQP ¨'P CKO CP ¨'DKUUQP ."4234+0'Vco d²o "
hqk''cf qvcf c''go "ª tgcu''f g''hqtguvcu''r ncpvcf cu''eqo "ugr ²ekgu''f g''ª rvqtgu''p¯q''pcvkxcu0'P q'
gpvcpvq.''wo c''rci wtc''ghkec|'f g''xgi gvc±¯q''f gr gpf g''f qu''qdlgvkxqu''g''f cu''ckuci gpu''nqecku''
*T KEJ CTF UQP ¨'P CKO CP ¨'DKUUQP ."4234+0'

P guvc''r gtur gevkxc.''q''c»f ki q''hqtguvcn'dtcuknigktq''*Ngk'340873."f g''47 12 714234+'guvcdgngeg''
hckzcu''f g''xgi gvc±¯q''s wg''f gxgo "ugt''r tqvgi kf cu''cq''tgf qt''f qu''eqr qu''f ª i wc''g''pcuegpvgu."c''
v¶wuq''f g''r tgugtxc±¯q''r gto cpgpvg "*CRR+." *UCP VQU¨ USR CTQXGM."4233+0' Rctc "Hkkrr g "
*4228+."c''f ghkpk±¯q''f g''wo c''rci wtc''r cf r¯q''f g''r tgugtxc±¯q''ugo "cpªrkug''g''eqo r tqxc±¯q"
ekpv¶hkec''f g''uwc''ghkeª pekc''geqn»i kec.''cn²o "f g''f gueqpukf gtct''ectcevgt¶uvkecu''gur ge¶hkecu''f c''
o ketqdcekc.''eqo q''hkukqpqo kc''f c''xgi gvc±¯q."p¶xgn''f g''f gi tcf c±¯q''f c''ª tgc.''ectcevgt¶uvkec''f g''
uqnq.''f genkxkf cf g''g''eqo r tko gpvq''f c''xgtvgpvg.''r qf g''eqo r tqo gvgt''c''hwp±¯q''geqn»i kec''f c''
o cvc''ekrkct''c''o ²f kq''g'nqpi q'r tc|q0'

O guo q''eqo "guug''cr ctcvq''ngi cn'g''tgeqpj gekf c''ko r qtv¸pekc''eqn»i kec."cu''hqtguvcu''
ekrkctgu''uqhtgtco "g''x¯o "uqhtgpf q''ko r cevq''co dkgpvcn'o wkvq''go "f geqtt´pekc''f g''wo c''
j kuv»tkec''qewr c±¯q''cpv»r kec.''«u''o cti gpu''f qu''ewtuqu''f ¢ i wc''s wg''guvgxg''cuuqekcf c''
r tkpekr cno gpvg''«u''f go cpf cu''o cf gktgktcu.''f g''ci kewnwtc''g''r ecw²tkc''*RGT GKT C''et al.."
4234+0'Ncegtf c''g''Hkiwgktgf q''*422; +'chkto co " f c''pgeguukf cf g''f g''ug'r tgugtxctgo "qw'
tguvcwtctgo "cu''o cvcu''ekrkctgu0'Cngrvco "s wg''c''kpvgpukf cf g''g''c''gzvgpu¯q''f q''r tqeguuq''f g''
gzr nqtc±¯q''pguuc''ª tgcu''ekrkctgu''vtqpco "wti gpvg''c''ko r ncpvc±¯q''f cu''c¿gu''f g''tgewr gtc±¯q''g''
o cpwgp±¯q''f cu''xgi gvc±¯q''lwpvq''cqu''tgewtuqu''j ¶f tkequ.''r qt''o gkq''f c''cf q±¯q''f g''v²epkecu''
cr tqr tkcf cu''r ctc''tgxgi gvc±¯q''f guugu''co dkgpvgu0'

''

60 4 T GUVCWT CÑ¥ i Q''HNQT GUVCN''

Cq''nqpi q''f g''x¨ tkqu''ekenqu''f g''gzr nqtc±¯q''f c''xgi gvc±¯q."u¯q''eqpj gekf cu''kpkekcvkxcu''f g''
tguvcwtc±¯q''co dkgpvcn'tgcnk|cf cu'h ª "egpvgpcu''f g''cpqu0'P q''u²ewq''ZKX.''go "eqpugs w¨ pekc''f q''
f guo cvco gpvq''f c''xgi gvc±¯q''f c''hqtguvc''Cvn¸pvkec.''q''T kq''f g''Lcpgktq''uqhtgw''eqo "c''hcnc''f g''
ª i wc''r ctc''q''cdcuvgeko gpvq''f c''eqo wpkf cf g''nqecn0'Q'gpv¯q''Ko r gtcf qt''f q''Dtcukn''qtf gpqw's wg''
hquug''tgcnk|cf c''c''tguvcwtc±¯q''f g''cri wpu''co dkgpvgu''f gi tcf cf qu."cvtcx²u''f q''r ncpvkq''f g''

ugo gpvgu" f g" gur²ckgu" pcvkxcu" g" gz»tkecu." gpvtg" 3: 84" g" 3: ; 40' Guugu" pqecku" j qlg" u¯q" eqpj gkf cu"eqo q"q"Rcts wg"P cekqpcn'f c"Vklwc"g"q"Lctf ko "Dqv¬pkeq"*TQF T K WGU"gv'cn0" 422; ="F GCP ."'3; ; 7="EQTNGVV."'3; ; +0'

Eqo "q"cwo gpvq"f q"ko r cevq"uqdtg"qu"gequukuvgo cu"pcvwtcku"r gnq"Dtcukn"uwuekqw"c" pgeguukf cf g"f g"ug"etkctgo "cnvgtpcvkxcu"ekgpv¶kecu"g"v²epkecu"ecr c| gu"f g"f ktgekqpct"cu" cvkxkf cf gu"f g"tgewr gtc±¯q"f g"uuc"¬tgcu0' Uwti ktco "guwuf qu"uqdtg"f cpf q"gur c±q"c"wo " etguegpvg"eqplwpvq"f g"r gus wkucu"g"r tqlgvqu."qeqttgpf q"wo "o qxko gpvq"f g"vtcpuk¯q"f g" r tqlgvqu" ugngvqu" r ctc" c" ko r ngo gpvc±¯q" f g" r ncpq" f g" c±¯q" c" nqpi q" r tc| q." f cpf q" c" r quukdknkf cf g"ghgvkxc"f g"eqo r ctc±¯q"f g"tguwncf qu"ekgpv¶kequ."dgo "eqo q"c"eqttg±¯q"f g" vgqtkc"g"c"r tqr quk±¯q"f g"pqxcu"cdqtf ci gpu"v²epkeq ekgpv¶kecu"*TQF T K WGU"gv'cn0"4229+0'

Tqf tki wgu" *4226+" o gpekqpc" s wg" vgo " ug" kpvgpukhkecf c" c" tgcnk| c±¯q" f g" guwf qu" tgncekqpcf qu"«"tguvcwtc±¯q"f g"co dkgpvgu"f gi tcf cf qu."i gtcpf q"eqpj eko gpvqu"uki pkhecvkxqu" uqdtg" c" f kp¬o kec" f g" hqto c±»gu" pcvwtcku0' Guugu" guwf qu" √o " o qf khkecf q" c" nkpj c" f g" r gpuco gpvq"f qu"r tqi tco cu"f g"tguvcwtc±q."f gkxcpf q"f g"ug"dwuect"uqo gpvg"c"tgkpvtqf w±¯q" f g"gur²ckgu"ctd»tgcu"pwo c"f cf c"ªtgc."r ctc"cuuko kt"c"eqo r ngzc"tgeqpuvtw±¯q"f qu"r tqeguuqu" geqn»i kequ"g."r qtvcpvq."f cu"kpvgtc±¿gu"f c"eqo wpkf cf g0"

P guuc"r gtur ecvkxc"f g"ug"tgewr gtct"c"uwuvgpvcdknkf cf g"f q"gequukuvgo c"hnqtguvcn"cu"c±¿gu" f g"tguvcwtc±¯q"ug"vqtpctco "o cku"eqo r ngzcu."r tkqtk| cpf q"c"eqo dkpc±¯q"f g"x²tkcu"gur²ckgu"g" hqto cu" f g" xkf c." cno glcpf q" q" tguvcdgngeko gpvq" f qu" r tqeguuqu" geqn»i kequ" *dcpeq" f g" r n pwncu."dcpeq"g"ej wxc"f g"ugo gpvgu."qwvcu"hqto cu"f g"xkf c."j gtdkxqtkc."c[hcki go "f g" pwtkgpvgu+"eqpf w| qtgu"f c"tgewr gtc±¯q"f c"f kp¬o kec"hnqtguvcn"dcugcf qu"pq"f gugpecf go gpvq" qw'pc"cegngtc±¯q"f q"r tqeguuq"f g"uweguu¯q"geqn»i kec"*O CTVKP U."4235+0'

Guwf qu"pguuc"nkpj c"f g"eqpj eko gpvq"f gxgo "vgt"eqo q"o gvc."ug"cxcnkctgo "qu"o ²vqf qu" f g"tguvcwtc±¯q"cf qvcf qu"pc"tgewr gtc±¯q"f g"co dkgpvgu"f gi tcf cf cu."r qku"c"eqngvc"g"cp²nkug" f qu"f cf qu"i gtcf qu"tgs wgtgo "wo "nqpi q"r tc| q"f g"kpxguvki c±¯q."r gt¶qf q"guug"peguu²tkq"r ctc" gxqnw±¯q" f cu" gur²ckgu" r ncpvcf cu." qw" ugc." f gugpxqnxko gpvq" xgi gvcvkxq" pcvwtcn' f c" tguvcwtc±¯q"co dkgpvcn0'Tguwncf qu"f g"kpxguvki c±¿gu"√o "gxkf gpekcf q"o qf gnqu"ghekgpvgu." r tqr qtekqpcpf q"c"ugng±¯q"f qu"o gnj qtgu"o ²vqf qu"eqo "dcug"go "gzr gtko gpvc±¯q"f g"eco r q" *GP I GN'("RCTTQVC."4225+0'

P c"ugng±¯q"f g"v²ckgu"ghekgpvgu."q"r ncpglco gpvq"guvtcv²i keq"r ctc"tgewr gtc±¯q"qw" eqpf w±¯q"f c"tgi gpgtc±¯q"pcvwtcn'f gxg"ugt"gus wo cv| cf q'r ctc"ecf c"gequukuvgo c"gur ge¶hkeq." r qku"qu"eqpj eko gpvqu"f q"r tqegf ko gpvqu"f g"tgi gpgtc±¯q"g"f qu"ugwu"r ct—o gvtqu"ko kcpvgu" r gto kvgo "s wg"cu"cku"guvtcv²i kcu"uglco "o gnj qt"vtcdcnj cf cu"*J CTFY K EM"gv'cn0"3; ; 9+0'

C"tgewr gtc±⁻q"vqtpnc/ug"wo c"ª tgc"f q"eqpj geko gpvq"c"ugt"f gudtcxcf c."pc"r gtur gevkxc"f g" s wg"tgwcwtct"wo "geqwukwvgo c"p⁻q"² "enqpct"hkf gf ki pco gpvg"uwcu"ectcevt¶uvkecu"qtki kpcku." o cu" uko " f gkzª/nq" go " wo " gut³i kq" cwwquuwvgpt³ xgn0' F gxg" gzkwnkt" c" r gtur gevkxc" f g" tgwcdgngeko gpvq"f c"kpvgi tkf cf g"dkqn·i kec"f q"geqwukwvgo c."dwucpf q"wo "p¶kgn'cegkiª xgn'f g" dkqf kxgtukf cf g" g" f g" xctcdknkf cf g" pc" guttwwwtc" g" pq" hwpekqpco gpvq" f qu" r tqeguuqu" geqn›i kequ."r tqr qtekqpcf q"p⁻q"u›"eqo "xcnqtgu"geqn›i kequ."eqo q"vco d²o "geqnⁿo kequ"g" uqekcku"*MCI G[CO C"gv'cn0"4225+0"

F guuc"hqto c"c"c tgewr gtc±⁻q"hnqtguvcn'cdtg" gur c±q" r ctc" q" uwti ko gpvq"f c"uweguu⁻q" geqn›i kec" swg" f gugo r gpjc" r cr gn" hwpf co gpvcn' pc" ctkc±⁻q" f g" eqo wpkf cf gu" pcwtcku" cwwquuwvgpt³ xgku." o cpvkf c" r qt" r tqeguuqu" geqn›i kequ" gswkrkdtcf qtgu" f q" ukuwgo c." cr tqxgkcpf q"c"tgukn⁴pekc"cao dkgpvcn'r ctc"xkcdknk| ct"cu"eqpf k¿gu'r ctc"c"cm r nkc±⁻q"f g"wo c" dkqf kxgtukf cf g"gngxcf c"*VQO C\ Kgv'cn0"4232+0'

"
4.5 O QF GNQ'F G'TGEWRGTC¥ï Q'HNQTGUVCN"

Q" r ncpglco gpvq" g" f gugpjq" f g" r tqlgvqu" f g" tgewr gtc±⁻q" hnqtguvcn' f g" co dkgpvgu" f gi tcf cf qu."tgs wgt"q'r gpuco gpvq"o cetq"pq"swg"eqpegtpg"cq"geqwukwvgo c"c"ugt"tgewr gtcf q." uwc"guttwwwtc"cwwcn"pgeguukf cf g"f g"tggwtwwwtc±⁻q"Hⁿukec"g"eqpj geko gpvq"f c"uweguu⁻q." xkucpf q"cegngtct"c"tgeqo r qukᶜq"pcwwtcn'f c"ªtgc0'Q"hqeq"r tkpekrcn'f c"tgwcwtc±⁻q"ugo r tg" ugtª "f g"tgewr gtct"c"hnqtguvc"q"o cku"r r»zko q"r quuⁿxgn'f q"qtki kpcn"qdlgvkxq"guug"swg"ugtª " cwkpi kf q" r qt" o gkq" f q" eqpj geko gpvq" f qu" xª tkqu" eqo r ctko gpvqu" g" uwcu" kpvgt" g" kpvtcttgnc±¿gu."kuq"²."eqo r tggpf gt"qu"r tqeguuqu"uweguukqpcku."r ctc"tc±ct"guttcᶜi kcu'f g" tgewr gtc±⁻q" ghkec| gu" s wg." tgcm gpvg." cegngtgo " c" tgcdknkc±⁻q" f g" ªtgcu" f gi tcf cf cu" *CNO GKF C."4238+0'

Rctc"o gnj qt"f gugpxqnxko gpvq"g"eqpf w±⁻q"f c"tgewr gtc±⁻q"hnqtguvcn"qu"o qf gnqu"u⁻q" f kxkf kf qu"go " uko r ngu" g" eqo r ngzqu0' Q" r tko gktq." eqo " dckzc" f kxgtukf cf g" hqt¶uvkec." pqto cm gpvg"² "ghkekgpvg"pc"r tqvg±⁻q"kpkekcn'f q"uqnq"eqpvtc"gtqu⁻q0'Gpvtgvcpvq."cr tgugpvc" r tqdngo cu"pq"swg"vcpi g"c"uwuvgpvcdknkf cf g"f q"geqwukwvgo c."r tgekucpf q."o wkvcu"xg| gu."f g" tqvkpgktcu"kpvgtxgp±¿gu."q"swg"cecdc"tguwncpf q"pq"cwo gpvq"f cu'f gur gucu"c"nqpi q"r tcz q0'Lª " pq"ugi wpf q."ug"r tqewtc"ko kct"c"pcwwtg| c."qw"uglc."q"eqpj geko gpvq"f q"cttcplq"guttwwwtcn'f q" geqwukwvgo c"cwzknkc"q"tgwcdgngeko gpvq"f cu"hwp±¿gu"geqn›i kecu'f cu'o cvcu'ekkctgu."r qt"o gkq" f c"gngxcf c"f kxgtukf cf g"f g"gur ²ekgu"g"f khgtgpvgu"i twr qu"uweguukqpcku0'S wcpf q"ug"vcvc'f g" co dkgpvgu"o cku"j gvgtqi ´pgqu."qpf g"qu"r tqeguuqu"geqn›i kequ'f c"hnqtguvc"u⁻q"guvcdgngekf qu."

j ª "wo c"vgpf´pekc"o gpqt"f g"kpvgtxgp±¯q"pc"ª tgc."cr tqzko cpf q/ug"f q"cwquuwvgpvcdknkf cf g" *O CTVKP U≟MWN\ ."4229+0"

C"hqto c"g"f ugspj q"f q"o qf grq"f g"tgewr gtc±¯q"f g"ª tgcu"f gi tcf cf cu"f gxg"eqpvgo r nct"g" ug"cf gs wct"c"ecf cf"ukwc±¯q"f g"f gi tcf c±¯q"r tgugpvg"pc"ª tgc0'Eqo "dcug"pq"f kci n»uvkeq"f q" o gkq"hµukeq."dk»vkeq."r tgugp±c"f g"tgi gpgtc±¯q"pcwtcn"o cvtk|"r tgf qo kpcpvg."pcwtg|c"f c" r ckuci go "g"hcvqtgu"nko kcpvgu."cn²o "f g"kphqto c±¿gu"uqdtg"uweguu¯q"pcwtcn'f q"gequukuvgo c" c"ug"tgustcwtcf q."² "f ghkpkf q"o grj qt"o ² vqf q"qw"eqo dkpc±¯q"f g"o ² vqf qu"gur ge¶hkequ"r ctc" ecf c"ukwc±¯q0'Go "vgug."swcpvq"o cku"f gi tcf cf c"ug"cr tgugpvc"wo c"ª tgc."o ckqr"f gpukf cf g"f g" gur ² ekgu"r kqpgktcu"f gxg"ugt"wknk|cf c."ngxcpf q/ug" go "eqpukf gtc±¯q"cu"gur gek"nkf cf gu"g" r ncuvekf cf gu"f guucu"gur ² ekgu"go "f gvgto kpcf qu"co dkgpvgu"*CNO GKF C."4238+0'

Rctc" Hgttgwk" *4224+." c" guecqrj c" f q" o qf grq" f g" tgecwtc±¯q." gur ge¶hkeq" r ctc" wo " f gvgto kpcf q"co dkgpvg"f gi tcf cf q."² "pqtvcf c"r qt"hcvqtgu"eqo q"q"i tcw"f g"f gi tcf c±¯q"g" j kuu»tkeq" f c" r gtvwtdc±¯q" f c" ª tgc." c" f kur qpkdknkf cf g" f g" dcpeq" f g" ugo gpvgu" g" o wf cu." eqpf k±¿gu" gf chqemq ª vecu." o ² s wkpcu" g" ko r ngo gpvqu" ci t¶eqncu." g" tgewtuqu" hkpcpegktqu" f kur qp¶xgku0'

F gpvtg"qu"o qf grqu"f g"tgewr gtc±¯q"hqtguvcn"c"kpf w±¯q"f c"tgi gpgtc±¯q"pcwtcn'² "wo " o ² vqf q"uko r ngu"f g"tgewr gtct"ª tgcu."qw'uglc."r quuwk"dckzq"ewuvq."i ctcpvkc"f c"r tgugtxc±¯q"f q" dcpeq"i gp²vkeq"g"wo c"f kxgtukf cf g"f g"gur ² ekgu"pq"co dkgpvg"c"ugt"tgustcwtcf q0'Guuc"v²epkec" vgo "eqo q"r tkpe¶r kq"q"uqnqo gpvq"f c"ª tgc"g"tgvktcf c"f q"hcvqt"f gi tcf cpvg."f gkzcpf q"s wg"gnc" ug"tgewr gtg"r gnc"f kn¯o kec"pcwtcn'f c"xgi gvc±¯q"*NKTC."4233+0'Pq"gpvcpvq." suug"v²epkec" f gxg"ugt"wknk|cf c"uqo gpvg"swcpf q"j ª "wo "dcpeq"f g"ugo gpvgu"qw'r n›pwncu"f g"gur ² ekgu" r kqpgktcu"g"ª tgcu"eqo "xgi gvc±¯q"pcwtcn'r r»zko cu" «"ª tgc"f g"kpvgtguug"f g"tgewr gtc±¯q" *MCI G[COC≟I CPF CTC."4222+0'Go "vgug."hcekrkxc"c"tgi gpgtc±¯q"pcwtcn'r tkqtk| cpf q"q" cr ctgeko gpvq"f cu"gur ² ekgu"pcvkxcu"g"r tqo qxgpf q"c"tgewr gtc±¯q"f q"co dkgpvg"f gi tcf cf q" *CVVCP CUKQ."422:+0'

Lª "pq"o qf grq"uweguukqpcn'j ª "wo c"hqto c"eqo r ngzc"f g"tgewr gtc±¯q."eqo "r ncpvkq"go " rkpj cu"g"cnc"f kxgtukf cf g"f g"gur ² ekgu"hqtguvcku."dwuecpf q/ug"wo c"uko knctkf cf g"hqr"úuvkc" ki wcn'«"wo c"hqtguvc"ekkrct"pcvkxc0'Guuc"o ckqr"f kxgtukf cf g"r tqr qtekqpc"o grj qt"ecr cekf cf g" f g"cwqttgi wnc±¯q"eqpvtc"r quu¶kgku"r gtvwtdc±¿gu."ghkekgpvg"ekenci go "f g"pwtkgpvgu."o ckqr" cvtcvkxkf cf g"«"hcwpc."r tqvg±¯q"f q"uqnq"eqpvtc"r tqeguuqu"gtqukxqu"g"tgukv´pekc"«"r tci cu"g" f qgp±cu"*O CTVKP U."4229+0'Guug"o qf grq"'go "uwc"r nkec±¯q"eqttqu wgktc"go "co dkgpvgu"eqo " gu³i kq"cxcp±cf q"f g"f gi tcf c±¯q"g"go "ª tgc"eqo "wo "j kuu»tkeq"f g"r gtvwtdc±¯q"qecukqpcf c" r qt"cvkxkf cf gu"f g"gzr nqtc±¯q"ci t¶eqnc0'Guugu"co dkgpvgu"uqhtgo "r gnc"cwu´pekc"f g"dcpeq"f g" ugo gpvgu"glqw'f g"r n›pwncu"f g"gur ² ekgu"pcvkxcu."cnkcf q."go "o wkvqu"ecuqu."cq"gngxcf q"i tcw'

fg"htcio gpvc±¯q"fc"rckuci go ."eqortqo gvgpfq"q"rqvgpekcn'fg"cwqttgewrgtc±¯q"fc"ª tgc."
pgeguukcpfq."rctc"ugw'tgucdgngeko gpvq"geqn»igq."fg"o qfg›qu"eqorngzqu"fg"tgewrgtc±¯q"
hqtguvcn'*CVVCPCUKQ."422: +0'

"

606 KPFKECFQTGU'GEQN˜ IKEQU"

Fgrqku" fc" fghkpk±¯q" fq" rtqlgvq" fg" tgewrgtc±¯q" hqtguvcn" ² " tgcn| cfq" wo " rncpglco gpvq"
o kpwekquq" g" ukuvgo ª vkeq." g" rquvgtkqt" o qpkqtco gpvq" fcu" gvcrcu" fg" fgugpxqnxko gpvq" fc" pqxc"
eqdgtwtc"xgi gvcn0'C"o gvqfqnqi kc"fg"o qpkqtco gpvq"rqfg"ugt"tgcn| cfc"rqt"eqorctc±¯q"fktgvc"eqo "
qwtcu"ª tgcu"p¯q"rgtwtdcfcu."cp²ukug"fg"cvtkdwvqu"fc"ª tgc"go "tgewrgtc±¯q"qw"cp²ikug"fc"vtclgv»tkc."
o gfkcpvg"wo "gequukuvgo c"fg"tghgt´pekc"*UGT."4226+0"

Rctc"O kvej gm"*4229+."kpfkecfqt"² "wo c"hgttco gpvc"s wg"rquukdknkc"q"fkci p»uvkeq."eqngvc"
fg"fcfqu"g"kphqto c±¿gu"uqdtg"wo "co dkgpvg"tgcn'g"go "rqt"ectcevgt¶uvkec"egpvtcn'c"u¶pvgug"fg"
kphqto c±¿gu"eqorngzcu"tgvgpfq"ctgpcu"q"uki pkhkecfq"guugpekcn'fqu"cur gevqu"cpcnkucfqu0"

Rctc"cpvq."fgpvtq"fq"eqpvgzvq"fc"tguvcwtc±¯q"geqn»ikec."q"kpfkecfqt"rqfg"ugt"s wcnkwgt"
xctiª xgn'wucfc"rctc"i ctcio ct"kphqto c±¿gu"cegtec"fc"eqpfk±¯q"cwcn'fg"fgvgto kpcfq"etk²tkq"
s wg"ug"o qpkqtc"fgpvtq"fq"rtqlgvq"fg"tgewrgtc±¯q"*TQFTKI WGU"gv'cn0'4235+."s wg"rqfg"ugt"
fkxkfkfq"go "uqekcn'geqn»ikeq"qw"geqp½o keq."fgrgpfgpfq"fq"rct—o gvtq"s wg"ug"fguglc"
kpxguvki ct"g"cxcnkct'pq"rtqlgvq0'

Qu"kpfkecfqtgu"geqn»ikqu."rqt"uwc"xg| ."dwueco "cn²o "fc"tgewrgtc±¯q"o qthqn»ikec"fc"
rckuci go ."cwzknkct"c"tgeqpuvkwwk±¯q"fqu"rtqeguuqu"geqn»ikqu"s wg"cnio gpvc"c"fkp—o kca"fg"
uweguu¯q"xgi gvcn"tgchkto cpfq"c"uwc"rgtr gwc±¯q"g"hwpekqpcnkfcfg"rctc"eqpugtxc±¯q"fc"
dkqfkxgtukfcfg" nqecn' *TQFTKI WGU˭ ICPFQNHK" 4226˭ HQPUGEC." 4235+0' Wo "
gequukuvgo c"tguvcwtcfq"p¯q"guª"½ q"uqo gpvg"cuuqekcfq"«"uwc"guvwwwtc"hqtguvcn'glqw'wo "
p¼o gtq" fgvgto kpcfq" fg" gur ²ekgu"xgi gvcku." o cu"vco d²o " fgxgtª " vgt" ugwu"rtqeguuqu"
geqn»ikqu" g"o cpvgpfqtgu" fcu"rqr wnc±¿gu" g"fg"uwcu"kpvgtc±¿gu."tguvcwtcfqu0' P guvg"
ugpvkfq."wo c"tguvcwtc±¯q"dgo /uwegfkfc"vco d²o "fgxgtª "tgi cvct"c"fkur gtu¯q."c"uweguu¯q."c"
rqnkpk| c±¯q." q" hnwzq" i ´pkeq" g" c" ekelci go " fg" pwvtkgpvgu." fg" o qfq" c" xkcdknk| ct" uwc"
cwqo cpwvgp±¯q" *RCNO GT" et al.," 3; ; 9˭ UGT." 4226˭ DGPPGVV" gv' cn0" 422; ˭
UCPVØCPPC"et al.,"4233+0'

C"v²epkec"fg"tguvcwtc±¯q"hqtguvcn'fghkpg"c"o ² vqfq"g"vkr q"fg"kpfkecfqtgu"c"ugtgo "
wwkn| cfqu"rctc"o qpkqtco gpvq"g"cxcnkc±¯q"fg"wo "gequukuvgo c"go "tguvcwtc±¯q0'P guvg"
ugpvkfq."q"eqplwpvq"fg"kpfkecfqtgu"guv²"fktvco gpvg"tgncekqpcfq"«"v²epkec"gueqnj kfc"g"fq"
tguwnvcfq"gur gtcfq"fc'tguvcwtc±¯q"*O CPFGVVC."4228˭TQFTKI WGU"et al0"422; +0'

P c"gueqrj c"f guuges"kpf kecf qtgu"geqn»i kegus"f gxgm "ugt"eqpvgm r mf qs"qu"cvtkdwvqs"dª ukegus"f g"wo "gequukuvgo c."eqo q"eqo r qsk¯q."guvtwwtc"g"r tqeguuqs"geqn»i kegus."clwf cpf q"r ctc"wo "o qpkqtco gpvq"ghkekgpvg"*UGT."4226='TWK /LC¦ P "("CKF G."4227+0'Cn²o "f guuges."qwtqs"cvtkdwvqs"r qf go "ugt"ngxcf qs"go "eqpukf gtc±¯q"eqo q"r gtwtdc¿¸gs"cpt»rkecs"g"cvtkdwvqs"f c"r ckuci go 0'Ugngekqpct"qs"kpf kecf qtgu"eqo "dcug"pguugs"cvtkdwvqs"²"ko r qtvcpvg."r qku."r ctc"wo "gequukuvgo c"ugt"tguvcwtcf q"p¯q"f gxg"cr gpcu"vgt"uwc"guvtwwtc"hqtguvcn"g"wo c"s wcpvkf cf g"gur ge¶hkec"g"f gvgto kpcf c"f g"gur²ekgu"xgi gvcku"tgewr gtcf cs."o cs"vco d²o "f gxgtª "vgt"ugus"r tqeguuqs"geqn»i kegus"tgguvcdgngekf qs."qs"s wcku"f ghkpgo "cs"r qr wnc¿¸gs"g"uwcs"kpvtc±¿gs."tguvcdgngekf qs"*TKÍ WGKTC='O CTKCPQ/PGVQ."4235+0

Kpf kecf qtgu"co dkgpvcku"s¯q"xctkª xgku"tghgtgpvgs"c"f kxgtuqs"cur gevqs"f c"o qthqmi kc."hkukqmi kc."hqt¶uvkec."hgpqnqi kc."ectcevgt¶uvkecs"enkoª vkecs"g"gfª hkecs."gpvtg"qwtqs."s wg."tgi kuvtcf qs"r gtkqf keco gpvg"g"f gxkf co gpvg"qti cnk¿cf qs."hqtpgego "gxkf´pekcs"f c"gxqnw±¯q"f q"eqo r qtco gpvq"f q"gequukuvgo c"o cetq"g"f g"uwcs"kpvtc±¿gs."*RQI I KP K¦ UVCRG='I QPÂCNXGU."3;;+0

Dtcpecnkqp"*et al."*4237+'ci tw ctco "qs"kpf kecf qtgu"go "s wcnkvcvkxqs"g"s wcpvkvcvkxqs0'Qu"s wcnkvcvkxqs"s¯q"qdvkf qs"f g"hqto c"p¯q"o gpuwtª xgn"eqo "dcug"pc"qdugtxc±¯q"g"cxcnkc±¯q"f q"qdugtxcf qt."wkrk¿cf qs"pqto cm gpvg"f g"hqto c"cduvtcvc"g"uwdlgvkxc0'Ugi wpf q"qs"cwqtgu."cs"cxcnkc±¿gs"s wcnkvcvkxcs"f gxgo "ugi wkt"wo c"qtf gpc±¯q"j kgtª ts wkec."guvcdgngegpf q"wo c"ugs w´ pekc"n»i kec"g"wo c"qtf go "f g"ko r qtv¤pekc"gpvtg"qs"f khgtgpvgs"kpf kecf qtgu"ugngekqpcf qs"r ctc"cxcnkct"c"ª tgc0'Rqt"qwtq"ncf q."qs"kpf kecf qtgu"s wcpvkvcvkxqs"ug"xcngo "f c"o gpuwtc±¯q"f g"f gvgto kpcf qs"r ct¤o gvtqs"f guetkvqtgs"f c"ª tgc"go "r tqeguuq"f g"tguvcwtc±¯q."r gm "kpf q"o wkvcs"r quukdkmf cf gs"f g"kpvgtr tgvct"qs"tguwncf qs."eqo "r qwec"kpvgthgt´ pekc"f q"cxcnkcf qt"pqu"tguwncf qs."eqphgtkpf q"wo c"o ckqt"ugi wtcp±c"pq"r tqeguuq0

F gpvtq"f guugs"eqpvgzvq."jª "wo c"i co c"f g"kpf kecf qtgu"s wg"s¯q"wkrk¿cf qs"r ctc"cxcnkct"q"r tqeguuq"f g"tguvcwtc±¯q"go "wo "co dkgpvg0'F g"wo c"o cpgktc"i gtcn"qs"kpf kecf qtgu"o cku"wkrk¿cf qs"Vo "eqo "gphqs wg"c"guvtwwtc"f c"xgi gvc±¯q."eqo q"kpetgo gpvq"pc"cnwtc"g"pq"FCR "*fk¤o gvtq"«"cnwtc"f q"r gkvq+."pc"eqo r quk±¯q."cvtcx²u"f c"fkxgtukf cf g"f g"gur²ekgs"xgi gvcku"f c"ª tgc"go "tguvcwtc±¯q"*USQ WGKTC"4224='TGKU"gv"cn0"4225='O GNQ."4226='CNO GKF C"("UCPEJ ¦\ ."4227='TQF TKÍ WGU"gv"cn0"4229+0'Qwtqs"kpf kecf qtgu"Vo "ukf q"r tqr quvqs"r qt"f khgtgpvgs"r guswkucf qtgs."c"gzgo r mq"f q"o qpkqtco gpvq"cvtcx²u"f c"eqqtt´pekc"f g"gur²ekgs"cpko cku"*NQPI EQTG"4225='FCO CUEGPQ."4227='ECGU."422;+."f g"ectcevgt¶uvkecs"hf¦ukeq/sw¶o kec"f qs"uqmqs"*DGPVJ CO "gv"cn0"3;;4='TJ QCFGU."gv"cn0"3;;:."EJ CGT."422:+"f g"r tqeguuqs"geqn»i kegus."r qt"gzgo r mq"elenci go "f g"pwtkgpvgu."f geqo r quk±¿q"hqnkct+"*I KUNGT."4222+."cn²o "f g"cur gevqs"f c"r ckuci go ."r qt"gzgo r mq"eqpgevkxkf cf g"f cª tgc

tguvcwtcf c" eqo " qwtqu" htci o gpvqu." r gto gcdknkf cf g" f c" o cvtk| " ektewpf cpvg." hnwzq" f g" qti cpkuo qu+"*I GQTI G'("\ CEM."4223="UKS WGKTC."4224+0'

Fcf qu"uqdtg"c"eqo r quk±¯q." c" f kxgtukf cf g" e" c" guvtwwtc" f cu" gur²ekgu" ngpj qucu" swg" kpvgi tco "q" r qxqco gpvq." r qt "ugtgo "ko r qtvcpvgu"kpf kecf qtgu"f q" p¶xgn"f g" eqpugtxc±¯q" f g" wo c'hnqtguvc"g"f g"o df hhkec±¿gu'ecwucf cu'r gnc"o df cn±c"pq"wuq"f q"uqnq."u¯q"htgswgpvgo gpvg" wucf qu"eqo q"kpf kecf qtgu"f g"ª tgcu"go "r qeguuq"f g"tguvcwtc±¯q"*I TC[="C\ WO C."4227="O KNNGT="Y CTFTQR."4228="O QTCGU."ECO RGNNQ="HTCPEQ."4232+0"

C"tgi gpgtc±¯q"pcwtcn"ug"ectcevgtk| c"eqo q"q"guvqswg"f g"f kxgtukf cf c"xgi gvc±¯q"g" tgr tgugpvc" c" hwwtc" eqo r quk±¯q" hnqt¶uvkec" f c" ª tgc." ugpf q" gur qpuª xgn' r gnq" r tqeguuq" uweguukqpcn"pc"hnqtguvc"*UQW\ C."4236+."o qtxqu"r gnqu"swcku."c"tgi gpgtc±¯q"²"wo "f qu" kpf kecf qtgu"o cku" wtknk| cf qu" swcpf q" ug" cxcnkco " ª tgcu" go " tguvcwtc±¯q" *XGP VWTQNK= HGNHNKNK="HCI I ."4233="O CTVKP U."4236+0'Rqt "ugt "eqpukfgtcf c"wo "ko r qtvcpvg"o gecpkuo q" f g"cxcnkc±¯q"f c"tguvcwtc±¯q"hnqtguvcn"*O CI P CI Q" et al0"4234+."tgcn| ct"q"guvwf q"swcn"²g" swcpvkcvkxq"f c"tgi gpgtc±¯q"r gto kvg"qdugtxct"q"guvqswg"g"f kuvtkdwk±¯q"f cu"ecekc'f gnc"pc" eqo wpkf cf g"xgi gvcn"i gtcpf q"f cf cu"swg"r quukdknktco "kphgtkt"uqdtg"q"eqo r qtco gpvq"g" f gugpxqnxko gpvq"f q"gequukuvgo c"*I CTEKC"et al0"4233+."pc"r gtur ectxc"f g"cwzknkct"pc" vqo cf c"f g"f geku¿gu'uqdtg"q"r tqeguuq"f g"tguvcwtc±¯q0"

Qu'ugtxk±qu'g"hwp±¿gu"co dkgpvcku"tgcn| cf cu"r gnqu"gequukuvgo cu'hnqtguvcku"co d²o "v¶o "ukf q"wucf qu"eqo q"kpf kecf qtgu."go "r ctvkewnct"qu"tgncekqpcf qu"«"f kn¬o kec"f c"o cv²tkc" qti ¬pkec"f q"uqnq."cuuqekcf qu"«"ugttcr knj gktc"*O QTCGU="ECO RGNNQ="HTCP EQ."4232+0' P guug"eqpvgzvq." u¯q"cr nkecf qu"kpf kecf qtgu." cku"eqo q<"ej wxc" f g" ugo gpvgu. dcpeq" f g" ugo gpvgu"pq"uqnq"glqw"ugtcr knj gktc." r tqf w±¯q"f g"ugtcr knj gktc."ugtcr knj gktc"cewo wncf c."g" qwtqu0'Guugu'cr tgugpvco "c'xcpvci go "f g'f ctgo "dcuk 'tgur quvcu'uqdtg'q"co dkgpvg'g'ugtgo "f g" swcpvkhkec±¯q'tgncvkxco gpvg'hµ ekn'*O CTVKP U."4236+0"

Rctc "gxkkct "cxcnkc±¿gu"gswkxqecf cu"g"ewuquq"f gupgeguuª tkqu." ²"ko r qtvcpvg"swg"uglco " ugngekqpcf qu"g"wknk| cf qu"o "pÀo gtq"f g"kpf kecf qtgu"swg"uglco "ghkekgpvgu"g"r ctc"ecf c" ukwc±¯q" gur ge¶hkec." cn²o " f g" cvgpf gt" c" tgswkukqu" hwpf co gpvcku." eqo q" hcekkf cf g" f g" o gf k±¯q." enctg| c" g" o qf khkec±¯q" r quu¶xgn' cq" nqpi q" f q" r tqeguuq" *F WT KI CP ." 4233="DTCP ECNKQP ="I CP F QNHK="TQF TK WGU."4234+0"

¦ " ucdkf q" swg." q" uweguuq" f c" tguvcwtc±¯q" f gr gpf g" f c" eqo r ggpu¯q" uqdtg" q" hwpekqpco gpvq" f qu" gequukuvgo cu" g" f c" ecr cekf cf g" ug" wknk| ct" guug" eqpj geko gpvq" pq" f gugpxqnxko gpvq" f qu" r tqlgvqu." dgo " eqo q." f gr gpf g" f q" wuq" f gguu" kpf kecf qtgu" swg" r gto kgo "o qpkqtct"g"cxcnkct"q"r tqeguuq"f c"tguvcwtc±¯q."qu"swcku"u¯q"xkuqu"eqo q"wo "

tgewtuq" ecr c| " f g" uwdukf kct" o grj qtkcu" f qu" j cdkvcu" r ctc" r tgugtxc±‾q" f c" f kxgtukf cf g"

dkqn»i kec"*DCUVQU.'4232+0'

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6(7 KP F KECF QT 'H UKEQ'F Q'UQNQ"

Cu"ectcevgt¶uvkecu"h¶ukecu."s w¶o kecu"g"dkqn»i kecu"f qu"uqnqu"u‾q"guugpekcku"eqo r qpgpvgu"

f g"uwc"r tqf wvkxkf cf g.'xkuvq's wg"cu"r ncpvcu"pgeguukvco "f g"uqnqu"dgo "guvtwwwtcf qu."ugpf q"r qt"

kuuq"c"ugng±‾q"g"c"wvknk|c±‾q"cf gswcf c"f g"ecf c"vkr q"f g"uqnq"f g"i tcpf g"ko r qtv‾pekc"r ctc"c"

o cpwgp±‾q" f c" s wcnkf cf g" g" f c" r tqf wvkxkf cf g" f q" ukuvgo c" *O CTEJ ï O " gv" cn0" 4229ª"

RK P CVCTQ'P GVVQ"gv'cn0'422; ª'DQI P QNC"gv'cn0'4232+0"

S wcpf q" j ª " eqo r cevc±‾q" f qu" j qtk| qpvgu" f q" uqnq" c" cvkxkf cf g" dkqn»i kec" g" c"

o cetqr qtqukf cf g" u‾q" tgf w| kf cu" pq" r gthkn' f q" uqnq." cwo gpvcpf q" c" f gpukf cf g." q" s wg"

r tqr qtekqpc" o ckqt" tgukuv‛pekc" h¶ukec" «" gzr cpu‾q" tcf kewnct" *LKO GP G\ " gv" cn0" 422: +0'Cn‾o "

f kuuq." f ko kpwk"c" r gto gcdknkf cf g"g"c"f kur qpkdknkf cf g"f g"pwwtkgpvgu"g"ª i wc"*HTGF F K'gv'cn0"

4229+0'Q"ko r cevq"f qu"ukuvgo cu"f g"r tgr ctq"g"o cpglq"f qu"uqnqu"v‾o "ukf q"cxcnkcf qu"r qt"o gkq"

f g"o gf kf cu"f g"r tqr tkgf cf gu"h¶ukecu."eqo q"c"f gpukf cf g"g"c"r qtqukf cf g"f q"uqnq"*ECTP GKTQ"

gv'cn0'422; ª."c"tgukuv‛pekc"f q"uqnq"«"r gpgvtc±‾q"*VCXCTGU'HKNJ Q ª'TKDQP ."422: +"g"c"

f kuvtkdwk±‾q"f qu"ci tgi cf qu"go "encuugu"f g"vco cpj q"qu"uwc"guvcdknkf cf go "ª i wc"*ECUVTQ"

HKNJ Q"gv'cn0'3; ; : +0'

C"o cv²tkc"qti ‾pkec"f q"uqnq"kphnwgpekc"f ktgvc"g"kpf ktgvco gpvg"cu"ectcevgt¶uvkecu"f q"uqnq."

f g"o qf q's wg"c"tgf w±‾q"f q"ectdqpq"qti ‾pkeq"vqvcn'guv" tgncekqpcf c"«"f gi tcf c±‾q"h¶ukec"f qu"

uqnqu."g"ugw"kpetgo gpvq"cvtcx²u"f q"o cpglq"cf gswcf q"o qf khkec"c"ecr cekf cf g"f g"ecti c"f qu"

uqnqu."s wg"ug"vqtpco "o gpqu"xwpgtª xgku"«"eqo r cevc±‾q"*DNCP EQ/ECP Q WK'gv'cn0'422; ª."

XKCP C"gv'cn0'4233+0'F g"ceqtf q"eqo "Y gpf nkpi "gv'cn0'*4227+."c"o cv²tkc"qti ‾pkec"² "q"

r tkpekr cn'ci gpvg"f g"hqto c±‾q"g"guvcdknk|c±‾q"f qu"ci tgi cf qu."g"r qt"kuuq"c"cxcnkc±‾q"f q"

f i—o gvtq"f g"r ctv¶ewncu"² "ko r qtvcpvg"r ctc"ug"cxcnkct"q"o qf gnq"f g"ci tgi c±‾q."ugpf q"s wg"r ctc"

Ukz" gv'cn0' *4226+." qu" o ketqci tgi cf qu" u‾q" encuukhkecf qu" eqo q" o cku" guvª xgku" g" o gpqu"

uwuegv¶xgku'c'r tª vkecu'ci t¶eqncu'f go cpglq'f q's wg'qu'o cetqci tgi cf qu0'

C"guvtwwwtc"f q"uqnq"² "wo c"f cu"r tqr tkgf cf gu"o cku"ko r qtvcpvgu."qu'uglc."² "q"cttcplq"f cu"

r ctv¶ewncu'f q"uqnq"g"f q"gur c±q"r qtquq"gpvtg"gncu'kpenwkpf q'ckpf c"q"vco cpj q."c"hqto c"g"q"

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ugr ctª xgku"*HGTTGKTC."4232+0Qu'ci tgi cf qu'u‾q'eqo r qpgpvgu'f c'guvtwwwtc'f q'uqnq'ugpf q."

r qtvcpvq." f g" ko r qtv‾pekc" r ctc" c" o cpwgp±‾q" f c" r tqukf cf g" g" f c" cgtc±‾q." r ctc" q"

etgueko gpvq" fcu" r ncpvcu" g" fqu" o ketqrti cpkno qu." rctc" c" kphknrtc±⁻q" fg" ª i wc" g" rctc" c" guvcdkrkfcf g'pgeguuª tkc"«'rtgxgp±⁻q"fc'gtquⁿq"*QCFGU."3; : 6⁼FGZ VGT."3; : : +0'

Rctc"q"guvwfq"fc'ci tgi c±⁻q'fq"uqrq"v⁄o "ukfq"wkrk|cfqu'qu'o ²vqfqu'fq'r gpgktco gpvq" rqr'xkc"ugec'g'rqr'xkc"Àko kfc'*GODTRCRC."3; ; 9+'rctc'guvko ct"c"guvcdkrkfcf g'fg'ci cf qu." Gpvtgvcpvq." cn²o " fc" cxcrkc±⁻q" fc" guvcdkrkfcf g" fg" ci cf qu." q" eqpj geko gpvq" fc" eqo rquk±⁻q" i tcpwrqo ²vtkec." c" fgpukfcf g" fqu" ci tgi cf qu" *gzenwkfpq" qu" gurc±qu" kpvtci tgi cf qu+"g"c"rqrqukfcf g"kpvtcci tgi cf qu."u⁻q"fg"i tcpf g"ko rqrt⁻pekc"rctc"kphgtkt" cri wo cu'r tqrtkgf cf gu'hfµikecu."s w¶o kecu'g'dkqn»i kecu'fq'uqrq."eqo q'vtqec'fg'i cugu."cduqt±⁻q" fg"ªi wc."f kur qpkdkrkf cf g"fg"ªi wc."pwvtkgpvgu"g"cvkxkf cf g"o ketqdkcpc."f g"gpqto g"tgngvⁿpekc" rctc"q"etgueko gpvq"g"f gugpxqnxko gpvq"f cu"r ncpvcu0'

Qu'ci tgi cf qu'u⁻q"enuukhkecf qu's wcpvq"cq"vco cpj q."eqphqto g"c'vgqtkc'f c'j kgtctswk| c±⁻q" f g"ci tgi cf qu."go " ekpeq'i twr qu<>'4" o ⁼f g'4"c'42" o ⁼f g'42"c'472" o ⁼f g'472" o "c'4"o o ⁼ g" @'4"o o " *VKUFCNN"(" QCFGU."3; : 4+0'Qu"o gpqtgu"s wg"472" o "u⁻q'f gpqo kpcf qu" o ketqci tgi cf qu'g'qu'o ckqtgu."o cetqci tgi cf qu."ugpf q"ecf c"ci tgi cf q'hqto cf q'r gnc"wpkⁿq" f qu'ci tgi cf qu'f c'enuug's wg"xgo "ogi q'cdckzq."ugi wkpf q."cuuko ."wo c'qtf go "j kgtªts wkec0'Qu" o ketqci tgi cf qu'u⁻q'o cpvkf qu'g'wpkf qu'r qt'o cvtkcku'qti ⁻pkequ'r gtukuvgpvgu."gps wcpvq'qu" o cetqci tgi cf qu'u⁻q'eqpuvkw¶f qu'g'guvcdkrk|cf qu'r qt'o cvtkcku'go r qtªtkqu."eqo q'tc¶ gu'f g" r ncpvcu"*UVGXGPUQP ."3; ; 6+0"

Wo " kpf kecf qt"f g"f gi tcf c±⁻q"f q"uqrq"²"q"vco cpj q"g"q"i tcw'f g"f gugpxqnxko gpvq"f qu" ci tgi cf qu."r qku'kphnwgpeko "hcvqtgu'eqo q"kphknrtc±⁻q."tgvgp±⁻q"f g"ª i wc."cgtc±⁻q."tgukuv́pekc" «"r gpgvtc±⁻q"f g"tc¶ gu."ugnco gpvq"g"gpetquvco gpvq"uwr gthkekcn"g"gtquⁿq"j ¶f tkec"g"g»nkec" *NGRUEJ ." 4233+0' Eqphqto g" q" vco cpj q" f qu" ci tgi cf qu." ecf c" enuug" ugtª " wpkf c" r qt" f khgtgpvgu'ci gpvgu'eko gpvcpvgu" *DCUVQU"gv'cn0"4227+0'Cn²o " f c"o cv²tkc"qti ⁻pkec"qu" o kpgtcku" f g"cti krc." eqo r quvqu"f g" hgttq." ectdqpcvqu" g"u¶rkec"eqnqkf cn" *NGRUEJ ." 4233+' vco d²o "u⁻q"eqpukf gtcf qu'ci gpvgu'eko gpvcpvgu0"

Rctc" f gvgto kpc±⁻q" f q" vco cpj q" f qu" ci tgi cf qu" g" guvcf q" f g" ci tgi c±⁻q." r qf go " ugt" wkrk|cf qu'eqo q"r ct⁻o gvtqu"q"Fk⁻o gvtq"O ²f kq"Rqpf gtcf q"*FO R+"g"q"Fk⁻o gvtq"O ²f kq" I gqo ²vtkeq"*FO I +"*P KO O Q"(" RGTMKPU."4224+0'Q'r tko gktq"tghngvg"c'r gtegpvci go "f g" ci tgi cf qu" i tcpf gu" tgvkf qu" pcu" r gpgktcu" eqo " o crj cu"o ckqtgu." gps wcpvq" q" ugi wpf q" eqttgur qpf g"c'wo c"guvko cvkxc'f q'vco cpj q'f c'enuug'f g'ci tgi cf q'f g"o ckqt"qeqtt´pekc0' Pguvg'ugpvkf q."s wcpvq'o ckqt"q'ci tgi cf q."o ckqtgu'ugt⁻q'q'FO R"g"qu'gur c±qu'r qtqupu'gpvtg" ci tgi cf qu." cwo gpvcpf q" c" kphknrtc±⁻q" g" f ko kpwkpf q" c" gtquⁿq" *CP I WNQ⁼ TQNQHH⁼ UQW\ C."3; ; 6+0"

"

70 O CVGTKCN'G'O¦ VQFQ"

70B ƒTGC'FG'GUVWFQ"

Q"guwfq"hqi'eqpfw¦kfq"go "fqku"o »fwrqu"fg"tgewrgtc±¯q"hqtguvcl'kpvtqfw¦kfqu"rgnq" iqxgtpq"fq"guvcfq"fg"Rgtpco dweq,"pc"o cvc"ekrkctkfc"Dcttci go "Ukrkrkk"co dqu"ukwcfqu"pc" o ctigo "fktgkvc"fq"tegugtxcv»tkq"fq"Ukrkrkk"dcekq"fq"Tkq"I qkcpc."pq"o wpke¶kq"fg"Xkc´pckc"/" RG"*Hki wtc"3+0"

C"ª tgc"guvª "kpugtkfc"pc"wpkfcfg"i gqco dkgpvcl'fq"Rncpcnvq"fc"Dqtdqtgo c"g"² "hqto cfc" rqt"o cek±qu"g"qwwgkqu"cnqu.."eqo "cnkwfg"xctkcpfq"gpvtg"872"c"30222"o gvtqu0'Nqecnk¦c/ug" pc"o guqttgi k¯q"O cvc"g"pc"O kcrqttgi k¯q"O cvc"Ugvgpvtkqpcl'fq"Guvcfq"fg"Rgtpco dweq." rko kvcpfq/ug"c"pqtvg"eqo "Vko dcÀdc"g"O cecr ctcpc."c"uwl"eqo "Nko qgktq"g"Dwgpqu"Cktgu."c" nguvg"eqo "Cnkcp±c."g"c"qguvg"eqo "U¯q"Xkegpvg"Hªttgtg"g"Dqo "Lctfko 0'C"ª tgc"o wpkekrcl'fg" Xkc´pckc"eqwc"46; .4"mo ² "g"tgrtgugpvc"2.47' fq"Guvcfq"fg"Rgtpco dweq0'Q"tgngxq"² " i gtcm gpvg"o qxko gpvcfq."eqo "xcngu"rtqhwpfqu"g"guvtgkxqu"fkuugecfqu0'Eqo "tgurgkxq"«" hgtvkrkfcfg"fqu"uqnqu"² "dcuvcpvg"xctkcfc."eqo "egtvc"rtgfqo kp¯pekc"fg"o ²fkc"rctc"cnvc" *RTQO CVC."4229+0'

C"ugfg"fq"o wpke¶kq"vgo "wo c"cnkwfg"crtqxko cfc"fg"33; "o gvtqu"g"eqqtfgpcfcu" i gqi tª hkecu"fg"29Å5; ø47ö"fg"ncvkwfg"uwl"g"57Å3; ø58ö"fg"nqpi kwfg"qguvg."fkuvcpfq"97.6"mo " fc"ecrkcl'Tgekhg."ewlq"ceguuq"² "hgkvq"rgnc"DT/"62: "g"RG/296"*O O G."4227+0'

Go " vgtmq" fg" tgngxq" c" dcekc" fg" eqpvtkdwk±¯q" fc" dcttci go " fq" Ukrkrkk" eqwc" c" gzvtgo kfcfg" pqtgguvg" fc" \ qpc" fc" O cvc" rgtpco dwecpc." crtgugpvcpfq" eqo q" vtc±q" ectcevgt¶uvkeq" fg" uwc" rckuci go " o qthqn»i kec" q" eqplwpvq" fg" gngxc±¿gu" *etkucu" g" xcngu" rctcngnqu+'swg"cuukpcnco "c"rtqlg±¯q"fc"guectrc"fq"Rncpcnvq"fc"Dqtdqtgo c"rctc"nguvg."uqdtg" cu" vgttcu" dckzcu" fc" equvc" ugvgpvtkqpcl'rgtpco dwecpc " *RGTP CO DWEQ." 4229+0' Vcku" gngxc±¿gu." swg" eqpuvkwwo " q" o cek±q" fq" Rktcwª " g" kpvgi tco " q" eqplwpvq" o qpvcphquq" fgpqo kpcfq"rqt"I ctcdku"et al0'*3; ; 3+"$Vgttcu"Cncu"fc"Vtcpuk±¯q"Ci tguvg/O cvc"Pqtvg"fg" Rgtpco dweq$."rtqrkekco "q"cxcp±q"$o cku"rtqeo kpgpvg"fc"|qpc"equvgktc"Ào fc"uqdtg"q" kpvgtkqt"o cku"ugeq"pcu"rtqzko kfcfgu"fc"fkxkuc"fg"Rgtpco dweq"eqo "q"guvcfq"fc"Rctc¶dc$" *O CEKGN."3; ; 5+0'

Gpvtg"c"ugttc"fq"O cuectgpjcu"*cq"pqtvg+"g"c"etkuvc"tgdckzcfc"*cq"uwr±"q"tgngxq"² " eqpuvkw¶fq"rqt"rgswgpcu"ej¯u"g"o qttqu"cttgfqpdfcfqu"eqo "cnkwfgu"kphgtkqtgu"c"522"o ." o qfgncfcu" go " vgttgpqu" o wkq" cpki qu" eqo rquvqu" rqt" tqej cu" ¶pgcu" g" o gvco »thkecu" kpvgi tcpvgu'fqu"Eqo rngzqu"I p¯kuukeq/O ki o cv¶keq"*Ctswgcpq+'g"Uwtwdko "*Rtqvgtq¦»keq" kphgtkqt+' *DTCUKN." 3; ; 2ª' RGTP CO DWEQ." 4223+' g" tgcn±cfcu" rgnc" uwrgth¶ekg" fg"

cr nkpco gpvq'r nkeý pkec'eqo "pﺍkgku'gpvtg"352"g'3:2"o ."qpfg"ug"nﻕecnk c'c"dcttci go "f q' Uktklk0'

Figura 1. Ectvc'vqr qi tª hkec'f c'dcttci go "f q'Tkq"Uktklk"o wpkeﺍ kq'f g"Xkeﾴpekc.'RG0''
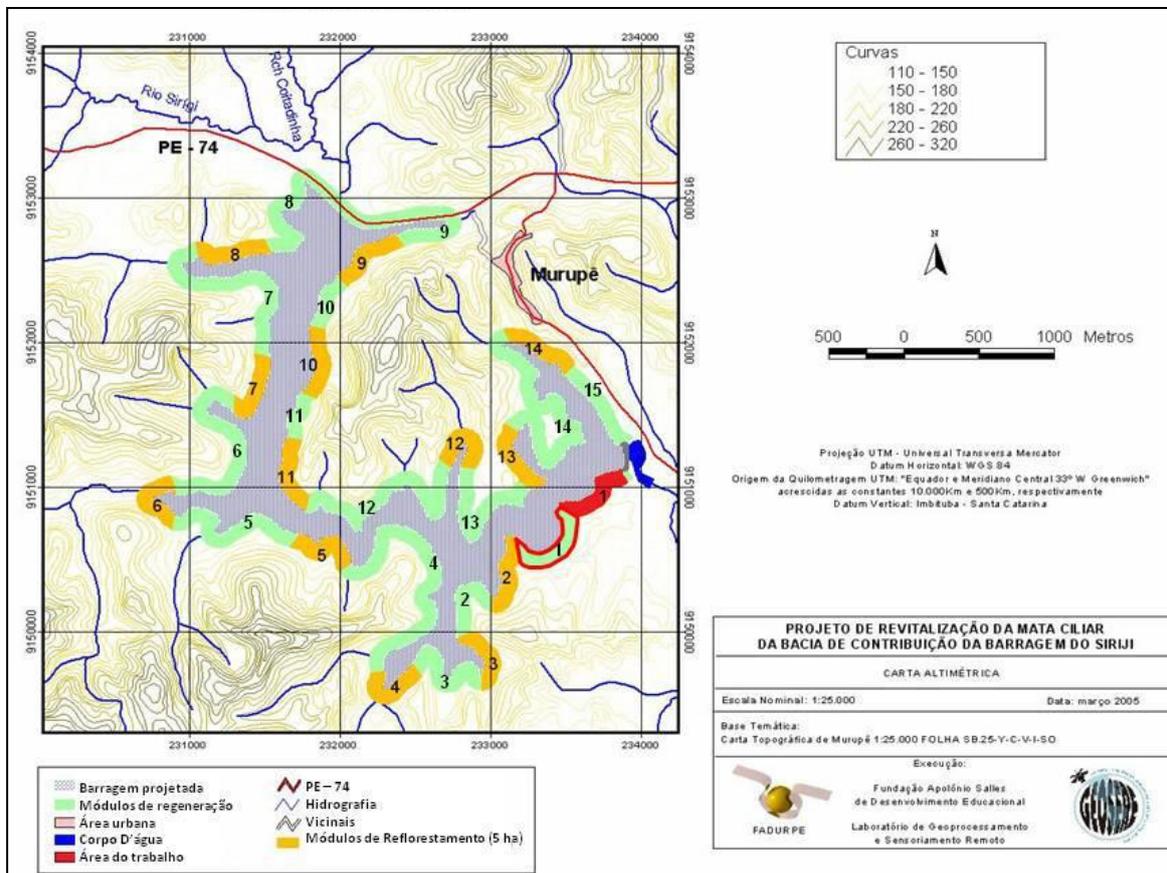
Qu'uqmqu'f q"gpvqtpq'f q"tgugtxcﺍ tkq'f c'Dcttci go "f q'Uktklk'ﾴo "ectcevgtﺍ ﾴ kecu'dcuvcpvg" uko knctgu'Pcﾪ tgc'f g"guwﾴ f q."pq"i gtcn"guﾭ q"gpswcf tcf qu'pc"qtf go "f qu'CTI KUUQNQU0' Uﾭ q" uqmqu" r qhwpf qu." ugo r tg" ukwcf qu" go " tgngxqu" qpf wncf qu" hqtvg" qpf wncf qu" g" cvﾲ " o qpvcpj ququ." q" swg" qu" vqtpco " dcuvcpvg" uwuegﾴ kgku" «" gtquﾭ q" swcpvq" f gurtqxkf qu" f g" eqdgtvwtc"qtki kpcﾴf g"o cvc0'Pcu'r ctvgu'o cku'dckzcu'f guvcu'gpequvcu'ﾴpi tgo gu"gxgpwcﾴ gpvg" uﾭ q" gpeqpvtcf qu" chqtco gpvqu" f g" tqej c" g" cﾴ wpu" uqmqu" o cku" tcuqu" swg" f ﾜxgo " ugt" eqpukf gtcf qu'pc"uwdqtf go "f qu'P GQUUQNQU'NKVﾴ NKEQU'*RTQO CVC."4229+0'

Go "vgtmqu'f g'ectcevgtﾴ kec'swﾜ o kec'uﾭ q'uqmqu'ﾪ ekf qu."go "o ckqtkc'eqo "ucwtcﾴﾭ q'r qt" dcugu'cdckzq'f qu'72ﾨ " "*F kut»hkequ+0'Pq"cur gevq'hﾴ keq."uﾭ q'uqmqu'r qtququ'eqo "vgzwtc" uwr gtﾴ kekﾴo ﾲf kc'r cuucpf q'c'cti knquc'go "r tqhwf kf cf g0Guvcu'f khgtgpﾱcu'vgzwtcku'ﾴo bﾲo " qu'vqtpco "o cku'uwuegﾴ kﾜ ku'«'gtquﾭ q0Go "eqpf kﾱﾱ gu'ﾴcwtcku'ﾴo "c'r ctvg'uwr gtﾴ kekﾴgur guuc" g" o cku" gewtgekﾴc" r gnc" r tgugpﾱc" f q" o cvﾴtkc" qtiﾴ pkec." eqpf kﾱﾱ gu" guvcu" swg" f ﾜki pco " j qtkﾜ qpvgu'uwr gtﾴ kekcku'f q'vkr qu'Cﾴ o qf gtcf q'g'r tqgo kpgpvg0'

Eqo "tgnc±¯q"«"ª tgc"fg"guuwfq."tcvc/ug"fc"o cti go "fktgkc"fc"dcttci go "fq"Uktklk"c"swcn"
hqk" fkxkfkfc" go " 36" o »fwqu." r ctc" tgewr gtc±¯q" hqtguvcn" eqo " ekpeq" j gevctgu" ecfc."
kpvgtecncfqu"r qt"ar qzko cfco gpvg"39.7"j gevctgu"fg"ecr qgktc0"C" tghgtkfc" r gus wkuc"guvª "
eqpegpvtcfc"pqu"fqku"r tko gktqu"o »fwqu"eqo "ª tgc"fg"7"j gevctgu"ecfc0"Q"r tko gktq"o »fwq"
fguvg" guvwfq" ² " eqo r qsvq" r gnc" ª tgc" fg" r ncpvkq" uwceguukqpcn" go " nkpj cu" *O U+" r ctc" c"
tgewr gtc±¯q" g" q" ugi wpfq" eqpvgpfq" c" ª tgc" eqo " kpfw±q" *O Kĺ" g" gptks wgeko gpvq" fc"
tgi gpgtc±¯q" pcvwtcn" *Hki wtc" 4+0" Cu" fwcu" ª tgcu" go " tgewr gtc±¯q" hqtguvcn" x´o " ugpfq"
o qpkvqtcfcu"fgufg"c"kpuvcnc±¯q"fq"r tqlgvq."qw"uglc."fgufg"fq"cpq"fg"42290"

Hki wtc "40"Ko ci go "vtkfko gpukqpcn"fc"ª tgc"fg"tgewr gtc±¯q"hqtguvcn"pc"dcttci go "fq"Tkq"Uktklk"Xkc´pekc"ó"RG(
*3+"Ecpc"fg"c±Àcct=*4+"O qf gnq"uwceguukqpcn"fg"r ncpvkq"go "nkpj c"eqo "fkxgtukfcfg"fg"gur ²ekgu"g"*5+"O qf gnq"
fg"kpfw±q"g"eqpfw±q"fc"tgi gpgtc±¯q"pcvwtcn0"

C"encuukhkec±¯q"fq"elko c"fc"tgi k¯q"² "fq"vkr q"Cuø"*elko c"vtqr kecn"eqo "guvc±¯q"ugec+."fg"
ceqtfq"eqo "c"Mÿr r gp/I ki gt."qw"uglc."swg"uki pkhkec"elko c"swgpvg"g"Ào kfq"eqo "ej wxcu"fg"
qwqpq/kpxgtpq0"

Fg"ceqtfq"eqo "c"encuukhkec±¯q"fq"KDI G"*4234+."c"xgi gvc±¯q"² "hqto cfc"r gnc"Hqtguvc"
Uwdecfwekhÿnkc"qw'O cvc"Ugec."swg"cr tgugpvc"ª txqtgu"fg"i tcpfg"r qtvg."ncvkhqnkcfcu."o wkvcu"
fcu"swcku"pq"r gt²qfq"ugeq."fgixco "eckt"r ctg"fcu"uwcu"hqnj cu"*XGNQUQ"*et al.,* 3;;3+0'Guuc"
hqto c±¯q"²"tgncekqpcfc"eqo "c"elko c"Cuø"go "ª tgcu"qpfg"cu"r tgekr kvc±¿gu"u¯q"kphgtkqtgs"«u"
fc'O ketqttgi k¯q"fc'O cvc'O gtkfkqpcn"g"c"guvc±¯q"ugec² "o cku"r tqnqpi cfc0"

704 FGUGPJ O Q'G'UWHKEKŝ PEIC'CO QUVTCN"

Rctc" c" fgvgto kpct" q" pÀo gtq" fg" r ctegncu" co quvtcfcu" wkkn|qw/ug" q" r tqegfko gpvq"
TGI TGNTR."fq"Uktug c"r ctc"Cpª rkug"Guvcv²uvkec"g"I gp²vkec"*UCGI +."fgugpvqrxkfq"r gnc"
Wpkxgtukfcfg" Hgf gtcn" fg" Xk±quc." ugi wkpfq" c" n»i kec" fc" "ewtxc" gur ²ekg¹tgcö0" Guvg"

r tqegf lo gpvq"² "c r tq r tk ec q"r c tc"c p ª rk ug"f g"tgi tguu¯q"f g"o f gnqu"f guegqpv¶pwqu."eqo r qvtqu" f g"wo c"r c rtg"rk pgc r"etguegpv g"f g"wo c"pc"hqto c"f g"r ncvgcw"*UCGI ."3; ; 9+0'

Rctc"q"f gnk pgco gpvq"co quvtcn"f cu"ª tgcu."hqtco "kpuvcncf cu"62"r ctegncu"r gm cpgpvgu" *Hki wtc"5+."ugpf q"42"r ctegncu"pc"ª tgc"f g"tgewr gtc± q"hqtguvcn"uweguukqpcn"f g"r ncpvkq"go " rk pj c"eqo "f kxgtukf cf g"f g"gur ² ekgu."g"42"wpkf cf gu"co quvtckc u"pc"ª tgc"tgewr gtcf c"r gm q" o ² vqf q"f g"kpf w¯ q"g"eqpf w¯ q"f c"tgi gpgtc± q"pcwtcn"vqf cu"eqpvgpf q"c"f ko gpu¯q"f g"32.2" z"32.2"o "*322"o ² +."gu wkf kuvcpvgu"gpvtg"uk"c"wo c"f kuv¯pekc"ukuwo ª vkec"f g"42.2"o "*Hki wtc"6+0'

Ecf c"wpkf cf g"co quvtcn"hqk"i gqttghgtgpekcf c"pq"ukuvgo c"f g"eqqtf gpcf cu"WVO "eqo "F cwo " Ukti cu"4222."eqo "cwz¶nkq"f g"wo "I RU"f g"pcxgi c± q"f c"o ctec"I cto kp""g"o qf gnq"O CR"EZ0'

Hki wtc"50O qpvci go "f cu"r ctegncu"r go cpgpvgu"go "eco r q0'
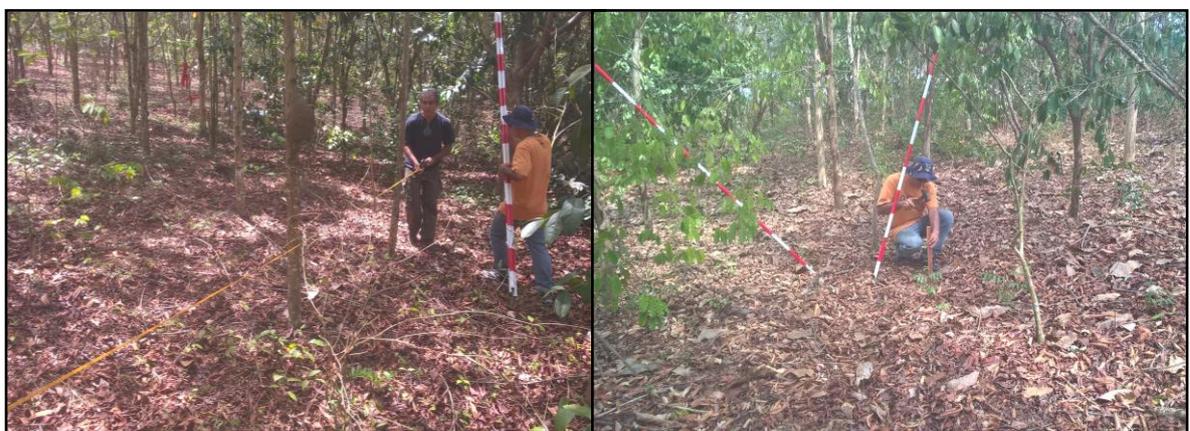
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Hqpvg<"NKTC."42330'

MODELO SUCESSIONAL DE PLANTIO EM LINHA COM DIVERSIDADE DE ESPÉCIES

MODELO DE INDUÇÃO E CONDUÇÃO DA REGENERAÇÃO NATURAL

Parcelas 10,0 x 10,0 m
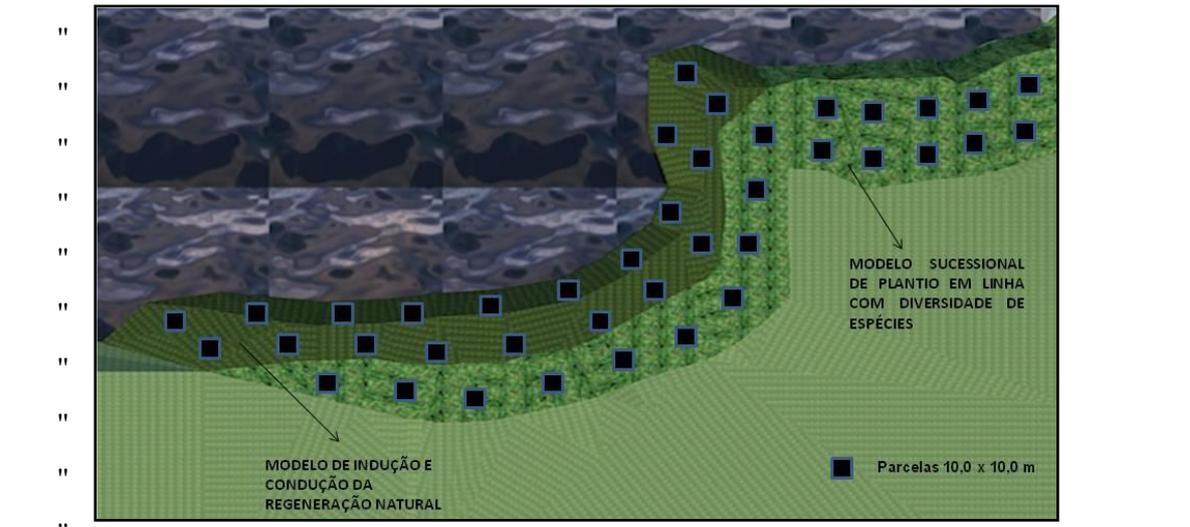
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ugpf q"ngxcpvcf qu"vqf qu"qu"kpf kx¶f qu"eqo "ektewphgt´pekc"c"cnwtc"f q"r gkvq"*ECR+"o gpqt"qw"
ki wcn'c"37"eo "*Hki wtc"7+0'

"
Hki wtc"70 Gus wgo c"f cu"r ctegncu"g"uwdr ctegncu"cnqecf cu"pcu"°tgcu"go "r tqeguuq"f g"tguvcwtc±¯q0'
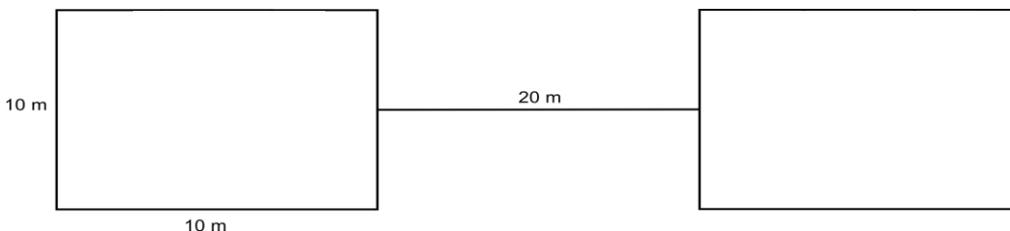
705 Kpf kecf qtgu'geqn»i kequ''

Hqk'ugrngekqpcf q "wo "eqpjwpvq"f g"kpf kecf qtgu"geqn»i kequ."f g"ceqtf q"eqo "c"o vqf qnqi kc"
cdqtf cf c"r qt"Dgmqwq=¨I cpf qrji ¨'Tqf tki wgu"*422; +."Hqpugec"*4233+"g"Ukrixc"*4239+."r ctc"
kpxguvki ct"q "r tqeguuq"f g"tgewr gtc±¯q"geqn»i kec"pqu"o qf gnqu"f g"tgewr gtc±¯q"hnqtguvcn'
kpvqf w| kf qu"pc"°tgc"f g"o cvc"ekrkct"f c"dcttci go "f q"Uktkik'c r gugpvcf qu"pc"Vcdgnc"30'Rctc"
vcpvq."pc"gueqnj c'f qu"kpf kecf qtgu"ngxctco /ug"go "eqpukf gtc±¯q'ectcevgt¶ukecu"d¨ukecu'f g"wo "
gequuukuvgo c"eqo q"c"guvtwwwtc."eqo r quk±¯q"g"r tqeguuqu"geqn»i kequ"*UGT."4226=¨VKGTPG["
gv"cn0"422; =¨DTCP ECNKQP "gv"cn0"4234+."pq"ugpvkf q"f g"o grj qt"ug"cxcrkct"q"p¶kgn'f g"
tgewr gtc±¯q'f c"°tgc0'
"

Vcdgnc'30'Kpf kecf qtgu'geqn»i kequ'gueqnj kf qu'r ctc"cp¨rkug"f cs"°tgcs'f g"o cvc"ektkct'go "r tqeguuq"f g"tguvcwtc±¯q."pc"dcttci go "f q"Uktkik'Xke´pekc'6'RG0'

Rct1ci go "	**Eqo r quk±¯q"**	**Guvtwwwtc"**	**Uqnq"**	**Hwp±¯q"**
O cvtk| " r tgf qo kpcpvg" " Tgngxq"f c" r ctkci go "	Tks wg| c"*U+" " Fkxgtukf cf g"	Rct¬o gvtqu" hkxquuqekqn»i kequ" " " " "	Guvcdkrkf cf g"f g" ci tgi cf qu" " Fgpukf cf g""	Tgi gpgtc±¯q" pcwtcn' " Ugttcr krj gktc" " "

"

Fgrqku'f c"ugng±¯q"f qs"kpf kecf qtgu"ug"r tqegf gw'c"cr rkec±¯q"f qs"kpf kecf qtgs'geqn»i kequ"
pcs"°tgcs"go "r tqeguuqs"f g"tguvcwtc±¯q'f c"o cvc"ektkct"wkrk| cpf q/ug"q"o guo q"r tqegf ko gpvq"

o gvqfqn›i keq" rctc" qu" fqku" o qfgqu." eqo q" rtgeqpki|cfq" rqt" Dtcecrkqp='" I cpfqrhk='" Tqftki wgu'*4237+0'

"

706 Kpfkecfqtgu'fg'rckuci go '"

Rctc"cpª rkug"fq"Tgngxq"fc"rckuci go "fqk'ngxcfq"go "eqpukfgtc±¯q"uwc"qeqtt´pekc"fgpvtq" fg"ecfc"rctegnc."ugpfq."rqtvcpvq."gzvtcrqncfc"rctc"c"ª tgc"i gtcl'fg"ecfc"o qfgq0"C"cxcnkc±¯q" fguvg"kpfkecfqt"guª rcuwcfc"pc"o gvqfqnqi kc"fg"Hqpugec"*4233+."c"ucdgt<"

▪ Q"Tgngxq"go "fgeqtt´pekc"fc"hqto c"rtgfqo kpcpvg"pc"rckuci go ."hqk'encuukhkecfq"go <" rncpq"ó"rtgfqo kpcpvgo gpvg"rncpq"qw'eqo "fgenkxgu"o ¼kq"uwcxgu='uwcxgo gpvg"qpfwncfq"ó" rtgfqo kpcpvg" eqo " fgen‡fkpiu" uwcxgu='" hqtvgo gpv g" qpfwncfq" ó" rtgfqo kp¬ekc" fg" fgenkxgu"cegpvwcfqu0"

▪ Rctc"c"O cvtk| "rtgfqo kpcpvg."qw"uglc."cpª rkug"fc"rckuci go "pc"swcn'cuª tgcu"guv¯q" kpugtkfcu"pq"ugpvkfq"fg"ectcevgtk| ct"c"o cvtk| "rtgfqo kpcpvg.'hqk'tgcnk| cfc"cxcnkc±¯q"*in loco"g" cvtcx²u"fg"ko ci gpu"ucv²nkvg"fq"cpq"fg"4237"fq"I qqi ng"Gctyj ."go "wo "ckq"fg"8"mo ='" rgto kvkpfq"kphgtkt"uqdtg"q"egpª tkq"qpfg"guv¯q"kpugtkfcu"c"o cvc"eknkct'fc"dcttci go "fq"Ukrkkk0'
"

707 Kpfkecfqtgu'fg'eqo rquk±¯q"

Rctc" ngxcpvco gpvq" fqu" fcfqu" tghgtgpvgu" cqu" kpfkecfqtgu" fg" eqo rquk±¯q." hqtco " eqrgvcfcu" kphqto c±¿gu" hqt¶uvkec" g" hkxquqekqn›i kec" pqu" fqku" o qfgqu" fg" tgewr gtc±¯q" hqtguvcl'cpcnkucfqu0'Pc"eqrgvc"fg"kphqto c±¿gu"go "eco rq."hqtco "eqpukfgtcfqu"vqfqu"qu" kpfkx¶fwqu" fg" gur²ekgu" ctd»tgcu" g" ctdwuvkxcu." rtgugpvgu" fgpvtq" fcu" rctegncu." eqo " ektewphgt´pekc"«cnvwtc"fq"rgkvq"*ECR+'o ckqt"qw'ki wcn'c"37.2"eo ."ugpfq"eqpvcdkik| cfqu"g" kfgpvkhkecfqu"eqo "rncec"fg"cnwo ¶pkq."ugpfq"cu"ektewphgt´pkcu"o gpuwtcfcu"g"c"cnwtc" guvko cfc"*hki wtc"8+0"

"

Hki wtc'80'O gfk±¯q'fg'ektewphgt´pekcu'g'fgvcnj g'fc'gvkswgvc'fg'kfgpvkhkec±¯q'fc"ª txqtg0'

S wcpfq" p¯q" hqk" hcekm gpvg" kf gpvkhkecfc" c" gur²cki" xgi gvcn" go " eco r q." q" o cvgtkcn" dqv¯pkeq"hqk"eqngvcf q"g"ecqpf kekqpcf q"go "nqecn'r t»r tkq"r ctc"vtcpur qtvg"g"kf gpvkhkec±¯q"pq" J gtb³tkq"U²ti kq"Vcxctgu" *F EHN/WHTRG+."ugpfq"qu o cvgtkcku"xgi gvcku"f gr qukcf qu"go " »kio q"gufcf q"dqv¯pkeq0'C"encuukhkec±¯q"vczqp¼o kec"cf qvcf c"r ctc"cu"r ncpvcu"hqk"q"ukuvgo c" Cpi kqur gto "Rj {mi gp{"I tqw r "KKK"*CRI ."422; +"g"qu"cwqtgu"g"pqo gu"ekgpv¶hkequ"hqtco " eqpuwncf qu"nc"Nkuvc"f g"Gur ²ekgu"f c"Hqtc"f q"Dtcukn"*>j wr <11hqtcf qbtcukn0bri 0qx0dt1@0'Qu" kpf kecf qtgu"cpcnkucf qu"hqtco <"

- Tks wg| c"/"hqk'o gpuwtcf q"r gnc"s wcpvkf cf g"f g"gur ²ekgu"go "ecf c"³tgc."f g"ceqtf q"eqo "q" ngxcpvco gpvq"hqt¶uvkeq0"
- F kxgtukf cf g" /" c" gutko cvkxc" f g" gur ²ekgu" go " ecf c" o qf gnq" hqk' f gvgtm kpcf c" r gnqu" ugi wkpvgu"¶pf kegu<

*Índice de diversidade de Shannon *J ø+.*

$$H' = \frac{\left[N.ln(N) - \sum\limits_{i=1}^{s} n_i ln(n_i) \right]}{N}$$

P "?" pÀo gtq"vqvcn'f g"kpf kx¶f wqu"o qutcf qu="p"k'?" pÀo gtq"f g"kpf kx¶f wqu"o qutcf qu" f c"k²uko c"gur ²ekg="U"?" pÀo gtq"f g"gur ²ekgu"o qutcf cu= ln "?"nqi ctko q"f g"dcug" pgr gtkcpc"*g+0'

*Índice de dominância de Simpson"*E+."*

$$l = \frac{\sum\limits_{i=1}^{s} n_i(n_i - 1)}{N(N-1)} \qquad C = 1 - l$$

l "?" ²" c"o gf kf c"f g"f qo kp¯pkc="E"?"¶pf keg"f g"f qo kp¯pkc"f g"Uko r uqp="p"k'?" pÀo gtq" f g" kpf kx¶f wqu" o qutcf qu" f c" k²uko c" gur ²ekg="P "?" pÀo gtq" vqvcn' f g" kpf kx¶f wqu" o qutcf qu="U"?"pÀo gtq"f g"gur ²ekgu"o qutcf cu0'

*Índice de equabilidade de Pielou *L+."*

$$J' = \frac{H'}{H'\,max}$$

J' "?" "¶pf keg"f g"Gs wcdkrkf cf g"f g"Rkgmqw=" $H'\,max$ "?" ln *U+"?" f kxgtukf cf g"o ³zko c="U"?" pÀo gtq"f g"gur ²ekgu"o qutcf cu"?" tks wg| c0'

"

Coeficientes de similaridade de Jaccard "*ULkl+0'

'"""'

$$SJ_{ij} = \frac{c}{a+b-c}$$

c''? "pÀo gtq''f g''gur²ekgu''qeqttgpvgu''pc''r ctegnc''3''qw'eqo wpkf cf g''3='d''? "pÀo gtq''f g'' gur²ekgu''qeqttgpvgu''pc''r ctegnc''4''qw'eqo wpkf cf g''4='e''? "pÀo gtq''f g''gur²ekgu''eqo wpu'' «u'f wcu'r ctegncu''qw'eqo wpkf cf gu0'

"

7.8 Kpf kecf qtgu'f g''guvtwwwtc''

Rctc''ectcevtk{ c±¯q''f qu''kpf kecf qtgu'f g''guvtwwwtc''hqtco "wucf cu''cu''ugi wkpvgu''xctk³xgku<"

- Cnwtc''o²f kc''/"f g''r qugg''f cu''cnwtcu''f g''vf qu''qu''kpf kx¶f wqu.''eqo "ECR''×"37"eo ." eqpvcdknk{ cf qu'' pcu''r ctegncu "*322"o +."hqk'' ecnewncf c''c''o²f kc''f cu''cnwtcu''f qu'' gur²eko gu'gpeqpvcf qu''go "ecf c''o qf gnq''f g''tgewr gtc±¯q''hqtguvcn0"
- FCR''o²f kq''/"f grqku''f g''o gpuwtcf c''c''ektewphgt´pekc''«''cnwtc''f q''r gkvq'*ECR+'f qu'' kpf kx¶f wqu''eqo "ECR''×"37"eo ."hqk'ecnewncf q''q''FkÜ gvtq''«''cnwtc''f q''r gkvq'*FCR+' f qu'' gur²eko gu'' g''r quvgtkqto gpvg'q''FCR''o²f kq'' f qu'' kpf kx¶f wqu'' f g''ecf c'' ³tgc'' guwwf cf c0"
- Rct¯o gvtqu''hkvquuqekqn»i kequ''/"c''cp³nkug''f c''guvtwwwc'hqtk{ qpvcn'hqk'f gvgto kpcf c''r gnqu'' r ct¯o gvtqu''hkvquuqekqn»i kequ''f g''f gpukf cf g'cduqnwvc''g''tgncvkxc."htgs w²pekc'cduqnwvc''g'' tgncvkxc." f qo kp¯pekc'' cduqnwvc'' g''tgncvkxc." g''xcnqt'' f g''ko r qtv¯pekc'' *O ©NNGT/ FQO DQKU='GNNGO DGTI ."3; 96+."wwik{ cpf q''r ctc''vcn'q''r tqi tcom "guvcv¶uvkeq''<-Tø' *422; +0'

"

7.9 Kpf kecf qtgu'f g''uqmq''

Uqmq''/"f gpvtq''f guug''kpf kecf qt''hqtco "cxcnkcf cu''c''guvcdknkf cf g''f g''ci tgi cf qu''xkc''Ào kf kc''g''c'' f gpukf cf g''f q''uqmq''pcu''r tqhwpf kf cf gu''f g''2/32.''32/42''g''42/62''eo 0'Cu''o gvf qmqi kcu'r ctc' ecf c''xctk³xgn'guv¯q''f guetkvcu''c''ugi wkt<'

"

<u>Guvcdknkf cf g''f g''ci tgi cf qu</u>''/"hqk'tgcnk{ cf q''r gnq''o²vqf q''f g''r gpgktco gpvq''eqo "wo "cr ctgnj q'' f g''queknc±¯q''xgtvkecn'f q''vkr q'[qqf gt.''f kur qpkdknk{ cf q''r gnq''Ncdqtcv»tkq''f g''H¶ukec''f q''Uqmq''f c' WHHRG0'Wwik{ qw'ug''q''o²vqf q''r tqr quvq''r qt''Mgo r gt''g''Tqugpcw'*3; ; 8+'eqo "cnvgtc±¸gu0'Q' gs wkr co gpvq''ekcf q''eqo r¿g/ug''f g''vt´u''tgekr kgpvgu'ekn¶pf tkequ.''eqo r quvq''ecf c''wo "r qt''wo " eqplwpvq''f g'r gpgktcu'eqo "cu''o cnj cu<'4.22.''3.22.'2.7.'2.47''g'2.347''o o "*Hki wtc''9+0"

"

"

Hki wtc"90 Crctgrjq"fg"quekrc±¯q"xgtvkecn'fq"vkrq"[qfgt."rctc"cnªnkugu"fg"guvcdknkfcfg"fg"cigtgicfqu"xkc"Àokfc0'

Hqpvg<"Q"cwvqt."42390"

"
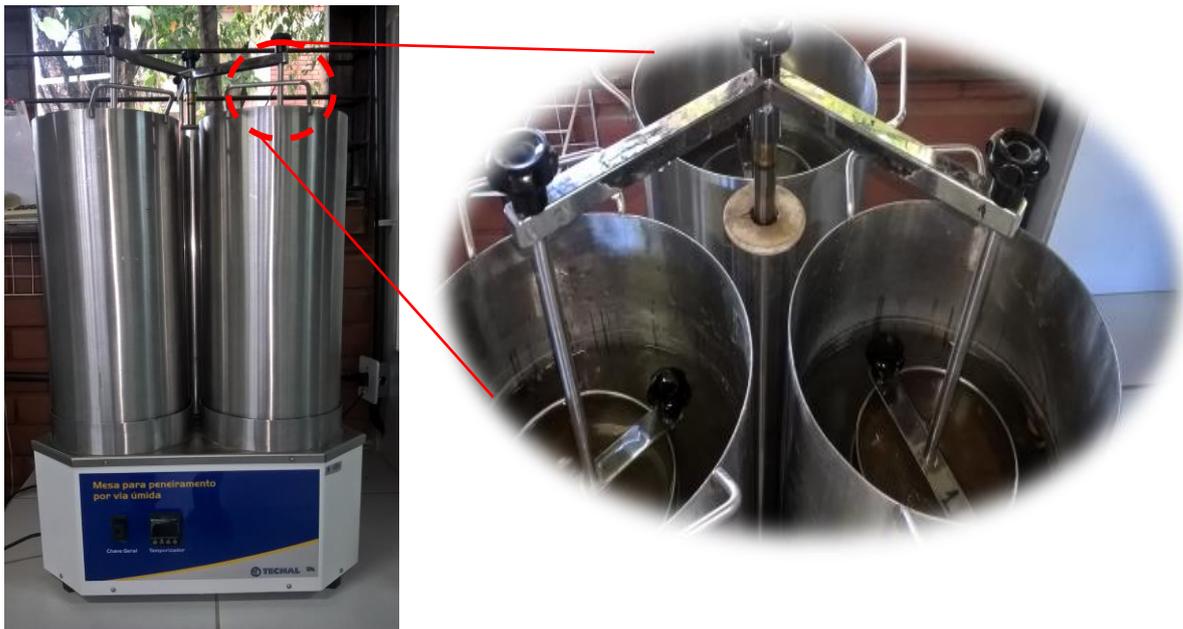
C"co quvtc"fg"uqnq"fguguvtwwvwtcfc"fqk"rcuucfc"go "rgpgktc"eqo "octjc"fg": oo "g"tgvkfc"pc"octjc"fg"6.98"oo ꞊"fq"o cvgtkcn'tgvkfq"hqtco "rguecfqu"72"i "go "fwrnkecvc"g"o tguvcpvg." cto c¦gpcfq0'Wo c"fcu"co quvtcu"hqk"eqnqecfc"go "ncvc"fg"cnwo ¶pkq"fg"rguq"eqpjgekfq"rctc" ugect"go "guvwhc"c"327àE"rctc"fgvgto kpc±¯q"fq"rguq"fc"co cuuc"fg"uqnq"ugeq0C"qwvtc"co quvtc" hqk"eqnqecfc"rctq"fg"rn¶uvkeq"hqttcfq"eqo "rcrgn'g"ucvwtcfc"rqt"ecrknctkfcfg0"

F grqku"fg"ucvwtcfc."c"co quvtc"hqk"eqnqecfc"pc"rctvg"uwrgtkqt"fq"eqplwpvq"fg"rgpgktcu." ugpfq"q"p¶kgn'fc"´iwc"clwuvcfq"fg"o qfq"s ug"qu"cigtgicfqu"eqpvkfqu"pc"rgpgktc"uwrgtkqt" hquugo "wo gfgekfqu0'Qu"cigtgicfqu"hqtco "uwdo gvkfqu"c"wo c"quekc±¯q"xgtvkecn'fg"37" o kpwvqu"eqo "wo c"htgs ÿpekc"fg"52"quekc±¿gu"rqt"o kpwvq"*Mgo rgt"g"Tqugpcw.'3; : 8+0' F grqku"fc"quekc±¯q."q"eqplwpvq"fg"rgpgktcu"hqk'tgvktcfq"g"q"o cvgtkcn'eqnqecfq"go "ncvcu"fg" cnwo ¶pkq"g"gpcwo kpjcfq"rctc"wo c"guvwhc"c"327àE"rctc"ugect"rqt"46"jqtcu0'Rquvgtkqto gpvg." fgvgto kpqw-ug"q"rguq"ugeq"rctc"fghkpk±¯q"fcu"encuugu"fg"cigtgicfqu"guª xgku"go "¶ iwc0"

Wkknk¦ctco -ug"qu"rguqu"qdvkfqu"rctc"q"eª newnq"fq"Fk¬o gvtq"O ² fkq"Rqpfgtcfq"*FO R+" g"fq"Fk¬o gvtq"O ² fkq"Igqo ² vtkeq"*FO I +."co dqu"rtqrquvqu"rqt"Mgo rgt"g"Tqugpcw' *3; : 8+<"

$$DMP = \sum_{i=1}^{n} x_i \times w_i$$

Hqpvg<"Uqw¦c"*4237+0"

$$DMG = \exp \frac{\sum_{i=1}^{n} wp \times \log\ x_i}{\sum_{i=1}^{n} wp}$$

"

Qpfg<‚FOR"/"fk—o gvtq"o ²fkq"rqpfgtcfq"*oo +‗"Zk'/"fk—o gvtq"o ²fkq"fcu'encuugu"*oo +‗"Yk'/"rtqrqt±⁻q"fg"ecfc"encuug"go "tgnc±⁻q"cq"vqvcn‗"FOI "/"fk—o gvtq"o ²fkq"igqo ²vtkeq"*oo +‗"yr"/"rguq"fqu'cigtgcfqu'fg"ecfc"encuug"*i +‗"

"

Fgpukfcfg"fq"Uqnq"ó"Hqk'fgvgtokpcfc"rgnq"o ²vqfq"fq"vqtt⁻q"rctchkpcfq."qpfg"q"vqtt⁻q"fg"uqnq"hqk'kpkekcnogpvg"kortgmo gcbknzcfq"eqo "rctchkpc."fgo qfq"c"rgto kkt"o gtiwj ª/nq"go "ª iwc"ug"fgvgtokpct"q"ugw'xqnwo g0'Cr»u'guug"rtqegfko gpvq"hqk'fgvgtokpcfc"c"fgpukfcfg"fq"uqnq"ugi wpfq"Fqpcig go c"*et al."*4233+."wkkk$z cpfq-ug"q"rguq"fq"vqtt⁻q"go "ª iwc."rguq"fq"vqtt⁻q"ugeq'g"ugw'xqnwo g0'Rctc"ecfc"rtqhwpfkfcfg"hqtco "tgcnk|cfcu"t´u'tgrgvk±¿gu0"

"

"

"

$$V_{Torão} = ((a-b)-c)$$

Qpfg<‚X$_{vqtt⁻q}$"/"Xqnwo g"fq"vqtt⁻q‗"c"ó"o cuuc"fq"vqtt⁻q"rctchkpcfq‗"d"ó"o cuuc"fq"vqtt⁻q"rctchkpcfq"o gti wj cfq"go "ª iwc‗"e"ó"xqnwo g"fc"rctchkpc‗"M cuuc"fc"rctchkpcl'20,20'

"

"

$$P_{Torão} = \frac{a}{1+b}$$

"

Qpfg<‚R$_{vqtt⁻q}$"/"Rguq"fq"vqtt⁻q"ugeq'c"327àE‗"c"ó"o cuuc"fq"vqtt⁻q"Áo ifq‗"d"ó"wo kfcfg"fc"uwdco quvtc0'C"rqtuukfcfg"vqvcn'hqk'fgvgtokpcfc"rqt"e²newnq'rgnc"gswc±⁻q"6."fg"ceqtfq"eqo "Fqpcig go c"gv"cn'*4233+0'

"

"

$$Pt = 1 - \frac{Ds}{Dp}$$

"

Qpfg<‚Rv'ó'Rqtuukfcfg"vqvcn‗Fuó"Fgpukfcfg"fq"uqnq‗Fr"ó"Fgpukfcfg"fg"rctv¶ewncu"

"

70‗ Kpfkecfqtgu'fg'hwp±⁻q''

C"guvko cvkxc"fqu'kpfkecfqtgu'fg"hwp±⁻q"fqk'fgvgtokpcfc"c"ugi wkpvg"o cpgktc<''

- I twrqu'geqn»i kequ'/"cu'gur²ekgu'fgrqku'fg"kfgpvkhkecfcu'nq"ngxcpvco gpvq"hqt¶uvkeq"hqtco "ci twrcfcu."fg"ceqtfq"eqo "c"encuukhkec±⁻q"uweguukqpcn"uwi gtkfc"rqt"I cpfqnhk‗"Ngkv⁻q"Hknj q"g"Dg| gttc"*3; ; 7+."go "rkqpgktcu."ugewpdª tkcu'kpkekcku."ugewpdª tkcu'ctfkcu'g"ugo "ectcevtk|c±⁻q0'Fgrqku'hqk'cxcnkfq"swcn'i twrq"geqn»i kq"rgfqo kpcxc"pcu'ª tgcu'*ᵃ +0'

- Tgi gpgtc±⁻q" pcwtcrl" /" " hqk" tgcnk| cfc" fgpvtq" fc" r ctegnc" fg" 322" o " 0' Kpfkx¶fwqu" tgi gpgtpvgu" hqtco " eqpukfgtcfqu" cswgngu" eqo " ektewphgt´pekc" «" cnwtc" fq" rgkq" *ECR3.52'o +'o gpgt'qw'ki wcrl'c'37'eo 0"

- Ugtcr krj gktc"/"fgpvtq"fguug"kpfkecfqr"hqk'cxcrkcfc"c"ugtcr krj gktc"cewo wrcfc"r tgugpvg"pc" eco cfc"uwr gthkekcn'fq"uqmq0'Rctc"c"am qvtci go "fc"ugtcr krj gktc"cewo wrcfc"hqk'ncp±cfq" pq"egpvtq"fg"ecfc"r ctegnc"wo "i cdctkq'fg"wfq"RXE"o gfkpfq"fg"2.72"z"2.72"o "*2.47" o +."eqngvcpfq/ug"qfc"ugtcr krj gktc"*hqrj cu."tco qu."htwfqu"e"hqtgu+'pgng"eqpvkfq"*hki wtc" ; +0'Go "ugi wkfc"q"o cvgtkcrl'hqk'go dcnfq"go "ucequ"r nⁿuvkequ"g"kfgpvkhkecfq."g"fgrqku" vtcpurqtcfqu"r ctc"q"Ncdqtc»tkq"fg"S w¶o kec"Co dkgptcrl'fc"WHTRG.'qpfg"hqk'hgkc"c" vkci go "r ctc"tgvktcr"suq"swg"r qr"vgpwfc"geukxguu"o kuwtcfq"«"co qutc0'Go "ugi wkfc"hqk' vcpuhgtkfq"r ctc"ucequ'fg"r cr gn'g"ngvcfq"r ctc"ugcr'go "gutwhc"c'92àE'fwtcpvg"6: 'j qtcu0' Rquvgtkqto gpvg."q"o cvgrkcrl'hqk'r gucfq'go "dcncp±c"cncrⁿftkec'fg"r tgek⁻q'cv²"cvkpi kt'r guq" eqpuvcpvg0'Go "ugi wkfc."hqk'vkkwtcfq'r ctc"swg"hquugo "tgcrk| cfcu"cu"cnⁿrkugu"swⁿo kecu'fg" pkvtqi´pkq" vqvcn" ectdpq" qrj⁻kq" vqvcl' h»rhqtq." r qvªuukq" e" u»fkq." eqphqto g" o gvqfqnqi kc'r tqr quvc'r qt'P gvq'g'Dcttgvq'*4233+'fguetkcu'c'ugi wkt0'

"

Hki wtc'; 0 Eqngvc'fc'ugttcr krj gktc'uqdtg'q'i cdctkq'fg'72'Z'72'eo 0'

"Hqpvg<'Q'cwqr. '4239"

"

P ktqi´pkq'vqvcn'ó "Hqtco 'r gucfqu'322i 'fc'co quvrc'g'go "ugi wkfc'vtcpuhgtkfqu'r ctc'wo "wdq" fki guvqr"g'cfkekqpcfq'9"o n'fg"o kuwtc'fki guqtc0'Rquvgtkqto gpvg"hqtco "eqnqecfqu'r ctc" cswgegr'pc'ecr gnc'qbfgegpfq'c'ugs w¶pkc'fg'wo c'j qtc'c'322'àE.'wo c'j qtc'c'422'àE'g'wo c" j qtc'c'522'àE0'F gpqku'fg'htkq."hqtco "cfkekqpcfqu'32"o n'fg'ª g wc'fguvknc fc0'C"fguvkc±⁻q'hqk' tgcrk| cfc"eqo "q"cwz¶rkq'fg"47"o n'fg'P cQJ "*72' +."ugpfq"q"fguvknc fq"tgeqrj kfq"go "wo " gtrgpo g{gr'eqo "32"o n'fg'ª ekfq'd»tkeq0'F gr qku'kvuuwqw/ug'c'co ½pkc "wucpfq/ug'wo c"uqnw±⁻q"

r cf t¯q''f g''J₄UQ₆''2.27''P .''ugpf q''q''kpf kecf qt''eqttgur qpf gpvg''«''o wf cp±c''f g''eqt''f q''xgtf g'' r ctc''q''xgto grj q''enctq0'

Ectdqpq''qti¯pkeq''vqvcn''ó''Hqk''r guef q''2.3''i ''f c''co quvtc''r t²/ugec''g''vtcpuhgtkpf q''r ctc''wo '' gtngpo g{gt''f g''722''o rô''P c''ugsẃpekc''hqtco ''cf kekqpcf qu''42''o n'f g''f ketqo cvq''f g''r qvª uukq''3'' P ''g''62''o n'f g''ª ekf q''uwrhÀtkeq''eqpegpvtcf q0'Go ''ugi wkf c''hqk''xgf cf q''q''gtngpo g{gt''r quvq'' r ctc''cswgegt''r qt''ekpeq''o kpwqu''go ''hgtxwtc''dtcpf c.''ugpf q''r quvgtkqto gpvg''ci kcf q''r qt''wo '' o kpwvq''g''eqnqecf q''go ''tgr qwuq''r qt''52''o kpwqu0'P c''ugsẃpekc''hqtco ''cf kekqpcf qu''422''o n'f g'' ª i wc''f gutkncf c.''32''o n'f g''ª ekf q''hquh›tkeq''eqpegpvtcf q''g''3''o n'f g''f kfgpkno kpc0'Rqt''Ànko q''hqk'' kwwncf q''q''gzeguuq''f q''qzkf cpvg''eqo ''uqnw±¯q''f g''uwrhcvq''hgttquq''co qpkcecn'2.7''P .''c²'' xktci go ''f c''eqt''r Àrr wtc''r ctc''xgtf g0''

H»uhqtq''ó''Hqk''kr gvcf q''r ctc''wdqu''f g''gpuckq''ugr ctcf co gpvg.''3''o n'f qu''r cf t¿ gu''f g''h»uhqtq'' *2¨47¨72¨97¨322''g''422''o i 0N¯³+0'Go ''ugi wkf c''hqtco ''cf kekqpcf qu''7''o n'f g''ª i wc''f gkqpk¦cf c'' g''4''o n'f q''tgci gpvg''gur ge¶kko.''o kuuvcu''f g''xqnwo gu''ki wcku''f g''o qnkdf cvq''f g''co ½pkc''c''7' ''g'' xcpcf cvq''f g''co ½pkc''c.''2.47' ''0'F gr qku''f g''vgt'tgr qwucf q''r qt''7''o kpwqu''ug''r tqegf gw''c''ngkwtc'' go ''gur gevtqhqv¼o gvtq''c''692po 0'F g''r quug''f cu''ngkwtcu''hqk''o qpvcf c''c''gs wc±¯q''f g''tgi tguu¯q'' rkpgct''r ctc''uwdukf kct''q''eª newnq''f g''eqpegpvtc±¯q''f g''h»uhqtq''pc''co quvtc.''gzr tguuq''go ''i ''ni ¯³0'

Rqv²uukq''g''u»f kq''ó''Rctc''ug''tgcrk¦ct''c''ngkwtc''f g''M''g''P c.''ug''wuqw'q''o guo q''gzvtcvq''wkkik¦cf q'' r ctc''f gvto kpc±¯q''f g''R0'Go ''cni wo cu''co quvtcu''uwc''ngkwtc''hqk''uwr gtkqt''cq''r qpvq''o ª zko q''f c'' ewtxc''r cf t¯q.''ugpf q.''r qtvcpvq.''f knu¶f q''eqo ''4''o n'f c''uqnw±¯q''g''eqo rngvcpf q/ug''q''xqnwo g'' r ctc''47''o n'eqo ''ª i wc''f gkqpk¦cf c0''

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80 ''TGUWNVCF QU'G'F KUEWUU₷ GU'
803 'Kpf kecf qtgu'f g'r ckuci go ''

C''f kci p»uvkeq''tgcrk¦cf q''eqo ''dcug''pqu''kpf kecf qtgu''f g''r ckuci go .''r quukdknkvc''wo c'' ectcevgtk¦c±¯q''f q''egp²rkq''cvwcn'f g''qpf g''cu''²tgcu''go ''tguvcwtc±¯q''hqtguvcn'guv¯q''kpugtkf cu.'' wo c''vg¦'swg''c''eqpf k±¯q''f c''r ckuci go ''r qf g''hcxqtgegt''qw'p¯q''guug''r tqeguuq0'

Cpcrkucpf q/ug''q''gpvqtpq''f c''²tgc''f g''tgewr gtc±¯q''hqtco ''r gtegdkf cu'cni wo cu'' c±¿ gu''cpvt»r kecu''swg''eqpvtkdwgo ''r ctc''c''kpvgpukhkec±¯q''f c''gi tcf c±¯q''pcu''²tgcu0'Gpvtg''guucu'' cvkxkf cf gu.''²''r quu¶xgl'f guvecct''c''ci tkewnwtc.''eqo ''c''o qpqewnwtc''f g''ecpc-f g/c±wect.'''' ko r ncpvcf qu''cq''nqpi q''f c''dcekc''j kf tqi tª hkec''g''ewnkkxq''f g''dcpcpcu.''hqto cf q''o cpej cu''f g'' r gto gcdknkf cf g''tgf w¦kf c''r ctc''xª tkcu''gur ²ekgu''f c''hcwpc''swg''r tqxcxgm gpvg''p¯q''eqpugi wgo '' f gunqect-ug''r qt''guucu''²tgcu0''

Vco d²o "²"xku¶xgn"c"gzvtc±¯q"fg"o afgktc"pc"o cvc"ekrkct."go "cri wpu"rqpvqu"fc"ªtgc"fg"guwfq."swg"go dqtc"c"rgi kurc±¯q"fgvtmkpg"c"o cpwgp±¯q"g"rtqvg±¯q"fcu"o cvcu"ekrkctgu." hqtco "xgtkhkecfqu"xªtkqu"vtgej qu"fg"xgi gvc±¯q"ekrkct"fguo cvcfqu.'o wkvcu'xg| gu."rqt"vtkj cu" fg"ceguuq"«"o cri go "fc"dcttci go "*hki wtc'32+0'

"

Hki wtc'320 Gzvtc±¯q"fg"o afgktc"krgi cl"*C+"g"vtkj c"fg"ceguuq"*D+"fgpvtq"fc"ªtgc"fg"rtgugtxc±¯q"rgtocpgpvg0'

Hqpvg<Q"cwqt."4239"

Xgtkhkeqw/ug"swg"c"o atk| "rtgfqo kpcpvg"²"c"ecpc/fg/c±Àect."eqo "rqwecu"o cpej cu"g" eqttgfqtgu"hqtguvcku"gpvtg"qu"eqpuukvygo cu."cl²o "fq"vco cpj q"tgfw| kfq"fqu"htci o gpvqu."q" kuqrco gpvq" hqk" gxkfgpekcfq." rqku" qu" htci o gpvqu" crtgugpvctco " dckzc" qw" pgpj wo c" eqpgevkxkfcfg"*hki wtc"33+0'Guug"kuqrco gpvq"²"hcvqt"et¶kieq"pc"fkp–o iec"fg"rqrwlc±¿gu." ko rgfkpfq"c"fkurgtu¯q"fcu"gur²ekgu"*O GV\ I GT."3;;;+."wo c"xg| "swg"c"rtgfqo kp¬ecf"fg" wo c"o cvtk| "ko rgto gªxgn"*ecpc/fg/c±Àect+"g"c"cw´pekc"fg"htci o gpvqu"swg"eqpgevco "cu" ªtgcu."u¯q"fqtvgu"gxkd´pekcu"fg"wo c"rckuci go "eqo "dckzc"tgukln´pekc."rqtvcpvq."crtgugpvcpfq" rqwec"eqpvtkdwk±¯q"rctc"tguvcvtc±¯q"fcuªtgcu"fgxkfq"«u"fkhkewlfcfgu"fg"vtqec"g"hnwzq"i ´pkeq"gpvtg"qu"gequukvgo cu"*UKNXC."4239+0"

O wkxqu"o co ¶gtqu."swcpfq"go "co dkgpvg"htci o gpvcfq."wkuk| co "cu"ªtgcu"fg"r ncpvc±¯q" fg"ecpc/fg/c±Àect"rctc"o qeqo q±¯q."clko gpvc±¯q"g"cdtki q"*O KTCP FC;'CXGNNCT."422: +." gpswcpvq" qwvtcu." ´o " uwc" o qktkfcfg" tgfw| kfc" go "co dkgpvgu"eqo " xgi gvc±¯q" guecuuc" *TQFFGP "et al0"4226+."guvcpfq"c"rgto gcdknfcfg"fc"o cvtk| "cuuqekcfc"«j cdknfcfg"fg"wuq" g"fg"o qxko gpvq"fcu"gur²ekgu"cpko cku"pc"guo c0'P guvg"ugpvkfq."swcpvq"o cku"ko rgto gªxgn" o cktc"c"fkhkewlfcfg"fg"vtqec"gpvtg"qu"co dkgpvgu"hqtguvcku"*N[TC/OQTIG"EIQCH GVK"RKXGNNQ."422: =HTCP MNP =NP FGP O C[GT."422; =UCP VQU/HKNJ Q"et al0"4234+0"

Ucpvqu"Hknj q"et al0"*4234+'tguucnco "swg"co dkgpvgu"qpfg"rtgfqo kpco "c"o qpqewlwtc" fg"ecpc/fg/c±Àect"u¯q"j quvku"rctc"c"dkqfkxgtukfcfg"hqtguval"iko cpfq"ckpfc."swg"c"o cvtk| " rtgfqo kpcpvg'fgvgto kpc"cu"eqpfk±¿gu"go "swg"qu"htci o gpqu"hqtguvcku"guv¯q"gzrquvqu."dgo " eqo q." c" ghkeá pekc" fc" fkurgtu¯q" fg" gur²ekgu" hqtguvcku" g" c" cdwpf¬pekc" fg" tgewtuqu"

fkurqp¶xgku0'Vcku'hcvqtgu'eqttqdqtco "eqo "c'kfgkc'fg'swg'c'rckuci go "qpfg'gtuⁿq'kpugtkfcu'cu" ªtgcu" go " tgewrgtc±ⁿq" rqfg" p¯q" guvct" kphnwgpekcpfq" rqukkxco gpvg" pq" rtqeguuq" fg" tgucwtc±ⁿq'hqtguvcn"go "xktwfg'fq'vkrq'fg'o cvkⱬ'swg'rgfqo kpc'g'kuqnco gpq'fcuⁿtgcu0'

Fqu" rqwequ" htci o gpvqu" gpeqpvtcfqu" pc" rckuci go " fq" gpvqtpq" fcu" ªtgcu" go " tgewrgtc±ⁿq."² prqu¶xgl'ug'qdugtxct"wo c'vgpf´pekc'rctcⁿq'hqto cvq'kttgi wct'fqu'o guo qu." gxkfgpekcpfq'c'qeqtt´pekc'fgⁿtgcu'o cku'tgeqtvcfcu."q'swg'tgo gvg'c'htci o gpvqu'fg'hqto cu' o cku'eqo rngzcu'g."rqtvcpvq." eqo "o gptⁿtgc'pÀengq'g"o ckr'rtqrgpu¯q'«'gzkw´pekc'fgⁿtgc' fg'dqtfc0'Rctc'Mwtcⱬ "et al. *422:+'hqto cu'kttgiwntgu'fqu'htci o gpvqu'uqhtgo ."i gtcm gpvg." o ckr'eqo "q'ghgkiq'fg'rgtuvtdc±ⱬ gu."rgnc'vgpf´pekc'fg'crtgugpvctgo "o ckrⁿtgc'fg'dqtfc0'

Crguct"fc"rckuci go "ugt"eqo rqurc'fg'rqwequ'htci o gpvqu'hqtguvcku"g"eqo "dckzc" eqpgevkxkfcfg."fgxg/ug'eqpukfgtct'swg'guugu'tgo cpguegpvgu'eqpvtkdwgo "rctc"c'rtqvg±¯q'fq" uqnq."fqu'o cpcpekcku'g'uwuvgpvcdknkfcfg'fqu'ugtxkⱬqu'gequukv´o kequ0'Fgxkfq'cqu'vco cpj qu' rgswgpqu'g'fgueqpgzqu."guugu'htci o gpvqu'rqfgo "p¯q'uwrqtvct'i tcpfgu'rqrwnc±ⱬ gs'fc'hqtc" g"hcwpc." gpvtgvcpvq" rqfgo "cdtki ct"o gvcrqrwnc±ⱬ gu'g"ugtxkt"fg" eqttgfqtgs'g"vco rqkpu' geqn»i kequ'*I J GT'CTFK'4229+0'Ugi wpfq'O gⱬ i gt"*3; ; 9+."htci o gpvqu'o ckqtgu'swg"2.94" j cⱴ'o "eqpfk±ⱬ gu"rctc"cuuo kt" c" hwp±¯q" fg" vco rqkpu"geqn»i kequ" pc"eqpgz¯q" fqu' tgo cpguegpvgu."ectcevgt¶u¬ec'guuc'swg'rqfg'ugt'cuuqekcfc'c'vqfqu'qu'htci o gpvqu'kpugtkfqu' pc'rckuci go 0'

Cu'fwcuⁿtgcu'go "rtqeguuqu'fg'tgucwtc±¯q'rquuwgo "vtgej q'fg'tgngxq'ngxgo gpvg" qpfwncfq"g"¶ji go g0'C"an¶kug'fq'tgngxq'rgto kg'eqo rggpfgt"cur gevqu'fq'uqnq"swg" rqfgo ."rquvgtkqto gpvg."kpkdkt'q'fgugpxqrxko gpvq'fcu'ur²ekgu."rqt'o gkq'fc'eqtt´pekc'fg' rtqeguuqu'gtqukxqu."fc'o gpqt'hkzc±¯q'fg'wo kfcfg."hkzkxkc±¯q'fg'pwtkgpvgu.'gpvtg'qwtqu0' Rctc'O ci pci q"et al0*4234+.'tgngxqu'eqo "fgenkxkfcfg'cegpwcfc'rqfgo "hcxqtgegt'rtqeguuqu' gtqukxqu." chgvcpfq" fktgvco gpvg" c" uweguu¯q" geqn»i kec." wo c" xgⱬ " swg" fgvgto kpco " cu' eqpfk±ⱬ gu'fg'nwo kpqukfcfg'g'wo kfcfg'fq'nqecn0"

Go "tgnc±¯q" «"tqej qukfcfg."qdugtxqw/ug'swg'p¯q'j ª "rtgfqo kп»pkc'fg'tqej cu'pcu" ªtgcu'fg'kpvtqfw±¯q'fcu'o qfgnqu'fg'tgucwtc±¯q'hqtguvcn'*O U'g'O K\0' "ko rqtvcpvg'ucrkgpvct" swg."go "i tcpfg'swcpkfcfg."c'rtgugp±c'fg'tqej cu'rqfg'rtglwfkect'q'guvcdgngeko gpvq'fqu' gur²eko gu."tgswgtgpfq'wo c'ugrgⱬⱬ¯q'fg'rncpvcu'cfcrvcfcu'«'guvc'eqpfk±¯q'fg'uqnq'rqweq' fgugpxqnxkfq¹'q'swg'p¯q'hqk'qdugtxcfq'pcuⁿtgcu'fq'rtgugpvg'guwfq'*UKNXC.'4239+0'

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Figura 3. Imagem aérea da paisagem onde estão inseridas as áreas de estudo (1 e 2) localizadas na barragem do Sirizi no município de Viçosa – PE.

Área 1 – Modelo Sucessional

Área 2 – Modelo de Indução da regeneração

Barragem do Sirizi

Distrito de Muripé

Fonte: Google Earth, 2016.

804 Kpf lecf qt 'f g'eqo r quk±¯q'"

C"cpᵃrkug"f qu'kpf lecf qtgu"f g'eqo r quk±¯q"r tqr qtekqpc"q"eqpj gelo gpvq"f c"s wcpvkf cf g" f g"gur²ekgu"guvcdglgekf cu"pcu"ᵃ tgcu."dgo "eqo q."c"j gvgtqi gpgkf cf g'hqt¶lnkec."cñ²o "f g"qwvcu" ectcevgt¶lnkecu'ko r qtvcpvgu'r ctc'ug"eqpj gegt"c'xgi gvc±¯q"gzkuvgpvg'pcu"ᵃ tgcu'f g"guvwf q0"

S wcpf q"cpcñkucf c"c"tks wg|c'f g"gur²ekgu"*U⁺."hqk'r quuïxgl"ug"r gtegdgt"s wg"qu'f qku" o qf glqu'f g"tgewr gtc±¯q'hqtguvcñ'guvwf cf qu"*O U"g"O K¹"vkxgtco "42"gur²ekgu"ecf c"o qf glq" *Vcdglc"4⁺0"

Hc| gpf q/ug" wo c" eqo r ctc±¯q" f c" tks wg|c" f g" gur²ekgu" ngxcpvcf cu" pcu" ᵃ tgcu go " r tqeguuq'f g'tguvcwtc±¯q."O U"g"O K¹'eqo "c'tks wg|c'f g'co dkgpvgu'ekñkctgu'pcvwtcku."r qpf gtc/ ug"s wg"pcu"ᵃ tgcu'f g"kpvtqfw±¯q'f qu'o qf glqu'f g"tgewr gtc±¯q'hqtguvcñ'f gxgtkc'j cxgt"wo " o ckqt"s wcpvkcvkq'f g"gur²ekgu0'Rctc"cpvq."Qñkxgktc"*4228⁺'cpcñkucpf q"s wcvtq'gequukuvgo cu' pcvwtcku"ekñkctgu."go "tgi k¸gu'r»zko cu"ᵃ u"ᵃ tgcu'f guvg"guvwf q."gpeqpvtqw'4;."58."63"g"85" gur²ekgu'pqu'co dkgpvgu0'

Rctc"O ctvkpu"*4236⁺'c'wvkñk|c±¯q'f c'r qwec'gur²ekgu'go "r tqlgvqu'f g'tguvcwtc±¯q."go " wo "egpᵃ tkq'eqo "dckzc"tgukñ¹ pekc."r qf g"ngxct"cq"kpuweguuq."r qku."ecuq'j cla"q"cvcs wg" uweguukxqu'f g'r tagi cu."cu"ᵃ tgcu'ugt¯q'f qo kpcf cu'r qt"i tco ¶pgcu'e"vtgr cf gktcu'ci tguukxcu's wg." eqpugs wgpvgo gpvg."r tqxqect¯q'r gtf cu'f g'kpf kx¶f wqu'ctd»tgqu0'

Go " cri wo cu" ukwc±¿gu." c" f qo kp¯ekc" f g" gur²ekgu" kpxcuqtcu." r tkpekr cm gpvg" i tco ¶pgcu'gz»ñkecu'g'vtgr cf gktcu."r qf g'kpkdkt'c'tgi gpgtc±¯q'pcvwtcñ'f cu'gur²ekgu'ctd»tgcu." o guo q" r tgugpvgu" pq" dcpeq" f g" ugo gpvgu" qw' s wg" ej gi wgo " «"ᵃ tgc." xkc" f kur gtu¯q" f g" r tqpᵃi wñqu0'Pguvcu"ukwc±¿gu."² "pegguᵃ tkc'wo c"kpvgtxgp±¯q'pq"ugpvkfq'f g"eqpvtqnct"cu' r qr wlc±¿gu'f g'kpxcuqtcu'ci tguukxcu'g'hcxqtgegt"q'f gugpxqñxko gpvq'f c'tgi gpgtc±¯q'pcvwtcñ' *O CTVKP U'("MWP \ ."4229⁺0'

C"tguvcwtc±¯q"eqo "q"o ckqt"pÀo gtq'r quuïxgl'f g"gur²ekgu"ctd»tgcu"eqpvtkdwk'r ctc" etkc±¯q'f g'f khgtgpvgu'o ketqu'j cdkvcvu'g'pkej qu'geqñ»i kqu."qu's wcku'hcekñkct¯q'q'r tqeguuq'f g' cwvq"uwuvgpvc±¯q"co dkgpvcñ'f c"ᵃ tgc"*DTCP ECNKQP "et al0"4234⁺0'Gpvtgvcpvq."F wtki cp"et al0"*4235⁺'tgncvco "s wg"c'dwuec'r qt'gngxcf q'pÀo gtq'f g'gur²ekgu."s wcpf q'p¯q'dgo "r ncpglcf c." r qf g" vtc| gt" f cpqu" eqo q" kf gpvkhkec±¿gu" gs wïxqecf cu." eqpvco kpc±¯q' i gp²vkec" g" cv²" f gucr ctgeko gpvq" f g" r qr wlc±¿gu" ñqecku" pq" ecuq" f g" ewñkcf q" pc" eqngc" f cu" ugo gpvgu0'Eqpwf q."Ukñxc"*4239⁺'cngtvc's wg"q"wuq'f g"cñc"tks wg|c'f g"gur²ekgu'r qt"uk's»."p¯q' i ctcpvg"q"uweguuq'f c"tguvcwtc±¯q."r qt²o ."go "i tcpf g'hgevkxkf cf g'pq"tguvcdgngeko gpvq'f c' dkqf kxgtukf cf g'f g"gur²ekgu'pcvkxcu'pc"ᵃ tgc."s wcpf q'wkñk|cf q'q'o ckqt'pÀo gtq'f g"gur²ekgu'lᵃ " pc'ko r ncpvc±¯q'f q'r tqlgvq'f g'tguvcwtc±¯q'hqtguvcñ0"

P c"eqo r quk±¯q"f cu"gur²ekgu"pcu"ª tgcu"f g"guwf q.."qdugtxqw′ug"pc"O U"42"gur²ekgu"dqv‑plecu"*3: "kf gpvkhkecf cu."3"go "p¶xgrl"f g"hco ¶hkc"g"3"gur²ekg"p¯o"kf gpvkhkecf c±."f kuvkdw¶f cu"go "; "hco ¶hkcu="pc"O K'hqtco "gpeqpvtcf cu"42"gur²ekgu"*42"kf gpvkhkecf cu."f kuvkdw¶f cu"go "35"hco ¶hkcu"dqv‑plecu"*Vcdgnc"4+0'T guwnxcf q"cr tqzko cf q"hqi'gpeqpvtcf q"r qt"Ukrxc"*4239+"pq"guwf q"f g"vt´u"ª tgcu"ekrkctgu"pqu"o wpke¶r kqu"f g"Nci qc"f g"Kicgpi c"g"Rcwf cnj q"ó"RG."eqo "r tgugp±cu"f g"45."53"g"65"gur²ekgu"dqv‑plecu."f kuvkdw¶f cu"go "33."37"g"45"hco ¶hkcu."tgur gevkxco gpvg0'

"

Vcdgnc"40 Gur²ekgu"eqpvcdkﬂ cf cu'pcu"ª tgcu"go "r tqeguuq"f g"tguvcwtc±¯q"*O U"g"O K+"pc"dcttci go "f q"Ukrkﬂ"go "Xke´pekc"ó"RG0"

Família/Espécies	Nº de Indivíduos		OR	GE	SD
	MS	MI			
Anacardiaceae					
Mangifera indica L.	-	1	E	Sc	Zoo
Schinus terebinthifolius Raddi.	1	-	N	Pi	Zoo
Spondias mombin L.	-	1	N	Pi	Zoo
Tapirira guianensis Aubl.	24	-	N	Pi	Zoo
Annonaceae					
Xylopia frutescens Aubl.	13	3	-	Sc	Zoo
Annonaceae	6	-	N	Si	-
Apocynaceae					
Himatanthus phagedaenicus Mart.	6	-	-	Si	Zoo
Tabernaemontana flavicans Wild. Ex Roem. & Schult.	-	1	N	Si	Zoo
Araliaceae					
Schefflera morototoni Aubl.	6	-	N	Pi	-
Bignoniaceae					
Handroanthus chrysotrichus (Mart. ex DC.) Mattos	-	1	N	Si	Abio
Tabebuia obtusifolia (Cham.) Bureau	1	-	N	Si	Abio
Boraginaceae					
Cordia sellowiana Cham.	-	3	N	Si	Zoo
Euphorbiaceae					
Mabea occidentalis Benth.	6	-	-	Si	Aut
Fabaceae					
Albizia polycephala (Benth.)	15	1	N	Pi	Abio
Anadenanthera colubrina (Vell.) Brenan	1	-	N	Si	Abio
Apuleia leiocarpa (Vogel) J.F.Macbr.	13	9	N	Pi	-
Bowdichia virgilioides Kunth.	11	3	N	St	Abio
Enterolobium contortisiliquum (Vell.) Morong.	2	-	N	Si	Abio
Hymenaea courbaril L.	1	-	N	Si	-
Inga laurina(Sw.) Willd.	12	-	N	Pi	Zoo
Inga ingoides (Rich) Willd.	3	2	N	Pi	-
Machaerium hirtum (Vell.) Stellfeld	-	16	N	Si	Abio

Species					
Samanea tubulosa (Benth.) Barneby & J. W. Grimes	9	14	N	Pi	Aut
Lamiaceae					
Vitex rufescens A.Juss.	-	5	N	Sc	Zoo
Malpighiaceae					
Byrsonima sericea DC	-	5	-	Pi	Zoo
Myrtaceae					
Psidium guineense Swartz.	-	1	N	Pi	Zoo
Polygonaceae					
Coccoloba mollis Casar.	-	22	N	Pi	Zoo
Rubiaceae					
Genipa americana L.	1	1	N	St	Zoo
Salicaceae					
Casearia hirsuta Sw.	-	1	N	Si	Zoo
Casearia sylvestris Sw.	1	-	-	Si	-
Sapindaceae					
Cupania revoluta Rdlk.	-	1	N	Pi	-
Talisia esculenta (A. ST.-HIL.) Radlk.	-	5	N	St	Zoo
Não identificados[1]					
Não identificado1	1	-	-	Pi	-

"P¯q"hqk"r quu¦xgn'c"kfgpvkhkec±¯q"fgxkfq"«"cwú´pekc"fg"o cvgtkcn'h²tvkn¦'O S"ó"O qfgn¿"uweguukqpcn¦'O K'ó"O qfgn"fg" kpfw±¯q"fc"tgi gpetc±¯q"pcwtcn¦'QT"ó"qtki go "*G'ó"gz»vkecu.""P "ó"pcvkxcu¦¬'I G'/"i twr q"geqn¿i keq'*Rk'ó"r kqpgktc."Uk'/" ugewpf²tkc"kpkekcn'US'/"ugewpf²tkc"vctfkc."Ue'/"go "ectcevgtk¦ c±¿q+¦'UF '/"u¦pdfqm o g"fg"fkurgtu¯q'*Cdkq'ó"cdk»vkec."Cw'ó" cwvqe»tkec."Cpg'ó"cpgo qe»tkec.'\qq'ó¦¦ qqe»tkec+)

Eqo "tgnc±¯q"«"tksws wg| c."c"hco ¶kc"Hcdcegcg"cr tgugpvqw'o ckqt"tgr tgugpvcvkxkfcfg"go " pÀo gtq" fg" gur²ekgu" *32+." ugi wkfc" fc" Hco ¶kc" Cpcectfkcegcg" *6+." Cppqpcegcg." Cr qe{pcegcg." Dki pqpkcegcg." Ucnkcegcg" g" Ucr kpfcegcg eqo "4"gur²ekgu"ecf c." ugpf q"cu' fgo cks"hco ¶kcs"eqo "cr gpcs'3"gur²ekg"ecf c0'Guvcs"hco ¶kcs"go "vgto qs"fg"tksws wg| c"guv¯q" r tgugpvgs'pq"vtcdcnj q'f g"Tqf tki wgs"*et al.'*4232+0'

C"hco ¶kc"Hcdcegcg"² "wo c"f cs"tgur qpsª xgks"r gnc"i tcpf g" f kxgtskf cf g"xgi gvcn'f cs" hqtgsvcs" vtqr kecks." vgpfq" r cr gn' f g" f gsvcs wg" eqo q" gngo gpvq" hqt¶uvkeq" pcs" r tkpekr cks" hqto c±¿gs" xgi gvcekqpcks" dtcskngktcs." r tkpekr cm gpvg" go " vtgej qs" f c" Hqtgsvc" Cvn±pvkec" *¦ KO O GTO CPP "et al0"4234+0'Rctc"Eco r gnq"*3;;:+."guss"hco ¶kc"vgo "wo "ko r qtvcpvg" r cr gm go "co dkgpvgs'f gi tcf cf qs."r qt"cwvctgm "eqo q"cvkxcf qtcs"g"tgi wncf qtcs'f qs"tgewtsqs" f kur qp¶xgks'r gto kkpf q"q"gsvcdgngeko gpvq"f g"gur²ekgs"o cks"gzki gpvgs0'

Eqo "tgnc±¯q"«s"gur²ekgs."c"swg"cr tgugpvqw'o ckqt"pÀo gtq'f g'kpfkx¶f wqs"pq"O S'hqk'c" *Tapirira guianensis'*p"?"46+.'¦ª'pq"O K'c"gur²ekg'Coccoloba mollis'*p"?"44+'r tgf qo kpqw'go " swcpvkf cf g." f go qpsvtcpf q" swg" cs" gur²ekgs o cks" cdwpf cpvgs" pcs" eqo wpkf cf gs" s¯q" f khgtgpvgs" go " ecf c" wo " f qs" co dkgpvgs" go " tgsvcwtc±¯q." r qsswkpf q" co d² o " cvtkdwqs" f khgtgpvgs0'C"gur²ekg'ctd»tgc'Tapirira guianensis.'co d² o "eqpj gekf c'r qt"cwr kÀdc."² "pcvkxc"

f q''Dtcukn''ugpf q''qdugtxcf c''cwcrm gpvg''go ''f kxgtuqu''guvcf qu''f cu''tgi k¸gu''Uwf guvg.''P qtf guvg''g''

P qtvg''f q''r c¶u0'¦ ''wo c''gur²ekg''f k»kec''f c''hco ¶kc''Cpcectf kcegcg.''co r rco gpvg''f kuvtkdwt±f c''go ''

vqf q''vgttkv»tkq''dtcukngktq.''r tkpekr cm gpvg''go ''vgttgpqu''Ào kf qu''*QNKXGKTC''HKNJ Q''(''

TCVVGT''3; ; 7+.''ugpf q''ko r qtvcpvg''grgo gpvq''f q''guvtcvq''ngpj quq''f g''o cvcu''f q''Dtcukn''Egpvtcn''

*UKNXC''L—PKQT''gv'cn0''3; ; +0'ª ''c''*Coccoloba mollis*''go ''co r rc''f kuvtkdwk¯q''g gqi ª hkec''

qeqttgpf q''pc''Equvc Tkec.''Rcpco ª.''Eqn‰o dkc.''Xgpg| wgnc.''Uwtkpco g.''I wkcpc''Htcpeguc.''

Gswcf qt.''Dqn¶kkc''g''Dtcukn''qpf g'² ''co r rco gpvg''f khwpf kf c.''go ''vqf cu'cu''tgi k¸gu.''eqo ''gzeg±¯ q''

f c''tgi k¯q''Uwn''f gufg''q''Co crª.''Co c| qpcu.''Rctª.''O ctcpj ¯q.''Rkcw¶''Egctª.''Rctc¶dc.''

Rgtpco dweq.''Cnci qcu.''O cvq''I tquuq.''Cetg.''Tqpf¼pkc.''Dcj kc.''I qkªu.''O kpcu''I gtcku.''O cvq''

I tquuq''f q''Uwn''U¯ q''Rcwnq''g''Tkq''f g''Lcpgktq0'Pc''Co c| ¼pkc''qeqttg''go ''o cvcu''f g''ecr qgktc.''

o cvcu''f g''vgttc''hkto g''g''o cvcu''f g''ki cr».''uqdtg''uqnqu''ctgi knququ''qw'tqej ququ.''go ''

cnkvwfgu'swg''xctkco ''f g''' gtq''c'': 22'o ''*O GNQ.''4226c+0'

Gpvtg''cu''f wcu''ª tgcu''f g''tgguvcwtc±¯ q''*O U''? ''42''urr 0¦''O K''? ''42''urr 0+.''swg''r quuwgo ''c''

o guo c''kf cf g.''9''gur²ekgu''u¯ q''eqo wpu¦'*Xylopia frutescens; Albizia polycephala; Apuleia*

*leiocarpa; Bowdichia virgilioides; Inga ingoides; Samanea tubulosa; Genipa american0'

Ecdg''tguucnvct''swg''f guvcu''gur²ekgu''ekcf cu.''pgpj wo c'² ''gz»kec.''wo c''xg| ''swg''ug''dwuec''c''

o ckqr''ugo grj cp±c''r quu¶xgn'eqo ''qu''co dkgpvgu''pcwtcku''swcpf q''ug''r rcpjc''tguvcwtct''wo ''

gequukuvgo c0'O ctvkpu''*4236+'tguucnvc.''swg''cu''gur²ekgu''gz»kecu''u¯ q''ci tguukxcu''f g''tªr kf q''

etgueko gpvq.''r qf gpf q''kpkdkt''c''uweguu¯ q''ugewpfªtkc''pcu''ª tgcu''go ''tguvcwtc±¯ q''hqtguvcn'g''

hqto ct''r qxqco gpvqu'j qo qi ´pgqu.''eqo ''ectcevgt¶ukecu''kpf guglªf cu'«'CRRu''go ''tguvcwtc±¯ q0'

Eqpvtkdwkpf q''eqo ''q'swg''hqk'ngxcpvcf q''go ''tgmc±¯ q''«u'gur²ekgu'swg''eqo r¿go ''cu''ª tgcu.''

gpvtg''qu''f kuu'o qf gmqu''f g''tguvcwtc±¯ q''hqtguvcn'*O U''g''O K+.''q''eqghkekgpvg''f g''uko krctkf cf g''f g''

Lccectf ''hkeqw'cdckzq''f q''xcmqt''f g''tghgt´pekc''r ctc''co dkgpvgu''p¯ q''uko krctgu0'Ucdgpf q/ug''swg''

cr gpcu''cu''eqo ''wpkf cf gu''eqo ''xcmqtgu''ceko c''f g''2.47''r qf go ''ugt''eqpukf gtcf cu''uko krctgu''

*O WGNNGT/F QO DQKU¦'GNNGP DGT.''3; 96+.''pguug''ecuq''c''cpªnkug''f c''eqo r quk±¯ q''f qu''

o qf gmqu''cr tgugpvqw'uko krctkf cf g''f g''2.43''qw'43' ''.''ectcevgtk| cpf q/qu''eqo ''co dkgpvgu''p¯ q''

ugo grj cpvgu''go ''eqo r quk±¯ q''f g''gur²ekgu0'

S wcpf q''cpcnkucf c''c''f kxgtukf cf g''pcu''ª tgcu.''q''o qf gmq''uweguukqpcn'cr tgugpvqw'¿pf keg''f g''

Uj cppqp''ki wcn'c''4.7: ''pcuuikpf 0'g''q''o qf gmq''f g''kpf w±¯ q''eqo ''4.65''pcuuikpf 0'*cdgmc''5+.''eqo ''q''

O U''cr tgugpvcpf q''o ckqr''f kxgtukf cf g0'Eqo ''c r tcpf q/qu''eqo ''qu''f g''qwvtqu''tcdcrj qu.''qdugtxc/

ug''swg''qu''xcmqtgu''f g''J ø'guvko cf qu''pq''r tgugpvg''guwf q''u¯ q''dckzqu''swcpf q''eqo r ctcf qu''cq''

gpeqpvtcf q''r qt''J qmcpf c''*422: +'eqo ''5.4; ''pcuuikpf 0'Hkectco ''r t»zko qu''cq''swg''hqk'ecncwncf q''

r qt''Qrkxgktc''*4228+.''swg''qdvgxg''¿pf kegu''gpvtg''4.78''c''5.8; ''pcuuikpf 0'go ''htci o gpvqu''ekrkctgu.''

vqf qu''kpugtkf qu''pq''eqpvgzvq''f c''Hqtguvc''Guvcekqpcn'Ugo kf eckf wcn'r t»zko qu'«u''ª tgcu''f q''

r tgugpvtg"guwwf q0"Tqej c"*et al. *4226+."pc"o cvc"ekrkct"f q"c±wf g"f q"Rtcvc"go "F qku"Ko ¯qu"go "
Tgekhg."gpeqpvtctco "¶pf kegu"f g"Uj cppqp"f g"4.8; "g"4.98"pcuukpf 0"

"

Vcdgnc"50'Guvko cvkxcu'f qu"¶pf kegu"f g"f kxgtukf cf g"r ctc"cu"ª tgcu"go "tgucwtc±¯q"*O U"g"O K÷"mecrk cf cu"pc"dcttcig go "f q"Uktklk"m wpk÷kq"f g"Xke´pekc"ó'RG0'

˘PF KEGU"	O U'	O K'
˘pf keg"f g"f kxgtukf cf g"f g"Uj cppqp/Y gcxgt"*J)÷"	4.7: "	4.65"
˘pf keg"f g"f qo kp¯ekc"f g"Uko r uqp"*E+""	2.2; "	2.34"
˘pf keg"f g"gs wcrkdkrkf cf g"f g"Rkgmqw"*L+"	2.: 8"	2.: 3"

"

Rctc"ug"eqpj gegt"c"f kxgtukf cf c"ª tgc"vo d²m "hqk'wukrk cf q"o "¶pf keg"f g"f qo kp¯ekc"
f g"Uko r uqp."f g"hqtm c"s wg."s wcpvq"m cku"r»zko q"f g"3."m cktr ²"c"f kxgtukf cf g."mqi q."c"
f qo kp¯ekc"f g"ur ² ekgu" ²"o gpqt."ugi wkpf q"q"o guo q"r cf t¯q"f qu"qwtqu"¶pf kegu"*UKNXC."
4239+0'Hqk'qdugtxcf q"pguvg"vtcdcrj q"wo "tguwncf q"f khgtgpvg's wcpf q"eqm r ctcf q'cqu"qwtqu"
¶pf kegu0'Q"xcrqt"f g"2.2; "gpeqpvtcf q"m quttc"wo c"dckzc"f kxgtukf cf g"pqu"mqecku"guvwf cf qu."
r qt"ugt"wo "xcrqt"m wkvq"f kuvcpvg"f g"30"

Eqm " q" ¶pf keg" f g" gs wcrkdkrkf cf g" f g" Rkgmqw" *L÷+" qdugtxc/ug" s wg" qu" m qf gmqu"
cr tgugpvctcm "xcrqtgu"r»zko qu0'Guug"¶pf keg"vgm "xcrqt"m ²zko q"c"ugt"cvkpi kf q"f g"3."g"s wg"
s wcpvq"m cku"r»zko q"f g"*2+'j ²"vgpf ´pekc"f g"cr gpcu"wo c"gur ² ekg'f qm kpct"c"eqm wpkf cf g0'
Pcu"ª tgcu"f q"guwf q"p¯q"j ²"f qo kp¯ekc"f g"f gvtm kpcf cu"gur ² ekgu."wo c"xg| "s wg."qu'xcrqtgu"
qdugtxcf qu'ug"cr tqzkm cm "f g"3."qw'uglc."eqttgm "f g"hqtm c"f kuvtkdw¶f c0'

"

Rctc" cp²rkug" f qu" kpf kecf qtgu" hqk'tgcrk cf q" q" ngxcpvcm gpvq" f qu" r ct¯m gvtqu"
hkvquuqekqn»i kequ'f cu"ª tgcu"go "tgucwtc±¯q0'C"cp²rkug"f qu'tguwncf qu'f g"ecf c"cm dkgpvg"²"
cr tgugpvcf c"go "f gvcrj g"pcu"vcdgncu"6"g"7."pc"qtf go "f cu'gur ² ekgu'f g'ceqtf q"eqm "q"xcrqt"f g"
ko r qtv¯ekc0'

Cq"ug"cpcrkuct"q"O U"*Vcdgnc"6+"qdugtxc/ug"s wg"hqtco "gpeqpvtcf qu"355"kpf kx¶f wqu."
ugpf q"c"f gpukf cf g"ki wcr'c": : 9"kpf 0'j c0'S wcpf q"qdugtxcf q"q"p°m gtq"f g"kpf kx¶f wqu."cu'ekpeq"
gur ² ekgu"eqm "m ckqt'f gpukf cf q"tgr tgugpvctcm "98.2; ' "f c"cm quvc."ugpf q"gncu<*Tapirira
guianensis, Albizia polycephala, Apuleia leiocarpa, Inga laurina e Samanea tubulosa*0'Rqt"
qwtq"ncf q."xgtkhkeqw'ug"s wg"9"gur ² ekgu"cr tgugpvctcm "cr gpcu"wo "Àpkeq"kpf kx¶f wq."q"s wg"
eqpvtkdwgo "r ctc"c"f kxgtukf cf g"f qu"cm dkgpvgu"guwf cf qu."f guvcecpf q/ug"cu"gur ² ekgu"f g"
Genipa americana, Schinus terebinthifolius, Casearia sylvestris e Tabebuia obtusifolia.

Ukrxc" *4239+" guswf cpf q" vt´u" co dkgpvgu" ekrkctgu" go " Rcwf crj q" ó" RG." gpeqpvtqw" wo c" f gpukf cf g" f g" 54: ." 872" g" 3572" kpf lj c." g" cu" ekpeq" gur²ekgu" eqo " o ckqt" f gpukf cf g" tgr tgugpvctco ": 4.54' ."8: .; 4' "g"77.63' "0'

Rctc" c" htgs w´pekc." cu" ekpeq" gur²ekgu" o cku" tgr tgugpvcvkxcu" pq" o qf gm" O U" hqtco <" *Tapirira guianensis* (36.97' +)"*Himatanthus phagedaenicu*u"); .: 6' +)"*Albizia polycephala*" *; .: 6' +)" *Apuleia leiocarpa* *; .42' +)" g" *Inga laurina* *; .42' +)" f go qpuvcpf q" swg" q" r qxqco gpvq"f q'O U"go "pc"uwc"eqo r quk±¹q"wo "r gtegpwcn'r gs wgpq"f g"gur²ekgu0"

S wcpvq"«" f qo kp¬pekc" pq" O U." cu"gur²ekgu" *Tapirira guianensis, Schefflera morototoni, Samanea tubulosa, Enterolobium contortisiliquum,* g" *Albizia polycephala*" eqttgur qpf gtco ." go "vgto qu"r getgpwcku." c"58.38' "f c"ª tgc"dcucn'vqvcn'co quvtcf c0"Xcnqt" o gpqt"f q"swg"guug" hqk" gpeqpvtcf q" r qt" Ukrxc" *4239+)"qpf g": 8.7; ' "f c"ª tgc" dcucn'vqvcn'co quvtcf c" guvcxc" eqpegpvtcf c"go "ekpequ'gur²ekgu0"

Cu" ekpeq" gur²ekgu" eqo " o ckqt" xcnqt" f g" ko r qtv¬pekc" *XK¹" pq" O U" hqtco <" *Tapirira guianensis,*" *Albizia polycephala,*" *Apuleia leiocarpa,*" *Inga laurina*" g" *Samanea tubulosa*0"C" *Tapirira guianensis,*" gur²ekg"eqo "o ckqt"XK"² "vco d²o "c"swg"cr tgugpvqw"o ckqt"f gpukf cf g." htgs w´pekc"g"f qo kp¬pekc"pq'O U0"

"

"

Vcdgm"60"Hkxquuekqpqi kc"f q"eqo r qpgpvg"ctd»tgq"f q"o qf gm"uweguukqpcn'*O U+"pc"dcttci go "f q"Ukxkm'go " Xkç´pekc"ó'RG0"

Gur²ekgu'	PK'	FC''	FT''	HC''	HT''	FqC''	FqT''	XK	XK*'	+'
Tapirira guianensis	46"	382"	3: .27"	82.22"	36.97"	2.29"	33.32"	65.; 2"	36.85"
Albizia polycephala	37"	322"	33.4: "	55.55"	: .42"	2.26"	8.69"	47.; 6"	: .87"
Apuleia leiocarpa	35"	: 9"	; .99"	55.55"	: .42"	2.26"	7.57"	45.55"	9.9: "
Inga laurina	34"	: 2"	; .24"	55.55"	: .42"	2.25"	6.; 9"	44.3: "	9.5; "
Samanea tubulosa	; "	82"	8.99"	48.89"	8.78"	2.28"	: .49"	43.7; "	9.42"
Bowdichia virgilioides	33"	95"	: .49"	48.89"	8.78"	2.26"	7.: : "	42.93"	8.; 2"
Xylopia frutescens	35"	: 9"	; .99"	48.89"	8.78"	2.25"	6.44"	42.77"	8.: 7"
Schefflera morototoni	8"	62"	6.73"	35.55"	5.4: "	2.29"	32.82"	3: .5; "	8.35"
Himatanthus phagedaenicus	8"	62"	6.73"	62.22"	; .: 6"	2.24"	4.87"	39.22"	7.89"
Annonaceae	8"	62"	6.73"	48.89"	8.78"	2.24"	4.62"	35.69"	6.6; "
Mabea occidentalis	8"	62"	6.73"	35.55"	5.4: "	2.26"	7.5: "	35.39"	6.5; "

Enterolobium contortisiliquum	4"	35"	3.72"	35.55"	5.4:"	2.27"	8.;3"	33.8;"	5.;2"
Inga ingoides	5"	42"	4.48"	35.55"	5.4:"	2.25"	5.:5"	;.58"	5.34"
Genipa americana	3"	9"	2.97"	8.89"	3.86"	2.25"	6.9;"	9.3;"	4.62"
Não identificado1	3"	9"	2.97"	8.89"	3.86"	2.25"	6.82"	8.;;"	4.55"
Schinus terebinthifolius	3"	9"	2.97"	8.89"	3.86"	2.25"	5.99"	8.38"	4.27"
Hymenaea courbaril	3"	9"	2.97"	8.89"	3.86"	2.24"	4.5:"	6.99"	3.7;"
Casearia sylvestris	3"	9"	2.97"	8.89"	3.86"	2.24"	4.57"	6.96"	3.7:"
Anadenanthera colubrina	3"	9"	2.97"	8.89"	3.86"	2.23"	4.28"	6.67"	3.6:"
Tabebuia obtusifolia	3"	9"	2.97"	8.89"	3.86"	2.23"	4.23"	6.62"	3.69"
VQVCN"	**355"**	**::9"**	**322"**	**628.89"**	**322"**	**2.8972"**	**322"**	**522"**	**322"**

P K'/"pÀo gtq"f g"kpf kx¶f wqu='F C"/"f gpukf cf g"cduqnwvc='F T"/"f gpukf cf g"tgncvkxc='HC"/"htgsw´pekc"cduqnwvc='HT"/" htgsw´pekc"tgncvkxc='F qC"/"f qo kp−pekc"cduqnwvc='F qT"/"f qo kp−pekc"tgncvkxc='XK'/"xcnqt"f g"ko r qtv−pekc0'
"

Cq"ug"cpcnkuctgo "qu"r ct−o gvtqu"f q"o qf gnq"O K'eqo "dcug"pc"Vcdgnc"7."qdugtxc/ug"swg"hqtco "gpeqpvtcf qu"; 8"kpf kx¶f wqu"g"wo c"f gpukf cf g"f g"862"kpf0]j c0'Cu"gur ²ekgu"eqo "o cktq"f gpukf cf g"hqtco " *Coccoloba mollis." Machaerium hirtum." Samanea tubulosa" g" Apuleia leiocarpa."tgr tgugpvcpf q"85.77'" f q"vqvcn'gpeqpvtcq"pq"o qf gnq"f g"kpw±q0'Fcu" 42" gur ²ekgu." pqxg"kxgtco " cr gpcu"wo " tgr tgugpvcpvg"pc"ªtgc"co quvtcf c." ugpf q" gncu꞉" *Mangifera indica, Spondias mombin, Cupania revoluta, Albizia polycephala. Handroanthus chrysotrichus. Casearia hirsuta. Genipa americana." Tabernaemontana flavicans* g *Psidium guineense*."

Vcdgnc"70Hkvquqekqnqikc"f q"eqo r qpgpvg"ctd»tgq"f q"o qf gnq"f g"kpw±q"f c"ªtgi gpgtc±'q"*O K꞉"nqecnkcf c"pc" dcttci go "f q"Uktkkkk'go "Xke´pkc"ó"RG0"

Gur²ekgu'	P K	F C"	F T"	HC"	HT"	F qC"	F qT"	XK"	XK" *꞉꞉+"
Machaerium hirtum	38"	329"	38.89"	75.55"	38.89"	2.2453"	5.5:"	58.94"	34.46"
Coccoloba mollis"	44"	369"	44.;4"	48.89"	:.55"	2.2449"	5.54"	56.79"	33.74"
Mangifera indica"	3"	9"	3.26"	8.89"	4.2:"	2.3;6"	4;.38"	54.4;"	32.98"
Samanea tubulosa"	36"	;5"	36.7:"	55.55"	32.64"	2.2428"	5.23"	4:.23"	;.56"
Apuleia leiocarpa	;"	82"	;.5:"	62.22"	34.72"	2.2456"	5.65"	47.52"	:.65"
Bowdichia virgilioides"	5"	42"	5.35"	35.55"	6.39"	2.2:32"	33.:6"	3;.36"	8.5:"
Byrsonima sericea"	7"	55"	7.43"	42.22"	8.47"	2.2577"	7.42"	38.88"	7.77"
Talisia esculenta"	7"	55"	7.43"	42.22"	8.47"	2.245:"	5.69"	36.;5"	6.;:"

Vitex rufescens"	7"	55"	7.43"	42.22"	8.47"	2.2394"	4.73"	35.;9"	6.88"
Xylopia frutescens	5"	42"	5.35"	35.55"	6.39"	2.2554"	6.:8"	34.38"	6.27"
Inga ingoides	4"	35"	4.2:"	35.55"	6.39"	2.2457"	5.65"	;.8:"	5.45"
Spondias mombin	3"	9"	3.26"	8.89"	4.2:"	2.2595"	7.67"	:.7:"	4.:8"
Cordia sellowiana"	5"	42"	5.35"	8.89"	4.2:"	2.242;"	5.27"	:.48"	4.97"
Cupania revoluta"	3"	9"	3.26"	8.89"	4.2:"	2.2456"	5.64"	8.77"	4.3:"
Albizia polycephala	3"	9"	3.26"	8.89"	4.2:"	2.2438"	5.39"	8.4;"	4.32"
Handroanthus chrysotrichus"	3"	9"	3.26"	8.89"	4.2:"	2.2437"	5.36"	8.49"	4.2;"
Casearia hirsuta"	3"	9"	3.26"	8.89"	4.2:"	2.2388"	4.64"	7.77"	3.:7"
Genipa americana"	3"	9"	3.26"	8.89"	4.2:"	2.2366"	4.32"	7.45"	3.96"
Tabernaemontana flavicans	3"	9"	3.26"	8.89"	4.2:"	2.2346"	3.:4"	6.;6"	3.87"
Psidium guineense"	3"	9"	3.26"	8.89"	4.2:"	2.2345"	3.9;"	6.;4"	3.86"
VQVCN"	**;8"**	**862"**	**322"**	**542"**	**322"**	**2.8:58"**	**322"**	**522"**	**322"**

PK/"pÀo gtq"fg"kpfkx¶fwqu="FC"/"fgpukfcfg"cduqnwvc="FT"/"fgpukfcfg"tgncvkxc="HC"/"htgsw´pekc"cduqnwvc="Ht"/"htgsw´pekc"tgncvkxc="FqC"/"fqo kp¬pekc"cduqnwvc="FqT"/"fqo kp¬pekc"tgncvkxc="XK/"xcnqt"fg"ko rqtv¬pekc0'

"

C" htgsw´pekc" fcu" ekpeq" gur²ekgu" fg" o ckqt" qeqtt´pekc" hqtco <" *Machaerium hirtum*." *Apuleia leiocarpa*."*Samanea tubulosa*."*Coccoloba mollis*"g"*Byrsonima sericea*."guvcpfq"gncu" rtgugpvgo "pc"o ckqtkc"fcu"rctegncu."uqo cpfq"76.39' 0"

Go " tgnc±¯q" «" fqo kp¬pekc." 78.74' " fc" ¬tgc" dcucn" vqvcn" eqo rggpfg" cu" gur²ekgu" *Mangifera indica*."*Bowdichia virgilioides*."*Spondias mombin*."*Byrsonima sericea*g"*Xylopia frutescens*0'

Go "vgto qu"fg"xcnqt"fg"ko rqtv¬pekc."cu"swg"crtgugpvctco "o ckqtgu"rgtegpwcku"pq"O K" hqtco <" *Machaerium hirtum*." *Coccoloba mollis*." *Mangifera indica*." *Samanea tubulosa*" g" *Apuleia leiocarpa*0'

Fg"vqfcu"cu"gur²ekgu"gpeqpvtcfcu"pq"O K"crgpcu"c"*Mangifera indica*"p¯q"hc| "rctvg"fc" hkqhkuukqpqo kc"fc"Hqtguvc"Guvcekqpcn'Ugo kfgekfwcn"eqpukfgtcfc"eqo q"gz»kec."nqi q"p¯q" fgxgtkc" guvct"rtgugpvg"pq"co dkgpvg"go "tguvcwtc±¯q0 Fg"ceqtfq"eqo "q" Kpuvkwwq"J »twu" *4238+."c"*Mangifera indica*"² "wo c"gur²ekg's wg"go "co dkgpvg'eknkct."i gtc"cnvgtc±¯q"fq"rJ "fc" ¬i wc"rqt"cr qftgeko gpvq"fcu"hqhjcu"g"htwvqu"go "i tcpfg"swcpvkfcfg0'Vco d²o "vgo "ko r cevq" uqdtg"c"fkur gtu¯q"fg"gur²ekgu"pcvkxcu'| qqe»tkecu."rqku"² "wwknk| cfc"eqo q"hqpvg"fg"cnko gpvq" rqt"cpko cku'g."eqpugs wgpvgo gpvg."fko kpwK'q"eqpuwo q"fg"htwqu'pcvkxqu'g"uwc"fkur gtu¯q0

Eqo q"q"qdlgvkxq"f g"ug"cpcnkuctgo "cu"ekpeq"gur²ekgu"s wg"cr tgugpvctco "o ckqtgu"xcmqtgu"
f g"f gpukf cf g."htgs ẃ pekc."f qo kp¬pekc"g"xcnqt"f g"ko rqtv¬pekc."pq"ugpvkf q"f g"ug"eqo r ctct"cu"
ª tgcu"f g"guwwf q."hqi"gncdqtcf c"c"vcdgnc"80"Rqf g"ug"r gtegdgt"s wg"pq"O U"c"gur²eki"*Tapirira
guianensis" guª" r tgugpvg" pc" f gpukf cf g." htgs ẃ pekc." f qo kp¬pekc" g" XK" fkhgtgpvg" f q"
qdugtxcf q"pq"O K"qpf g"guvc"gur²eki"p¬q"² "qdugtxcf c"gpvtg"qu"ekpeq"o ckqtgu"xcmqtgu"f qu"
r ct¬o gvtqu"hkqwuuqekqn›i kequ"cpcnkucf qu0"Pq"O U."cl²o "f gnc."c"gur²eki"*Albizia polycephala"
guvgxg"r tgugpvgo "vqf qu"qu"r ct¬o gvtqu0"Lª "r ctc"cu"gur²ekgu"f g"*Apuleia leiocarpa"g"Inga
laurina"u»"p¬q"hqtco "qdugtxcf cu"pq"r ct¬o gvq"f g"f qo kp¬pekc."fkhgtgpvg"f c"gur²eki"f g"
Samanea tubulosa s wg"cr tgugpvqw/f gpukf cf g."f qo kp¬pekc"g"xcnqt"f g"ko rqtv¬pekc0"

P q"O K"cu"gur²ekgu"f g"*Coccoloba mollis, Machaerium hirtum, Samanea tubulosa,
Apuleia leiocarpa g Byrsonima sericea vkxgtco "r tgugp±c"pqvª xgn"pqu"r ct¬o gvtqu"f g"
f gpukf cf g" g" htgs ẃ pekc0" C" Mangifera indica" guª" r tgugpvg" gpvtg" qu" r ct¬o gvtqu"
hkxquuqekqn›i kequ"cpcnkucf qu"f g"f qo kp¬pekc"g"XK0"Cuuko ."eqo r ctcpf q/ug"cu"ª tgcu."pqvc/ug"
s wg"j ª "f wcu"gur²ekgu"eqo wpu"go "f gpukf cf g."htgs ẃ pekc"g"xcnqt"f g"ko rqtv¬pekc"*Apuleia
leiocarpa" g" Samanea tubulosa+" gpvtg" cu" ekpeq" eqo " o ckqtgu" xcmqtgu" pqu"r ct¬o gvtqu"
hkxquuqekqn›i kequ0"Vco d²o "hqi"qdugtxcf q"s wg"p¬q"jª "gur²ekgu"f qo kpcpvgu"eqo wpu"gpvtg"cu"
ª tgcu"f g"guwwf qu"*O U"g"O K0"

Área	Densidade	Frequência	Dominância	VI
MS	*Tapirira guianensis*	*Tapirira guianensis*	*Tapirira guianensis*	*Tapirira guianensis*
	Albizia polycephala	*Himatanthus phagedaenicuu*	*Schefflera morototoni*	*Albizia polycephala*
	Apuleia leiocarpa	*Albizia polycephala*	*Samanea tubulosa*	*Apuleia leiocarpa*
	Inga laurina	*Apuleia leiocarpa*	*Enterolobium contortisiliquum*	*Inga laurina*
	Samanea tubulosa	*Inga laurina*	*Albizia polycephala*	*Samanea tubulosa*
MI	*Coccoloba mollis*	*Machaerium hirtum*	*Mangifera indica*	*Machaerium hirtum*
	Machaerium hirtum	*Apuleia leiocarpa*	*Bowdichia virgilioides*	*Coccoloba mollis*
	Samanea tubulosa	*Samanea tubulosa*	*Spondias mombin*	*Mangifera indica*
	Apuleia leiocarpa	*Coccoloba mollis*	*Byrsonima sericea*	*Samanea tubulosa*
	Byrsonima sericea	*Byrsonima sericea*	*Xylopia frutescens*	*Apuleia leiocarpa*

Cq"ug"eqo r ctct"c"f gpukf cf g"f g"kpfkx¶f wqu"gpvtg"cu"ª tgcu."pqvc/ug"s wg"q"O U"*::9"
kpf 0j c+"cr tgugpvqw/o ckqt"xcnqt"f g"f gpukf cf g."ugi wkf q"f q"O K"eqo "862"kpf 0j c0"C"o ckqt"
f gpukf cf g"f q"O U"go "tgnc±⁻q"cq"O K"f gxg"vgt"tgnc±⁻q"eqo "cu"eqpfk±¿gu"f cu"ª tgcu."wo c"xg| "

swg."cr guect"f g"ugt go "gs wk̄pgqu."pq"O K̄qdugtxqw̌ug"swg"qu"hcvqtgu"f c"r ckuci go "*tgngxq."
f gerkxkf cf q"g" gve0¨"r qf go " guect"f kliewncpf q" q"f gugpxqnxko gpvq" xgi gvcekqpcn'pcs wgng"
co dkgpvg0'Cpcnkucpf q/ug"qwtcu'hqtgucu'tgucwtcf cu"g"pcwtcku."r gtegdg/ug"swg"c"f gpukf cf g"
xctkc"f g"4;9"c"30963"kpf 0'hj c"*P CXGU."4235¨'O CTEW\ \ Q"gv'cn0'4236¨'UKNXC."4239+'go "
ª tgcu" go " r qeguuq" f g" tguvcwtc±̄q." ² " f g" 983" c" 5062: " kpf 0'hj c" *QNKXGKTC." 4228¨'
J QNCP F C."422: ¨'P CXGU."4235¨'O CTEW\ \ Q"gv'cn0'4236¨'UKNXC."4239+'r ctc"ª tgcu"
pcwtcku."cr guect"f g"j cxgt"f kiitgp±cu"co quvtcku"gpvg"qu"guuf qu0'Rctc"vcpvq."qu"xcnqtgu"
uwr tcekxcf qu"pq"r tgugpvg"guuf q"guv̄q"gpvg"qu"xcnqtgu"qdugtxcf qu"go "qwtqu"tcdcnj qu"f g"
tguvcwtc±̄q."eqo r tqxcf q"s wg"guuc"p̄q"² "wo c"tgcnkf cf g"kuqncf c0'

Eqo "tgnc±̄q "«"f qo kp̄pekc"i gtcn'pcu"ª tgcu."f gxkf q "«"u"eqpf k¿gu"co dkgpvcku"g "cq"
j ku»tkeq"f g"wuq"f g"ecf c"wo c"f gncu."qu'xcnqtgu"f g"ª tgc"dcucn'hqtco "f g"2.8972"o ²hj c"pq"O U"
g"f g"2.8:58"o ²hj c"pq"O K0'Eqo q"xkuvq."cu"ª tgcu"go "tguvcwtc±̄q"cr tgugpvctco "xcnqtgu"
kphgtkqtgu"cq"gpeqpvtcf q"r qt"O ctcw\ | q"*et al0'*4236+."swg"cxcnkctco "ª tgcu"go "r tqeguuq"f g"
tguvcwtc±̄q"eqo "ugvg"cpqu."gpeqpvcpf q"ª tgcu'dcucku"f g"6.34: "o ²hj c"g"6.48; "o ²hj c0'

Eqo " dcug" pqu" f cf qu" cr tgugpvcf qu." eqpuvcvc/ug" swg" q" O U" r quuwk" f gpukf cf g" g"
f qo kp̄pekc'f kuvkpvqu"go "tgnc±̄q"cq'O K"cr guect"f g'vgtgo "ukf q"ko r ncpvcf qu'pc"o guo c"² r qec¨"
q" swg" r gto kvg" kphgtkt" swg" cu" eqpf k¿gu" co dkgpvcku" f q"O U" guv̄q" f kuetgvco gpvg" o cku"
hcxqtªxgku"cq"ugw"f gugpxqnxko gpvq"guvtwwtcn"dgo "eqo q."cu"eqpf k¿gu"f q"uqnq"f c"ª tgc"
r qf go "hcxqtgeg´/ncu0'

F g"o qf q"guvtwwtcn'g"eqo "dcug"pqu"kpf kecf qtgu"f kuewkf qu."ucdg/ug"swg"cu"ª tgcu"f g"
guuf q" ug" gpeqpvtco " pwo c" ugsw´pekc" f g" gxqnw±̄q" geqn»i kec." go " dwuec" f c" cwtq"
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f qu"o qf gnqu"f g"tguvcwtc±̄q"j ª "qkvq"cpqu."g "eqo " dcug"go " qwtqu"guuf qu"f kuewkf qu"
cpvgtkqto gpvg." r qf g/ug" f k| gt" swg" cu" ª tgcu" r qf gtĩo " guect" go " o gnj qtgu" eqpf k¿gu."
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j qwxg"wo "o qpkqtco gpvq"ghkekgpvg."eqpvtqng"f c"cvqeqo r gtk±̄q"g"f g'j gtbª egcu"kpkdkf qtcu"
f c"tgi gpgtc±̄q"pcu"ª tgcu."egtco gpvg"q"r tqeguuq"f g"tguvcwtc±̄q"hqtguvcn'guvctkc"o gnj qt"
f gugpxqnxkf q0'

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806 Kpf kecf qt 'f g'hwp±̄q'"

C" cr nkec±̄q" f guugu" kpf kecf qtgu." r quukdknkqw' eqpj gegt" q" hwpekqpco gpvq" f qu'
gequukuvgo cu"go "cp̄nkug."qw'uglc."f cu"ª tgcu"go "r tqeguuq"f g"tguvcwtc±̄q."eqo "c"hkpcnkf cf g"
f g'r tqlgvct'uwc'ecr cekf cf g'f g"cwqttgi wnc±̄q'pq"co dkgpvg0"

Go "tgnc±⁻q"cqu"i twrqu"geqn»i kequ's wg"r tgfqo kpctcm "pqu"cm dkgpvgu"guwwfcf gu"*Hki wtc"

35+."c"rtgugp±ec"f g"gur²ekgu"encuukhhecfcu"eqo q"rkqpgktcu"hqk'o ckqt"pa"⁻tgc"go "rtqeguuq"f g"

tguvcwtc±⁻q"f q"O Keqo "qeqtr´pekc"f g"78' ."gpswcpvq"pq"O U"c"rgtegpvci go "f g"gur²ekgu"

rkqpgktcu"hqk'69' 0'S wcpf q"uqo cf q"q"i twrq"f cu"rkqpgktcu"eqo "cu"ugewpf⁰tkcu"kpkekcku"pcu"

ª tgcu" go "rtqeguuq" f g" tguvcwtc±⁻q." pqvc/ug" swg" o cku" f g" 92' " f cu" gur²ekgu" pqu" f qku"

co dkgpvgu"u⁻q"f g"kp¶ekq"f g"uweguu⁻q"geqn»i kec0'

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Hki wtc'350'I twrqu"geqn»i kequ."go "r gtegpvwcn"pcu"ªtgcu"go "r tqeguuq"f g'tguvcwtc±⁻q"*O U"g"O K+."qecn¿cf cu
pc"o cvc"ekkct"f cf"dctt ci go "f q"Uitklli"Xié´pekc"ó"RG"*Rk"/"rkqpgktc±'Uk"/"ugewpfª tkc"kpkekcn±'Uv"/"ugewpfª tkc
vctfkc0' ..

MS
47 %
11 %
42 %
■ Pi ■ Si ■ St

MI
56 %
17 %
28 %
■ Pi ■ Si ■ St
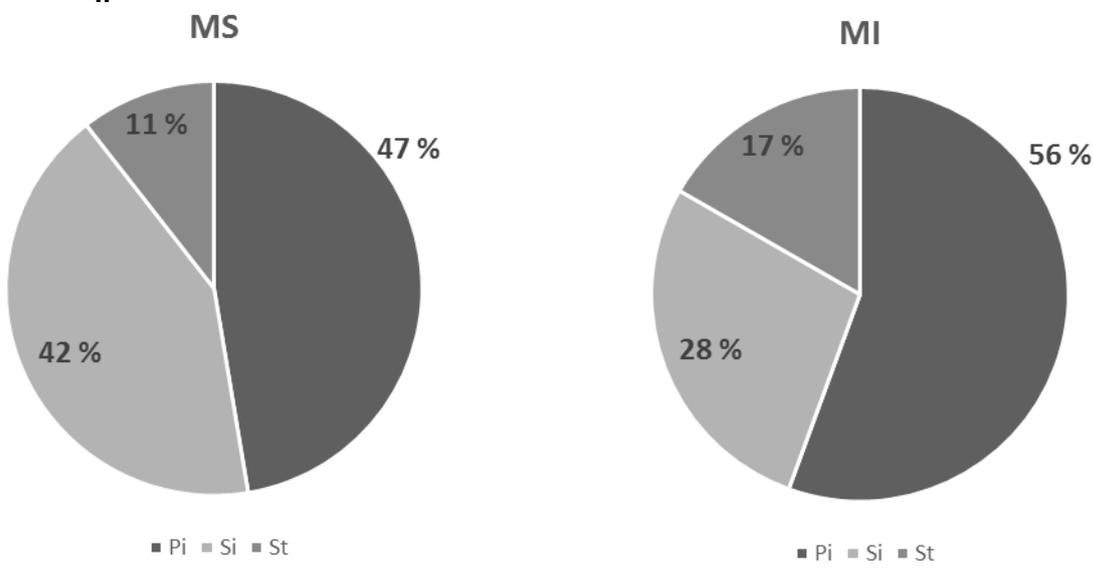
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tgi gpgtcpvgu"ctb»tgqu"*DTCP ECNKQP *et al*0'422; +0'"

P c"ªtgc"go "r tqeguuq"f g'tguvcwtc±⁻q"pq o qf gnq"O U."c"swcpvkf cf g"f g"r kqpgktcu"hqk'wo "

r qweq"o ckqt'f q"swg"c"swcpvkf cf g"f g"gur²ekgu"ugewpfª tkcu"*64' +."q"swg"r gto kvg"kphgtkt"swg"

c" ª tgc" guvª " go " wo " go " guvªi kq" f g" uweguu⁻q" o cku" cxcp±cf q" f q" swg" pq" o qf gnq" O K"

*r tgf qo kp⁻ekc'f g'Rk"? '78' +.'kpf kecpf q"swg"cu"gur²ekgu'kpkekcku'f c'uweguu⁻q"guv⁻q"egf gpf q"

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eqpugtxcf qu0'

Ecdg"ucnkgpvct"swg."cr guct"f g"j cxgt"i twr qu"geqn»i kequ'r tgf qo kpcpvgu."go "vqf qu"qu"f qku"

co dkgpvgu"j ª "tgr tgugpvcpvgu"f qu"qwvtqu"i twr qu."ectcevgt¶uvkec"guuc"f g"xkvcn'ko r qtt⁻pekc"pc"

tguvcwtc±‾q0'Eqo q"tguucnc"O ctvlpu"*4235÷."c'eqo dkpc±‾q"f g"gur ² ekgu'f g"f klhgtgpvgu"i twr qu"
geqn»i kequ"² "hwpf co gpvcn'pqu"r tqlgvqu"f g"tguvcwtc±‾q."wo c"xg| "swg."cu"gur ² ekgu"cf cr vcf cu"
c"eqpf k¿gu"f g"o clqt"nwo kpqukf cf g"eqoqpk| co "cu"ª tgcu"cdgtvcu"g"etgego "tcr klf co gpvg."
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uweguu‾q."swg"f ct‾q"uuwvgpvcdlklf cf g"«'hqtguvc0'S wcpf q"c"f gpuif cf g"f g"gur ² ekgu'r kqpgktcu'² "
cnc" g"p‾q" guª " dgo " f kuvtkdw¶f c" gur cekcno gpvg." q" f gugpxqnrko gpq" f c" ª tgc" r qf g" ugt "
eqo r qo gvlf q."r qku'guucu"gur ² ekgu"cr tgugpvco "o o "ewvtq"elecq"f g"xkf c"*37/42"cpqu÷."p‾q"
i ctcpvkpf q"c"o cpwgp±‾q"f g"f quugn'go "nqpi q"r tc| q"*O ˝ P KEQ."4234÷0'P guvg"ugpvkf q."ug"
vqtpc"guugpekcl'gtr"gur ² ekgu'swg"r quuco "f ct"eqpvkpwf cf g"cq"r tqeguuq"uweguukqpcn'uo c"xg| "
swg."cq"o qqtgtgo ."cu"r kqpgktcu"hqto co "enctgktcu"swg"cr klf co"r qf go "ugt"eqnqpk| cf cu"
r qt'i tcm ¶pgcu'kpxcuqtcu."tgvctf cpf q"c"uweguu‾q"geqn»i kec"*UKNXC."4239÷0'

F g"ceqtf q"eqo "c'hki wtc"36."c"s‾pf tqo g"f g"f kur gtu‾q'f cu'sgo gpvgu'f kur gtuc'r qt"cpko cku."
guª "eqpegpvtcf c'go "o cku'f g"77' "f cu"gur ² ekgu"*55'ur r 0÷'swg"eqo p¿go "cuª tgcu'f g"guuwf q."
ugpf q"52' "f g"gur ² ekgu| qqe»tkecu'pq"O U'g"82' "pq"O K0'Rctc'tgi k¿go'f g"enko c"vtqr kecn'c"
s‾pf tqo g"f g'f kur gtu‾q'f cu'sgo gpvgu"r qt"cpko cku'² "o cku"eqo wo "swg"cu"qwtcu"hqto cu'f g"
f kur gtu‾q0'Rctc"Vcdctgklí'Rgtgu"*4224÷."pc'Hqtguvc'Cvnpvkec."f g"75'c'; ; ' "f cu"gur ² ekgu"
ctd»tgcu"cr tgugpvco "o gecpkuo qu"swg"r tgo kvgo "c'f kur gtu‾q'f g"uwcu'ugo gpvgu"r qt"cpko cku"
xgtvgdtcf qu0'Rctc"o cvc"eklkct."c'f kur gtu‾q'| qqe»tkec"gqm "ugpf q"eqpulf gtcf c"eqo q"c"
r tkpekr cl'hqto c'f g"f kur gtu‾q"go "hqtguvcu"vtqr keclu."eqpulf gtcpf q'swg."guugu'co dkgpvgu"
r quukdklkvco " c" o cpwgp±‾q" f c" hcwpc" go " dwuec" f g" cnko gpvq." ª i wc" g" tghÀi kq"
*UVGHCP GNNQ÷' HGTP CP F GU/DWNJ ï Q÷' O CTVKP U." 422; ÷' UVGHCP GNNQ" gv" cn0"
4232÷'UECTKQV÷'TGKU."4232÷'UKNXC"et al.."4234÷'UKNXC."4239÷0'

Hki wtc"360'U¶pf tqo g"f g"f kur gtu‾q."go "r gtegpvwcn"pcu"ª tgcu'go "r tqeguuq'f g"tguvcwtc±‾q"*O U"g"O K÷.
nqeclk| cf cu"pc"o cvc"ekkct'f c"dcttci go "f q"Uktklk"Xkeã pekc"ó"RG"*\qq/"| qqe»tkec÷'Cdkq"/"cdk»kec÷'Kf "/
kpf gvgto kpcf cu÷0'

MS

30 %
35 %
35 %

■ Zoo ■ Abio ■ Id

MI

15 %
60 %
25 %

■ Zoo ■ Abio ■ Id
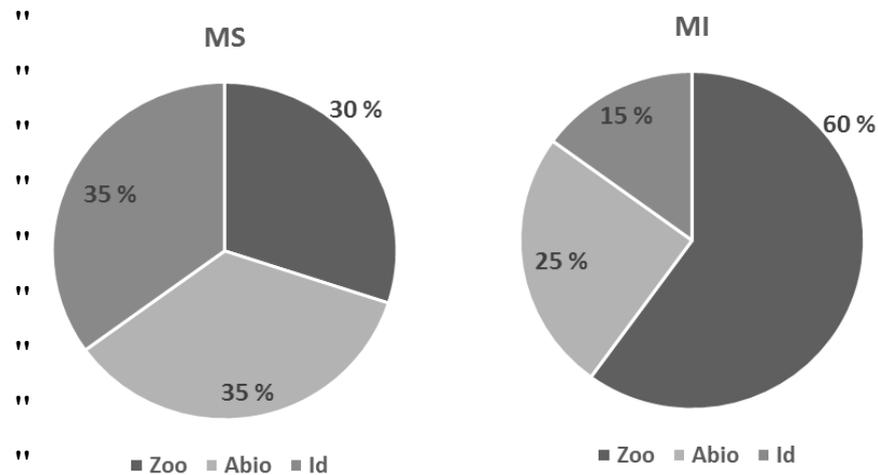
Qu" tguwncf qu" gpeqpvtcf qu" eqpf k‌| go " eqo " q" ekcf q" go " guwf q" cpvgtkqtgu." hkecpf q"
r t»zko q"cq"gpeqpvtcf q"r qt"Xgp‌| ng"*et al*0'*4236+'s wg. "cxcnkcpf q"c"us‌pf tqo g"f g"f kur gtu‌q"
go "t´u"hcugu"f c"uweguu‌q"hnqtguvcn'go "co dkgpvg"ekhkct f g"hnqtguvc"guvcekqpcn"ugo kf ecf wcn"
gpeqpvtctco "wo "r gtegpvwcn'f g"tks wg‌| c"f g": 4 r ctc‌| qqeqtkc0'"

Eqo q" dcug" pqu" qwtqu" kpf kecf qtgu" l ª" f kuewkf qu. "pqc/ug" s wg" q" co dkgpvg f q"O U."
s wcpf q"eqo r ctcf q"cq"O K"cr tgugpvc"eqo r qtvco gpvq"guvtwwtcn‌ectcevgk| cf q"r qt"o ckqt. "
ª tgc"dcucn‌g"f gpukf cf g"f g"kpf kv‌f wus. "o gpqt"qeqtr ‌pekc"f g"gur ² ekgu"r kqpgktcu"g"f kur gtu‌q"
f qu"f kª ur qtqu"r qt"cpko cku0'

Eqo "tgnc‌q "«"tgi gpgtc‌q"pcwtcn f cf q"ko r qtvpvg"r ctc"ug"cxcnkct"c"gxqnw‌± q"f c"
xgi gvc‌q"s wg"hqk"ko r ncpvcf c"g"c"r gtr gwwc‌q"f c"eqo wpkf cf g"*UKNXC. "4239+."hqk'r quu‌kxgl'
cpcnkuct"cur gevqu"ko r qtvcpvgu. "f gpvtg"gngu. "c"eqo r quk‌q"f cu"gur ² ekgu"r tgugpvgu"pc"ª tgc. "
eqo q"gzr quq"pc"vcdgnc"90'Eqphqto g"qbugtxcf q. "pc"eqo r quk‌q"f c"tgi gpgtc‌q"pcwtcn'f q"
O U"hqtco " gpeqpvtcf qu"; 3"kpf kv‌f wqu. "encuukhkecf qu"go "xkpvg"g"ugku"gur ² ekgu"bqv‌pkecu. "
f kuvtkdw‌f qu"go "f g| guugvg"hco ‌kcu‌pq"O K"j cxkc"4; 7"kpf kv‌f wqu"f g"vtkpvc"g"t´u"gur ² ekgu. "
ci twr cf cu"go "f g| gpqxg"hco ‌kcu0'

Eqo r ctcpf q-ug"c"eqo r quk‌q f cu"gur ² ekgu"ctb»tgcu"pq"O U. "f cu"48"gur ² ekgu"r tgugpvgu"
pc"tgi gpgtc‌q. "36"u‌q "gpeqpvtcf cu"pq"eqo r qpgpv"ctb»tgq‌pq"O K"f cu"55"gur ² ekgu"
tgi gpgtcpvgu."37'hc| go "r ctg"f q"eqo r qpgpv"ctb»tgq. f go qpuvtcpf q"s wg"cr tqzko cf co gpvg"
72' "f cu"gur ² ekgu"gpeqpvtcf cu"pc tgi gpgtc‌q"guv‌q"co b²m "r tgugpvgu"pc r ctg"ctb»tgc"f q"
co dkgpvg."o guo q."pq"ecuq"f q"O U."vgtgo "ukf q"co quvtcf qu"r qwequ"kpf kv‌f wqu0'
"

Vcdgnc"90'Gur ² ekgu"tgi gpgtcpvgu"pcu"f cu‌ª tgcu"go "r tqeguuq"f g"tgguvcwtc‌q"f q"*O U"g"O K‌"nceck‌| cf cu"pc"o cvc"ekhkct"f c"bcttci go "f q"Uktkkk'pq"o wpkk‌r kq"f g"Xke´ pkc"ó'RG"

Hco ‌kc /Gur ² ekgu"	Pàf g‌Kpf kv‌f wqu		QT"	I G"	UF"
	O U'	O K'			
Cpctecf kcegcg"	'"	'"	'"	'"	'"
Tapirira guianensis Cwdn0'	7"	/"	P "	Rk'	\ qq"
Cppqpcegcg'	'"	'"	'"	'"	'"
Annona montana "eh0'	/"	3"	P "	Rk'	\ qq"
Cppqpcegcg"	: "	/"	P "	Uk'	/"
Cr qe{pcegcg"	'"	'"	'"	'"	'"
Vcdgtpcgo qpvcpc'hncxkecpu'Y knf 0'Gz'T qgo 0(‌ "Uej wn0'	/"	: "	P "	Uk'	\ qq"
Himatanthus phagedaenicus"O ctv0'	: "	4"	/"	Uk'	\ qq"
Dki pqpkcegcg"	'"	'"	'"	'"	'"
Handroanthus sp.	5"	5"	P "	Uk'	Cdkq"
Handroanthus chrysotrichus"*O ctv0'gz"F E0+'O cwu"	/"	8"	P "	Uk'	Cdkq"
Tabebuia obtusifolia"*Ej co 0+'Dwtgcw'	7"	/"	P "	Uk'	Cdkq"
Dqtci kpcegcg"	'"	'"	'"	'"	'"

Cordia sellowiana "Ej co 0"	/"	3"	P "	Uk"	\ qq"
Dwtugtcegcg"	'"	'"	'"	'"	'"
Protium heptaphyllum "O CTEJ 0"	5"	3"	P "	Uk"	\ qq"
Ecgucrrlpkqlfgcg"	'"	'"	'"	'"	'"
Caesalpinia leiostachya "*Dgpyj 0+'F wemg"	32"	/"	P "	Uk"	/"
Ejt{uqdcrrpcegcg"	'"	'"	'"	'"	'"
Licania tomentosa "*Dgpyj 0+'Htkuej 0"	5"	/"	P "	Uk"	/"
Gt{vjtqz{rrcegcg"	'"	'"	'"	'"	'"
Erythroxylum citrifolium "C0'Uv0/'J kl0"	/"	3"	P "	Uv"	\ qq"
Gwrjqtdlcegcg"	'"	'"	'"	'"	'"
Mabea occidentalis "Dgpyj 0"	3"	/"	/"	Uk"	Cdkq"
Hcdcegcg"	'"	'"	'"	'"	'"
Albizia polycephala "*Dgpyj 0+"	7"	44"	P "	Rk"	Cdkq"
Anadenanthera colubrina "*Xgm0+'Dtgpcp"	3"	59"	P "	Uk"	Cdkq"
Apuleia leiocarpa *Xqi gm+'L0H0'O cedt0	3"	/"	P "	Rk"	/"
Enterolobium contortisiliquum "*Xgm0+'O qtqpi 0"	/"	4"	P "	Uk"	Cdkq"
Hymenaea courbaril "N0"	8"	/"	P "	Uk"	/"
Inga laurina "*Uy 0+'Y klf 0"	3"	/"	P "	Rk"	\ qq"
Inga ur 0	36"	35"	P "	Rk"	\ qq"
Machaerium hirtum "*Xgm0+'Uvgmhgmf "	/"	3"	P "	Uk"	Cdkq"
Mimosa caesalpiniifolia "Dgpyj 0"	3"	/"	P "	Rk"	Cdkq"
Samanea tubulosa "*Dgpyj 0+'Dctpgd{'('10'Y 0'I tlo gu"	3"	/"	P "	Uk"	Cdkq"
Swartzia pickelii "Mkmlr *ex*'F wemg"	3"	8"	P "	Uk"	\ qq"
J{rgtlecegcg"	'"	'"	'"	'"	'"
Xkuo ic'i wkcpgpuku "*Cwdr0+'Rgtu0"	3"	3"	P "	Rk"	\ qq"
Ncolkcegcg"	'"	'"	'"	'"	'"
Ncolkcegcg"	/"	4"	/"	Ue"	/"
Vitex rufescenu "C0Lwuu0"	/"	74"	P "	Ue"	\ qq"
O cllifjlcegcg"	'"	'"	'"	'"	'"
Byrsonima sericea "F E"	3"	36"	/"	Rk"	\ qq"
O cllcegcg"	'"	'"	'"	'"	'"
Eriotheca ur 0	3"	3"	/"	Ue"	/"
Apeiba tibourbou Cwdr0	/"	3"	P "	Rk"	/"
O gllustom cwcegcg"	'"	'"	'"	'"	'"
Miconia albicans "*Uy 0+'Vtkcpc"	/"	4"	P "	Uk"	/"
Miconia sp.	/"	3"	/"	Ue"	/"
O{vcegcg"	'"	'"	'"	'"	'"
Eco r qo cpgukc'ur 0	/"	3"	P "	Rk"	\ qq"
Psidium guineense "Uy ctv 0"	/"	32"	P "	Rk"	\ qq"
Engenia sp.	6"	/"	/"	Ue"	/"
Pgrjtqllplfcegcg"	'"	'"	'"	'"	'"
Inga ingoides *Tlej +'Y kl0	3"	3"	P "	Rk"	/"
Qejlpcegcg"	'"	'"	'"	'"	'"
Ouratea castaneifolia "*F E0+'Gplr 0"	/"	33"	/"	Uk"	\ qq"
Rqrl{ilqpcegcg"	'"	'"	'"	'"	'"

Coccoloba mollis'Ecuct0'	/"	3; "	P "	Rk'	\ qq"
Twdkcegcg''	""	""	""	""	""
Genipa americana'N0'	5"	3"	P "	Uv'	\ qq"
Ucrkececgcg''	""	""	""	""	""
Casearia sylvestris'Uy 0'	3"	; "	""	Uk'	\ qq"
Casearia hirsuta'Uy 0'	/"	; "	P "	Uk'	\ qq"
Ucrkpf cegcg''	""	""	""	""	""
Cupania revoluta'Tf m0'	/"	3: "	P "	Rk'	/"
Allophylus edulis'*C0Uv0'J kn0'gv'crn0+'J kgtqp0'gz 'P kgf gtn0'	/"	3"	P "	Rk'	\ qq"
Talisia esculenta'*C0UV0'J KN0+'TCF NM0'	4"	59"	P "	Rv'	\ qq"
Vqvcrlf g'kpf kx¶f wqu''	; 3"	4; 7"	""	""	""

O U'ó'O qf gnq'uweguukqpcn»M Kó'O qf gnq'f g'kpf w±ɉq'f c'tgi gpgtc±ɉq'pcwtcn»QT ɉ'ó'qtki gm "*G'ó'gz»vkcu±" I G'/'i twrq'geqn»i keq'*Rk'ó'r kpgktc. "Uk'/'ugewpf ª tkc'kpkekcn "Uv'/'ugewpf ª tkc'ctf kc. "Ue'/'ugm "ectcevgtk{ c±ɉq±"DF "/" sɉpftqm e'f'e f kur gtu¯q'*Cdkq'ó'cdk»vkec. 'Cwu'ó'cwvqc»tkec. 'Cpg'ó'cpgm qe»tkec. '\ qq'ó'| qqe»tkec+'

Ngxcpf q/ug'gm "eqpskf gtc±ɉq's wg'eqm "dcug'pc'tgi gpgtc±ɉq'pcwtcn'r qf g/ug'gpvgpf gt"g" eqm r tggpf gt"q'p¶kgn'f g'tguknpᶜpkec'f cᵃ tgc. 'ɒ "r qus¶kgn'kphgtkt's wg'pqu'm qf gnqu'O U'g'O Kjᵃ "alc'tguknpᶜpkec. 'm c'xgj | 's wg. 'cr tgugpvcm "gngxcf c'f gpukf cf g'f g'tksuj| c. 'f gm qpuvcpf q's wg'c" ej gi cf c'f g'r qrᵃ g wqu'pcᵃ tgcu'guvᵃ "eqpugi wkpf q'ug'guvcdgnegt0'S wcpf q'eqm r ctcm /ug'cu' f wcuᵃ tgcu'gm "tguvcwtc±ɉq'pqv/ug'c'f khgtgp±c'f qu'xcnqtgu'gpeqpvtcf qu'gpvg'qu'cm dkgpvgu. " r gtm kkpf q'uwi gtkt's wg'q'm qf gnq'uweguukqpcn'r qf g'guvct'vgpf gpf q'c'guvci pc±ɉq'uweguukqpcn" lᵃ "s wg. 'f gr qku'f g'qkq'cpqu'f g'r ncpvkq'ckpf c'ug'gpeqpvtc'eqm "wm "s wcpvkvcvkxq'r gs wgpq'f g" tgi gpgtcpvgu'*hki wtc'37+0'

Hki wtc'370 Xkuvc'kpvgtpc'f q'm qf gnq'uweguukqpcn'*C+'g'f q'm qf gnq'f g'kpf w±ɉq'f c'tgi gpgtc±ɉq'pcwtcn'*D+. " qkecrl'cf qu'pc'm cvc'ekrkctrf c'dcttci gm "f q'Uktkkjl'pq'm unkc¶f kq'f g'Xke´pekc'ó'RG0'

Fg 'ceqtf q'eqm "O ctvkpu"*4236+. 'gm "cnl wpu'ecuqu. 'c'gngxcf c'kphguvc±ɉq'f g'i tcm ¶pgcu' kpxcuqtcu. 'eqm q'q'ecrlm /i qtf wtc. 'eqnqpk¯q'g c'dtcswkᵃ tkc. 'r qf g'kpkdkt c 'tgi gpgtc±ɉq' pcwtcn'f cu'gpᵃ ekgu'ctdwnkxq/ctb»tgcu. 'm gm q's wg'guucu'guvglcm "r tgugpvgu'pq'dcpeq'f g" ugm gpvgu'qw'ej gi wgm "cᵃ tkc. 'xkc'f kur gtu¯q0'Gpvtgvcpvq. 'eqm "dcug'pguuc'kphqtm c±ɉq'g'pq'

egpª tkq "qdugtxcf q "pc "ª tgc "go "tguvcwtc±¯q "f q "O K"r qf g/ug "kphgtkt "s wg "c "gzkuv́ pekc "f g "o cvqeqo r gvk±¯q "pc "ª tgc "p¯q "gusª "kpkdkpf q."c "r tkpc¶ tkq."q "guvcdgngeko gpvq "f c "tgi gpgtc±¯q "pcwwtcn0' Rqt²o ." c "r twf´ pekc "f guuc "kphqto c±¯q "f gxg "ugt "ngxcf c "go "eqpukf gtc±¯q "pq "r ncpglco gpvq "f g "ª tgc "r ctc "tguvcwtc±¯q "hqtguvcn "r qku."Ukncc "*4239+."pq "guwf q "f g "vt´ u "co dkgpvgu "ekntctgu."cngtvc "uqdtg "c "f ko kpwk±¯q "f c "tgi gpgtc±¯q "pcwwtcn "f gxkf q "«"kphguvc±¯q "f g "i tco ¶pgcu "kpxcuqtcu 's wg "eqo r gvgo "g "ko r gf go "q "guvcdgngeko gpvq "f g "kpf kx¶f wqu "ctd»tgqu0"

Rctc "s wg "c "tgi gpgtc±¯q "pcwwtcn "ceqpvg±c "go "wo "co dkgpvg "f gi tcf cf q "qw"go "r tqeguuq "f g "f gi tcf c±¯q." f gvgto kpcf cu "eqpf k¿gu "s¯q "pegeuuª tkcu." eqo q "c "gnko kpc±¯q "f qu "hcvqtgu "ecwucf qtgu "f c "f gi tcf c±¯q."gpvg "gngu "q "r cuqtgkq "g "kpe´pf kqu."c "gzkuv́ pekc "f g "hqpvg "f g "r tqpª i wnqu "*dcpeq "f g "ugo gpvgu "f q "uqnq." ej wxc "f g "ugo gpvgu+."c "r tgugp±c "f g "f kur gtuqtgu." dqcu "eqpf k¿gs "f g "enko c "g "uqnq."cw´ pekc "f g "r tgf cf qtgu "g "f g "ci gpvgu "cpt»r kequ"*HCTKC±" U¡ TKQ=¡I CTTKF Q.'4223+0"

Cpcnkucpf q/ug "c "tgi gpgtc±¯q "pcwwtcn "qdugtxqw/ug "s wg "cu "gur²ekgu "r kqpgktcs "p¯q "hqtco " r tgf qo kpcpvgs "gpvg "qs "tgi gpgtcpvgs0' S wcpf q "eqo r ctcf cs "«"eqo r quk±¯q "ctd»tgc." cs "gur²ekgs "r tgf qo kpcpvgs "pc "tgi gpgtc±¯q "pcwwtcn "hqtco "cs "ugewpf ª tkcs "kpkekcku"*ñki wtc "38+0' Tguwwcf q "ugo gnj cpvg "hqk "qdugtxcf q "r qt "Uqw¡c "*4236+"gpvg "cs "ª tgcs "tguvcwtcf cs0"

Hki wtc "380 F kuvkdwk±¯q "f qs "i twr qs "geqn»i kqs "f cs "gur²ekgs "qdugtxcf cs "pcs "ª tgcs "go " r tqeguuq "f g "tguvcwtc±¯q *O S "g "O K."nqecn¡cf qs "pc "o cvc "eknkct "f c "dcttci go "f q "Ukrkkík'pq "o wpkeír ¡kq "f g "Xke´pekc "ó"RG"*Rk'/‹r kqpgktc=Uk
/"ugewpf ª tkc "kpkekcn=Uv'/"ugewpf ª tkc "ctf kc=Ue"/"ugo "encuukñkec±¯q+0"
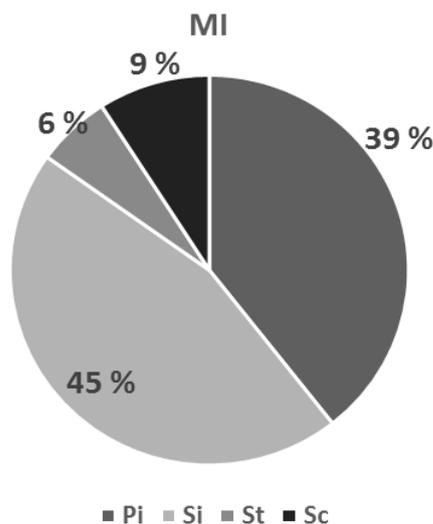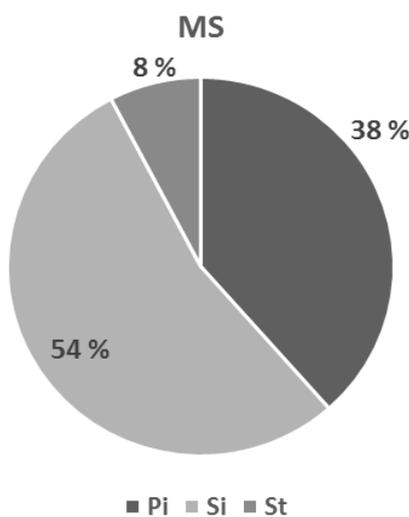
Go "tgnc±¯q "«"śpf tqo g "f g "f kur gtu¯q "f qs "f k⁴ur qtqs." c "r tgf qo kp¯pekc "f c |qqeqtkc." s wcpf q "qs "cpko cks "f kur gtuco "cs "ugo gpvgs."hqk"pqv»tkc "pcs "f wcs "ª tgcs."ugpf q "o cks "r tgugpvg "pq "O K"eqo "83÷ "f cs "gur²ekgs "*Hki wtc "39+."eqttgpf q "uwc "f kur gtu¯q "r qt "ugs"o ecpkuo q0" Ectcevgt¶svkec "eqpukf gtcf c "dgp²ñkec "r ctc "c "r gtr gwwc±¯q "f qs "kpf kx¶f wqs "go "co dkgpvgs "go "

tgucwtc±¯q." r qku." ugi wpfq" Xgp|ng" *et al.* "*4236+." c" tgnc±¯q" r npcm/cpmo cn" r quuwk"

ko r qtv‑pekc"grgxcf c"r ctc"c"uweguu¯q"f c"hmqtguvc"go "cm dkgpvg"ekrkct0"

Hki wtc'390U'pftoqe"fg"fkurgtu¯q"fqu"kpfkx¶fwqu"tgigpgtcpvgu"pcs"tgcs"go "r qceguuq"fg"tgucwtc±¯q"*O U"go O K¬"nqecm|cfqu"pc"m cvc"ekrkct"fc"dcttgim go "fq"Uktklk"pq"m wpke¶r kq"fg"Xke´pekc"ó"RG"*\ qq"/"| qqe»rkec‗Cdkq"/cdk»rkec‗Kf "/"kpfgvgm kpfcu+0"

MS   MI

Rctc"q"eqo r qpgpvg"tgi gpgtcpvg"hqk"tgcm| cf c"c"cprkug"hkvquuqekqn»i kec"f cu"f wcs"a tgcs"f g"guvwf q."eqphqm e"cr tgugpcf q"pcs"vcdgmcs<"g;."eqo "cs"gur ²ekgs"gzr quvcs"go "qtf go "f getguegpvg"f q"xcmqt"f g"ko r qtv‑pekc0

Vcdgmc<! 0 Hkvquqekqnqi kc"f c"tgigpgtc±¯q"pcuwtcm"f c"a tgc"go "tgucwtc±¯q"f q"O U."m ecm| cf c"pc"m cvc"ekrkct"f c"dcttgim go "fq"Uktklk"pq"m wpke¶r kq"fg"Xke´pekc"ó"RG0

Gur ²ekgs	PK'	F C"	F T"	HC"	HT"	FqC"	FqT"	XK'	XK'* +'
Apuleia leiocarpa	36"	;5"	37.6"	69"	32.67"	2.226:"	5.86"	7:7.96"	52.35"
Cppqncegcg"	:"	75"	:.:"	55"	9.68"	2.2288"	7.25"	552.3:"	38.;:"
Caesalpinia leiostachya‴	32"	89"	33.2"	75"	33.;6"	2.2245"	3.9:"	455.64"	34.23"
Himatanthus phagedaenicus‴	:"	75"	:.:"	55"	9.68"	2.2263"	5.2:"	424.3;"	32.62"
Tabebuia obtusifolia‴	7"	55"	7.7"	49"	7.;9"	2.2272"	5.97"	344.;7"	8.54"
Samanea tubulosa‴	7"	55"	7.7"	42"	6.6:"	2.2269"	5.75"	:8.;6"	6.69"
Tapirira guianensis	7"	55"	7.7"	49"	7.;9"	2.224;"	4.3:"	93.59"	5.89"
Hymenaea courbaril‴	8"	62"	8.8"	62"	:.;8"	2.2238"	3.3:"	8;.;6"	5.82"
Engenia sp.	6"	49"	6.6"	35"	4.;;"	2.2264"	5.39"	63.85"	4.36"
Handroanthus sp.	5"	42"	5.5"	35"	4.;;"	2.226:"	5.86"	57.:2"	3.:6"
Licania tomentosa‴	5"	42"	5.5"	42"	6.6:"	2.2244"	3.86"	46.38"	3.46"
Protium heptaphyllum‴	5"	42"	5.5"	9"	3.6:"	2.2273"	5.:5"	3:.:6"	2.;9"
Inga ur 0	3"	9"	3.3"	9"	3.6:"	2.2337"	:.8:"	36.46"	2.95"
Mabea occidentalis‴	3"	9"	3.3"	9"	3.6:"	2.232;"	:.49"	35.79"	2.92"
Inga ingoides	3"	9"	3.3"	9"	3.6:"	2.2326"	9.:7"	34.::"	2.88"
Genipa americana‴	5"	42"	5.5"	42"	6.6:"	2.2233"	2.:2"	33.:5"	2.83"

Machaerium hirtum	3"	9"	3.3"	9"	3.6; "	2.22: 5"	8.4: "	32.4; "	2.75"
Albizia polycephala"	3"	9"	3.3"	9"	3.6; "	2.2298"	7.9: "	; .6; "	2.6; "
Talisia esculenta	4"	35"	4.4"	35"	4.; ; "	2.2239"	3.4: "	: .63"	2.65"
Enterolobium contortisiliquum	3"	9"	3.3"	9"	3.6; "	2.2286"	6.: 8"	9.; 9"	2.63"
Eriotheca ur 0'	3"	9"	3.3"	9"	3.6; "	2.2286"	6.: 8"	9.; 9"	2.63"
Inga laurina	3"	9"	3.3"	9"	3.6; "	2.2282"	6.78"	9.69"	2.5: "
Byrsonima sericea"	3"	9"	3.3"	9"	3.6; "	2.2267"	5.66"	7.86"	2.4; "
Casearia sylvestris"	3"	9"	3.3"	9"	3.6; "	2.2264"	5.3: "	7.44"	2.49"
Anadenanthera colubrina"	3"	9"	3.3"	9"	3.6; "	2.2252"	4.48"	5.93"	2.3; "
Vismia guianensis	3"	9"	3.3"	9"	3.6; "	2.223; "	3.67"	4.59"	2.34"
Vqvcn'	**; 3"**	**829"**	**322"**	**669"**	**322"**	**2.3543"**	**322"**	**3; 66"**	**322"**

P K'/"P Ào gtq"f g" Kpf kx¶f wqu=¯F C"/"F gpukf cf g" cduqnwvc *kpf (c⁻³=¯F T"/"F gpukf cf g" tgncvkxc" *¯ =¯HC"/"
Htgsẃ pekc" cduqnwvc" *¯ =¯HT"/"Htgsẃ pekc" tgncvkxc" *¯ =¯FqC"/"Fqo kp⁻pekc" cduqnwvc" *o ⁰ (j c⁻³=¯FqT"/"
Fqo kp⁻pekc" tgncvkxc" *¯ =¯XK/"Xcnqt" f g" ko r qtv⁻pekc" *¯ +0'

Vcdgnc '; 0 Hkxquqekqnqi kc" f c" tgi gpgtc±¯q" pcwtcn" f c" ⁰ tgc" go "tguvcwtc±¯q" f q" O K" ncecnk{ cf c" pc o cvc" ekntkct" f c" dcttci go "f q" Uktkkkk'pq" o unce¶k kq" f g" Xk´ pekc" 6" RG

Gur²elgu"	**P K'**	**F C"**	**F T"**	**HC"**	**HT"**	**FqC"**	**FqT"**	**XK'**	**XK**"** +'
Machaerium hirtum	59"	469"	34.76"	82.22"	; .22"	2.2259"	4.; 4"	54. .: 3"	43.34"
Talisia esculenta"	59"	469"	34.76"	: 2.22"	34.22"	2.2249"	4.37"	545.; ; "	42.96"
Vitex rufescens	74"	569"	39.85"	55.55"	7.22"	2.2263"	5.42"	4: 3.86"	3: .25"
Coccoloba mollis	3; "	349"	8.66"	68.89"	9.22"	2.2257"	4.92"	343.: 6"	9.: 2"
Apuleia leiocarpa	35"	: 9"	6.63"	55.55"	7.22"	2.2277"	6.4; "	; 6.66"	8.27"
Cupania revoluta"	3: "	342"	8.32"	62.22"	8.22"	2.224: "	4.43"	: 3.2: "	7.3; "
Samanea tubulosa"	44"	369"	9.68"	48.89"	6.22"	2.224; "	4.53"	8: .: 4"	6.63"
Byrsonima sericea"	36"	; 5"	6.97"	48.89"	6.22"	2.2253"	4.64"	67.: ; "	4.; 6"
Psidium guineense"	32"	89"	5.5; "	75.55"	: .22"	2.223: "	3.66"	5; .2: "	4.72"
Casearia sylvestris"	; "	82"	5.27"	48.89"	6.22"	2.2259"	4.: 9"	56.; ; "	4.46"
Tabernaemontana flavicans	: "	75"	4.93"	42.22"	5.22"	2.226; "	5.: 5"	53.36"	3.; ; "
Casearia hirsuta"	; "	82"	5.27"	42.22"	5.22"	2.225: "	4.; 8"	49.2; "	3.95"
Handroanthus chrysotrichus"	8"	62"	4.25"	48.89"	6.22"	2.2263"	5.43"	48.34"	3.89"
Ouratea castaneifolia"	33"	95"	5.95"	35.55"	4.22"	2.2246"	3.: 7"	35.: 5"	2.: ; "
Albizia polycephala"	: "	62"	4.25"	42.22"	5.22"	2.223: "	3.63"	: .: 5"	2.77"
Handroanthus sp.	5"	42"	3.24"	35.55"	4.22"	2.226; "	5.: 5"	9.; ; "	2.72"
Himatanthus phagedaenicus"	4"	35"	2.8: "	35.55"	4.22"	2.2269"	5.93"	7.25"	2.54"
Inga ingoides	3"	9"	2.56"	8.89"	3.22"	2.2332"	: .: 3"	4.; 4"	2.3; "
Mimosa caesalpiniifolia"	4"	35"	2.8: "	8.89"	3.22"	2.2275"	8.3; "	4.: 7"	2.3: "
Protium heptaphyllum"	3"	9"	2.56"	8.89"	3.22"	2.22: 8"	: .; 4"	4.49"	2.37"
Swartzia pickelii"	3"	9"	2.56"	8.89"	3.22"	2.22: 4"	: .5; "	4.3; "	2.36"
Nco kcegcg"	4"	35"	2.8: "	8.89"	3.22"	2.225: "	4.; ; "	4.46"	2.35"
Cordia sellowiana"	3"	9"	2.56"	8.89"	3.22"	2.2292"	7.6; "	3.; 8"	2.34"
Eco r qo cpgukc" ur 0'	3"	9"	2.56"	8.89"	3.22"	2.2284"	6.: ; "	3.88"	2.33"

Miconia sp.	3"	9"	2.56"	8.89"	3.22"	2.2259"	4.;5"	2.;;"	2.28"
Vismia guianensis	3"	9"	2.56"	8.89"	3.22"	2.2254"	4.75"	2.:8"	2.27"
Apeiba tibourbou	3"	9"	2.56"	8.89"	3.22"	2.2249"	4.2;"	2.93"	2.27"
Eriotheca ur 0'	3"	9"	2.56"	8.89"	3.22"	2.2247"	3.;4"	2.87"	2.26"
Annona montana'''	3"	9"	2.56"	8.89"	3.22"	2.2244"	3.8:"	2.79"	2.26"
Miconia albicans'''	4"	35"	2.8:"	35.55"	4.22"	2.2226"	2.57"	2.69"	2.25"
Allophylus edulis'''	3"	9"	2.56"	8.89"	3.22"	2.2235"	3.26"	2.57"	2.24"
Genipa americana'''	3"	9"	2.56"	8.89"	3.22"	2.222:"	2.88"	2.45"	2.23"
Erythroxylum citrifolium	3"	9"	2.56"	8.89"	3.22"	2.2225"	2.46"	2.2:"	2.23"
Vqvcn'	**4;7"**	**3;89"**	**322"**	**889"**	**322"**	**2.3499'**	**322"**	**3784"**	**322"**

PK'/"P Ào gtq" fg" Kpfkx¶fwqu=" FC"/" Fgpukfcfg" cduqnwvc" *kpfÓ c/³=" FT"/" Fgpukfcfg" tgncvkxc" * +="HC"/" Htgsw´pekc" cduqnwvc" * +="HT"/" Htgsw´pekc" tgncvkxc" * +="FqC"/" Fqo kp¬pekc" cduqnwvc" *o Ó c/³=" FqT"/" Fqo kp¬pekc'tgncvkxc'* +="XK"/"Xcnqt'fg'ko rqtv¬pekc"* +0'

"

Cq"ug"guvko ct"c"fkuvtkdwk±¯q"fc"guvwwwtc"j qtk| qpvcn'fc"tgi gpgtc±¯q"pcvwtcn'qdvgxg/ug" wo c" fgpukfcfg" fg" 829" kpfÓ c/³" g" 3;89" kpfÓ c/³." pq" O U" g" O K" tgurgevkxco gpvg." eqo " fqo kp¬pekc'cduqnwvc'guvko cfc"go "2.354"o Ó c/³'g'2.349"o Ó c/³'r ctc"c"go guÑ tgcu0"

Pqo qfgnq'fg'kpfw±¯q'*O K'\'cpvq'c'tkswg\ c'fg'gur²ekgu'swcpvq'c'fgpukfcfg'hqtco "o cku' cnvcu'fq"swg'pqo qfgnq'uwegunqpcn'*O U0'Rcdt¯q'ugo gnj cpvg'hqk'gpeqpvtcfq'r qt"Uqw| c" *4236+'swcpfq'cxcnkqw'c'tgi gpgtc±¯q'go "ª tgcu'tgucvtcfcu'g'eqo r ctqw'c'wo "htci o gpvq" tghgt´pekc0'

Fcu" gur²ekgu" kfgpvkkecfcu" pq" eqo r qpgpvg" tgi gpgtcpvg." pq" O U" c" *Caesalpinia leiostachya"g'Apuleia leiocarpa"crtgugpvctco /ug'o cku'htgswgpvgu'pc"ª tgc."eqo "33.;6'"g" 32.67'" tgur gevkxo gpvg0'Pq"co dkgpvg"go "tgucvwtc±¯q"fq"O K"c'Talisia esculenta"g" Machaerium hirtum"vkxgtco "34'"g;'"fg'htgsw´ pekc'tgncvkxc.'tgur gevkxo gpvg."ugpfq"qu' xcnqtgu'o cku'cnvqu'fq'r qxqco gpvq0'

Cpcnkucpfq/ug'cu'ekpeq'gur²ekgu'fgo cktq'XK'*Vcdgnc'"g;'+'pqvc/ug'swg."gpvtg'cu'fwcu' ª tgcu'fg'guwfq'wo c"gur²ekg'ug'tgr gvg.'eqo "xcnqtgu'dgo "fkuvkpvqu0'Pcu'fwcs'ª tgcs'go " tgucvwtc±¯q "*CTu+." c"Apuleia leiocarpa" guvgxg" gpvtg" cu" ekpeq" eqo " o cktq" xcnqt" fg" ko rqtv¬pekc0'Guvc"gur²ekg'r quuwk'co r nc"fkuvtkdwk±¯q'i gqi tª hkec."r tghgtgpekcm gpvg"go " gpequcu" fg" o qttqu" g" uqnq" dgo " ftgpcfqu." cr tgugpvcpfq"dqc"tgi gpgtc±¯q" pcvwtcn' go " hqtguvcu'ugewpdª tkcu'g'pq"kpvgtkqt'fg'ecr qgktcu"*O CTEJ IQTK'3;;9=ECTXCNJ Q."4225+." q'swg'gzrnkec'gpeqpvtª /nc'pcu'ª tgcu'go "tgucvwtc±¯q0'

Cq"ug"cpcnkutgo "guugu'r ct—o gvtqs'hkvquuqekqm i kequ'hkec'gxkfgpvg'cs'xctkc±¿gs'gpvtg'qs' r ct—o gvtqs'fcs'ª tgcu'go "tgucvwtc±¯q'O U'g'O K'r qt'kuuq.'² 'egtvq'swg.'c'tgi gpgtc±¯q'fcs' ª tgcs'go "tgucvwtc±¯q'fq"O U'gpeqpvtc/ug'go "ukwwc±¯q'dcuvcpvg'kphgtkqt'c'ª tgc'fq"O K'vgpfq"

eqo wo "gpvtg"cu"ᵃ tgcu's wcvqt| g"gur ² ekgu."cli q"gur gtcf q"r qt"guvctgo "r t»zko cu"g"kpugtkfcu"pq" o guo q"eqpvgzvq"f c"r ckuci go 0"

F g"hqto c"o cetq."cq"ug"cxcnkct"c"tgi gpgtc±¯q"pcwtcn"eqo q"wo "kpfkecfqt."ngxcpf q/ug"go "eqpukfgtc±¯q"qu"cur gevqu"o cku"ko r qtvcpgu"*eqo r qukᵗ¯q"g"guvwwwtc÷."r ½f g/ug"r gtegdgt" swg"qu"r tqeguuqu"geqn»i kequ"pq"O U"guᵗ¯q"ug"f gugpxqnxgpf q"ngpvo gpvg"qw"eco kpj cpf q" r ctc"guvci pc±¯q"uweguukqpcn"r qf gpf q"eoo r qo gvgt"c"hwpekqpclkfcf g"geqn»i kec"g"hwwwtq" f guugu"co dkgpvgu"guwwf cf qu0"

Go " tgnc±¯q" « " ugttcr kj gkia." c" swcnl' go " wo " ko r qtcpng" r cr gn" pc" fkp–o kec" f qu" gequukuvgo cu."qdugtxqwug"c"r tgugp±c"f g"P /VQVCN"*P +."h»uhqtq"*R +."cuuko "eoo q."ectdqpq" *E +."u»fkq"*P c+"g"qtᵃ uukq"*M +."pc"ugttcr kj gkia"cewo wncf c0"

Rctc"vcpvq." q" tgvqtpq" pwtkekqpcl"f c"ugtcr kj gkia"² "hwpf co gpvcl"r ctc"qu"gequukuvgo cu" hqtguvcku."ugpf q"c"xkc"o cku"ko r qtvcpng"f q"ekenq"dki gqs w¶o keo"f g"pwtkgpvgu0"Guug"ekenq." cuuqekcf q"cq"dki w¶o keo."ektewnc±¯q"f g"pwtkgpvgu"pq"kpvgtkqt"f c"r ncpvc."r quukdknkvc"swg"cu" ᵃ txqtgu"r quuco " ukpvgvk| ct" c" o cᵗ tkc" qti –pkec" cvtcx²u" f c" hqvouᵗpvgug." tgekencf q" qu" pwtkgpvgu"swg"ᵗ o "r cr gl"f g"i tcpf g"tgngx–pekc"go "uqmu"cmlo gpvg"kpgo r gtk| cf qu"qpf g"c" dkoo cuuc" xgi gvcl' r cuuc" c" hwpekqpct" eoo q" r tipekr cl' tgugtxcᵗ tkq" f g" pwtkgpvgu" *UEJ WO CEJ GT"*et al0"4225;"I QO GU"et al.."4232+0"

P c"vcdgnc"32"o quvto /ug"cu"eqpegpvcᵗ¿gu"o ² fkc"f g"P ."L."M."P c"g"E"pc"ugttcr kj gkia" cewo wncf c"pq"kpvgtkqt"f qu"co dkgpvgu"cpcnkucf qu0"Q pktqi ´pkq"g"q"r qtᵃ uukq"hqtco "qu" pwtkgpvgu"swg"cr tgugpvctco "o ckqtgu"xcqtgu"go "uwcu"eoqpegpvcᵗ¿gu"pc"ugttcr kj gkia0"Qu" f kku"o qf gmu"f g"tgguvcwtc±¯q"hqtguvcl"*O U"g"O K+"r ctvkco gpvg"cr tgugpvctco "q"o guo q" guᵗqswg"f g"E"r ctc"qu"f kku"co dkgpvgu"go "tgguvcwtc±¯q0"

"

Vcdgnc "320 Eqpegpvtc±¯q"f g"pwtkgpvgu"pc"ugttcr kj gkia"f qu"co dkgpvgu"go "tgguvcwtc±¯q"*O U"g"O K+." local| cf qu" pc"o cvc"eklkct"f c"dcttci go "f q"Uktkkj "pq"o wpkeᵗ kq"f g"Xkc´pekc"ó"RG0""

Modelos/Nutrientes	Nitrogênio total (N)	Fósforo (P)	Potássio (K)	Sódio (Na)	Carbono (C)
	(g/kg⁻¹)				(%)
MS	9,64	1,52	1,55	0,26	25,23
MI	9,31	1,49	1,68	0,23	24,77

"

Xkmc"*422: +"guwwf cpf q"c"ugtcr kj gkia"go "tghqtguvco gpvq"qdvgxg"wo c"guvko cvkxc"f g" eqpegpvtc¿gu"f g"42.66"i 0i ⁻³"r ctc"pktqi ´pkq."3.; 8"i 0i ⁻³"r ctc"h»uhqtq"g"; .; 3"i 0i ⁻³"r ctc"q" r qtᵃ uukq0Lᵃ "go "guwwf q"uko knct."Ulkc"*422:+"gpeqpvtqw"cu"eqpegpvtc¿gu"f g"339.6"i 0i c⁻³"f g" P "g"4.; "i 0i c⁻³"f g"R."swcpf q"eoo r ctcf q"eoo q"Xkmc"*422:+"q"xcnqt"² "o cku's wg"q"f qdtq"r ctc" P "g"s wcug"c"o gvcf g"f g"R0Q wcpf q"eoo r ctcf q"cq"s wcpkhkecf q"pguug"guwwf q."qu"xcnqtgu"uᵗ q"

dckzqu''g''f g''i tcpf g''xctkc±⁻q.''ugpf q''guuc''xctkc±⁻q''cecukqpcf c.''gpvtg''qwtqu''r quu¶xgku''hcvqtgu.''r gmc''i tcpf g''f khgtgp±cf g''gur ² ekgu''f q''tghqtguvco gpvq''wkrk{cf q''r qt''Ukrxc''*422: +''g''Xkrc''*422: +.''cq''f guvg''vtcdcrj q0'

Q''guvqsw g''f g''ugtcr kj gktc''² ''xctkª xgrf g''ceqtf q''eqo ''q''gequukvgo c''eqpukf gtcf q''g''ugw'guª f kq''uweguukqpcr''*F GNK/VVK'3; ; +0'Go ''ug ''tcvcpf q''f g''o cvc''eikrkct.''guuc''ecwo wrc±⁻q''guª ''tgrcekqpcf c''cq''vger''f g''wo kf cf g''g'' «''hgtvkrkf cf g''f q''uqrq''swg''c''uwr qrvc.''cr tgugpvcpf q''tguwrf cu''f khgtgpvgu''o guo q''guvcpf q''guuc''o cvc''pq''o guo q''eqpvgxvq''f c''r ckuci go ''g''cr tgugpvcpf q''eqpfk¿ gu''erko ª rkecu''uko krctgu''*RCI CPQ''g''F WTK'CP .''4222+0'

F g''hqto c''i gtcn''pq''r tgugpvg''guwf q.''q''eqpvÀf q''f g''pwtkgpvgu''pc''ugtcr kj gktc''qdgf ege w''«''ugi wkpvg''qtf go <'P ''@''M''@''R''@''P c0'Eqo r qtvqo ''uko krct''vco d²o ''hqk''qdugtxcf q''r qt''Rkpvq et al0''*422; +'r ctc''Hqtguvc''Guvcekqpcr''Ugo kf eckf wcr'pq''kp¶ekq''f g''uweguu⁻q.''go ''Xk±quc''*O G +.''g''r qt''Egrgpvcpq''et al0''*4233+go ''r rcpvkq''o kuvq''eqo ''ekpeq''cpqu.''go ''f khgtgpvgu''rqecku''f c''Equvc''Tkec0'

Cri wpu''guwf qu''eqo q''qu''f g''I qo gu''gv''cr0''*4232+.''Egrgpvcpq''gv''cr0''*4233+''g''F kpk{ ''gv''cr0''*4233+.''f go qpvtco ''swg''cr guct''f c''uko krctkf cf g''pq''cr qtvg''f g''ugtcr kj gktc.''q''eqpvÀf q''f g''pwtkgpvgu''r qf g''ug''f khgtgpekct''go ''hwp±⁻q''f q''gur ² ekgu.''kf cf g.''uc{ qpcrkf cf g''g''rqecr''f g''xkf q''c''o ckqt''qw''o gpqt''r tqf w±⁻q''f g''ugtcr kj gktc0'

C''ugtcr kj gktc''uqdtg''q''uqrq''f cu''hqtguvcu''² ''wo ''ko r qtvcpvg''kpf kecf qt''f c''swcrkf cf g''co dkgpvcr''r tgugpvcpf q''wo ''guvqswg''f g''pwtkgpvgu''r ctc''hwwtc''o kpgtcr{ c±⁻q''g''ekerci go .''vgpf q''cuuko .''r cr gr''ko r qtvcpvg''pc''f kp¬o kec''f qu''gequukvgo cu''*UKNXC.''422: ='XKF CN''gv''cr0''4229+0'

807 Kpf kecf qtgu''f g''uqrq''

C''f gpukf cf g''f q''uqrq''*F u+''² ''wo ''cvtkdwq''swg''tghrgvg''q''cttcpjq''f cu''r ctv¶ewrcu''f q''uqrq''g.''r qtvcpvq.''guª ''kpvko co gpvg''cuuqekcf c''«u''ecrcevgt¶uvkecu''f q''ukuvgo c''r qtquq''*HGTTGKTC.''4232+.''swg''s wcpf q''o qf khkecf c''c''f kur quk±⁻q''f cu''r ctv¶ewrcu''pq''uqrq.''eqpugs wgpvgo gpvg.''chgvc''f ktgvco gpvg''c''f gpukf cf g0'

P c''vcdgrc''33''qdugtxc/ug''swg''pqu''co dkgpvgu''go ''tgguvcwtc±⁻q''c''F u''xctkqw''f g''3.73''g''3.; 7''i 0eo ⁻⁵''pq''O U''g''r ctc''q''O K'hqk''f g''36; ''c''378''i 0eo ⁻⁵0'Guvgu''xcrqtgu''u⁻q''i gtcro gpvg''gpeqpvtcf qu''go ''uqrqu''ctgpququ''*DTCF [.''3; ; ='CNNGQP K (''O GNQ.''422; +0'Ucpvqu''*4233+''gpeqpvqw''xcrqtgu''f c''f gpukf cf g''f q''uqrq''xctcpf q''f g''3.42''g''3.8: ''i 0eo ⁻⁵''go ''P gquuqrqu''Tgi qrkvkequ0'Go ''dqtc''swg''qu''tguwrf qu''f q''r tgugpvg''guwf q''vgpj co ''wrtcr cuucf q''wo ''r qweq''qu''ekcf qu''pc''rkvgtcwtc.''guª ''q''f gpvtq''f c''pqto crkf cf g''o gpekqpcf c0'

P wo c"cpªrkug"o cetq."qu"o gpqtgu"xcnqtgu"fg"Fu"hqtco "gpeqpvtcfqu"pqu"jqtk|qpvgu"uwrgthkekcku"*2"/"32"eo +."q"swg"fgxg"guvct"cuuqekcfq"cqu"ckqtgu"vgqtgu"fg"ectdqpq"qti¬pkeq"vqvcn"rtgugpvgu"pguugu"jqtk|qpvgu."swcpfq"eqo rctcfqu"eqo "qu"fgo cku"jqtk|qpvgu0"Rctc"Uejkqxq"*et al0"*4232+."qu"xcnqtgu"fg"Fu"go "uqmqu"ctgpququ"sïq"ligktco gpvg"o gpqtgu"go "uwrgthekg"g"vgpfgo "c"cwo gpvct"go "rtqhwpfkfcfg"pq"rgthkl"*TGKPGTV"("TGEJ GTV."4228+0"C"rtgugp±c"o ckqt"fg"o cvªtkc"qti¬pkec"pq"jqtk|qpvg"uwrgthekckl"fq"uqmq"rqfg"vgt"eqpvtkdwªfq"rctc"fko kpwk±q"fc"fgpukfcfg."g"eqpugswgpvo gpvg."pc"fkuvtkdwk±q"fg"vco cpjq"fg"rqtqu"*RCTCJ[DC"et al.."4235+0

¦ "rquuªxgl"pqvct"swg"c"fgpukfcfg"fq"uqmq"cwo gpvc"go "rtqhwpfkfcfg."q"swg"tgo gvg"c"fko kpwk±q"fc"rqtqukfcfg"vqvcl"go "xktwfg"fc"tgfw±q"fqu"gurc±qu"vc|kqu"g"cngtc±q"pc"fkuvtkdwk±q"fqu"vco cpjqu"fg"rqtqu."kphnwgpekcpfq"fktgvco gpvg"c"fko kpwk±q"fq"vgqt"fg"wo kfcfg" xqnwo ²vtkec" g"pq"eqo rqtco gpvq"fcu"rtqrtkgfcfgu"jkftªwnkecu"fq"uqmq"*KO QJ QHH"et al0"4222+0

Fg"o qfq"i gtcn"²"rquuªxgl"uwi gtkt"swg"pcª"tgc"go "tguvcwtc±q"fq"OU"q"uqmq"²"o cku"eqo rcevcfq"swcpfq"eqo rctcfq"cq"OK"rqku."ug"qdugtxco "xcnqtgu"fg"fgpukfcfg"ecko c"fg"3.;"i Øeo /5"pcu"eco cfcu"o cku"rtqhwpfcu0"Rctc"Ctecxgfg"*4237+."xcnqtgu"fg"fgpukfcfg"fq"uqmq"ceko c"fg"3.77"i Øeo /5"sïq"ecrcevgtk|cfqs"eqo q"uqmqs"fg"dckxc"swcnkfcfg."rqku"eqo "c"eqo rcevc±q."jª"wo "cwo gpvq"fc"fgpukfcfg"fq"uqmq"g"tgfw±q"fc"rqtqukfcfg"vqvcn"*MNGKP ™NKDCTFK"4224+0

Swcpvq"o ckqt"q"rtqeguuq"fg"eqo rcevc±q."o gpqt"c"tgvgp±q"g"ecrcekfcfg"fg"kphknvtc±q"fq"uqmq"*TGKEJ GTV™TGKPGTV™DTCKFC."4225+."g"ug"kuuq"qeqttgt"fgufg"c"eco cfc"uwrgthkekcn"cwo gpvc"c"xwnpgtcdknkfcfg"c"rtqeguuqu"gtqukxqu."rqku"swcpvq"o ckqt"c"fgpukfcfg."o gpqt"ugtª"c"rqtqukfcfg"vqvcl."eqpugswgpvo gpvg."c"ecrcekfcfg"fg"cto c|gpco gpvq"fc"ªi wc"rgmq"uqmq."q"swg"eqpvtkdwk"eqo "q"guecco gpvq"uwrgthkekcn0

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Vcdgnc"330 Fgpukfcfg"g"pÞxgn"fg"ci tgi c±q"fq"uqmq"pqu"co dkgpvgu"go "tguvcwtc±q"*O U"g"O K+"nqecnk|cfqu"pc"o cvc"ekmkct"fc"dcttci go "fq"Uvtkklk"pq"o wpke¶rkq"fg"Xke´pekc"ó"RG"

Profundidade	Densidade (g/cm^{-3})		Agregados (mm)			
cm	MS	MI	DMG (MS)	DMP (MI)	DMG (MS)	DMP (MI)
0--10	1,51	1,49	2,28	2,77	2,60	2,90
10--20	1,95	1,51	1,54	2,16	2,03	2,48
20--40	1,86	1,56	1,42	1,91	1,52	2,13

FO R"ó"Fk¬o gvtq"o ²fkq"rqpfgtcfq÷FO I "ó"Fk¬o gvtq"o ²fkq"i gqo ²vtkeq0

C" guvcdknkfcfg" fg" ci tgi cfqu" cxcnkcfc" rgmq" fk¬o gvtq" o ²fkq" rqpfgtcfq" *FO R+" g" fk¬o gvtq"o ²fkq"i gqo ²vtkeq"*FO I +"crtgugpvcfqs"pc"Vcdgnc"33."o qurtc"swg"c"ªtgc"uqd"

tguvcwtc±¯q"f q"O K"cr tgugpvqw"qu"o ckqtgu"¶pf kegu"f g"FO I "g"FO R0'Q"ghgkvq"f c"cvkxkf cf g" o ketqdkcpc."c"rkdgtc±¯q"f g"gzuwf cf qu"r qt"rc¶ gu."q"etgueko gpvq"g"hwpekqpco gpvq"f cu"rc¶ gu." o qtvg"f qu"vgekf qu."eqphgtkrco ."r tqxcxgm gpvg."o ckqt"guvcdkrkf cf g"cqu"ci tgi cf qu"pguvg" ukuvgo c."eqo q"eqo gpvf q"r qt"Ucnqp"*et al0"*422: +0'

P c"r tqhwpf kf cf g"f g"2/32"eo "*vcdgnc"33+."pqvc/ug"wo c"f khgtgp±c"gzr tguukxc"f q"FO I " gpvtg"cs°tgcu"go "r tqeguuq"f g"tguvcwtc±¯q"hnqtguvcn"g"c"o gf kf c"s wg"xck"cr tqhwpf cpf q."guuc" f khgtgp±c"cwo gpvc."f ko kpwkpf q"pc"eco cf c"f g"42/62"eo 0'

F g"o qf q"i gtcn"qdugtxqw/ug"c"r tgf qo kp±ekc"f g"ci tgi cf qu"eqo "cm cpj qu"o ckqtgu"s wg" 4.2"o o ."q"s wg"kpf kec"c"dckzc"r tgugp±c"f go cetqci tgi cf qu0'Qdugtxc/ug"pc"°tgc"f q"O U"s wg" qu"xcnqtgu"f g"FO R"g"FO I ."r tkpekrcm gpvg"pc"r tqhwpf kf cf g"f g"42/62"eo ."guv¯q"r r»zko qu" f g"3.2"o o ."kpf kecpf q"c"o ckqt"r tgugp±c"f g"o ketqci tgi cf qu0'Qu"o cetqu"g"o guqci tgi cf qu" u¯q"o cku"ugpu¶xgku"cq"o cpglq"f q"uqmq"*EQUVC"L—P KQT"gv"cn0"4234+0'

Ugi wpf q"Ecuvtq"Hkrj q."O u¿ kmrk"g"Rqf cpquej k"*3; ; : +."c"r tgugp±c"f g"ci tgi cf qu"i tcpf gu." kpf kecf c"r gm"FO R."r qf g"tghngvkt"c"tguku¶pekc"f qu"uqmqu"c"r tqeguuqu"gtqukxqu."ugpf q"cuuko ." r qf g/ug"kphgtkt"s wg"qu"uqmqu"guwf cf qu"u¯q"pcwwtcm gpvg"xwrpgt°xgku"c"r tqeguuqu"gtqukxqu" r gm"qu"xcnqtgu"cr tgugpvcf qu"f g"FO R0"

Rctc"Ctqqxgtf g"gv"cn0"*4237+."uqmqu"s wg"cr tgugpvco "xcnqtgu"f g"ci tgi c±¯q"kphgtkqtgu"c"3" o o "v́ o "wo c"s wcnkf cf g"twko ."gpvtg"3"o o "g"3.67"o o "cr tgugpvco "wo c"s wcnkf cf g"tgi wnct"g" gpvtg"3.67"o o "g"3.82"o o "wo c"dqc"s wcnkf cf g0P c"Vcdgnc"33."r qf g/ug"qdugtxct"s wg"cu"°tgcu" go "tguvcwtc±¯q"ug"gps wcftco "go "wo c"s wcnkf cf g"dqc0P c"r tqhwpf kf cf g"f g"42/62"eo ."qu" xcnqtgu"f g"FO I "pc"°tgc"f q"O K"tguwmqw"go ""3.64"o o ." gxkf gpekcpf q"wo c"s wcnkf cf g" tgi wnct0'

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90 EQPENWUï Q"

Cu" fwcu" ª tgcu" guwfcfcu" guⁿ q" pc" o guo c" rckuci go " g" crtgugpvco " rtqeguuq" fg" tguvcwtc±⁻q" hnqtguvcn' fkhgtgpvgu eqo " tgnc±⁻q" «" eqo rquk±⁻q." guvtwwtc" g" rtqeguuqu" geqn»i kequ. "go dqtc"guvcpfq"uqd'rgtwwtdc±¿gu'cpvt»rkecu0"

Crguct"fcu"ªtgcu"go "tguvcwtc±⁻q"*O U"g"O K"rquuw¶tgo "c"o guo c"kfcfg"*vgo rq+"fg" ko rncpvc±⁻q."q"O K'crgugpvqw"o gpqu"fgugpxqnxkfq"swg"q"O U."hcvq"cvtkdw¶fq"cqu"hcvqtgu" dk»vkequ'g"cdk»vkequ'qdugtxcfqu"pcu"ªtgcu0'

Pc"eqphki wtc±⁻q"hqt¶nrkca"p⁻q"jqwxg"fkhgtgp±c"pc"tkswg| c"fg"gur²ekgu. "dgo "eqo q" rqwec" xctkc±⁻q" pqu" ¶pfkegu f g" fkxgtukfcfg0' Cu" ectcevgt¶nkecu" guvtwwtcku" p⁻q" hqtco " fguvqcpvgu'gpvtg"qu"co dkgpvgu0'

Cu"eqo wpkfcfgu"ctd»tgcu"fqu"o qfgnqu"fg"tguvcwtc±⁻q"hqtguvcn"crgugpvco "curgevqu" hqtguvcku."rqt²o ."p⁻q"uⁿ q"ghkekgpvgu"go "fkxgtukfcfg"guvca⁻i kec"dkqn»i kec. "ugpfq"pgeguuªtkc" c"cdq±⁻q"fg"c±¿gu"eqttgvkxcu"rctc"cwxknkct"q"rtqeguuq"fg"tguvcwtc±⁻q"fcu"ªtgcu."g"fg" hwpfco gpvcn'ko rqtv∵pekc'c'ko rngo gpvc±⁻q'f q"o qpkqtco gpvq"eqpuvcpvg0'

Qu"ko rcevqu"cpvt»rkequ"√o "rtglwfkecfq"q"rtqeguuq"fg"fgugpxqnxko gpvq"geqn»i keq"fqu" fqku"co dkgpvgu"go "tguvcwtc±⁻q"guwfcfqu0'

: 0 TGHGTž PEKCU"

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CNNGQP K'N0T'H0'('O GNQ."X0H0'S w¶p kec'g'O kpgtcmgi kc'f q'Uqm0'UDEU"/"Xk±quc."422; 0'
"

CNO GKF C." F 0'U0' **O qf gmgu'f g''tgewrgtca±q''am dkgpvcn'** K p<'Tgewr gtca±q''am dkgpvcrl'f c''O cvc''Cvn–pvkec']qpmkpg_05tf "gf 0'tgx0'cpf "gpn0'Kj ²wu."DC<'Gf kivuu."4238."r 0'322/3590'KUDP "; 9: /: 7/9677/662/40'
"

CNO GKF C."T0'Q0'R0'Q"(" Uf PEJ G\ ."N0'G0'Tgxregi gvca±q''f g''ªtgeu'f g''m kpgta±q<'etk²tkqu''f g'' m qpkqtcm gpvq''g''cxcrka±q''f q''f gumo r gpj 0'Tgxkwc'f tvqvtg'4; *3+<'4227."r 0'69/760'
"

CP G WNQ. "T0'L0±'TQNQHH"I 0±'UQW\ C."O 0'N0'R0'Tgnc±gu'gpvtg''c''gtqf kdkrlkf cf g''ci tgi ca±q.'' i tcpwmo gvtka''e''cctcevgt¶mvkecu''swb kecu''f g''uqmju''dtcukrgktqu0'**Tgxkwc'Dtcurgktc'f g''EKpekc'f q''Uqm.**'x0': ."r 0'355/35: ."3; : 60'
"

CRI "KKK0'Cp'wf cvg'qh'vj g''Cpi kqrgto "Rj {mqi gp{'I tqwr"ecmuukhkecvkqp''hqt''vj g''qtfgtu''cpf ''hco krigu''qh'hmqy gtkpi "r mcpvu<'CRI "KKK0'Dqvcpkcrl'Lqwtpcrl'qh''j g'Nkppgcp'Uqekgv{."Nqpftgu."x0'383."r 0'327/343."422; 0'
"

CTEQXGTF G."U0'P 0'U0'gv'crl0'S wcrkf cf g''f¦mkec''f g''uqmqu''go "wuq''ci t¶oqrc'ac''tgi K±q''ugo K²tkf c''f q''gutcf q''f c''Dcj kc0'**Tgxkwc'Dtcurgktc'f g''EKpekc'f q'Uqm.**'x05; ."r 0'0695/30: 4."42370'
"

CVVCP CUKQ."E0'O 0'O cpwcn'V²epkeq<'Tguvcwtca±q''g''O qpkqtcm gpvq''f c''O cvc''Ekrkct'g''f c''tgugtxc''Ngi crl'r ctc''a''Egtvkhkeca±q''Ci t¶oqrc''/''Eqpugtxa±q''f c''Dkqf kxgtukf cf g''pc''Echgkcmwuc''/''Rktcekecdc.''UR<'Kó chmqtc."422: 0'82'r 0'
"

CXKNC. "A0'N0'gv'crl0'Ectcevgt¦ ca±q''f c''xgi gvca±q''g''gur²ekgu'r ctc''tgewr gtca±q''f g''o cvc''ekrkct. ''Kw¶¶''TU0'EKpekc'Hmqtguvcr'Ucpvc'O ctkc."x0'43.''p04.''r 0'473/482."42330'
"

DCTTGNC." Y 0'gv''crl0' **Cu''tgnc±gu'gpvtg''cu''o cvcu'ekrkctgu.'uq'tkqu''g''qu''r gkzgu0'** *Gf u+0' Kp<' TQF TK WGU."T0'T0±'NGKVg O "HKNJ Q."J 0'H0'O cvcu'ekrkctgu<'eqpugtxa±q''g''tgewr gta±q0'U²q Rcwtq<'Gfkvqtc''Wpkxgtukf cf g''f g''U²q'Rcwmq'Hcr gus."r 0': 9/429."42220'

DCUVQU."Tgpcwq''Ucrf cpj c''gv''crl0'Hqto ca±q''g''guvcdkrk ca±q''f g''ci tgcf cu''f q''uqmq'kphmgpekcf qu''r qt'' ekmqu'' f g'' wo gf geim gpvq'' g'' ugeci go " cr »u'' cf k±q'' f g'' eqm r qvwqu'' qtg ±pkqpu'' eqm '' f khgtgpvgu'' ectcevgt¶mvkecu'jkf tqf»kkecu0'Tgxkwc'Dtcurgktc'f g''EKpekc'f q''Uqm."Xk±quc."x0'4; ."p0'3."r 0'43/53." Hgd0' 42270' Cxckrcdmg" htqo " >j wr <1ly y y 0nekgmq0'dt1nekgmq0'r j r Auetkr v?uekactwgzv(r kf ?U232228: 542272222322225(mpi ?gp(pt o ?kuq@>0'Ceeguu'qp''46'Cwi 042390j wr <1f zf qkfqt i1320: 37; 21U2322/28: 542272223222250'

DCUVQU."UC0'**Cr rkea±q''f g''kpf kecf qtgu''f g''cxcrka±q''go "wo "r tqjgvq''f g''tgwcwtca±q''hqtguvcr'Tgugtxc''Rctvkewrct'f q''Rcvtko ½pkq''Pcwwtcrl'ó''TRRP''Hc|gpf c''Dwmr²q.''Cko qr²u."O G 0'** 42320' 33: r 0' Fkuugtvca±q" *O guvtcf q''go "Dqv–pkea+''ó''Wpkxgtukf cf g''Hgf gtcrl'f g''Xk±quc."Xk±quc0'

DGNNQVVQ." C0±'G CPFQNHK' U0±'TQFTK WGU." T0' T0' Rtkpekr cku''kpkekcvkxcu''f g''tgwcwtca±q''hqtguvcrl'pc''O cvc''Cvn–pvkec.''cr tgugpvcf cu''uqd''c''»vkec'f c''gxqmw±q''f qu''eqpegkqu''g''f qu''o ²vqfqu'' cr rkeaf qu''/''Hcug 30'Kp<'TQF TK WGU."R0'J 0'U0±'KUGPH CI GP."K0 '*Gf 0+0' **Rcevq'r grc''tgwcwtca±q''f c''O cvc''Cvn–pvkec<'tghgtgpekcrl'f qu''eqpegkqu''g''ca±gu'f g''tgwcwtca±q''** hqtguvcr0'U²q'Rcwq<'NGTH)'GUCN .''Kpwkwwq''DkqCvn–pvkec."422; 0r 0'33/350'
"

DGP P GVV."C0'H0±'J CUNGO ."C0±'EJ GECN ."F0'E0±'ENCTMG."O0'H0±'Lqpgu"TP ."Mqgj p"LF ."Ncmg" RU."Nwo uf gp"NH."Nwpv"KF ."O cemg{"DI ."P cm{"TO ."O gpnj qtuu"RY ."P gy "VT."P gy gml'I T ."QøJ ctc" V."S wkpp"I R."Tcf hqtf "LS ."Tqdkpuqp"F ."Y cwuqp"LGO ."[gp"CN'422; 0'Geqmi kecn'r tqeguugu<c'mg{" gmgo gpv"kp"uvtcvgi kgu"hqt"pcwwtg"eqpugtxcvkqp0'Geqmi kecn'O cpci go gpv'(" Tguvqtcvkqp"32*5+<3; 4/ 3; ; 0'
"

DGP VJ CO ."J 0±'J CTTKU."I0'C0±'DKTEJ ."R0±'UJ QTV."M0'E0'J cdkcv' cuuukhkecvkqp" cpf "uqkn' tguvqtcvkqp"cuuguum gpv'wukpi "cpcn{uku"qh"uqkn'm ietqdkqmi kecn'cpf "rj {ukoejm go kecn'ej ctcevgtkuvkeu0' Lqwrpcn'qh'Crr mgf "Geqmi {"4; *5+<3; ; 4.'r 0'933/93: 0'
"

DNCP EQ/ECP S WK"J 0±'UVQP G."N0'TO0±'UEJ NGI GN ."C0'LO0±'N[QP ."F0'LO0±'XK KN ."O 0'H0±'O KMH C." O0'O0±'UVCJ NO CP ."R0'Y 0±'TKEG ."E0'Y 0'P q/vknm'kpf wdge f "kpetgcug "kp"qti cpke "ectdqp"tgf wegu" o czko wo "dwnm'f gpukv{"qh"uqknu0'Uqkn'Uekgpeg"Uqekgv{ "qh'Co gtkec"Lqwrpcn'O cf kuqp."x0'95."r 0' 3: 93/3: 9; .'422; 0'
"

DQI P QNC." K0' C0' FGF GEGM." T0' C0±' NCXQTCP VK" Q0' L0±' J K C." C0' T0' Kphnw´pekc" f g" r tqr tkgf cf gu'hf ukeqj "f tkecu'f q"uqmi "pq"etgueko gpvq"f g"Rkpwu"vcgf c0'Rgua wkuc "Hqr tguvcn'Dtcukngk c." Eqmo dq."x0'52."p083.'r 059/'6; .'42320'
"

DQTVQNW\ K"G0'E0'Eqpvco kpc±o q"f g"a i wcu"uwr gthkekcku"r qt"ci qw»zkequ"em "hwp±o q"f q"wuq"f q" uqmj "pwm a"o ciketqdcele"j kf tqi a hkeqr f g"Ci wf qu."TU0'Tgxkuvc"Dtcukngkta"f g"Gpi gpj ctkc"Ci r¶eqm"g" Co dkgpvcn'Eco r kpa"I tcpf g."x032."p06."r 0: : 3/: : 9.'42280'
"

DTCF [."P 0'E0'P cwwtg| c"g"r tqr tkgf cf gu'f qu"uqmu090'gf 0'Tkq"f g'Lcpgktq<H0'Dcuvqu.'3; ; ; 0': ; ; "r 0'
"

DTCP ECNKQP ."RJ 0U0'gv'cn0'Cxcnkc±o q"g"o qpkqtco gpvq"f g"a tgcu"go "r tqeguuq"f g"tguvcwtc±o q0'Kp< O CTVKP U."U0'X0'*gf 0±'Tguvcwtc±o q"geqmi kec"f g"gequukuvgo cu'f gi tcf cf qu0'Xk±quc<'Gf kvqtc" WHX.'4234.'r 0'484/4; 50'
"

DTCP ECNKQP ."RJ 0U0±'I CP F QNHK"U0±'TQF TK WGU."T0T0'Tguvcwtc±o q'hqtguvcn0'U q"Rcwq< Qhkekpc"f g'\gz vqu.'42370'
"

DTCP ECNKQP ."RJ 0U0±'KUGTP J CI CI GP ."K0±'I CP F QNHK"U0±'TQF TK WGU."T0T0'Hcug"4<'r mpvkq" f g" a txqtgu" pcvkxcu" dtcukngktcu" hwpf co gpvcf q" pc" uweguu q" hqtguvcn0' Kp< TQF TK WGU." T0T0±' DTCP ECNKQP ."RJ 0U0±'KUGTP J CI GP ."K0'*Qti 0±'Rcewq'r ctc'c 't guvcwtc±o q'f c'O cvc'Cvm pvkec< tghgtgpekcn'f qu"eqpegkqu"g"c±±gu"f g"tguvcwtc±o q"hqtguvcn0'50'gf 0'U q"Rcwq<'GUCNS ."NGTH±' Kpuvkwwq'DkqCvm pvkec0'422; 0'ecr 03.'r 037/; 20'
"

DTCUKN0'E»f ki q"Hqtguvcn'Dtcukngktq0'Ngk'P 0'340873'f g'47'f g'm ckq'f g'42340'F kur ¿gg"uqdtg"c" r tqvg±o q'f c'xgi gvc±o q'pcvkxc='cmvgtc'cu"Ngku"pqu'80 5: .'f g'53'f g'ci quvq'f g'3; ; 3.'05; 5; 7.'f g'3; 'f g' f g| go dtq"f g'3; ; 8.''g"33064: .'f g'44'f g'f g| go dtq"f g'4228='tgxqi c'cu"Ngku'pqu'60993."f g'37'f g' ugvgo dtq"f g'3; 87."g'90976.'f g'36'f g'cdtkn'f g'3; ; ."g"c"O gf kf c"Rtqxku»tkc"pq'40388/89."f g'46'f g' ci quvq'f g'4223='g'f a "qwwtcu'r tqxkf ´eç ckcu0'Dtcu¶hkc.'F H.'42320'
"

DTCUKN0'F gr ctvco gpvq"P cekqpcn'f c "Rtqf w±o q"M kpgtcn'*F P RM +0'Rtqi tco c "Ngxcpvco gpvq" I gqm»i kequ"Da ukequ"f q"Dtcukn±'ectvc"i gqm»i kec."ectvc"m gvcmqi gn¹vkec"/"Guecnc"3<3220222.'Hqmj c" Nko qgktq/RE'*UD047/[/E/X"+0'Dtcu¶hkc.'3; ; 20'
"

DTQUQHUMG."M0'F 0'gv'cn0'J ctxguvkpi "ghhgevu'qp'm ketqemb cvke"i tcf kgpvu"htqm "um cm'uvtgco u"vq" wr mcpf u'kp'y guvgtp'Y cuj kpi vqp0'Geqmi kecn'Crr mkecvkqpu."x09."p04.'r 03: : 63422.'3; ; 90'

ECGU."D0'T0'O 0'O cuxqfhcwpc''vgttguxvg''cuuqekcfc''c''ª tgcu''go ''rtqeguuq''fg''tguxcwtc±¯q''pc''hc|gpfc'' gzrgtko gpvcn' Gfiª tfkc.'' Dqwecw'' ó'' UR0' Fkuugtvc±¯q'' *O guvcfq'' go '' EKpekcu'' Hqtguvcku±.'' Wpkxgtukfcf g'Guvcfkcn'Rcwkuvc''õLwrkq'fg'O gus wkxc'Hkrj qö.''Dqwecw0422; .''r0930'

ECO RGNNQ.''G0'H0'E0'Uweguu¯q''xgi gvcn'pc''tgewrgtc±¯q''fg''ª tgcu''fgi tcf cf cu0'Kp<"F KCU.''N0'G0±' O GNNQ0'L''Y 0'*Gf 00'Tgewr gtc±¯q''fg''ª tgcu''fgi tcf cf cu0'Xk±quc.''O I <'WHX.''UQDTCFG.''3; ; : 0' r 0³: 6/3; 80'

ECTP GKTQ.''O 0'C0'E0±' UQW\ C.''G0'F 0±' TGKU.''G0'H0±' RGTGKTC.''J 0'U0±' C\ GXGF Q.''Y 0'T0' Cxtkdwqu''fµuukqu.'s w¶o kqu''g''dkqn»i kqu''f q''uqm''fg''egttcf q'' qd'f khgtgpvgu''ukuvgo cu''f g''wuq''g'' o cpglq0'Tgxkuvc'Dtcukrgktc''f g''EKpekc'f q'Uqrq.Xk±quc.''x0'55.''r 0369/379.''422; 0'

ECUVTQ''HKNJ Q.''E0±'O W\ KNNK''Q0±'RQF CP QUEJ K''C0'N0'Guvcdkrkf cf g''f qu''ci tgi cf qu''g''uwc'' tgnc±¯q''eqo ''q''vgqt'f g''ectdqpq''qti ¬pkeq'pwo ''Ncvquuqrq''Tqzq''f kuxt»hkeq.''go ''hwp±¯q''f g''ukuxgo cu''f g'' r ncpvkq.''tqxc±¿gu''f g''ewnxwtcu''g''o ²qf qu''f g''r tgr ctq''f cu''co quvtcu0'Tgxkuvc''Dtcukrgktc''f g''EKpekc''f q'' Uqrq.''Xk±quc.''x0'44.''r 0749/75: .''3; ; : 0'

ECUVTQ.''O 0'P 0±'O CTVKP G\ ''ECUVTQ.''T0±' UQW\ C.''R0'E0'C''ko rqtv±pekc''f c''o cvª ekrkct''pq'' eqpvgzvq''f c''eqpugtxc±¯q''f q''uqrq0'Tgxkuvc''Grgvt½pkec''f g''Gf wec±¯q''f c''Hcewrf cf g''f g''Ctci wckc.''x0' 47.''p06.''r 0452/463.''42350'

ECXCNECP VK.''I 0'I 0±' NQEMCD[.''D0'I 0'Ghhgevu''qh''ugf ko gpv''f gr qukkqp''qp''cdqxg tqwpf ''pgv'' r tko ct{''r tqf wevkxkv{.''xgi gvckqp''eqo r qukkqp.''cpf ''uvtwewtg''kp'tkr ctkcp''hqtguu0'Y gvncpf u.''x0'48.''p0' 8.''r 0'622/62; .''42280'

ECXCTNJ Q.''R0'G0'T0'Gur ² ekgu''ctd»tgcu''dtcukrgktcu0'Dtcuºkc<'Go dtcr c0'Kphqto c±¯q''vgepqn»i kec0' Eqnqo dq.''RT<'Go dtcr c'Hqtguvc.''x0'3.''4225'325; 'r 0'
"
EGNGP VCP Q''F 0±' \ CJ CW K''T0'C0±'HKP GI CP .''D0'QUVGTVCI .''T0±'EQNG.''T0'L±'J QNN.''M0'F 0' Nkwvghcm'f {cpo kev''wpf gt'f kihgtgpv'vtqr kecn'hqtguv'tguvqtcvkqp''uvtcvgi kgu''kp'Equvc'Tkec0'Dkqvtqrkec'' 4233.''x0'65.''pà'5.''r 0'49; /4: 90'
"
EJ CGT.''I 0'O 0'O 0 qpkqtco gpvq''f gª tgcu''tgewr gtcf cu''qw'go ''tgewr gtc±¯q0'Kp''UTN''Vcxctgu']Gf 0'0' Ewtuq''f g''tgewr gtc±¯q''f gª tgcu''f gi tcf cf cu<'c'xk±¯q''f c''eK pekc'f q''uqrq''pq''eqpvgzvq''f q'f kci p»uvkeq.'' o cpglq.'' kpf kecf qtgu''f g''o qpkqtco gpvq''g''guvcv² i kcu''f g''tgewr gtc±¯q0'Go dtcr c''Uqrqu.'' Tkq''f g'' Lgpgktq.''422: .''r 0434/44: 0'
"
EQNNKP U.''C0'N0'gv'cn0'C''r tgnko kpct{''kpxguvki cvkqp''qh''vj g''ghhkece{''qh'tkr ctkcp''hgpekpi ''uej go gu''hqt'' tgf wekpi ''eqpvtkdwkqpu''htqo ''gtqf kpi ''ej cppgn'dcpmu''vq''vj g'ukn cvkqp''qh''ucm qpkf ''ur cy pkpi ''i tcxgnu'' cetquu''vj g''uqwvj y gu0'L0'Gpxktqpo gpvcn'O cpci go gpv.''WM.''x0; 3.''p07.''r 03563/356; .''42320'

EQTNGVV.''T0V00.'Gpxktqpo gpvcn''hqtguvt{''kp''J qpi ''Mqpi <'3: 9363; ; 90' Hqtguv''Geqrqi { ''cpf '' O cpci go gpv'338.''; 56327.''3; ; 0'

EQUVC''L—P KQT.''E0'gv'cn0'Ectdqpq''go ''ci tgi cf qu''f q''uqrq''uqd''xgi gvc±¯q''pcvkxc.''r cuvci go ''g'' ukuvgo cu''ci t¶eqrcu''pq''dkqo c''egttcf q0'Tgxkuvc''Dtcukrgktc''f g''EKpekc''f q'Uqrq.''x0'58.''r 0'3533/3543.'' 42340'
"
F CO CUEGP Q.''C0'E0'H0'O cetqhcwpc''gfª hkec.''tgi gpgtc±¯q''pcvwtcn'f g''gur ² ekgu'ctd»tgcu.''rkcpcu''g'' gr ¶hkcu''go ''hqtguvcu''go ''r tqeguuq''f g''tguvcwtc±¯q''eqo ''f khgtgpvgu''kf cf gu''pq'Rqrcpvc''f q''Rctcpcr cpgo c0' F kuugtvc±¯q''*O guvcf q''go ''Tgewtuqu''P cwtcku±.''Wpkxgtukf cf g''U¯q''Rcwrq.''Rktcekecdc0'4227.''r 0' 3290'
"

FGCP.." Y 0" W kj " Dtqcf cz" cpf " Hkfgdtcpf<" Vj g" F guvtwevkqp" qh" vj g" Dtc| kdkcp" Cvncpvke" Hqtguv0' Wpkxgtukv{ "qh'Ecnkhqtpkc'Rtguu. "Dgtmgng{. "3; ; 70'

FGNKVVK."Y 0'C0'Ekenci go "f g'pwvtkgpvu'o kpgtcku'go "o cvcu'ekdkctgu0'Kp<'UKO R¯ UKQ"UQDTG'O CVC" EKNKCT. " 3; ; : . " U q" Rcwnq0' Cpcku0' U q" Rcwnq<" Hwpf c±¯q" Ecti kn" Ugetgvctkc "f q" O gkq" Co dkgpvg. "Kpuvkwvq"f g'Dqv pkec.'3; ; 0'r 0 : /; ; 0'
"

FGZVGT."C0'T0'Cf xcpegu'kp'ej ctcevgtk| cvkqp'qh'uqkn'uvtwewwtg0'Uqkn'Vkmci g "Tgugctej ."x0'3.'r 0'3; ; /
45: . '3; ; 0'
"

F KP K ."C0'T¯'RGTGKTC."O 0'I ¯'NQUU."C0'Crqtvg'f g'o cvgtkcn'dg¶ wq'g'pwvtkgpvg'r ctc 'q'uqkq'' go 'r ncpvkq'f g'gwecnkrvq'g'hqtguvc 'ugewpf ¯ tkc0'Rgus wkuc'Hqtguvcn'Dtcukngktc "4233. 'p 53. 'x0'87. 'r 0'
3; /'480'
"

FQP CI GO C. "I 0'M¯ECM RQU. "F 0'X0'D0'f g ECNF GTCP Q. "U0D0 VGKZ GKTC. "Y 0'I ¯XKCP C. " L0'J 0'O 0'o cpwcn'f g 'o ²vqf qu'f g'cp kug'f g'uqnqu0'Tkq'f g'Lcpgktq<'Go dtcr c "Uqnqu. '42330'452'r 0'
"

FWT K CP ."I 0'Q"wuq'f g'kpfkecf qtgu'r ctc'o qpkqtcn gpvq'f g" tgcu'go "tgewr gtc±¯q0'Kp<'WGJ CTC. "V0'J 0'M¯ CPF CTC. "H0'D0"*Qtiu0+0'Ecf gtpqu'f c'O cvc 'Ekdkct0'U q'Rcwnq<'EGVGUD"/"Dkdnkqvgca. "p0'6. 'r 033/4; . '42330'
"

FWT K CP ."I 0'TCM QU. "V0'U0'T0'O cpaq'cf cr vcvkxq<'r tko gktcu'gxr gtk pekcu'pc'tguvcwtc±¯q" f g'gequkuvgo cu0'U q'Rcwnq. 'UR<'R a i kpcu'("Ngvtcu'Gf kqtc. '42350'
"

GO DTCRC"/"Go r tguc'Dtcukngktc'f g'Rgus wkuc'Ci tqr gwª tkc0'Egpvtq'P cekqpcn'f g'Rgus wkuc'f g'Uqnqu0' O cpwcn'f g'o ²vqf qu'f g'cp kug'f g'uqnq04c'gf0'Tkq'f g'Lcpgktq<'Egpvtq'P cekqpcn'f g'Rgus wkuc'f g'Uqnqu. " 434r . '3; ; 90'
"

GPI GN"X0'N0¯RCTTQVVC "L0'C0'F ghkpkpf q"c'c'Tguvcwtc±¯q"Geqn i kec<'Vgpf gpekcu'g'Rgtur gevkxcu" O wpfkcku0'kp<'MCI G[COC. "R0[0¯QNKXGKTC. "T0'G0¯O QTCU. "N0'H0'F 0' et al0'*eqqtfu0+0' Tguvcwtc±¯q'Geqn i kec'f g'Gequkuvgo cu'P cwtcku0'Dqwecw<'HGRCH. '4225. 'r r 03/480'

HCT KC. "J 0'J 0¯'U TKQ. "H0'E0¯I CTTKF Q. "O 0'C0'Q0'Tgeqo r quk±¯q'f c"xgi gvc±¯q'ekdkct "kpvgi tcfc"«" eqpugtxc±¯q'f g'o ketqdcekc0'Kpuvkwvq'Hqtguvcn'U q'Rcwnq. 'p0'43. 'r 03/35. '42230'
"

HGTTGKTC. "O 0'O 0'Ectcevgtk| c±¯q"f¶ükec'f q"uqnq0'Kp<'Nkgt. "S 0'f g'L0'xcp0'Hükec'f q"uqnq0'Xk±quc<'
UDEU0'r 0'3/49. '42320'
"

HGTTGVVK.'C0'T0'O qf gnqu'f g'r ncpvkq'r ctc'c 'tguvcwtc±¯q0'Kp<'I CNXï Q. "C0'R0'O 0¯O GF GKTQU. "C0' E0'f g' U0' *Gf 0+0' Tguvcwtc±¯q'f c'O cvc 'Cvn pvkec'go "ª tgcu'f g'uwc'r tko kvkxc'qeqtt´pekc'pcwtcn0' Eqmo dq<'Go dtcr c'Hqtguvcu. '42240'r 0'57/650'

HKNKRRRG."L0'Cxcnkc±¯q'f c'tgi wtc'f gcn'f g'hqtguvcu'tkdgktkpj cu'eqpukf gtcpf q 'o df gnci go '' o cvgo ª vkec. 'guvko cvkxc'f g'gtqu q'r qt '359Eu'g'curgevqu'geqn i kqu0'42280'366h0'F kuugtvc±¯q" *O guvtcf q'go 'EK pekc 'Co dkgpvcn+/'Wpkxgtukf cf g'f g'U q'Rcwnq. 'U q'Rcwnq. '42280'

HQPUGEC." H0' *Eqqtf 0+0' O cpwcn'f g' tguvcwtc±¯q"hqtguvcn<'wo " kpuvtwo gpvq"f g"cr qkq"«" cf gswc±¯q'o dkgpvcn'f g'r qr tkgf cf gu'twtcku'f q'Rct ª 0'Dgm o . 'RC<'VP C. '4235034: ; 'r 0'

HQPUGEC." X0' J 0' E0' Ugng±¯q'f g" kpf kecf qtgu' geqn i kequ' r ctc " cxcnkc±¯q'f g" r ncpqu'f g" tguvcwtc±¯q'f g¯ tgcu'f gi tcf cf cu0'42330: 8'h0'F kuugtvc±¯q'*O guvtcf q'go "F kxgtukf cf g'Dkqn i kec'g" Eqpugtxc±¯q+ó'Wpkxgtukf cf g'Hgf gtcn'f g'U q'Ectnqu. 'Uqtqecdc0'
"
"

HTCP MNKP ." L0' H0⁺ NKP F GP O C[GT ." F 0' D0' Ko r qtvcpeg" qh" o cvtkz" j cdkxcvu" kp" o ckpvckpkpi " dkqmqi kecn'f kxgtukv{0'**RP CU.**"]U0Q .'x0'328.'r 056; /572.'422; 0'

HTGF F K" Q0' U0⁺ EGP VWT KQP ." L0' H0⁺ DGWVNGT ." C0' P 0⁺ CTCVCP K' T0'I 0⁺ NGQP GN ." E0' N0' Eqo r cavc±⁻ q' f q" uqmq" pq" etgueko gpvq" tcf kewnct" g" r tqf wkxkfcf g" f c" ewnvwtc' f q" o krj q0' **Tgxkuvc' Dtcukngktc' f g'Ekpekc'f q'Uqmq .**'Xk±quc .'x0'53.'r 0'849/858 ."42290'

I CP F QNHK" U0⁺ NGKVi Q" HKNJ Q." J 0⁺ DG\ GTTC ."E0' N0' H0' Ngxcpvco gpvq" hqrΓuvkeq" g" ecrª vgr" uweguukqpcn'f cu"gurΒ ekgu'ctdwuvkxq/ctbΒtgcu'f g'wo c'hqtguvg"o gsΒhkkc"ugo kfgeⓘf wc'pq"o wpkeΒr kq'f g' I cwtwrj qu ."UR0'**Tgxkuvc'Dtcukngktc'f g'Dkqmqi kc .**'Uπq'Rcwnq ."x0'77 ."p0 .06 ."r 0'975/989 ."42260'

I GQTG G ."V0'N0'("\ CEM ."U0'Urcvkcn'cpf "vgo r qtcn'eqpukf gtcvkqpu"kp"tguvqtkpi "j cdkvcv'hqt"y knf rkhg0' Tguvqtcvkqp'Geqmqi { '*5+⁺4223 .'r 0'494/49; 0'

I J GTCTF K'F 0'H0'O 0'O qf gnqu'f g'o cvr qr wnc±⁻q0'**O gi cf kxgtukf cf g .**'x0'5 .p0'3 .'r 0'78/85 ."42290'

I KUNGT 0'E0'X0'V0'Guvtwvwtc"g"hvp±⁻q'f cu"o cvcu'ekrkctgu'tgo cpgegpvgu"g"ko r ncpvcf cu'go "Ucpvc' Etw| "f cu"Rcm gktcu ."UR0'Vgug'*D qwvqtcf q'go "Dkqmqi kc'Xgi gvcn+ó'Wpkxgtukf cf g'Guvcf wcn'Rcwnkuvc" õLÀtkq'f g'O gusvkuc'Hkrj qö ."Tkq'Erctq0'4222 ."r 0'389.

I QO GU ."L0'O 0⁺ RGT GKTC ."O 0 I 0⁺ RIŞ A-TQF TK WGU ."H0'E0'O 0⁺ RGT GKTC ."T 0'J 0'A0⁺I QP F KO ." H0'T 0⁺ UKNXC ."G0'O 0'T0'Ar qtvg'f g'ugter kj gkic'g'f g'pwtkgpvgu'go "hcgi o gpvqu"hqtguvcku'f c'O cvc' Cvn±pvkec ."TL0'**Tgxkuvc'Dtcukngktc'f g'EKpekcu'Ci r⁺rkcu .**'4232⁼x0'77 ."pà'5 ."r 05; 5/5; 30"

I TCDQKU ."L0 *et al*0'Tgqrf gpc±⁻ q'ugr cekcn'g'gxqnv±⁻ q'f c'geqpqm c'ci r⁺ rkc'⁢q'ecuq'f cu'Vgttcu'Cnvcu' f c'Vtcpuk±⁻ q'Ci tguvg'O cvc'P qtvg'f g'Rgtpco dweq0'Tgekhg .'3; ; 30*Tgncv»tkq'f g'Rgusvkuc'EP Rs +0'

I TC[."C0P 0⁺'C\ WO C ."F 0'N0'Tgr gcvcdkrkv{'cpf "ko r ngo gpvcvkqp'qh'c'hqtguv'xgi gvcvkqp'kpfkecvqt0' Geqmqi kecn'Kpfkecvqtu ."]U0Q .'x0'7 .'r 0'79/93 ."42270'

J CTF Y KEM ."CTO UVTQP I ."M0'H0⁺'Y TCVVGP ."U0'F 0⁺'RTGUVKF I G ."T0'C0⁺'FⓤECNNCI J CP ." O 0'I gpgvke"eqo r ctkuqp'qh'y j kgtkpi gf 'y ggkxkr'ur gekgu'cpf "r qr wncvkqpu'd{'TCRF /RET0'P GY " \ GCNCP F "RNCP V'RTQVGEVKQP "EQP HGTGP EG ."70"3; ; 9 ."Ecpvgtdwt{ ."P \ 0'**Rtqeggf kpi u0**' Ecpvgtdwt{ .'P \ ⁺Nkpeqrp'Wpkxgtukv{ .'3; ; 90'r 0'549/'5540'

J KEMU ."D0'L0' gv'cr 0'Tgur qpugu"qh"uco qpkfu"vq'j cdkvcv'ej cpi gu0' **Co gtkecp"Hkuj gtkgu"Uqekgv{ "' Ur gekcr'Rwdrkecvkqp .**'x03; .'r 06: 5673: .'3; ; 30'

J QNCP F C ."C0'E0'**Guvtwvwtc'g'f[pⓘkec'f g'dqtf c'pq'eqo r qpgpvg'ctbΒtgq'f g'wo 'htci o gpvq'f g' Hmtguvc" Guvcekqpcn'Ugo kfgeⓘf wcr'go "Rgtpco dweq0' 422: 0' . 9h0' F kuugtvc±⁻ q" *O guvtcf q" go " EKpekcu'Hmtguvcku+ó'Wpkxgtukf cf g'Hgf gtcr'Twtcr'f g'Rgtpco dweq .'Tgekhg0'

KO J QHH ."U0⁺ UKNXC ." C0' R0' f a⁼ VQTO GP A ."E0' C0' **Cr rkec±¿gu'f c ''ewtxc'f g 'tguku´ pekc'pq '' eqpvtqng'f c'⁏ wcrkf cf g'ⓘ⁖kcc'f g'wo 'uqmq'uqd'r cuvci go** 0'Rgus 0'Ci tqr ge0'Dtcu0'Dtcu⁘kc ."X0'57 .'p09 ." ."4222 .'r 036; 5/37220'

KP UVKⓤVWQ" J ˜ TWU0' **Dcug" f g" f cf qu" uqdtg" ur Β ekgu" gzΒ vkecu" kpxcuqtcu" go " KSP /Dtcukr0'** F kur qn¶kgr'go <'j vr ⁙Ik5p0kpuvkvwvj qtwu0qti 0drly y y 1@0'Ceguuq'go <'4'f g| 0'42390'ó'Kpuvkvwvq'J »twu' f g'F gugpxqrkmo gpvq'g'Eqpugtxc±⁻ q'Co dkgpvcr'Vj g'P cwtg'Eqpugtxcpe{0'

LKO GP G\ ."T0'N0±"I QP¥CNXGU." Y 0'I 0±"CTC—ŁO "HKNJ Q. "L0'X0±"CUUKU."T0'N0±"RKTGU."H0'T0± UKNXC."I 0'R0'Etgueko gpvq"f g"r ncpvu"f g"eqdgtwwtc"uqd"f khgtgpvgu"p¶kgku"f g"eqo r cvc±"q"go "wo " Ncvquuqrq"Xgto grj q0'**Tgxkuwc'Dtcukngktc'f g'Gpi gpj ctkc'Ci t¶qnc'g'Co dkgpva**n'Eco r kpc"I tcpf g." x034. "p04."r 03386343."422: 0'

"

MCI G[CO C."R0'[0±"I CP F CTC0'H0'D0'Tgewr gtc±"q "f g"ª tgcu"ekrkctgu0'Kp<"Rqf tki wgu. "T0'T0'("J 0' f g"H0' Ngkv̄q "Hkrj q" *gf u0±"O cvcu"ekrkctgu<"eqpugtxc±"q"g"tgewr gtc±"q0'Ūq "Rcwnq."Gf kxqtc"f c" Wpkxgtukfcf g"f g'Ūq'Rcwnq."HCRGUR."4222."46; /492'r 0'

"

MCI G[CO C."R0'[0±"QNKXGKTC."T0'G0±"O QTCGU."N0'H0'F 0'gv"cn0' *eqqtfu0±0'**Tgucwtc±"q "Geqn»i kec'f g'Geouukwvgo cu'Pcwtckku**0'Dqwecw<"HGRCH."4225."562'r 0'

"

MGO RGT."Y 0'F 0±"EJ GRKN."Y 0'U0'Uk{g"f kuvkdwvkqp"qh"ci i tgi cvgu0'Kp<"DNCEM."E0'C0'gv"cn0'*Gf 0±' O gyj qf u"qh"uqkr"cpcn{uku<"r ctv'KCi tqpqo {."x0'; ."r 06; ; /732. "3; 870"

"

aaaaaa±"TQUGP CW."T0'E0'Ci i tgi cvg "uvcdkrkv{"cpf "uk{g"f kuvkdwvkqp0'Kp<"C0'MNWWG."C0'*Gf 0±' O gyj qf u"qh"uqkr"cpcn{uku<"r ctv'30'40'gf 0'O cdkuqp."Y K'CUC"g"UUC."3; ; 80'r 0'647/6640"

"

MNGKP ."X0'C0±"NKDCTF K"R0'N0'F gpukf cf g"g"f kuvkdwvk̄q"f q"f k—o gttq "f qu"r qtqu"f g"wo "Ncvquuqrq" Xgto grj q."uqd"f khgtgpvgu'ukuvgo cu"f g"wuq"g"o cpgjq0'**Tgxkuwc'Dtcukngktc'f g'Ek̄pekc'f q'Uqnq.**"p0'48." 4224. "r 0': 79/: 890'

"

MTWRGM." T " C0±" HGNUMK"I 0±" Cxcrkc±"q"f c "Eqdgtwwtc "Tkrªtkc"f g "Tkqu"g "Tkcejqu"f c "Dcekc"" J kf tqi tªhkec"f q "Tkq"f cu'Rgf tcu."Tgi k̄q "Egpvtq/Uwn"f q "Guvcf q"f q"Rctanª 0'**Tgxkuwa'Ek̄pkcu'Gzcvcu'** g'Pcwtcku"Xqp0': "p'ª'4. "LwnIF g' "42280'

"

MWTCU\ ."I 0±"TQUQV."P Œ0±"QNKXGKTC."[0O 0O 0±"TQUQV."O 0C0'Ectacewtk{c±"q"f q"gpvqtpq"f c" tgugtxc"hqtguvcn'Go dtcr c0'Grci ktk'f g'Ec±cf qt" *UE+"wucpf q"ko ci go "Kknqpqu0'**Hqtguwc**."x05: . "p06." r 0863/86. ."422: 0'

NCEGTF C." F 0O 0C0±" HK WGKTGF Q." R0U0' Tguvcwtc±"q" f g" o cvcu" ekrkctgu" f q" tkq" O gcrko " pq " o wpke¶kq"f g" Dcttc" f q" Eqtf c/O C<" ugrg±"q" f g" gur²ekgu" g" eqo r ctc±"q" f g" o gvqf qni kcu" f g" tghqtguvco gpvq0'**Cevc'Co a|qpkca.**"O cpcwu."x05; . "p04. "r 04; 7'6524. "422: 0'

NGO MG/F G/ECUVTQ."O 0'N0±"I WGTTC."L0'U0'Cxcrkcecq"f c"eqdgtwwtc"xgi gvcn'õo cta"tkrctkõ"g"c" uwa"kphnẃpekc"uqdtg"c"vgo r gtcwwtc"f cu"ª i wcu"f q"e»ttgi q"Rkr qec"ó"O qttkpjq"ó"I qk̄ u0'I mdcn' Uekgpeg"cpf "Vgej pqnqi {."Tkq"Xgtf g."x05. "p05. "r 0: 6/; 5. '42320'

"

NGRUEJ ."K0'H0'3; "rk+¿gu"f g"r df qrqi kc0'Ūq"Rcwnq<"Qhkekpc"f g'Vgzvqu."678'r 0'42330'

"

NKO C."F 0'C0'U0'**Kphnẃpekc'f c`b cva'ekrkct 'pc'¶ wcnkf cf g'f cª i wa'pa'dceka'f q'Tkdgk̄q'Ncjgaf q''** ó''VQ0'42320'; 5'h0'F kuugtvc±"q0 *O guvtcf q±'go "Tgewtuqu'H ¶ktkqu"g"Ucpgco gpvq+0'Wpkxgtukfcf g" Hgf gtcn'f q'Tkq'I tcpf g'f q'Uwn'Rqtvq'Cngi tg."TU0"

"

NKO C."R0'T0'C0'Tgvgp±"q"f g"ª i wa'f g"ejwxc"r qt"o cva'ekrkct "pa"tgi k̄q"egpvtcn'f q"Guvcf q"f g"Ūq" Rcwnq0'3; ; 0'335"h0'F kuugtvc±"q" *O guvtcf q±'go "Ci tqpqo kc+0'õHcewnf cf g'f g'Ek̄pkcu'Ci tqp¼o kecu." Wpkxgtukfcf g'Guvcf wcn'Rcwnkuva'õLwkq'f g'O guwkxc'Hkrjqõ."Dqwecw."3; ; 0'

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NKO C."Y 0'R0±\ CMKC."O 0'L0'D0'**J kftqnqi kc'f g'b cvas'ekrkctgu0**'Kp<"TQF TK WGU."G0'T0±"NGKVi Q" HKNJ Q. "J 0'H0'*4Å'gf 0±0'O cvcu"ekrkctgu<"eqpugtxc±"q"g"tgewr gtc±"q0'Ūq "Rcwnq<"GF WURI'HCRGUR0'r 0' 55/66042260'

"

NKO C."Y 0'R0±\ CMKC."O 0'L0'D0'J kftqnqi kc'f g'o cvcu'ekrkctgu0'Rktcekecdc<"KRGH."42270'F kur qn¶kgn' go <>j wr <1yy y 0'r gf0±0'O cvcu"ekrkctgu<Iqp¶ kecu."Ceguuq"go <'32'f g'qwwdtq'f g'42340'

"

NQP I EQTG. "V0'Vgttguvkcn'ctyj tqr qfu"cu"kpfkecvqtu"qh"geqmi kecn'tguvqtcvkqp" uweeguu"kp"eqcuvcn' uci g"uetwd"*Ecnkhqtpkc."WUUC0'Tguvqtcvkqp'Geqmi { "33*6+‹"4225."r 05; 9/62; 0'

"

N[TC/LQTI G. "M 0'E0‡'EKQEJ GVK"I 0‡'RKXGNNQ. "X0'T0'Ectpkxqtc"o co o cn"kp"c "htci o gpvgf " npcpf uecr g"kp"pqtyj gcuv'qh"U q'Rcwq'Uvcvg. "Dtc| kn0Dkqf kxgtukv{ 'Eqpugtxcvkqp."]U00."x039.'r 03795/37: 2.'422: 0'
OCEJ CFQ. "T0'G0‡'XGVVQTC\ \ K'E0'C0‡'ZCXKGT."C0'E0'Uko wn±'q"fg"egn³tkqu"cnvgtpcvkqu"fg" wuq"fc"vgttc"go "mo c"o kctqdcekc"wkihk{ cpfq"‹ epkcu"fg"o qfgnci go "g"i gqrtqeguuao gpvq0'Tgxkuvc"Dtcukngktc"f g"Ek³pkca"f q"Uqn."Xk±quc."x0'49."r 0'949/955.'42250'

"

O CEKGN. "Ecki q"Awi wutq"Co qrlm 0'O qfgnk{ c±'q"fc"agtikewnvwtcg"q"r cr gn"fc"i tcpfg"r rqfw±'q"pa" tgqrfgpa±'q"gur eckn'fcu"Vgttcu"Cncu"fc"Vtcpski±'q"Ci gruvg"O cvc"Pqtvg"fg"Rgtpco dwco0'Tgekhg." 3; ; 50'592 h0' Fkuugtvc±'q "*O guvtcfq"go " I gqi ctakc+"/"F gr ctvco gpvq"f g"EKpkca"I gqi³hkcu." Wpkxgtukfcf g"Hgfgtcl'f g"Rgtpco dweq0'

"

O CI PCI Q. "N0'H0'U0'et al0'Qu"rqeguuqu"g"guta i kqu"uweguukqpaku"f c"o cv"cvi±pvka"eqo q" tghgt¨pkka"r cta"c"tguvcwtc±"q"hqtguvcn0' Kp‹"O CTVKP U."U0X0'*Gf +‹"Tguvcwta±'q"geqmi kca"f g" gequkuvgo cu"fgi tcfcf qu."Xk±quc."O I ‹"Gfkvqta"WHX."42340'r 08; /3220'

"

O CPF GVVC. "G0'E0'P 0'Cngtpavkcas"fg"TCF "g"im r qrt¨pkka"f c"avcvilk±'q"go o qnkqtco gpvq"f qu" r qtjgvqu" f g" tghqtguvgo gpvq0' Kp" NM " Dctdqua"]Eqqtf 00' O cnwcl' r cta" tgewr gtc±'q" f g" ªtgcu" f gi tcf cf cu"f q"guvcf q"f g"U q'Rcwq‹"O cvcu'ekkctkes"pq"kpvgtkqr r cwkuvc0'Kputtwwu"f g"Dqv¨pkca."U q' Rcwq04228."r 0'328/33: 0'

"

O CTEJ ï Q. "T0'N0‡'DCNDKP Q. "N0'E0‡'UKNXC. "G0'O 0‡'UCP VQU"JWP KQT. "M0'F 0'I 0‡'ECTQNKP Q" F G"U f ."O 0'C0‡'XKLNGNC. "N0‡'DGECS WGT."T0'S wcrkf ad g'f g'wo 'Ncwqunqqy'Xgem gaj q'rqod'kkugo cu' f g'kpvgi ta±'q'fcxqutarecwª tka'pq'Eqrrcfo0'Rguski ka'Ci qrecwª tia'Dtcukngkta."Dtcur#kkc."x0'64."r 0' : 95/: : 4."42290'

"

O CTEJ KQT K'M0'P 0'E0'Fgpf toqmi ka'f cs'aqi kiur gm o cs‹'Ngi wm kpquus."Ucpta'O catka‹'Gf 0'WHUO ." 3; ; 9."422r 0'

"

O CTEW\ \ Q. "UD0'gv'cn0'Eqo r cta±'q"gpvtg"ª tgcs"go "tguvcwtc±'q"g"ª tgc"f g"tghgt¨pkka"pq"Tkq' I tcpf g"f q"Uwn'Dtcukn0'Tgxkuvc'f txqrg."Xk±quc."x05: ."p08."r 0'83/; 94."42360'

"

O CTKPJ Q/HKNJ Q. "M0‡'I CUVCN."O 0'N0'O ao ¶gtqu"f as"¶avcu"eikkctgs"f qs"egttcf qs"f q'Dtcukl' Egpvtal0'Kp‹"TQF TK WGU."T0'T0‡'NGKVi QóHKNJ Q. "J 0'H0'*Gf s+0'O cvcs"eikkctgs‹"eqpugtxc±'q"g" tgewr gta±'q0'U q'Rcwq‹'Gfkvqta'Wpkxgtukfcf f g'U q'Rcwq lHar gup ."r 0'42; /444."42220'

O CTVKP U. "U0'X0'Tgewrgtc±'q'f g'o avcs'eikkctgs0'40'gf 0'Xk±quc."O I ‹'Crtgpfa'H¹ekl'Gfkqtc." 42290'x030'477 'r 0'

"

O CTVKP U." U0X0' Tgewrgtc±"q'f g"ª tgcs'f gi tcf cf as‹'c±³gs'go "ª tgas'f g"rtgugtxc±"q" rgto cpgpvg.'xq±qtecs.'clwf gs'tqf qvxk¹tkqs'g'f g'ª kpgta±'q50'gf 0'Xk±quc‹'Crtgpfa'H¹ekl'42350'
"

aaaaaaa0'Tguvcwtc±'q"hqtguval'go "ƒtgas"f g"Rtgugtxc±"q'Rgto apgpv'g"Tgugtxa'Ngi al0'Xk±quc‹' Gfkqtc'ERV.'42320'

"

O CTVKP U. "U0X0‡'MWP \ ."UJ 0'Wug"qh'gxcnwavkqp"cpf"o qpkqrkpi "kpfkecvqtu"kp"c"tkpctkap"hqtgut' tguvqtcvkqp"rqjgev"kp"Xk±quc."uqwyj cavgtp"Dtc|kn0'Kp‹"TQF TKI WGU."T0'T0‡'O CTVKP U. "U0'X0‡'

I CPFQNHK"U0'*gfu+0'**J ki j 'f kxgtuls{ 'hqtguv'tguvqtcvkqp'kp'f gi tcf gf ''ctgcu**0'Pgy "[qtm2'Pqxc."
42290'r 0483/4950'

OGFTK"E0'gv'cn0'Oqrhqcpcvqm ic"f g'»ti¯qu'vgi gvcvkxqu'f g'r npcvu'luxgpku'f g'Cgi kr j klc''ugmqy kcpc''
Ej co 0'*Nco lcgcgcg+'uwbm gvkfcu'cq''cmi cm cm gpvq''f q''uwduvtcvq0'**Cevc''Dqvcplcc''Dtcukkc**."Hgktc''f g'
Ucpvcpc."xqn047'p04."r 0667/676."42330'

OGNNKRC."G0'=**J WPEJ ."**U0'G 0'Kphnwgpegu''qh'tkr ctkcp''nqi i kpi ''cpf ''kp/utgcm ''ptgi e''y qqf ''em gqxcn'
qp"r qqn'j cdkvcv'cpf ''ucm qpkf ''gpukv{ 'cpf ''dkqm cuu≺'co gtc/cpcm{uiu0'**Ecpcf icp'Lqwtpcn'qh'Hqtguv'**
Tgugctej .'x05; .'p09."r 034: 263523."422; 0'

OGNQ."C0'E0'G 0'**Tghnqtguvcm gpvgu''f g'tguvcwtc±̄q''f g''m cvcu'ckkctgu≺'cpª rkug''guvwwvwtcm'g''**
m ² vqf q''f g''m qpkvqtcm gpvq''pq''m ² fkq''Xcmg''f q''Rctcpcr cpgm c''*UR+0'Fkugttc±̄q''*Oguvtcf q'*gm ''
EKpekcu''f c''Gpi gpj ctic''Com dkgpvcn+''Wpkxgtukfcf g''f g'Ūq''Rcwn'.'Ūq''Ectmqu0'4226'c.'r 03630'

OGNQ."G0'**Cu'spu² ekgu''f g''Eqeeqmqbc''R0'Dtqy pg''*Rqm{i qpcegcg+''f c'Cm cz½pkc''dtcukknkc**0'Cevc''
Com cz½qpkec≺'XQN056.'p̀à'6.'4226'dl.'r 0747''ó''7730'

OGV\I GT."L0'R0'Guvtwwwtc''f c'r ckuci go "g''ftci m gpvc±̄q≺'cpª rkug''dkdrkqi rª hkec0'**Cpckku''f c''Cccf gm ia''
Dtcukknkta''f g'EKpekcu**."x093.'r 0667/684."3; ; ; 0'

OGV\I GT."L0'R0'Tgncvkqpuj kr u''dgwy ggp''nctf uctc g''utwewwtg''cpf ''ttgg''ur ecigu''f kxgtuks{ 'kp''utqr kectn'
hqtguu''qh''uqwj /gcuv''Dtcz km0'**Ncpf uctc g''cpf ''Wtdcp'Rncppkpi** .'x059.'p03.'r 04; /57.'3; ; 90'

OKNNGT."UO0='Y CTFTQR ."DJ 0'Cf crvkpi ''y j g''hqtkuvic''swcntk{ ''cuuguum gpv''kpf gz''vq''kpf kecvg''
cpyj tqr qi gpke''f kuwwdcpeg''kp''egpvrcn'Rgppu{ m cpic''y gtncpf u0'Geqm i kcm''Kpf kecvqtu."]UO0_."x08."p04."
r 0535ó548."42280'

OKTCPFC."L0'T0'=''CXGNNCT."N0'O 0'Ukwgm cu''ci tuñqrcu'uwwgpt³ xgku''g''dkqf kxgtuifcf g''hcwp¶uvkec≺'q''
ecuq''f c'ecpa''qri ¯pkca''gm ''m cpgjq''ci tqgeqm i keq0'**KP VGTHCEGJ U**."x05.'p04."r 03/35."422: 0'

OKVEJ GNN."I 0'Rtqdrgm u''cpf ''hwpf cm gpvaml'qh''uwuvckpcdrg''f gxgmqr m gpv''kpf kecvqtu0'Kp≺''UKEJ G."T0'
gv'cn0̄''pf kegu'xgtuwu''kpf kecvqt'qtgu≺'r rgeki{,gu''eqpegkwwciu''pa'f kuewuū q''f c''uuwtgptcdkklf cf g''f g'r ¶ugu0'
Com dkpvg'̄g''Uqekgf cf g.'Ecm p kpcu'x07'p04."r 0359/36: 8'un/f gm 0'42270'

O´ PKEQ." CŒE0' **Vtcpufgt´ pekc''f g''dcpcqu''f g''ugm gpvgu''uwrgrlhekclu''com q''guvcv² i ia''f g'**
gprksw gek gm gpvq''f g''wo c''hqtguvc''gm ''r tqeguuq''f g''tguvcwtc±̄q0'42340'396''r 0' Fkuugtvc±̄q'
*Oguvtcf q''gm '' EKpekcu'' Hqtguvcku+''/ '' Gueqrc'' Uwr gtkqt'' f g'' Ci tkewmwtc''õNwk¿ '' f g'' Swgktq¿ ö.''
Wpkxgtukfcf g''f g'Ūq'Rcwl.''Rktcekecdc0'

O QTCGU."NJFO 0̄''ECO RGNNQ."GJHE0̄''HTCPEQ."C0C0'tguvcwtc±̄q''hqtguvcm'f q''dkci p»usiq''f g'
f gi tcf a±̄q''cq''uuq''f g'kpf kectf qtgu''geqm kecu'r ctc''q''m qpkqtcm gpvq''f cu'c±̄guu0'Qgeqm ia''Cwutcrku."
Tiq''f g'Lcpgktq.''x086.'p04."r 0359/673."42320'

O WNNGT/F QO DQKU."F 0̄''GNNGO DGTI .''J 0'**Cim u''cpf ''m gyj qf u''qh''xgi gvcvkqp''geqmqi {** 0'Pgy "
[qtm2'Lqj p''Y kng{ '(''Uqpu.''3; 960'

PCKO CPP.''T0'L0̄''F GEJ CO RU."J 0̄''O EENCKP 0'O 0'G0̄''Tkr ctkc≺''geqmqi {.''eqpugtxcvkqp."cpf ''
m cpai gm gpv'qh'uttgcm ukf g''com m wpkvkgu0'**Gngxkgt ''Cecf gm ie'Rtguu**."Ucp'Fkgi q."x045."p04."r 0436/
467."42270'

PCXGU."T0R0'**Guvtwwutc'f q'eqo rqpgpvg'ctd»tgq'g'f'c'tgi gpgtc±¯q'f g'^ᵃtgcu'go 'rtqeguuq'f g''tguvcutc±¯q'eqo ''f kgtgpvgu'lf cf gu.''eqo rctf cu'c''eqqukuvgo c''f g''tghgt´pekc0'42350'322h0'
Fkuqgtvc±¯q ''(O guvtcf o go '' Tgewtuqu'' Hqtguvcku+''/ ''Gueqnc'' Uwrgtkqt '' f g'' Ci tkewnwtc'' õNwk| ''f g'' Swgktq| ö.''Wpkxgtukf cf g''f g''U¯q''Rcwq.''Rktcekecdc0'

PGVQ."G0'D¯DCTTGVQ."N0'R0'**Cpᵃ rlugu's w¶ kecu'g'dkqs w¶ kecs'go 'rncpvcu**.'Tgekhg<'WHTRG."Gfkqtc''Wpkxgtukᵃ tkc'f c''WHTRG.'42330'483r 0'

PKO O Q.'L0'T0¯RGTMRP U.''M0'U0'Ci i tgi cvg''uvcdknkv{''cpf ''uk| g'f kuvtkdwwkqp0'Kp<'FCPG.''L0J 0¯VQRR.'' I 0'E0'Gf 0'0'O gvj qf u''hf 'uqkn'cpcn{uku<''rctv'6.''Rj {ukecn'o gvj qf u0'O cf kuqp.''Y K<''Uqkn'Uekgpeg'Uqekgv{''qh'Co gtkec.'r 0'539/54: .'42240'

PWPGU.''H0'R0¯=''RRP VQ.''O 0'V0'E0'Fgeqo rquk±¯q'f q''hqnj gf q''go ''tghqtguvcm gpvq''ekrkct''pc''dcekc''jkftqi rᵃ hkec'f q''tkq''U¯q''Htcpekueq.''O kpcu''I gtcku0'**Tgxkuvc''Egtpg**.'Ncxtcu.''x0'3: .'p0'5.'r 0'645/653.''42340'

QCF GU.''L0'O 0''Uqkn''qti cpke'o cwgt ''cpf ''uvtwewwtcn'uvcdknkv{<'o gej cpkuo u''cpf '' ko r nkecvkqpu''hqt''o cpci go gpv0'Rncpv'cpf ''Uqkn'x0'98.'r 0'53; /559.''3; : 60'

QNKXGKTC''HKNJ Q.''C0V0''(''TCVVGT.''L0C03; ; 70'C''uvwf {'qh'vj g'hqtig kp'qh'Egpvtcl'Dtcukncp''hqtguv'd{''vj g'cpcn{uku'qh'rncpv'urgekgu'f kuvtkdwwkqpu'r cuvgtpu0'**Gf kpdwti j 'Lqwpcl'qh'Dqvcp{ '**74<363/3; 60'

QNKXGKTC.''G0'D0'V²cplecu'f g'tgewr gtc±¯q'f g'^ᵃtgcu'ekrkctgu'go ''vkdw²tkqu'f q''tkq''ewcpi k'| qpc''f c'' o cvc''nqtvg'f g'Rgtpco dweq0'42360'; 3h0'Vgug''*F qwvqtcf q''go ''Gpi gpj ctkc''Hqtguvcn''ó''Wpkxgtukf cf g'' Hgf gtcl'f g'Twtcl'f g'Rgtpco dweq.'Rgtpco dweq0'

QNKXGKTC.''G0'D0**''Hnqt¶uvkec'g'guvtwwutc'fkvquuqeknqi kec'f g'b cwc'ekrkct ''pc'Dcekc'f q'Tkq'I qkcpc''**ó'RG0'42280'; : h0'F kuugtvc±¯q'*O guvtcf q''go ''Ekᶜ pekcu''Hqtguvcku+''ó''Wpkxgtukf cf g''Hgf gtcl'Twtcl'f g'' Rgtpco dweq.'Tgekhg0'

RCI CP Q.''USP 0¯F WTK CP.''I 0'**Cur gevqu'f c''ekqnci go ''f g'þwtkgpvgu'go 'b cvcu'ekrkctgu'f q'Qgsvg''f q'Guvcf q'f g'U¯q'Rcwq.''Dtcukn0'Kp<'TQF TK WGU.''T0T0¯NGKVi Q''HKNJ Q.''J 0H0'*Gf u0'0'O cvcu''ekrkctgu<'eqpugtxc±¯q'g'tgewr gtc±¯q0'U¯q'Rcwq<'GF WURIHCRGUR.'42220'r 0'32; /3450'

RCNO GT.''O 0'C0¯CO DTQUG.''T0'H0'Rqhh'P L'3; ; 90'Geqnqi kecl'vj gqt{''cpf ''eqo o wpkv{''tguvqtcvkqp'' geqnqi {0'Tguvqtcvkqp'Geqnqi {''7*6+<4; ; 3/5220'

RCTCJ [DC.''T0' f c''D0'X¯ ''UKNXC.''H0'D0' T0¯ ''SAN VQU.''L0'E0'R0' f g¯ 'UKNXC.''C0'D0' f c¯ 'ECXCNECPVK'C0'E¯'UKNXC.''H0'D0'D'f g¯'DWTIQU.''P¯'QNKXGKTC.''PGVQ.''O 0'D0'f g¯'UQW\ C''PGVQ.''P 0'E0'f g¯'CTC—LQ''HKNJ Q.''L0'E0'f g¯'NQRGU.''Q0'H0¯'NW\ .''N0'T0'S 0'R0'f c¯'NGKVG.''C0'R0¯'UQW\ C.''N0'I 0'O 0'E0¯'UKNXC.''E0'R0'f c¯'XCTGLi Q''UKNXC.''O 0'C0'(''DCTTQU.''C0'J 0'E0'**\ qpgco gpvq'Ci tqgeqn»i keq'f q'Guvcf q'f g'Rgtpco dweq0**'Tgekhg<'Go dtcr c''Uqnqu''ó''Wpkf cf g''f g'' Gzgewᶜ q.''Rguswkuc''g'F gugpxqrxko gpvq0'Ugetgvctkc''f g''Rtqf wᶜ q''Twtcl''g''Tghqto c''Ci tᵃ tkc''f q'' Guvcf q''f g'Rgtpco dweq.'42230'EF/TQQO 0'*Go dtcr c''Uqnqu0'F qewo gpvqu.'57+0'

RGTGKTC.''KO 0'gv'cl0'Vtgg''ur gekgu''qeewttkpi ''qp'ctr ctkcp''urr g''cpf ''eqttgncvkqpu'y kj ''uqkn'xctkcdngu'' kp'vj g'wr r gt''I tcpf g''Tkxgt.''O kpcu''I gtcku.''Dtc| kn0'**Ekᶜ pekc''Twtcl''**Ucpvc''O ctkc.''x064.''p034.''r 043; 4/ 43; : .'42340'

RGTPCO DWEQ0'**Rtqi tco c''f g''Cr qkq''cq''F gugpxqrxko gpvq''Uwuvgpvᵃ xgn'f c'\ qpc''f c''O cvc''f g''Rgtpco dweq''***RTQO CVC+0' Tghqtguvco gpvq'' Dcttci go '' Uktklk0' Ngxcpvco gpvq'' Vqrqi tᵃ hkeq0'Xkᶜ pekc.''RG.''ci quvq'42290'*Tgncᵃ vtkq'V²cpleq+0'

"

RGTPCO DWEQ0' Ugetgvctkc"f g"Tgewtuqu"J ¶f tkequ"*UTJ +Eqpuwnqtkc"V² epkc"Nvf c"*EQVGE+0' **O crc'f g'Tgeqpj geko gpvq'f g'Uqmu'f c'Dcekc'J kf tqi ª hkec'f c'Dcttci go** 0'Tgekhg.'4223'd0'*GKC"/" Guwwf q'f g'Ko rcevq'Co dkgpvcn'f c'Dcttci go "f q'Uktkkki+0'

"

RII PCVCTQ"PGVVQ."KO'V0±''KCVQ."G±'I QGF GTV.Y 0'L0'Cvtkdwqu"hƒukequ"g"sw│o kequ"f g"wo " rcvquuqrq"Xgto grj q/co ctgrq"uqd"rcuti gpu"eqo "f khgtgpvgu"j kuv»tkequ"f g"wuq0'**Tgxkuvc'Dtcukrgktc'f g"" EKpekc'f q'Uqrq.**'Xk±quc.'x05'.'r 03663/366: .'422; 0'

"

RIPJ Q."C0'R0'gv'cn0'Oqfgrci go "f c'tgvgp±¯q'f g'j etdekfcu'go "| qpcu'tkrªtkcu0'Tgxkuvc'Dtcukrgktc'f g' Gpi gpj ctkc'Ci t¶qrc'g'Co dkgpvcn'Eco r kpc.'I tcpf g.'x'032.'p06.'r 0: ; 8/; 24.'42280'

"

RIP VQ."U0'K0'E0±''O CTVKP U."U0'X0±''DCTTQU."P0'H0±''F KCU."J 0'E0'V0'**Elenci go 'f g'pwtkgpvgu'go ''** f qiu'vtgej qs'f g'Hqrgruv'Gucekqpcn'f qelf wcrk'pc'tgruerva'hqtguvcrl'O cvc'f q'Rctc¶rq'go 'Xk±quc.''** **O I** .'Dtcukn0'ƒ txqtg'422; .'pà'55.'r 0'875/8850'

"

RQI I KCP KI'Hƒ''UVCRG."L0'N0±''I QP¥CNXGU."L0'N0'O 0'Kpfkecf qtgu'f g''uuvgpvcdktkf cf gu''f cu'' r rcpvc±¿gu'hqtguvcku0'Kp<''Y QTMUJ QR''QDTG''O QP KVQTCO GP VQ''CO DKGP VCN'GO "ƒ TGCU'' HNQTGUVCKU.''40''3; ; : .'Rktcekecdc<''RGF '3; ; : .'r 055/660'

"

RTQO CVC'' /'' Rtqi tcoc ' f g'' Crqkq'' cq'' Fugepxqrximgpvq'' Uuuvgp³vgrl' f c'' \ qpc 'f c'' O cvc ' f g'' Rgtpco dweq0'**Rtqjgvq'f g'Tgxkvcrk| c± ¯ q'f c'O cvc'Efkct 'f c'Dcekc'f g'Eqpvtkbwk¯ q'f c'Dcttci go "" Uktkkk**078'r 042290' "

"

T "Fgxgrqr o gpv'Eqtg 'Vgco "*422; +0'T<'C"rcpi wci g'cpf "gpxktqpo gpv'hqt"uvcvkuvkecn'eqo r wvkpi 0'T " Hqwpf cvkqp'hqt"Uvcvkuvkecn'Eqo r wvkpi .'Xkgppc.'Cwuvtkc0'KUDP "5/; 22273/29/2.''''WTN'j wr <lly y y 0T/ r tqlgev0qti 0'

"

TGKEJ GTV.'L0'O 0±''TGKP GTV.'F 0'L0±''DTCKF C.'L0'H0'Swrkf cf g'f qu'uqrqu'g"uuvgpvcdktkf cf g"f g' uktuvo cu'ci t¶qrcu0'EKpekc'('Co dkgpvg.'x049.'4225.'r 052/6: 0'

"

TGKU.'' C0±''DGEJ CTC.''HE0±''GURP F F QNC.''O M'D0''f g.''XIGKTC.''P 0'M±''UQW\ C.''N0'N0''f g0' Tguvcwtc±¯q.''f g'ªtgcu'f gi tcf cf cu<''c 'pwergc±¯q'eo q "dcug"r ctc"kpetgo gpvct'qu"r tqeguuqu' uweguukqpcku0'**Pcvwt|c'g'Eqpugtxc±¯q**03*3+<'4225.'r 04: /580'

"

TGIP GTV.''F 0'L0'('' TGKEJ GTV.''L0'O 0'Eqnwpc'f g'ctgkc'r ctc'o gf kt''c 'tgvgp±¯q'f g'ªi wc'pq'uqrq<' r tqv»vkr qu'g'vguvg0'EKpekc'Twtcn'Ucpvc'O ctkc.'x058.'p08.'4228.'r 03; 53/3; 570'

"

TJ QCF GU.''E0'E0±''GEMGTV.''I 0'G±''EQNGO CP .''F 0'E0'Ghhgev'qh'r cuwtg'vtggu'qp'uqkl'pktqi gp'cpf " qti cpke"o cwgt<'ko r rkecvkqpu"hqt"r tqr kecl'o qpvcpg"hqtguv'tguvqtcvkqp0'Tguvqtcvkqp "Geqrqi {'8*5+<' 3; ; : .'r 0484/4920'

"

TKEJ CTF UQP 0'L0'U0±''P CKO CP "T0'L0±''DKUUQP "R0'C0'J qy "f kf "hkzgf /y kf yj "dwhhgtu"dgeqo e" uvcpf ctf "r tcevkeg"hqt"r tqvgevkpi "htguj y cvgtu'cpf "vj gkt"tkr ctkcp"ctgcu'htqo "hqtguv'j ctxguv'r tcevkeguA' **Htguj y cvgt 'Uekgpeg**.'x053.'p03.'r 0454645: .'42340'

"

TK WGKTC."F 0'O 0'I ±''P GVQ."G0'O 0'O qpkvqtco gpvq<'uo c"r tqr quvc"kpvgi tcf c"r ctc"cvcrk± ¯ q"f q' uweguu" go " r tqlgvqu'f g"tguvcwtc±¯ q"geqn›i kec"go "ª tgcu'hqtguvcku"dtcukrgktcu0'**Tgxkuvc"eclkkww.'**' Ucnxcf qt.'p03.'r 0956: : .'42350'

"

TK
 WGKTC." F0O0
0±" OCTKCP
Q/PGVQ." G0' Oqpkxqtcm gpvq<" wo c" rtqrquvc" kpvgitcfc" rctc" cxcnkc±
q"fq"uweguuq"go "rtqlg

    0O gm.." Ucnxcfqt.." p03.."r0956: :."42350'
"

TQEJ C.."gv"cn0'**Hmt¶mkec"g"Hkxquuqekqmgi kc"f c" cvc"f qu"c±uf gu"f q"rtcvc"f q"O gmq..'tgusgtxc"geqm>gi kec"f g"f qku"kto ¯q0' Rgekfg."ó"RG0"KX."Lqtpcfc"fg"Gpuk pq"Rgusqukuc"g"Gzvgpu¯q.."Tgekfg<"WHTRG."42260'
"

TQFFGP." O0±" TQFTK WGU." H0' J 0' I 0±" DGUVGNO G[GT." U0' Ocpmd " ywqh" *Ej r{uqe{qp" dtcej {wtwu<"Kmki er"3: 37+0'Kp<"UKNNGTQ/\ WDKTK'E0±"J QHHOCPN." O 0±"O CEFQPCNF.."F0 Y 0' *Gf 0±"Ecpkfu<"hqzgu.."y qmgu.." lcemcm" cpf " fqi u0' Uvcwu'Uwtxg{"cpf "Eqpugtxcvkqp" Ccvkqp" Rmcp0' Eco dtkf g<"KWEN." 42260'r 048/530'
"

TQFTK WGU'T0' T0±"NMO C.."T0'C0'Hf±"I CPF QNHK'U0±"PCXG'C0'I 0'**Dkqm kecn'Eqpugtxcvkqp00'Qp" vj g"tguvqtcvkqp"qh"j ki j "fkxgtuky" hqtguvu<"52 {gctu" qh"gzr gtkgpeg"kp" vj g" Dtc| kmkcp" Cvmpvke" Hqtguv0' Xqr0'364."r 03464 "ó"3475."422; 0'

TQFTK WGU." G0'T0±" EWNNGP " LT0' N0±"DGNVTCO G.'V0'R0±"O QUECI NKCVQ.'C0'X0±"UKNXC." K0'E0'Cxcnkc±
q"geqp¼o kec"f e"ukuvgo cu"ci roqtguvcku"ko r mcpvcf qu"r ctc"tgewr gtc±
q"f g"tgugtxc"rgi cn'pq"r qpvcn'f q "Rctcpcr cpgm c0'U q"Rcwmq0'**Tgxkuvc"f txqtg." Xk±quc."O I ."x0'53."p0'7."r 0'; 63/; 6: ."42297'

TQFTK WGU." T0' T0±'I CPF QNHK' U0' Eqpegkqu." vgfd´pekcu"g"c±gu" rctc" c" tgewr gtc±
q"f g"hmtguvcu"ekmkctgu0' Kp<"TQFTK WGU." G0'T0±'NGKVi Q" HKNJ Q.."J 0' H0' *4Å'gf 0±' O cvcu"ekmkctgs<"eqpugtxc±
q"g"tgewr gtc±
q0'U q"Rcwmq<'GF WUR0'HCRGUR0'r 0'457/469'42260'
"

TQFTK WGU." T0' T0±'I CPF QNHK' U0±" PCXG." C0'I 0±" CVVCP CUK0." E0' O 0' Cvkxkf cf gu" f g" cf gs wc±
q"co dkgpvcn'g'tguvcwtc±
q" hqtguvcm'f q"NGTHIGUCNS IWUR0'Rgusukc"Hmtguvcn'Dtcukmgkrc" 77<"4229.."r 09/430'
"

TQFTK WGU." T0'T ±'NMO C.."T0'C0'H±"I CPF QNHK'U±"PCXG.."C0'I 0'Qp"vj e"tguvqtcvkqp"qh'j ki j "fkxgtukv{ "hqtguvu<52 {gctu"qh"gzr gtkgpeg"kp"vj g"Dtc| kmkcp"Cvmpvke"Hqtguv00'Dkqmqi kecn'Eqpugtxcvkqp"
364*8+."422; 'r 03464/34730'
"

TQFTK WGU." T0'T0'gv"cr0'*Eqqtf0±"/"RCEVQ"RGNC"TGUVCWTC¥ ï Q"FC"O CVC"CVNŽP VKEC0'**Rtqvqeqmq'f g'm qpkxqtcm gpvq'r ctc"r tqi tcm cs'g'r tqlgvqu'f g'tguvcwtc±
q'hmtguvcn0'U q"Rcwq.." UR<'Rcevq'Rgmc'Tguvcwtc±
q'f e"O cvc"Cvmpvke.."42350'x0'40'
"

TQFTK WGU." T0'T0' gv" cr0' **Cvkxkf cf gu" f g" cf gs wc±
q" g" tguvcwtc±
q" hmtguvcr' f q" NGTHIGUCNS IWUR0'Rgusukc"Hmtguvcm'Dtcukmgktc.."Eqo dq.."p0'77.."r 09/3.."42297'

TQFTK WGU." T0'T0'gv"cn0'Cvkxkf cf gu"f g"cf gs wc±
q"g"tguvcwtc±
q'hmtguvcm'f q"NGTHIGUCNS IWUR0'
**Rgusukc 'Hmtguvcm'Dt cukmgkt c.."Eqo dq.."p0'77."r 09/3.."42297'

TQFTK WGU." T0'T 00'Wo c"f kuewuu¯q"pqo gpenwucn'fcu"hqto c±gu"ekmkctgu0'Kp<'T0'T0'TQFTK WGU"
("J 0'HO'NGKVi Q'HKNJ Q0'O cvcu'ekmkctgs<'eqpugtxc± g'tgewr gtc± q0'U q"Rcwq.'GF WUR0'r r 0'; 3/
; ; ."42260'

TQFTK WGU." T0'T0±'I CPF QNHK'U0'Eqpegkqu." vgfd´pekcu"g"c±gu"r ctc"tgewr gtc±
q"f g"hmtguvcu"ekmkctgu0'Kp<'TQFTK WGU." T0'T0±'NGKVi Q"HKNJ Q.."J 0'f g"H0'*Gf 0±'O cvcu'ekmkctgs<'eqpugtxc±
q"g"tgewr gtc±
q0'U q"Rcwq<'GF WUR."42260'ecr 03703."r 057/4690'
"

TWKĮ /LCGP ." O Œ0̲̈" CKFG." O 0' Tguvqtcvkqp" Uweeguu‹" J qy " ku" kv'' dgkpi " m gcuwtgf A" **Tguwqtcvkqp" Geqmi {** ."Vweuqp."x035.'p05.'r 078; /7990'42270'
"

UCGI "/" Ukuvgo c" f g" cn² rkugu" guvcv¶ mkecu" g" i gn² vkecu0' **O cpwcrl' q ' wuw³ rkq.** "xgtu̅q "9030' Xk±que." Wpkvgtukfcf g "Hgf gtcrl' f g "Xk±que." 3; ; 9. "372'r 0'
"

UCNVQP ."L0'E0̲̈" O IGNP KE\ WM."L0̲̈"DC[GT. "E0̲̈"DQGP K"O 0̲̈"EQP EGȒ̄ ï Q." R0'E0̲̈"HCDT̀EKQ." E0'C0̲̈" O CEGF Q." O 0'E0'O 0̲̈"DTQEJ ."F 0'N0'Ci tgi c±̄ q" g" guvcbkrkf cf g" f g" ci tgi cf qu" f q" uqnq" g" m ukuvgm cu"ci tqr gew² tkqu" g" m 'O cvq." I tquuq' f q" Uwr0'**Tgxkvuc' Dt cukngkt c' f g' EK pekc' f q' Uqnq.** "Xk±que." x0' 54. "p03. "r 033/43. "422: 0'
"

UCP VøCP P C. "E0' U0̲̈" VTGU. "F 0' T0̲̈" TGRU." C0' Tguvwtuc±̄ q" geqn›i kec‹" ukuvgm cu" f g" pwengc±̄ q0' Ugetgvctkc'f q'O gkq'Cm dkgpvg."Ū q'Rcwnq0'4233. '85'r 0'
"

UCP VQU. "A0' N0' U0̲̈" RGTGKTC." G0' E0' I 0̲̈" ECXCNECP VK." N0' J 0' C0' Htci m gnvc±̄ q" hqtguvcrl' f geqttgpvg'f q'wuq'f q'uqnq"g'f q'r toeguuq'f g'gi tcf c±̄ q'cm dkgpvcrl'pq'm wpke¶ rkq'f g'Lwqs wgktq "*CN+0' Ecm kpj qu'f g'I gqi tchkc0'Wdgtn̲ pf kc0'x0; . 'p047. 'r 0337'6'342. '422: 0'
"

UCP VQU. 'F 0U0̲̈"URCRQXGM. 'I 0'Tgvgn̲̈ q'f g'ugf km gpvqu'gm qvkf qu'f g'³ rgc'f g'nɛxqwtc'r gnc"m cvc" ekrkct."gm 'I qkcwdc"*I Q+0'**Tgxkvuc' Dt cukngkt c' f g' EK pekc' f q' Uqnq.** 'x057. 'p07. 'r 03: 33/3: 3: . '42330'

UCP VQU. 'I 0'O 0'O 0̲̈"ETW\ ."L0'F 0̲̈"O CTS WGU."Q0'O 0̲̈"I QDDK"P 0'F kxgtukf cf g' f g' xgur cu"ugekcku" *J { m gnqr vgtc‹ 'Xgur kf cg+'gm "ª rgcu'f g"Egttcf q'pc"Dcj kc0'**Pgqvt qr kecrl'Gnvqm qmqi {** ."x05: . "p05." r 0539/5420'422; 0'

UCP VQU." L0'E0'D0' f qu0' **Ectcevgtk{ c±̄ q' f g" Pgquuqquu" Tgi qrĺ kecu' f c ' Tgi Ȓ q ' Ugm kª tkf c ' f q" Guvcf q'f g'Rgrtpcm dwcq**0'42330'373r 0'F kuugtvc±̄ q'*O guvtcf q'gm "Ci tqpqm ic"ó"Eĺ pekc'f q'Uqnq+' Wpkxgtukf cf g'Hgf gtcrl'Twtcrl'f g'Rgrtpcm dwcq0'F gr ctvcm gpvq'f g'Ci tqpqm ic0'Tgekhg. '42330'
"

SCP VQU'HKNJ Q." O 0' gv' crl0' J cdkcv' r cvej "cpf " m cvtkz gfhgevu" qp" um cn'm cm m crl'r gtukuvgpeg"kp" Cm c| qpkcp'hqtguv'htci m gpvu0'**Dkqf kxgtukv{ 'Eqpugt xcvkqp.**]U0̲̈_.'x043.'r 03349/3369. '42340'
"

UECTIQV."G0E0̲̈"TGU."C0'Tks wg| c" g" guvtwwvwtc"hqt¶ rkvkec'f g"eqttgf qtgu"ekrkctgu"gm "tgi gpgtc±̄ q" pcvwtcrl'pq'r ncpcno'pqtvg"ecvctkpgpug. "uwrl'f q"Dtcukr0'**Rgtur gevkxc.** "Hqtkrcp» rqrku."x056. "p0347. "r 075/ 87. '42320'
"

UEJ KQXQ. "L0'C0̲̈"RGTGKTC. "O 0'I 0̲̈"O KTCP F C. "N0'R0'O 0̲̈"F KSU'P GVQ. "C0'J 0("HQP VCP C. "C0' **Ectcevgtk{ c±̄ q'g'encuukhecc±̄ q'f g'uqnqu' f gugpxqrxkf qu'f c'tgnkvqu' f c'fqtm c±̄ q'Cs wkf cwcpc/ O UUT0'Dtcu'Ekĺ 'Uqnq.** 'Xk±que. 'x0560'r 0: : 3'/': : ; . '42320'
"

UEJ WO CEJ GT." O 0' X0̲̈" DTWP ." G0' L0̲̈" TQF TKI WGU." N0' O 0̲̈" UCP VQU." G0' X0' Tgvqtpq" f g" pwtkgpvgu"xkc'f gr qukɛ± q'f g"ugtcr kj gktc"gm "wm "r qxqcm gpvq'f g"ce² ekc/pgi tc"*Cececkc'm gctpukk'F g" Y knf 0̲̈"pq'Guvcf 'f q'Tkq'I tcpf g'f q'Uwn0'f txqtg. '4225. 'x049. 'r 09; 3/9; : 0'
"

UGO NKVUEJ ."T0'F 0' gv' crl0' Ghhgevu' qh" vko dgt" j ctxguv" qp" cm pj kdkcp" r qr wncvkqpu‹ wpf gtuvcpf kpi " m gej cpkum u'htqm 'hqtguv'gzr gtkm gpvu0'**Dkq'Uekgpeg.** 'x07; . 'p0; . 'r 0: 756: 84. '422; 0'

UGT "*Uqekgv{ 'hqt "Geqmi kecrl'Tguvqtcvkqp0'Kpvgtpcvkqpcrl'Uekgpeg'cpf "Rqnke{ 'Y qtmkpi "I tqwr +0'42260' Vj g" UGT " kpvgtpcvkqpcrl' r tim gt" qp" geqmi kecrl' tguvqtcvkqp0' Uqekgv{ 'hqt" Geqmi kecrl' Tguvqtcvkqp" Kpvgtpcvkqpcn "Vweuqp0'
"

UKNXC "L—P KQT." M Œ0 "HGNHKNK"LO 0 "P QI WGKTC. "R0G0'("TG\ GP FG. "C0K0'3; ; : 0'**Cpª rkug"**
hqt¶ukec'f cu'b cvc'f g'i cngtkc'bq'F kuvtkrq'Hgf gtcn0Kp'Egttcf q<0'M cvu'f g'I cngtkc "*L0H0'Tkdgktq. "
gf 0+0'Go dtcr c/ERCE. "Rmcpcnkpc. 'r 075/; 50'

UKNXC. "O 0'K0'Q0'Cxcrkc± q'geqn»i kec'f g"ª tgcu'ekrkctgu'go 'rtqeguuq'f g'tgtucwtc± q'hqtgucripc "
|qpc'f c'b cvc'pqtvg. 'Rgtpam dweq0'42390; 9h0'F kuugtvc± q'*M guvtcf q"go "Gpi gpj ctkc "Hqtguvcn+'ó"
Wpkxgtukfcf g"Hgf gtcn'f g'Twtcn'f g'Rgtpam dweq. 'Rgtpam dweq0'

UKNXC. "T0M0U0'gv'cn0'Guvtwwtc"g"u¶pftqm gu"f g"f kur gtˉq'f g"gur²ekgu"ctb»tgcu"go "wo "vtgej q"f g"
o cvc "ekrkca. "Ukrkpj c²m ."Rgtpam dweq. "Dtcukn0'**Rgus whuc "Hmqt guvcn'Dt cukrgktc. "**Cqmqo bq. "x054. "p08; . "
r 08/33. '42340'

UKNXC. "N0'U0±'TGKEJ GTV. "L0'M 0 '**T»r kequ'go 'ekˊpekc'f q'uqm q**. 'Xk±quc. "M I 0 'Uqekgfcf g"Dtcukrgktc "
f g'EKˊpekc'f q'Uqm q. "x07. 'r 06; '/'356. '42290'

UKNXC. "T 0'M 0' Cr qtvg"f g" ugtcr krj gktc "g"swcpvkhkec± q"f g" pwtkgpvgu "go "ªtgcu"f g"tgcdkrkca± q. "
O wpke¶rkq "f g" Ugtqª f kec. "TL']o qpqi tchkc_0. 'Ugtqªf kec< Kpuvkvwwq "f g" Hqtguvcu. "Wpkxgtukfcf g "
Hgf gtcn'Twtcn'f g'Tkq 'f g'Lcpgktqˉ422: 0'

UKS WGKTC. "NPR0'O qpkqtcm gpvq"f g"ªtgcu'tgvcwtcfcu'pq'kpvgtkqt'f q'guvcf q'f g"Uˉq"Rcwq. "Dtcukn0'
F kuugtvc± q *M guvtcf q'go "Tgewtuqu'Hqtguvcku+. "Wpkxgtukfcf g"f g"Uˉq"Rcwq. "Rktcekecdc0'4224. "
r 08380'

UKZ. "L0±'DQUUWʓ V. "J 0±'FGI T[\ G. "U0±'FGP GH. "M0'C "j kuvqt{ qh'tgugctej "qp'vj g"rkpm'dgwy ggp"
*o ketq +'ci tgi cvgu. "uqkr'dkqvc. "cpf 'uqkr'qti cpke"m cwgt'f {pam ics0'**Uqkri'Vkm0'Tgu**. "x09; . 'r 09/53. '42260'

UQW\ C. " NR0 0' **C "tgi gpgtc± q' pcwwtcn'eqm q "kpf kecf qr "f g"uwwgpvcbkkf cf g"go "ª tgcu"go "**
rtqeguuq'f g'tgtucwtc± q. '42360'/34: h0'Vgug "*F qwqtcf q"go "Gpi gpj ctkc "Hqtguvcn+'ó"Wpkxgtukfcf g "
Hgf gtcn'f g'Ncxtcu. "Ncxtcu0'

UQW\ C. " O 0' O 0' f g±' NQW\ CF C. " L0± UGTTïQ. " L0' G0± \ CP WP EKQ. " L0' E0' Uqekcn' y cur u'
*J {o gpqr vgtc<'Xgur kf cg+'cu'kpf kecvqtu'qh'eqpugtxcvkqp'f gi tgg'qh'tkr ctkcp'hqtguv'kp'uqwj gcuv'
Dtc| kn0'**Uqekqbkqm qi {**. 'x078. 'p04. 'r 05: 9/5; 80'42320'

UQW\ C. "Y 0'N0'U0'Eqo r qtvam gpvq"hʮkeq'o ge—pkeq'f g'f kqu'uqm qu'ewnkxcf qu'eqo "ecpc-f g/c±Àcct"
go "f khgtgpvgu'ukuvgm au'f g'm cpgjq0'42370'3: 5'h0'Vgug "*F qwqtcf q"go "Ci tqpqm kc+'ó'Wpkxgtukfcf g "
Hgf gtcn'Twtcn'f g'Rgtpam dweq. 'Tgekhg. '42370'

UVGHCP GNNQ. 'F 0'gv'cn0'U¶pftqm g'f g'f kur gtˉq'f g'f kˊur qtqu'cu'gur²ekgs'f g'vtej qu'f g'xgi gvc± q'
ekrkct 'f q'Tkq'f cs'Rcecu. 'S wgtˊpekc. 'M V0'**Ccvc'Co a|qplec**. 'M cnauu. 'x062. 'p03. 'r 0363/372. '42320"

UVGHCP GNNQ. "F 0±'HGTP CP FGU/DWNJ ï Q. "E0±'M CTVKP U. "U0'X0'U¶pftqm g"f g'f kur gtˉq"f g"
ugo gpvgu"go "vr´u'vtej qs'f g'xgi gvc± q'ekrkct "*P cuecpvg. "M gkq"g"Hq| +'cq"m pi q"f q"Tkq"r kpfc¶dc. "
M V0'**Tgxkuvc'f rxqtg**. 'Xk±quc. 'x055. 'p08. 'r 08273/3283. '422; 0'

UVGXGP UQP . "H0'L0'J wo wu"ej go kuvt{<'i gpguku. "eqo r qukvkqp. "tgcevkqpu0'40'gf 0'P gy "[qrkˊLqj p "
Y kng{ "(" "Uqpu. '734'r 0'3; ; 60'

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